THE FACTORS ASSOCIATED WITH LENGTH OF STAY ON ACUTE CARE PSYCHIATRY INPATIENT UNITS IN ST. JOHN'S NEWFOUNDLAND AND LABRADOR

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The Factors Associated with Length of Stay
on Acute Care Psychiatry Inpatient Units
in St. John's, Newfoundland and Labrador

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Abstract

Background: In St. John's, Newfoundland there are three tertiary care institutions that provide acute inpatient psychiatry services. To date, the factors associated with increased length of stay, in these institutions, has not been systematically studied.

Some of the psychiatrists who admit patients to these facilities have speculated that the length of stay and the distribution of the factors associated with length of stay varies across the inpatient psychiatric facilities in the city. The accuracy of their opinions has not been examined previously.

Objectives: Length of stay on acute care hospital units is influenced by many factors such as patient demographics, diagnosis, treatment regime and attitudes of the attending physician. This study has three objectives: 1) to identify the factors associated with length of stay on the acute admission wards in St. John's, Newfoundland, 2) to assess the accuracy of the psychiatrists' opinions that length of stay differs significantly among the three psychiatric institutions in St. John's and 3) to assess the accuracy of the psychiatrist's opinions with respect to the factors that impact on length of stay in St. John's, Newfoundland.

Method: A chart review was conducted to measure length of stay by institution and to determine which factors were associated with length of stay for inpatient psychiatry units in St. John's. The data represents patients discharged from hospital between April and June 1997 inclusive. The patients were above 19 years of age, were discharged from an acute care inpatient unit during the study period, and had no

other admissions during the thirty days prior to the admission or within 30 days of the discharge. Fourteen variables were examined for a potential association with length of stay. Regression analysis was used to identify significant associations between patient, illness and treatment related factors and length of stay.

Data from the chart review was also used to assess the accuracy of the psychiatrists' opinion that length of stay varies significantly among the acute care admissions of the city. The length of stay was calculated for each admission site and then compared for significant differences.

Psychiatrists' perceptions of the factors associated with length of stay were gathered by an opinion questionnaire. The questionnaire was administered to all psychiatrists with admitting privileges for the acute psychiatry inpatient sites in St. John's. Descriptive analysis was used to quantify the psychiatrists' opinions. These opinions were then compared to the results of the chart review for factors associated with length of stay.

Results: Results of the chart review revealed that length of stay did not vary significantly among the three institutions, or between the two types of admission sites. Of the fourteen factors examined for an association with length of stay, patient age, primary diagnosis, presence of a discharge plan, and duration of the discharge plan were significant. The involvement of pastoral care workers in the patient care almost reached the level of significance.

Results of the survey revealed that the majority of psychiatrists were of the opinion that patient age, gender and race had little impact on length of stay. The age

and gender of the treating psychiatrist were also believed to have little impact on length of stay. Level of education, marital status, employment status, income level, and place of residence were believed to have moderate impact on length of stay. The level of patient stress, primary diagnosis, the presence of co-morbid illness, treatment issues, the expertise of the attending psychiatrist and the practice composition of the attending psychiatrist were believed to impact substantially on length of stay. This was not entirely consistent with the results of the chart review.

Discussion: Four of the fourteen variables were significantly associated with length of stay on the inpatient psychiatry units in St. John's, Newfoundland. Several of these findings are consistent with earlier studies. Of the ten remaining factors that were not significantly related to length of stay, seven had been previously studied and shown to be associated with length of stay in other clinical settings. This suggests that the factors associated with length of stay in St. John's, Newfoundland may be unique to that region and that length of stay literature is not universally applicable.

The psychiatrists' perception that lengths of stay varied significantly among sites was inaccurate. As well, the psychiatrists' perceptions of factors that are associated with length of stay were not consistent with the findings of the chart review. This discrepancy between opinion and reality warrants further examination if physicians are to be expected to actively reduce length of stay in the future.

Table of Contents

List of Tables

Chapter 1: Introduction

1.1 Overview

An improved understanding of mental illness and the availability of more effective treatment strategies have resulted in a greater proportion of mentally ill individuals being treated in the community. Since the beginning of de-institutionalization in the 1960's, we have witnessed a reduction of hospital-based resources for inpatient psychiatry, a reduction in the number of acute care psychiatry beds and an increased reliance on outpatient and community based services.

The reduction in hospital beds continues to be a contentious issue even though health care administrators have tried to create community care models to minimize dependency on inpatient services (Caffey, Galbrecht and Klett, 1971). Since there has not been a parallel decline in the number of patients requiring care, reducing bed availability could, potentially limit patient access to inpatient services and subsequently compromise quality of care.

To maintain access to inpatient services, with fewer beds, for just as many patients, length of stay must be reduced. Toward this end, an accurate appraisal of the factors associated with length of stay could prove valuable. An understanding of the impact of specific factors on length of stay might allow clinicians to implement patient management protocols that use resources more efficiently. As well, it could help clinicians to plan patient care more effectively and to better direct families in preparation for discharge of their relatives. Likewise, knowledge of these factors could inform the decision-making processes of hospital administrators when

developing and establishing new inpatient programs, particularly those directed at reducing length of stay.

Length of stay is not likely to be determined by a single factor (Mezzich & Coffman, 1985; Oiesvold, Saarento, Sytema, Christiansen, Gostas, Lonnerberg et al., 1999). Although numerous studies have identified factors that impact on length of stay (Altman, Angle, Brown, & Sletten, 1972; Gordon, Jardiolin & Gordon, 1985; Gruber, 1982), it is questionable whether this literature is applicable and generalizable to present day inpatient settings and, more specifically, to the unique setting in St. John's.

The degree to which measurable variables are correlated with length of stay seems to be a source of intense debate within psychiatry. Advances in technology and psychopharmacology in the last two decades have changed the conventional management of psychiatric disorders. Effective community based services that provide a spectrum of services have been established. A greater proportion of patient care is occurring in ambulatory settings. Thus, it is likely that the profile of the patient admitted to an inpatient psychiatry unit has changed. Furthermore, the diagnostic criteria for many illnesses have been revised, even within the last ten years. This, too, has the potential to have altered the diagnostic case mix of psychiatry inpatient units. This evolution in treatment protocols and diagnostic processes limits the generalizability of the results of previous length of stay studies to present day service delivery models.

Effecting changes in length of stay in a particular city requires an understanding of which factors are relevant for that patient population. (Goodban,

Lieberman, Levine, Astrachan, and Cocilovo (1987) as cited in Dalgalarrondo &

Gattaz, 1992). St. John's, Newfoundland is a unique clinical setting. It has three

acute care inpatient sites that provide tertiary level psychiatric services to a catchment

area of approximately 300,000 people who are homogeneous with respect to

demographics. All three sites are governed by a single administration but each site

has its own psychiatrists, nursing staff and multidisciplinary teams so variability in

practice patterns may exist. Still, there is relatively little turnover in the complement

of psychiatrists and allied healthcare professionals that serve the region and most

have completed their training in and around the local area. As well, past research has

demonstrated that length of stay can vary by geographical region, (Dalgalarrondo &

Gattaz, 1992: English, Sharfstein, Scherl, Astrachan & Musynski (1986) as cited in

Oiesvold, Saarento, Sytema, Chrisiansen, Göstas, Lonnerberg, 1999). Considering all

this, it is not unreasonable to speculate that previous studies examining length of stay

and its determinants may not be applicable to the inpatient units of St. John's. The

first objective of this study was to identify the factors associated with length of stay

for acute inpatient psychiatry units in St. John's, Newfoundland. To do this, a chart

review was used to collect information for several factors that might be associated

with length of stay in St. John's, Newfoundland.

Psychiatrists working with the Health Care Corporation of St. John's, the

administrative body for the region's hospital services, have speculated that length of

stay varies among the three inpatient psychiatry sites. The accuracy of this perception,

however, has not been systematically examined. As such, the second objective of this

study was to determine if the psychiatrists' perceptions of the inter-institutional

variability in length of stay were accurate. To do this, data from the chart review were used to determine length of stay for each of the three institutions providing care.

Physicians are frequently under pressure to minimize length of stay for their patients. If clinicians are to be expected to participate in the active reduction of length of stay, it is necessary that they have an accurate understanding of length of stay and its determinants. The accuracy of physicians' opinions in this regard has not been extensively studied. The third objective of this study was to determine whether or not the psychiatrists' opinions regarding the impact of specific factors on length of stay in St. John's were accurate. To do this, a survey was administered to the admitting psychiatrists and their opinions were compared to the results of the chart review.

1.2 Literature Review

The literature review was conducted by searching MEDLINE from 1966 to date using the following keywords: length of stay, duration of hospitalization, acute inpatient psychiatry admission, readmission rates, and bed utilization. A total of 308 articles were located. Additional publications were identified for review if they were cited by relevant articles identified from the MEDLINE search. Studies that did not examine general acute inpatient psychiatry units were excluded.

Studies pertaining to length of stay have examined the impact of shorter length of stay on patient outcome, the factors associated with an increased length of stay or both. Review of the outcome related literature is useful to establish a rationale for continuing to actively reduce of length of stay. Review of the literature on factors associated with length of stay informs the process of reducing length of stay. In both

cases, an accurate understanding of the complexity of length of stay could have wide ranging implications to the delivery of health care.

Obtaining a clear understanding of the impact of a shortened length of stay and developing an accurate appreciation of the factors associated with length of stay is a challenge. Variability in the definition of length of stay, across studies, makes comparison of results difficult. For example, two studies from the 1970s defined "short stay" admissions as those less than or equal to 90 days and "long stay" admissions as those greater than 90 days (Rosen, Katzoff, Carrillo and Klein, 1976; Mattes, Rosen, Klein and Millan, 1977). Two other studies, from the same decade, assign the cutoff between short and long stay as being 30 days (Glick, Hargreaves, Drues and Showstack, 1976; Herz, Endicott and Gibbon, 1979). Today, in the context of the acute care psychiatry setting, a length of stay approaching 30 days could constitute a long stay. Consequently, factors associated with shorter stays in the 1970s may not be associated with the short stay admission of the 1990s and the applicability of early studies is questionable.

Additionally, variability of sample compositions, the evolution of diagnostic criteria over time, advances in diagnostic procedures and treatment options and differences in health care delivery models throughout the world, limit the ability to compare results and to apply results to current practice settings.

1.2.1 Length of Stay and Outcome

There are patients for whom a longer stay may be necessary to optimize a positive outcome. For other patients, duration of hospitalization may not be as

important to outcome as is the access to a specific in-hospital intervention. There are other patients for whom a longer length of stay can be detrimental and they therefore, should be discharged as quickly as possible (Goffman (1961) as cited in Oiesvold et al., 1999). As such, the impact of length of stay on outcome, either negative or positive, may be dependent on the population and the outcome being considered.

Numerous outcomes related to length of stay have been examined. The summary that follows illustrates that negative patient outcomes are not necessarily associated with shorter lengths of stay and thus justifies future research directed at examining length of stay and its determinants.

Both retrospective and prospective study designs have been used to study patient outcome as a function of length of stay. In the retrospective studies, subjects experiencing a specific outcome were selected and data regarding length of stay were obtained by reviewing the medical records of those patients. Retrospective studies are inexpensive, require less time for completion and often need smaller sample sizes than prospective studies. The reliance on quality of documentation and the issue of dealing with missing data, however, can be problematic. In the prospective studies that examine outcome and length of stay, patients are randomly assigned to a short or long stay protocol. Specific outcomes are subsequently measured at discharge or a specified time thereafter. Using a prospective design has the advantage of measuring outcome after intervention and thus allows for the identification of a causal relationship between independent and dependent variables. Unfortunately, these studies are expensive, require longer time for completion and often necessitate the use

of blinding techniques when measuring the outcome of interest. Additionally, the attrition of subjects is a potential concern.

In 1982, Gruber examined the association between length of stay and relapse/readmission rates by using a retrospective study design. Two hundred and seventy-five patient files were randomly selected from the 500 psychiatric admissions between June 1976 and July 1977. The mean average length of stay was 7.69 days. Gruber demonstrated that 'frequent recidivists' more often had a history of short hospital stays. It is not possible to conclude with any certainty, however, that the shorter length of stay was responsible for the more frequent readmission of the patients since the design was retrospective. Furthermore, since there was little description of the clinical setting, the ability to apply these results to other clinical settings is limited.

The association between duration of hospital treatment and the rate and rapidity of relapse has also been considered (Appleby, Prakash, Luchins, Gibbons & Hedeker, 1993). Fifteen hundred patients with a diagnosis of schizophrenia were randomly selected from ten state hospitals that serve acutely ill patients. The median length of stay (the most appropriate measure of central tendency for length of stay data since it is typically a skewed distribution) was 17 days and 90% of patients were released within 90 days. Data were collected to examine the association between length of stay and the specified outcome variables. Co-variate analysis was used to ensure that observed differences in readmission and rapidity of relapse were not the result of confounding variables. While length of stay was shown to share an inverse linear relationship with readmission rates and rapidity of relapse, the study failed to

control for the effects of co-morbid medical and psychiatric diagnoses. As well, the importance of illness severity in mediating the effect of length of stay on outcome was not considered. This could have been a limitation imposed by the retrospective design however, rather than being an oversight of the authors.

In 1971, Caffey et al. used a prospective study design to evaluate the therapeutic potential of a treatment program for schizophrenic patients that consisted of a brief period of hospitalization (<21days) followed by a systematic regimen of follow-up at home. The sample consisted of 201 schizophrenic men newly admitted to hospital. Patients were excluded from the study if they were admitted for alcohol problems, had medical illnesses which could be expected to delay discharge, were not within reasonable commuting distance from the hospital, had little or no means of social support, and/or were considered to be dangerous to themselves or others. Patients were randomly assigned to one of the three treatment groups: 1) shorter hospitalization period with home care follow-up, 2) shorter hospitalization period without home care follow-up and 3) conventional length of stay with conventional follow-up care. The outcomes measured included the extent of symptoms at three weeks and one year after admission, the patient's level of community adjustment immediately after discharge, the rate of readmission and the rapidity of relapse. At three weeks post-discharge, brief stay patients (<21 days) demonstrated as much sustained improvement as did patients with conventional longer stays (>=21 days) provided they received systematic follow-up after discharge. Follow-up at one year revealed that conventional stay patients were "less symptomatic" but differences between groups for community adjustment, readmission rates and rapidity of relapse

did not exist. Given the exclusion criteria of this study, the effects of co-morbidity could not be considered. Furthermore, those patients excluded (alcoholics, the medically ill, those from far away) may be more representative of the schizophrenics for whom a longer length of stay is more beneficial and thus the detection of a negative association between a shorter length of stay and outcome would have been compromised.

A similar study evaluated the effectiveness of short-term hospitalization for schizophrenic patients by measuring global functioning and utilization of aftercare services (Glick et al., 1976). Patients were randomly assigned to a short-stay protocol (71 subjects) or a long-stay protocol (70 subjects). The average length of stay for the short and long stay group was 21-28 days and 90-120 days respectively. Those admitted to the long stay protocol had better global functioning one year after discharge but this outcome was dependent on the nature of psychotherapy received as an outpatient. These observations are consistent with that of Caffey et al. (1971).

Rosen et al. (1976) examined the effect of short-term hospitalization on affective and cognitive functioning for varied psychiatric diagnoses. The sample consisted of 173 psychiatry patients admitted to one of five open psychiatry units over a period of one year. That the sample was not confined to those with a diagnosis of schizophrenia is a noteworthy difference from the two previous studies. Patients were assigned to a short-term or long-term group in a non-random fashion. The average length of stay for the long stay group was 179.05 days and 85.9 days for the short stay group. This is another noteworthy difference from the two studies reviewed above. At time of discharge, short-term patients exhibited greater improvement in

affective and cognitive functioning (Rosen et al.). The greater improvement in functioning for short stay patients, however, could have been mediated by variation in treatment between groups since the short-term group was medicated more aggressively. The failure to randomly assign patients to short stay and long stay groups further compromised the results.

In 1977, Mattes et al. re-examined the population that Rosen et al. had reported on a year earlier. One hundred and twenty-seven patients of the original sample were included. Patients and families were surveyed on measures related to psychopathology and social adjustment. Forty-four patient questionnaires and fifty-eight family questionnaires were returned. Length of stay was not associated with outcome as long as the nature of follow-up for the two groups was considered (patients in the long stay group received more private therapy and short stay patients received more group therapy). A weakness of this study was the failure to control for the impact of non-responders.

In 1979, two more studies compared the outcomes of short stay versus long stays. Hirsch, Platt, Knights & Weyman (1979) demonstrated that length of stay of 106 patients admitted to general acute care psychiatry units did not correlate with variability in the resource utilization, measures of social outcome or degree of improvement in mental status. Herz et al. (1979) examined the effect of illness on patients' families as a function of length of stay for 175 patients. The impact of the illness on families was not a function of length of stay and was dependent on other non-examined factors (Herz et al.). The power to capture statistically significant

associations was possibly compromised in both of these studies due to small sample size.

More recently, a Canadian group examined the association between reduction in length of stay and readmission rates in Saskatoon, Saskatchewan using a chart review method (Edward-Chandran, Malcolm, & Bowen, 1996). This study took advantage of the fact that in that city, one general hospital had implemented policies to reduce length of stay on acute care units while another general hospital had not. In the end, they concluded that a reduction in length of stay does not necessarily result in an increased re-admission rate.

Jayaram, Tien, Sullivan and Gwon (1996) reported on their experience with the implementation and operation of a short stay inpatient unit. They argued that shorter stays were more economical and perhaps even more profitable but the implications of this style of care delivery needed rigorous evaluation (Jayaram et al, 1996). They examined the suicide rate as an outcome of a short stay treatment unit. Of the 109 patients studied, none committed suicide. Strong linkages between inpatient and emergency services and the commitment to provide prompt clinical follow-up after discharge were postulated as having offset the risk of increasing the suicide rate (Jayaram et al.).

1.2.2 Factors Associated with Length of Stay

Studies examining length of stay and its associated factors span more than three decades. Despite this, there is little consensus regarding the role that many factors play in influencing length of stay. The application of the results of early

studies to current day practice is questionable. For more recent studies, the

comparison of the different studies is difficult because there are differences in study

design, institutional settings and health care delivery systems.

1.2.2.1 The Early Studies

The interest in identifying factors associated with length of stay began as early

as the 1970s. In 1972, Altman et al. examined factors for their ability to predict

length of stay (Altman et al. 1972). The sample of 5743 patients (predominantly male

and predominantly white) was selected from one of five state hospitals in Missouri,

USA, that provided acute inpatient psychiatric care. Patients were categorized as

being "short stay" (less than 90 days) or "long stay" (greater than 90 days) and then

compared with respect to several patient, illness and treatment variables. The patient

related variables that were associated with increased length of stay were being

female, of the 'Negro race', being single or widowed, and having low levels of

education. Illness related variables that were associated with increased length of stay

included abnormalities in mental status/physical exam and having a diagnosis of

Acute or Chronic Brain Syndrome, Mental Deficiency, or Schizophrenia. Altman et

al. also demonstrated that previous admission histories impacted on length of stay. In

particular, the patients who had spent more time in hospital in the past or had a higher

number of previous admissions had longer stays.

Allodi and Cohen (1978) reviewed the case records of 103 patients admitted

to a psychiatry unit in Toronto, Canada, between January and March of 1975. The

median length of stay was 6.63 days. Of the patient related variables examined,

patients who were not living with family and were not married at the time of admission had longer hospital stays. The illness related variables associated with longer ward terms included the degree of physical illness and a diagnosis of functional or organic psychosis. A history of chronic hospitalization was also associated with an increased length of stay.

Gruber (1982) examined the relative effect of several independent variables on length of stay. Two hundred and seventy-five patient files were randomly selected from the 500 admissions to a single psychiatric ward in Dearborn, Michigan, USA, between June 1976 and 1977. The median length of stay was 5 days. The best predictors of length of stay were patient age, severity of psychiatric disorder, and average number of days per previous admission. Although men were observed to have consistently longer ward terms, the relationship between observed length of stay and gender did not reach statistical significance. Social class (as measured by Duncan's Socioeconomic Index), the number of dependents and the number of previous admissions were not significantly related to length of stay.

In 1983, an American group conducted a retrospective computer analysis to examine the factors associated with long and short stays (Boelhouwer & Rosenberg, 1983). The data, collected from 765 patient records, were representative of admissions to a psychiatric service in a medical-surgical hospital in 1976. A summary of results is found in Table 1.

Table 1

Profile of short vs. long stay patients, n=765 (Boelhouwer & Rosenberg, 1983)

Variable		Short stay	Long Stay
Patient Related Variables	Gender	Male	Female
	Age	Younger	Older
	Marital Status	Married/Divorced/Separated	Single/Widowed
	Employment	Employed	Unemployed/Retired
Illness Related Variables	Diagnosis	Neurosis>Psychosis	Psychosis>Neurosis
	Co-morbid Medical Diagnosis	Less likely	More likely
Treatment Related Variables	Medication Used	Less likely	More likely
	Electroconvulsive Therapy	Less likely	More likely
Physician Related Variables	Doctor's length of stay as recorded by the hospital over time	Short	Long

Diagnosis predicted length of stay but other treatment variables had stronger and more direct effects. The use of regression techniques to assign a relative importance of a given factor in the prediction of length of stay is a major strength of this study. Even when all variables were considered, however, only 20% of the variance in length of stay could be explained.

Gordon et al. (1985) considered the relationship between the degree of stressors, functional status and length of stay. The sample consisted of 105 patients admitted to a hospital in Florida, USA, with a variety of psychiatric diagnoses (18 Schizophrenia, 34 Affective disorder, 18 Adjustment disorder and 35 other). Details for other facets of demographic and clinical variables were lacking so a clear

description of the sample cannot be established. Patients were divided into age groups and diagnostically related groups and subsequently compared for DSM III-R (American Psychiatric Association, 1994) Axis IV scores (a measure of the degree of stress experienced by a patient), Axis V scores (representing functional status as judged by the diagnosing clinician) and length of stay. The ratio of Axis IV/Axis V correlated with length of stay regardless of age. Diagnosis on Axis I also predicted length of stay and schizophrenic patients had the longest average length of stay. Gordon et al. also suggested that the ratio of Axis IV /Axis V could be used to identify patients who may need more intensive treatment.

These early studies contribute to our understanding of the relationship between specific factors and length of stay. However, the nature and practice of psychiatry has changed dramatically over the last three decades. New medications, new diagnostic techniques and an increased understanding of the etiology of psychiatric illnesses have modified the way in which we diagnose and treat patients suffering from mental illness. For example, with respect to the work of Altman et al. (1972) and Allodi and Cohen (1978), some of the diagnostic categories they used are now obsolete or have been substantially revised. Therefore, even though the results of these studies are consistent with one another, it is difficult to know, with any certainty, whether or not their findings are applicable to present day practice patterns in psychiatry.

1.2.2.2 More Recent Studies

Researchers have persisted in their efforts to identify the factors that are associated with length of stay. More recent studies, in the late 1980's and 1990's offer insights that are more applicable to present day inpatient settings.

Baker and Rochon (1989) compared patients on short stay units with those on long stay units with respect to age, gender, discharge diagnosis, and length of stay. Discharge diagnosis was categorized as "psychotic disorder" versus "non-psychotic disorder". One thousand, three hundred and sixty four patients were selected from inpatient units within a psychiatric hospital over a period of one year. The results showed that older age, being female and having a psychotic disorder were associated with a greater number of admission days for a specific patient.

In 1992, Dalgalarrondo and Gattaz examined 16 socio-demographic and clinical variables in relation to length of stay. Three hundred consecutive admissions to an acute care inpatient psychiatry unit in Brazil were examined. The average length of stay was 19.4 days (standard deviation = 18.7 days). Results demonstrated that patients from outside the catchment area had a longer length of stay, that a diagnosis of psychosis predicted longer stay but that affiliation with the Pentecostal churches conferred a lower risk of increased stay.

In 1997, Creed, Tomensen and Tramner echoed the earlier sentiments of Boelhouwer and Rosenberg (1983) that even after increasing the number of variables studied there remains a portion of the variance in length of stay that is not explained. As such, Creed et al. (1997) set out to assess the factors that predicted length of stay for a single psychiatry unit of an inner city population in Manchester, England. More

specifically, they wanted to determine if length of stay was significantly related to diagnosis and whether a larger proportion of the variation in length of stay could be explained if multiple clinical and social data were considered. The sample consisted of 115 inpatients admitted over a 9 month period. Forty-eight patients had been randomly allocated for inpatient care and 7 had been sent to the inpatient unit due to severity of illness and legal status. The remainder served as a comparison group. One way ANOVA was performed to determine if there was a difference in length of stay among different diagnostically related groups. A series of multiple regression analyses were conducted using the log (length of stay) of the index admission and the log (total duration of stay throughout the year) so as to quantify the relative contribution made by each factor. The transformation of these variables was justified as the length of stay data was skewed such that the logarithm approaches a normal distribution. In this way the requirements of the statistical methods employed were satisfied. Patients with mania, depression and schizophrenia had significantly longer index admissions than those with neuroses and other diagnoses. When the length of stay, per patient, was considered over the duration of one year, patients with mania had significantly longer stays than all diagnoses except depression. In agreement with other studies, only a small proportion of the variation in length of stay was explained by diagnosis (14.6%). When social and clinical variables were included in the analyses, 36.6% of the variance was explained. Five social/clinical factors were associated with increased length of stay: living alone, having a diagnosis of mania, having low ratings on the Social Behavior Scale, having disturbances of behavior, speech/other functions, and the presence of non-specific symptoms as measured by

the Present State Exam (PSE - a tool used to obtain detailed and systematic assessments of psychiatric symptoms) (Creed et al., 1997). These results are consistent with those reported in previous studies (Boelhouwer & Rosenberg, 1994; Gordon et al. 1985; Horn, Chambers, Phoebe, Sharkey & Horn, 1989). The authors also note, however, that inner city urban hospitals have been associated with longer lengths of stay (Horgan & Jencks (1987) as cited in Creed et al.) and as such, it would be important to repeat this study in larger samples and in variable regional settings.

Huntley, Won Cho, Christman, and Csernansky (1998) examined patient-related variables for their ability to predict length of stay in a single, acute care psychiatric facility in St. Louis, Missouri. Data on all patients discharged over two six-month periods were collected. The mean length of stay was 16.3 days (standard deviation =17.6 days). Data for 760 patients were obtained from the centre's database. Patients with outlying values for length of stay were excluded so as to satisfy the statistical requirements for using multiple stepwise regression. Five variables significantly predicted length of stay: a primary diagnosis of schizophrenia, the number of previous admissions, a primary diagnosis of mood disorder, age, and a secondary diagnosis of a substance related disorder. The first three of these variables accounted for 16% of the variance in length of stay and all variables when considered together accounted for 17% of the variance. Interestingly, when the additional variable of "substance diagnosis" was combined with a primary diagnosis of schizophrenia or mood disorder, and the effects of age and gender were excluded, the proportion of the variance explained was still, only 20%.

1.2.2.3 The Influence of Clinical Setting

It seems the more that length of stay is studied, the more contradictions that arise. It continues to be difficult to identify those factors that are universally associated with an increased length of stay for most admission settings. Huntley et al. (1998) asserted that "the discrepancies between our results and clinical judgment and between our results and the results of previous studies, suggest that the observations and predictions of one or even many clinical experts may be unreliable and that predictors of length of stay may vary considerably across different hospitals". There is evidence to suggest that this is true. Heiman and Shanfield (1980) demonstrated that length of stay can be affected by factors that are intrinsic to a particular inpatient setting. They examined the variability of factors associated with increased length of stay among hospitals in Tucson, Arizona, USA. The hospitals included a private hospital affiliated with a community mental health clinic, a Veterans Administration hospital, a free standing private hospital, a general hospital affiliated with a poverty-area community mental health center and a county general hospital. Lengths of stay, for 1975, were compared among hospitals by diagnosis. Within each hospital, a diagnosis of neurotic disorder was associated with a shorter ward term while a diagnosis of schizophrenia was associated with longer stays. The length of stay for these diagnoses varied among the hospitals, however. The county hospital had shorter length of stay, as did the general hospital affiliated with a poverty-area community mental health center, for all neurotic diagnoses. Only the county hospital had a shorter length of stay for schizophrenia. There was no statistical difference in length

of stay, among the hospitals, for major affective disorders. Inter-institutional variations in age and gender did not explain variability in length of stay.

Heiman and Shanfield (1980) argued that any observed variability in length of stay among institutions could be explained. The county hospital was not a random sample of patients, received more disruptive patients and more frequently admitted patients via the emergency room. Furthermore, the county hospital was under tighter fiscal restraint, had fewer beds and was more likely to be under pressure to minimize length of stay. The distribution of diagnoses was markedly different for the county hospital as well. There were 2-4 times more schizophrenic than neurotic patients in the county hospital. This disproportionately large number of schizophrenic patients and small number of neurotic patients may have indicated that the public hospitals were treating a different patient population than the other hospitals and this could explain the variability in length of stay by diagnostic category. Furthermore, while schizophrenics were admitted to all sites, those admitted to the public system may have been more chronic in nature with a history of multiple previous admissions than in the privately run hospitals (Rowitz & Levy (1968) as cited in Heiman & Shanfield). The failure to detect differences among sites for affective disorder diagnoses was likely related to small number of patients in this diagnostic category. These authors failed to note, however, that variability among the hospitals, with respect to administrative policies and physician practice style, also, could have accounted for some of the discrepancies among the hospitals.

Fortney, Booth and Smith (1996) also examined the degree of inter-hospital variation in length of stay. The sample was selected from 107 acute care inpatient

psychiatry units in Veterans' Affairs hospitals in the United States. Each of these 107

units had their own complement of psychiatrists, nursing staff, social workers and

occupational therapists but similar administrative policies. Only patients with a

diagnosis of major depressive disorder were included. The average length of stay was

17.9 days. The results demonstrated that patient demographics, treatment history and

severity of illness predicted length of stay. Despite the fact that standardized

treatment regimens for depression were adhered to and that the VA hospitals operated

under similar administrative models, a high degree of inter-hospital variation was still

observed. Fortney et al. (1996) speculated, then, that variations in treatment duration

must be due to differences in physician practice styles.

Institution related idiosyncrasies associated with administrative policies and

physician cohorts may determine, in part, whether a given factor is associated with an

increased length of stay for a particular institution. It is not unreasonable to speculate

then that intrinsic differences in health care delivery systems among countries could

also account for discrepant results. Failure to control for influence of such

characteristics that are intrinsic to the individual institution or unique to the health

care delivery system could explain the presence of contradictory results. Realistically,

however, the statistical control of all the elements at play, may not be feasible. In

1999, Oisevold et al. argued that examining length of stay across many clinical

settings and different service systems, simultaneously, might be the only way to

identify common patterns in the factors that predict length of stay regardless of

clinical setting. The Nordic Comparative Study on Sectorized Psychiatry, (Oiesvold

et al., 1999) examined seven psychiatric services across four countries to identify

which socio-demographic and clinical factors were associated with length of stay and to determine if there was a common pattern across all hospitals. The inpatient services in the four countries were similar in that they had a near total responsibility for providing psychiatric inpatient care for their catchment areas. They differed, however on parameters such as the proximity to outpatient services, the proportion of staff dedicated to outpatient services, the number of inpatient beds, and the total number of available staff. All 837 patients were 15 years or older and considered "new" to psychiatric services (no admission to inpatient services in the previous 18 months). The study measured length of the first inpatient episode and variability in length of stay across sites. Separate analyses were completed for all the factors by gender, diagnosis and hospital of admission.

Length of stay was significantly different among the four admission sites with median values ranging from 8 to 26 days. This difference remained statistically significant even when all other measured variables were taken into account. All factors examined were significantly associated with length of stay except employment status. With respect to resource availability, longer stays were associated with intermediate staffing numbers. These associations were determined for the complete sample. When the impact of these factors was considered in the context of gender and diagnosis, not all of the same factors were associated with length of stay. This suggests that the association between a given factor and length of stay is very much dependent on the nature of the population being considered. There was no apparent link between the number of available beds and length of stay. The socio-demographic and clinical variables shown to be associated with length of stay are found in Table 2.

Table 2

Factors Associated with Longer LOS, n=837 (Oiesvold et al., 1999)

Factors Associated with increased Length of Stay	Total Sample	Gender		Diagnosis	
		Male	Female	Psychotic	Non-Psychotic
No Children at home	Y	N	N	N	N
Being old	Y	N	N	N	N
Being female	Y	-	-	N	Y
Presence of Psychosis	Y	Y	Y	-	-
Previous outpatient care	Y	Y	N	Y	Y
Previous outpatient aftercare	Y	Y	N	Y	Y
Number of staff	Y	N	N	N	N
Number of beds	Y	N	N	N	N

(Y=Yes; N=No)

1.3 St. John's is Unique

1.3.1 The Hospitals are Unique

There are three tertiary care institutions that provide acute care inpatient psychiatry services for adults in St. John's. These are the Waterford Hospital, St. Clare's Mercy Hospital, and The Health Sciences Center. The first of these serves both the acute and chronic care population and is strictly a psychiatric facility. The remaining two sites, The Health Sciences Center, in a suburban area of the city and St. Clare's Mercy Hospital, in the core of the city, are located in general hospitals. These are all managed by one administrative body, the Health Care Corporation of St. John's. Hence service mandates and practice protocols are uniform across institutions.

The Waterford Hospital has three acute care units dedicated to the needs of patients requiring psychiatry services while the Health Sciences Center and St.

Clare's Mercy Hospital each have one unit. Each unit has its own complement of attending physicians, social workers, psychologists, physiotherapists, occupational therapists, dieticians and pastoral care workers. The attending physician is the leader of the multidisciplinary team and responsible for generating referrals to team members when clinically indicated.

There are a number of differences between the units at the Waterford Hospital and the general hospital sites. The acute care units at Waterford Hospital are defined as open units but can be converted to secure units if the safety risk of the patient so dictates. The Waterford Hospital also has a professionally trained intervention team to deal with acutely violent and aggressive patients. This team operates in conjunction with the nursing staff and provides an additional level of illness management that is not available at the general hospitals. Thus, patients who are aggressive or who pose extreme imminent risk to themselves or to others are preferentially admitted to the Waterford Hospital. The general hospital units however are also open units but, at the time of this study, there was no provision for securing them throughout the day. They were regularly secured during the evening hours but, during the day, patients at these sites generally had more off ward privileges as compared to the Waterford Hospital. Thus, admission to a general hospital unit is more likely for those at low risk for self harm, for elopement, or for causing harm to others.

The three sites also differ in the availability of diagnostic and consultation services. For example, diagnostic-imaging procedures such as CT scans, MRI scans, ultra-sound, nuclear medicine procedures or invasive radiological procedures are not available on site at the Waterford Hospital. As such, patients admitted to the

24

Waterford Hospital, who are in need of these services, are transported to one of the general hospitals to avail of these investigations.

The Waterford Hospital also differs from the general hospitals with respect to access to consultation services. As would be expected, in a general hospital setting, there is more ready access to medical/surgical consultation. For the Waterford Hospital, however, medical/surgical consultation is provided by medical staff from the general hospitals that travel to the Waterford Hospital site once per week. The admitting psychiatrist is aware of inter-institutional differences in delivery of care, and uses this knowledge to choose the site of admission. For example, the physician selectively admits a highly aggressive and agitated patient to a secure unit at the Waterford Hospital rather than to a general hospital unit when possible. Patients may be preferentially admitted to a general hospital if they have significant co-morbid medical illness or have a high probability of an underlying organic etiology for their psychiatric symptoms. Site of admission for patients in good physical health, is dictated by bed availability and the principle working site of the attending psychiatrist. In the end, the site of admission is chosen based on patient safety, bed availability and the need for access to medical care.

Upon reflection, the Waterford Hospital and the two general hospitals differ in several ways. While all the units described are designated as acute care units, there exists the possibility that they function very differently, from one another and from institutions in other clinical settings. Past research has demonstrated that the determinants of length of stay can vary by institution and that length of stay can be effected by the intrinsic characteristics of the institution examined (Heiman &

Shanfield, 1980; Fortney et al. 1999). Thus, to identify the factors associated with length of stay in St. John's, it is necessary to conduct a study specifically for that setting.

1.3.2 The Clinical Setting is Unique

In order to reduce length of stay in St. John's, without compromising quality of care, it is necessary to have an accurate appreciation of the factors associated with an increased length of stay for that clinical setting. Quite possibly, the clinical setting in St. John's could be considered unique such that the literature, to date, is not applicable.

The Health Care Corporation of St. John's serves a catchment area of approximately 200 000 people (HCCSJ, 2002). The population is relatively homogeneous and stable over time. Most of the people who live there have been born on the island and thus lived there for a considerable period of time. There is also limited immigration to the island from the rest of Canada and the rest of the world.

Additionally, the presence of extended family is substantial. The care and support for those who are ill is very much considered a responsibility of well family members. The dependency on the role of and the need for community and hospital based services in this setting, then, may be different from other clinical settings examined to date.

The complement of physicians is also unique. Most of the psychiatrists have trained and worked in the province of Newfoundland. As well, a large proportion of the psychiatrists is native to Newfoundland and they implicitly understand the unique

culture and attitudes of Newfoundlanders. This has the potential to impact on their

practice style and on the way that they deliver care to their patients.

1.4 Study Objectives

An overview of the study objectives can be found in Table 3. The following is

a detailed discussion of these same objectives.

Table 3

Study Objectives

Objectives
- to identify the patient, illness and treatment related factors that are associated with length of stay for acute inpatient psychiatry units in St. John's, Newfoundland.   - to assess the accuracy of the psychiatrists' opinions that there is significant inter-institutional variation in length of stay for the inpatient psychiatry units in St. John's, Newfoundland.   - to determine whether or not the psychiatrists' opinions regarding the impact of specific factors on length of stay in St. John's were accurate.

1.4.1 Objective #1: Factors Associated with Length of Stay in St. John's

Length of stay is not likely to be determined by a single factor (Mezzich &

Coffman, 1985; Oiesvold et al., 1999). Efforts to identify the factors that are

associated with an increased length of stay, despite using a broad range of

demographic, diagnostic and treatment variables, have failed to consistently account

for variance in length of stay in all hospitals. In general, the field has become

pessimistic that any particular variables reliably predict length of stay across all

psychiatric facilities (Choca, Peterson, Shanley et al. (1988) as cited in Huntley et al., 1999).

Studies have demonstrated that length of stay can vary as a consequence of regionality (English, Sharfstein, Scherl, Astrachan & Musynski (1986) as cited in Oiesvold et al., 1999) and that effecting change in length of stay for a particular city requires an understanding of which factors are relevant for that patient population (Goodban, Lieberman, Levine, Astrachan, and Cocilovo (1987_as cited in Dalgalarrondo and Gattaz, 1992).

Furthermore, considering the limitations of the existing research and the uniqueness of the clinical setting in St. John's, it is not unreasonable to speculate that the predictors of length of stay in St. John's may differ from those previously identified in the literature. Therefore, the first objective of this study was to identify the patient, illness and treatment related factors that are associated with length of stay for acute inpatient psychiatry units in St. John's, Newfoundland.

1.4.1.1 Patient Related Variables

A summary of the research on length of stay and the associated patient related factors is presented in Table 4. Only a few factors have been repeatedly studied and it is of these factors that we have the best knowledge. These factors are patient age, patient gender, the degree of social support, the capacity for independent living, the level of education and employment status.

Patient age: For patients with psychiatric illness, older age confers a higher risk of

prolonged hospitalization. This is true irrespective of study design, sample

composition and the context of care. Studies conducted in Canada, the United States,

and several European countries have reported this positive association between age

and duration of hospital stay despite considerable variation in the health care delivery

systems (Fortney et al., 1999; Jayaram et al., 1996; Oisevold et al., 1999). It was

hypothesized that increasing age would be associated with increased length of stay for

the inpatient units of St. John's.

Table 4

Patient related factors associated with increased length of stay

	Older Age	Gender	Marital Status	Education	Employment Status	Social Support	Capacity for Independent Living	Place of Residence
Altman et al.		Female	Single	Low	Unemployed			
Alllodi & Cohen			Not Married			Not living with Family	Not living with Family	
Boelhouwer & Rosenberg	√	Female	Single or widowe d		Unemployed or Retired			
Creed et al.						Living alone	Living alone	
Huntley et al.	√	∅						
Gruber	√	∅						
Gordon et al.								
Dalgalarrond o & Gattaz	∅	∅		∅	∅	√		√
Baker & Rochon	√	Female						
Oiesvold et al.	√	Female						
Heiman & Shanfield	∅	∅						
Fortney et al.	√		Not Married					√

(√ = presence of an association; ∅ = no association)

Patient Gender: Although, most studies demonstrate that being female is associated with increased length of stay (Baker & Rochon, 1989; Boelhouwer & Rosenberg, 1983), Dalgalarrondo & Gattaz (1992), in Brazil, failed to correlate gender with length of stay. Oisevold et al. (1999) demonstrated that the ability of gender to predict length of stay was affected by diagnosis (for example female gender predicted length of stay only in the absence of psychotic symptoms). Gender has not been a consistent predictor of length of stay. For St. John's, it was hypothesized that being female would be associated with increased length of stay.

Presence of Social Support: Marital status is another patient related factor that has been examined for its ability to predict length of stay. Patients with short stays are more often married, separated or divorced (Boelhouwer & Rosenberg, 1983) and being single or being widowed is most commonly associated with increased length of stay (Baker & Rochon, 1989; Fortney et al., 1999).

It was Fortney et al. (1999) that speculated that it was the degree of social support and not the patient's marital status that correlated with a longer stay. When they observed that married patients more often had shorter stays they suggested that being married conferred a higher degree of social support (Fortney et al.). In support of this notion, Creed et al. (1997) and Cyr and Haley (1983), as cited in Creed et al., reported that lack of social attachments was an important predictor of length of stay.

Other forms of social support experienced by a patient may also confer decreased risk of prolonged stay. At least two studies report that those patients with

strong religious affiliations and/or actively involved in a religious community have shorter length of stays (Dalagalarrondo & Gattaz, 1992; Palinkas (1990) as cited in Dalgalarrondo and Gattaz). The former group observed that Protestant patients in Brazil had shorter lengths of stay and asserted that it was due to the greater support from and the stronger social network within that religious community in that country.

Family support is also important in length of stay (Yohanna et al., 1996). Lack of family involvement in inpatient admission is associated with longer stays. (Lyons (1997) as cited in Durbin et al., 1999). Living alone or in a hostel is associated with increased length of stay even when degree of disability is accounted for (Creed et al, 1997; Cyr & Haley as cited in Creed et al.). The presence of social support, as conferred through the patient's involvement in a stable relationship, was expected to be associated with shorter length of stay on inpatient units in St. John's.

Capacity for Independent living: According to the research, a patient's capacity for independent living is inversely related to length of stay (Altman et al., 1972). This is understandable since the ability to live independently is a measure of patient functioning. The association between functional status and length of stay has been studied but the method of quantifying level of functioning has varied considerably across studies. Gordon et al. (1985) considered patient scores for Global Assessment of Functioning (DSM IV) and found an inverse relationship between the scale scores and length of stay. Jayaram et al. (1996) used the Milwaukee Evaluation of Daily Living Skills to demonstrate that dependence was significantly associated with length of stay. Another study demonstrated that short stay patients had less impaired self-

care and demonstrated a better ability to complete their activities of daily living (Yohanna et al., 1998). For St. John's, it was hypothesized that the capacity for independent living, as evidenced by the ability to complete high school and maintain gainful employment, would be associated with shorter length of stay.

Place of Residence: Several studies have demonstrated an association between place of residence and length of stay. Specifically, living outside the catchment area for the hospital is associated with increased length of stay (Dalgalarrondo & Gattaz, 1992; Fortney et al. 1996). Tertiary care institutions of St. John's serve one particular region of the province of Newfoundland. However, the majority of the other communities in the province is rural and thus have limited provisions for acute care psychiatric services. Patients from these areas usually travel to St John's for inpatient psychiatric services. Consequently, psychiatrists may prolong length of stay until they are certain that the patient is entirely stable and able to return to the local community where they may have limited psychiatric supports. As such, it was expected that those patients living outside the catchment area of the Health Care Corporation of St. John's would have longer stays.

1.4.1.2 Illness Related Variables

The illness parameters that have been most extensively examined are diagnosis, severity of illness, presence of co-morbidity and the type of co-morbid illness. A summary of the research on length of stay and the associated illness related factors is presented in Table 5.

Diagnosis: Interest in the association between diagnosis and length of stay is longstanding. Early studies identified that schizophrenia was associated with a longer hospital stay (Altman et al., 1972). Huntley et al. (1998), twenty years later, confirmed this finding and also showed that patients with drug related disorders have shorter stays. In the intervening years, studies demonstrated that the presence of psychotic symptoms, irrespective of diagnosis, was predictive of a longer length of stay (Dalagalarrondo & Gattaz, 1992; Oisevold et al. 1999). Boelhouwer and Rosenberg (1983) compared groups of short and long stay patients and also reported that psychotic diagnoses were more often associated with longer stay. Yohanna et al. (1998) also identified that the patients who experience prolonged stay more often have psychotic disorders and that short stay patients have higher rates of primary substance use disorders. In 1997, Creed et al. demonstrated an association between length of stay and a diagnosis of mania, depression and schizophrenia. In the 1980s, when prospective payment systems were introduced in the United States, and reimbursement for service was tied to a patient's diagnostic category (DRG), studies evaluated the extent to which DRGs accounted for variance in length of stays for inpatient units. DRGs alone failed to adequately predict length of stay since there was considerable variability in length of stay between institutions (Doremeus, as cited by Lutjens, 1993; Halloran & Kiley as cited by Lutjens). McCrone and Phelan (1994) corroborated this finding and concluded that DRGs are poor predictors of resource utilization. Several studies have demonstrated that diagnostic related groups do not reliably predict length of stay in psychiatry because there is substantial variation of

length within DRG's themselves (Essock & Norquist (1989) as cited in Creed et al.,
1997, Oyebode et al. as cited in Creed et al., 1997). This suggests that other factors
are influencing length of patient stay either independently or in conjunction with
diagnosis. For St. John's, it was hypothesized that psychotic disorders would be
associated with a longer length of stay.

Severity of Illness: There is some agreement among various studies that the DRG of a
patient can explain variation in length of stay, but only to a limited extent (Cyr and
Haley, 1983 as cited in Creed et al.; Fortney et al., 1999; Greenfield (1989) as cited in
Dalagarrondo & Gattaz, 1992; Jayaram et al., 1996;Mezzich & Coffman, 1985;
Yohanna et al., 1998). By examining additional variables in the context of DRGs, the
predictability of length of stay improves. In particular, considering severity of illness
improves the reliability of predictions. Indeed, the consideration of severity of illness
in one study explained 34-50% of the variation in length of stay for all patients (Horn
et al. as cited in Creed et al., 1997). The time at which severity of illness is measured
is also relevant. While, short stay patients are less acutely ill at the time of admission
(Yohanna et al.), it is not necessarily the severity of illness at the time of admission
that predicts length of stay. Rather, it seems that the maximum severity experienced
during the admission or a notable change in severity during the admission is more
predictive of length of stay (Yohanna et al.; Durbin et al., 1999). While severity of
illness is important to consider in a length of stay study, it was not included as one of
the variables of interest in this study. The rationale for its exclusion was that an
accurate assessment of maximum severity and the detection of a notable change in

severity over the course of the admission would have required subjective interpretation of the medical record as this type of information is not systematically documented on patient records.

Co-morbid Illness: The evidence of an association between co-morbid illness, either physical or mental, and an increased length of stay seems equivocal. Several authors have reported that the presence of co-morbid medical illness is predictive of length of stay (Allodi & Cohen, 1978; Altman et al., 1972; Boelhouwer & Rosenberg, 1983). A more recent study, however, failed to associate a longer length of stay with the presence of co-morbid medical illness or treatment complications (Jayaram et al., 1996; Fulop as cited in Jayaram et al.). Still, it has been shown that short stay patients have fewer medical diagnoses (Boelhouwer & Rosenberg, 1983). McCrone and Phelan (1994) state that co-morbidity monitoring is effective in enhancing the predictability of resource utilization, but the research regarding the association between co-morbid psychiatric illness or functional disabilities and length of stay is discrepant. While longer stays have been documented among patients with functional disabilities, the presence of developmental disabilities in patients with psychiatric illness is not associated with longer stays on psychiatric inpatient units (Addington, Addington & Ens, 1993; Burge, Ouellette-Kuntz, Saeed, McCreary, Paquette, & Sim, 2002; Mezzich & Coffman, 1985; Lieberman, Dencker, Bernard, Kastrup and Kirschner as cited in Jayaram et al., 1996). For St. John's, it was expected that the presence of any co-morbid illness would predict a longer length of stay. Co-morbid medical diagnoses and co-morbid psychiatric illnesses were considered separately.

Table 5

Illness related factors associated with increased length of stay

	Diagnosis	Evidence of Psychosis	Co-morbid Medical Diagnosis	Co-morbid Psychiatric Diagnosis	Severity of Illness
Altman et al.	√	√	√		
Allodi & Cohen		√	√		
Boelhouwer & Rosenberg		√	√		
Creed et al.	Mania	√			
Huntley et al.	Schizophrenia/ mood disorder				
Gruber					√
Dalgalarrondo & Gattaz		√			
Yohanna et al.					√
Baker & Rochon		√			
Heiman & Shanfield	√	Psychotic/mood disorder			
Durbin et al.		Psychosis/ Depression			√
McCrone & Phelan					
Fortney et al.	√			√	√
Oiesvold et al.	√				

Other illness variables: Two additional variables were of interest in this study. The reason for admission and the duration of acute symptoms were examined for their association with increased length of stay. These two variables have not been systematically examined to date. It was expected that the presence of psychotic symptoms, irrespective of diagnosis, and the duration of these symptoms prior to admission would be associated with increased length of stay.

1.4.1.3 Treatment Related Variables:

The relationship between treatment variables and length of stay has been considered in the care of psychiatric patients. More commonly, the influence of pharmacological agents and psychological interventions has been examined. (Boelhouwer & Rosenberg, 1983; Oiesvold et al., 1999). When comparing short stay patients and long stay patients, Boelhouwer and Rosenberg demonstrated that fewer short stay patients received electroconvulsive therapy during the course of hospitalization. Jayaram et al. (1996) demonstrated that higher rates of medication side effects were associated with longer stay patients. These findings are consistent with the results of many other studies (Lieberman, McPhetres, Elliott et al. as cited in Jayaram et al.). The impact of these factors on length of stay in St. John's was not examined in this study. Instead, in this study, it was of interest to determine if length of stay was associated with the presence and duration of a discharge plan, the number of health care professionals involved in care and the discipline of health care professionals involved in care during the admission.

Discharge Planning: The use of active discharge planning in acute inpatient settings has the effect of reducing length of stay, particularly if implemented in the first 24 hours of admission (Farren as in Lutjens, 1993; Marchette & Holloman as cited in Lutjens, 1993). In this study, it was expected that the presence of a discharge plan would be associated with a shorter length of stay. It was also hypothesized that patients whose discharge plan was established early in the admission process might have shorter lengths of stay.

Health Care Professionals: Oisevold et al. (1999) were the only group to consider the relationship between of the number of health care professionals on an inpatient unit and the length of stay for those units. They found that an intermediate number of staffing was associated with the shorter length of stay. In St. John's, it was hypothesized that the greater the number of health care professionals involved in care, the more complex the illness and the longer the associated length of stay. It was also hypothesized that the pattern of involvement of the specific disciplines could be associated with length of stay.

1.4.1.4 Physician Related Factors

The nature of the association between physician related factors and length of stay is unclear. Huntley et al. (1998) stated that the behaviour of individual physicians is a significant factor in prolonging length of stay but that length of stay may not always be comparable between physicians because of clinical differences in caseload. Fortney et al. (1999) asserted that observed inter-hospital variations in treatment duration reflect unmeasured differences in physicians' practice styles. They concluded that physician practices must play a role in determining length of stay since all other variables in their study were common to all institutions.

The specific physician related factors that impact on length of stay are not yet clear. Since hospitals serve markedly different functions within a system of care, the comparison of inpatient psychiatric facilities with respect to the physician factors that are associated with length of stay is an incredibly complex task (Goodban,

Lieberman, Levine, Astrachan and Cocilovo as cited in Dalgalarrondo & Gattaz, 1992). Studies involving a single service system could identify the physician related factors associated with stay but may not produce results that are applicable in other clinical systems. To date, it has been speculated that discrepant findings in studies of single sites may be attributable to idiosyncratic features of that particular service system and not solely the impact of varying physician practice patterns (Oisevold et al., 1999). Additional research is needed to determine the specific physician related idiosyncrasies that are associated with increased length of stay (Cleary et al., 1991).

In St. John's, the cohort of psychiatrists working on the inpatient units consisted of only twenty-one physicians. This sample size was too small to determine if length of stay was associated with specific physician characteristics. It was sufficient, however, to assess the accuracy of physician perceptions on issues related to length of stay.

1.4.2 Are the Psychiatrists' Opinions Accurate?

1.4.2.1 Objective # 2: Does Length of Stay Vary by Site in St. John's?

Psychiatrists working with the Health Care Corporation of St. John's have speculated that length of stay varies among the three inpatient psychiatry sites. In support of this notion, previous studies have identified that length of stay can vary among institutions due to intrinsic differences in the clinical settings (Heiman & Shanfield, 1980; Fortney et al. 1996). St. John's acute care inpatient psychiatry sites differ in availability of resources. The Waterford Hospital is, perhaps, more suited to the management of patients at high risk of self harm, harm to others and/or

elopement. The patient profiles could potentially vary between the Waterford

Hospital and the general hospital inpatient units and, as such, the speculation of the

psychiatrists that length of stay varies among the admissions sites, may not be

unreasonable. On the other hand, the three institutions are governed by the same

administrative body and must operate under the same policies and protocols.

Furthermore, despite each site having its own multidisciplinary team, and a different

cohort of psychiatrists, the majority has been trained in the province and is likely to

have similar practice styles. For these reasons, it is possible that length of stay may

not vary by site. To date the accuracy of the psychiatrists' opinions has not been

systematically examined. The second objective of this study was to assess the

accuracy of the psychiatrists' opinions on this matter. To do this, data from the chart

review was used to compare the length of stay for the three admission sites in St.

John's.

1.4.2.2 Objective #3: Factors Associated with Length of stay in St. John's:

Psychiatrists' Opinions

Physicians are frequently under pressure to minimize length of stay for their

patients. If clinicians are to be expected to participate in the active reduction of length

of stay, it is necessary that they have an accurate understanding of length of stay and

its determinants. The accuracy of physicians' opinions in this regard has not been

extensively studied.

To date, it has been unclear whether or not physician attitudes impact on

length of stay. Repeatedly reminding physicians about the need to shorten length of

stay has been one way to reduce length of stay (Richman & Pinsker as cited in Boelhouwer & Rosenberg, 1983). As well, simply monitoring extended stays can result in a decrease in the number of patients with prolonged stays (Huntley et al., 1998). Implicit to this observation is that an awareness of length of stay may alter practice style such that a shorter length of stay is achieved. How physicians actually reduce length of stay has not been examined but one could speculate that the beliefs and attitudes of the individual physicians must come into play. Mezzich and Coffman, in 1985, surveyed health care professionals for their opinions regarding the predictors of length of stay. The psychiatrists believed that symptomatology, level of adaptive functioning, social supports, specific psychiatric disorders and chronicity of illness were important in predicting length of stay.

For this study, the third objective was to determine whether or not the psychiatrists' opinions regarding the impact of specific factors on length of stay in St. John's were accurate. To do this a survey was administered to the admitting psychiatrists and their opinions were compared to the results of the chart review.

Chapter 2: Methods

2.1 First Objective

The first objective of this study was to identify the patient, illness and treatment factors associated with length of stay on acute inpatient psychiatry units in St. John's, Newfoundland. A chart review method was used to collect length of stay data for a systematically derived sample of patients discharged from the three acute care psychiatry services in the city.

2.1.1 Study Population

Patient records were eligible for inclusion if they represented discharges from one of the three acute care psychiatry units over a period of three months (April to June 1997, inclusive). Records were sorted by date of discharge, rather than date of admission so as to avoid having to track admission records far beyond the three month period of the study. Four hundred and forty eight patient discharges were recorded across the three institutions: 271 from the Waterford Hospital, 75 from St. Clare's Mercy Hospital and 102 from the Health Sciences Center.

Patient records were excluded from the study if they represented discharges from the Forensic Assessment Unit, (considered an acute care unit at the Waterford Hospital) where length of stay was determined by court order, from day programs, or were transfers off service to medical/surgical units. Patient records were also excluded if they had two or more discharges, within 30 days of one another and during the study period since these patients were believed to represent "frequent users" of the system. This intent was to exclude frequent users of the system since

previous studies have demonstrated that extensive hospitalization histories can influence the behavior of the determinants of length of stay (Altman et al., 1972; Fortney et al., 1996; Gruber, 1982; Huntley et al., 1998; Zilber et al., 1990). If a patient had two discharges during the three month period, but more than 30 days apart, only data for the first admission were collected (3/448 patients). Inclusion and exclusion criteria are summarized in Table 6.

Table 6

Exclusion/Inclusion Criteria

Exclusion Criteria	Inclusion Criteria
• Discharges from the Forensic Unit • Discharges from the day program • Second discharge for a given patient but more that 30 days after the first discharge • Transfers off service • Frequent User Records	Adults 19 years of age or older Discharges between April1997 and June 1997 (inclusive)

Three hundred and eighty six discharges were eligible for inclusion in the study. One hundred and sixty discharges were then systematically selected for review by choosing every second discharge from the list of 386 eligible patients (91 from the Waterford Hospital, 31 from St. Clare's Mercy Hospital and 38 from The Health Sciences Center). All sites contributed an equal proportion of subjects (Figure 1).

2.1.2 Sample Size Determination

The literature on factors associated with length of stay reports mainly small to moderate effect sizes. Using r = 0.22 (between a small and moderate effect size), and to ensure an 80% power, a sample size of 160 was calculated as being sufficient for the purposes of this study.

Figure 1: Summary of Exclusion Process
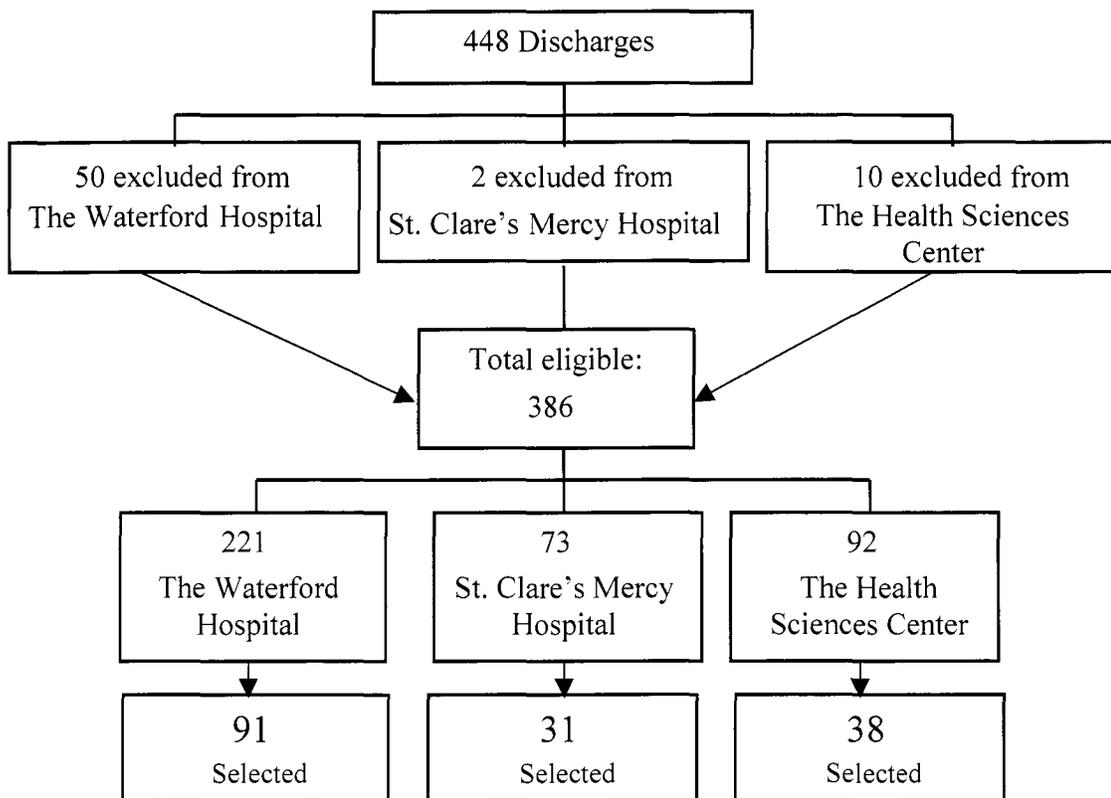
2.1.3 Data Collection

A standardized abstraction form was used to record relevant information designed for this purpose (Appendix A). Site of admission, date of admission and

date of discharge were recorded as they appeared on patients' charts. The length of stay was calculated for each case by counting the number of days from admission to discharge days, inclusive. This method of including the admission and discharge days in calculating the length of stay remained consistent across all sites. Patient, illness and treatment related variables were considered. Missing data was clearly noted.

2.1.3.1 Patient Related Factors

The following patient-related factors were examined.

- Age: Age was captured as a categorical variable using the following categories: 19-29; 30-39; 40-49; 50-59; 60+ years

- Gender

- Degree of Social Support: Specific social support data were not included in the charts. Therefore, a proxy indicator was used. The length of stay for patients who were married or in common law relationships was compared to the length of stay for those patients who were single, divorced, widowed or separated. An assumption was made that the patient who is actively involved in a stable relationship experiences higher levels of social support than the patient who is not. Relationship status was considered to be the best possible approximation of the presence of social support from information documented in the medical record.

- Capacity for Independent Living: Measures of the capacity for independent living are not specifically documented in medical records. However, successful completion of high-school and an ability to maintain

gainful employment are clearly documented. Given that these two variables can influence lifetime functioning they were considered as proxy measures of capacity for independent living.

- Place of Residence: Place of residence was classified as being inside or outside of the catchment area for the Health Care Corporation of St. John's.

2.1.3.2 Illness Related Factors

The following illness related factors were examined.

- Primary Diagnosis: Primary diagnosis was defined as the psychiatric illness most responsible for admission. DSM-IV (Revised) diagnostic categories were collapsed into six general categories, three of which are described in Table 7. (The American Psychiatric Association, ed.4) The third, fourth and fifth diagnostic categories were "Anxiety Disorders", "Adjustment Disorder" and "Other Diagnoses of Interest" respectively.

- Co-morbidity: The presence/absence of co-morbid psychiatric and medical illness was considered independently with respect to length of stay.

- Reason for Admission: Reason for admission was defined as the primary presenting symptom at time of admission as documented in the admission orders. Five reasons for admission were considered: a safety concern (suicidal and/or homicidal), a mood symptom (depressed or manic), psychotic symptoms, substance-related symptoms (primarily intoxication and withdrawal syndromes) and "other" symptoms (stress, somatic complaints).

Table 7

Classification of Primary Diagnosis

Mood disorder	Psychotic Disorder	Substance Disorder
Major Depressive Disorder Dysthymic Disorder Bipolar Disorder I/II without psychotic features Cyclothymic Disorder	Major Depressive Disorder with psychotic features Bipolar II Disorder with psychotic features Schizoaffective Schizophreniform Disorder Schizophrenia Delerium secondary to a general medical condition Delusional Disorder Substance Induced Psychotic Disorder	Intoxication Delirium Withdrawal Delirium

- Duration of Acute Symptoms: Duration of acute symptoms was measured as the time elapsed since the onset of the symptoms that precipitated the current admission. It is not to be confused with the duration of illness since many patients may have had longstanding psychiatric diagnoses. The time period for symptoms was coded as "days" if symptoms were present for less than 7 days prior to admission, "weeks" if between 7 and 30 days prior to admission (inclusive), "months" if greater than or equal to 31 days but less than or equal to 364 days and "> 364 days" if greater than three hundred and sixty four days.

2.1.3.3 Treatment Variables

The following four treatment related variables were examined:

- The number of health care professionals that provided care over the course of hospitalization.

- The discipline of the health care professionals that provided care over the course of admission. The disciplines of health care professionals included psychiatrist, nurse, social worker, psychologist, physiotherapist, occupational therapist, dietitian, and "other" (pastoral care worker).

- The presence/absence of a well defined discharge plan.

- The duration of the discharge plan.

2.1.4 Statistical Analysis

Typically, length of stay data has a skewed distribution. In the early studies, the conventional way to analyze length of stay was to use the median and the method of weighted least squares. In more recent studies, the natural logarithm of length of stay has been used as the dependent variable since its distribution approximates normal. This allowed for the use of ANOVA, a more familiar statistical technique, without gross violation of the assumptions. In this study the latter method is employed. To control for the effects of co-linearity between factors, each factor that correlated with length of stay was subsequently included in a multivariate analysis. Frequency distributions were used to describe the population and Chi-squared analysis was used to identify significant differences among sites. In cases where

expected cell sizes were less than five the Exact Fisher Test was used to determine significance.

2.2 Second Objective: Accuracy of psychiatrists opinions re variation in length of stay across sites

The second objective of this study was to assess the accuracy of the psychiatrists' opinion that length of stay varies significantly among the three psychiatric institutions in St. John's, Newfoundland. The mean and median lengths of stay were determined for each site using data collected from the chart review. Subsequently, ANOVA was used to determine if length of stay differed among the three institutions.

2.3 Third Objective: Accuracy of psychiatrists' opinions re factors associated with length of stay

The third objective of this study was to assess the accuracy of the psychiatrists' opinion with respect to the factors associated with length of stay in St. John's. A questionnaire survey was designed specifically for this portion of the study.

2.3.1 Study Population

Psychiatrists were eligible for inclusion if they were:

- employed by the Health Care Corporation of St. John's
- functioning as full-time psychiatrists during the three month study period

- admitting patients to the acute care units.

Those psychiatrists who did not have regular contact with the acute care units were excluded.

2.3.2 Source of Data – A physician questionnaire

A survey was used to obtain psychiatrists' opinions on the determinants of length of stay for acute care psychiatry units. A copy of the questionnaire is contained in Appendix B. Section 1 of the questionnaire collected information regarding physician demographics. Section 2 of the questionnaire collected information regarding practice demographics. Section 3 of the questionnaire ascertained psychiatrists' opinions about the impact of patient, illness, and physician-related factors on length of stay. Physicians were requested to rate the impact of each factor using a Likert scale ranging from 0 (little or no impact) to 3 (moderate impact) and up to 5 (high impact). The factors to be considered are found in Table 8. Physicians were also asked to rate physician factors (physician age, gender, level of physician experience, and practice composition) in terms of the ability to impact on length of stay.

2.3.3 Administration of the Questionnaire

Before the questionnaire was administered, it was reviewed by three health care professionals – an epidemiologist, a psychiatrist who was not part of the sample and a family physician. The purpose for doing this was to obtain constructive criticism about the questionnaire with respect to the phrasing of questions,

appropriateness of language used, and questionnaire length. This resulted in several

revisions.

Table 8

Factors associated with length of stay: The Psychiatrist survey

Patient Factors	Illness Factors	Physician Factors
• patient age • gender • marital status • level of education • employment status • place of residence • level of stress experienced by the patient	• reason for admission • duration of acute symptoms • primary diagnosis • presence of co-morbid psychiatric diagnosis • presence of co-morbid medical illness	• physician age • physician gender • level of physician experience • practice composition

The physician questionnaire was accompanied by a cover letter outlining the

reasons for the study and assuring the physician that all responses would remain

confidential. The cover letter also requested that all questionnaires be returned in the

sealed envelope provided. An uncompleted questionnaire would indicate that the

physician did not consent to participation but allowed the researcher to account for all

questionnaires administered. Prior to administration of the questionnaire, each

physician was briefed, in person, as to the nature of the study. At the time of the

briefing, a number of physicians immediately completed the questionnaire and

returned it to the researcher. A smaller number of physicians requested that they be

allowed to complete the questionnaire at a time that was more convenient and agreed

to forward the questionnaire at a future date. Two weeks after the initial contact was made with each physician, a follow-up phone-call was made to their office as a reminder to return the questionnaire if they had not already done so. One week later, each physician received a request, in writing, that the questionnaire be submitted.

2.3.4 Statistical Analysis

The analysis of the information collected by the questionnaire was carried out in two parts. The information regarding physician and practice demographics was used to describe the sample. Frequency distributions were obtained for each of the data points in these two sections. Given that the sample size was small and that the number of factors comparatively large, only descriptive analysis was conducted. To protect the physicians' right to privacy, descriptive analysis was conducted for the complete group of physicians.

For each factor, the Likert ratings from each physician were added together and divided by the number of physicians that ranked that variable. The resulting score was referred to as the "average rating value" for that variable. If the average rating value was between zero and 1.9 the variable was thought to have little or no impact on length of stay. If the average rating value was between 2 and 3.9 the variable was classified as being considered to have moderate impact on length of stay and if the average rating value was greater than or equal to four, it was classified as having high impact on length of stay.

2.4 Ethical Considerations

This study was reviewed The Human Investigations Committee at Memorial University of Newfoundland and was successful in gaining approval (See Appendix C). Ensuring anonymity and confidentiality of subjects was paramount in the study. Therefore, given the small number of physicians surveyed, only descriptive analyses were completed. For the same reason, physician responses were not analyzed as a function of demographic parameters.

Chapter 3: Results

3.1 Description of the charts reviewed

3.1.1 Socio-demographic Characteristics

A total of 386 patient charts met the inclusion criteria for this study and 160 were selected for review. The distribution of the socio-demographic characteristics, for the 160 charts selected are summarized in Table 9.

Table 9

Socio-demographic characteristics of the study sample (N=160)

Variable	Total (N=160)
Age Group:	
19-29	18.8 % (30)
30-39	29.4 % (47)
40-49	25.6 % (41)
50-59	13.1 % (21)
60+	13.2% (21)
Gender:	
Male	51.9% (83)
Female	48.1% (77)
Stable Relationship:	
Yes (Married/Common Law)	37.5% (60)
No (Single/divorced/separated/widowed)	62.5% (100)
Employment Status:	
Employed	15.0% (24)
Unemployed	85.0% (136)
Education:	
High school Complete	52.5% (84)
High school Incomplete	47.5% (76)
Place of Residence:	
Within Catchment Area of St. John's	61.9% (99)
Outside Catchment Area	35.6% (57)
Missing data	2.5% (4)

The age group most represented was 30 and 39 years. The distribution of males versus females was 51.9% and 48.1% respectively. The majority of patients in the sample was not in a stable relationship at the time of admission. Most patients (85%) were unemployed and slightly more than half had completed high school. Approximately sixty-one percent resided within the catchment area for St. John's.

3.1.2 Illness Characteristics

The distribution of these characteristics is presented in Table 10. For 40% of the patient records, the reason for admission was documented as "safety issues". Mood symptoms and psychotic symptoms were the next most common reasons for admission followed by symptoms associated with a substance use disorder. The category labeled as "other" included reasons such as "stress", "confusion", "anxiety", "sleep deprivation", "medication side effects", "medication changes", and "medication non-compliance".

Most of the patient records (43.1%) indicated that the patient had been experiencing acute symptoms in the order of "weeks". The most common diagnosis for the study sample was mood disorder (46.3%) followed by psychotic disorder (19.4%), substance use disorder (13.1%) and adjustment disorder (13.1%). The remainder of records indicated some "other" disorder which included, personality disorder, anxiety disorders, and dissociative identity disorder. Most patients in the study sample (64%) did not have a co-morbid psychiatric disorder. Approximately half had a co-morbid medical illness.

Table 10

Illness characteristics of the study sample (n = 160)

Variable	Total Sample (n=160)
Reason for admission:	
Safety	40.0 % (64)
Mood Symptoms	30.0% (48)
Psychotic Symptoms	15.0% (24)
Substance Symptoms	8.8% (14)
Other	6.3% (10)
Onset:	
Days	21.9% (35)
Weeks	43.1% (69)
Months	32.5% (52)
>364days	2.5% (4)
Diagnosis:	
Mood Disorder	46.3% (74)
Psychotic Disorder	19.4% (31)
Substance Use Disorder	13.1% (21)
Adjustment Disorder	13.1% (21)
Other	14.3 % (23)
Co-morbid Psychiatric Diagnosis:	
Present	35.6% (57)
Absent	64.4% (103)
Co-morbid Medical Diagnosis:	
Present	51.9% (83)
Absent	48.1% (77)

3.1.3 Treatment Characteristics

The involvement of physicians and nursing staff was implicit for every

patient. Approximately 30% of patients received care from one additional

professional, 38.8 % received care from two additional health care professionals and

29.4% had care from 3 or more additional healthcare professionals. The most

commonly involved discipline other than Psychiatry and Nursing was that of Social

Work (37.5%). Occupational Therapy services were the next frequently utilized at

19.4%. Almost 17% of the patients received interventions from Psychology. More

than half of the charts had a documented discharge plan (63.8%). The mean duration

of the discharge plan prior to the documented discharge date, was three days with a

median value of two days. The distribution of treatment characteristics is

summarized in Table 11.

Table 11

Treatment characteristics of the study sample

Variable	Total Sample (n=160)
Number of additional healthcare professionals involved in care:	
1	31.9% (51)
2	38.8% (62)
>=3	29.4% (47)
Type of healthcare professional:	
Psychiatrist	100%
Nurse	100%
Social work	37.5% (60)
Psychology	16.9% (27)
Physiotherapy	2.5% (4)
Occupational Therapy	19.4% (31)
Dietician	7.5% (12)
Other	16.3% (26)
Discharge Plan:	
Present	63.8% (100)
Absent	36.3% (58)
Duration of Discharge Plan (days):	
Mean	3.10
Median	2
Standard deviation	5.364

3.1.4 Those Patients Discharged Against Medical Advice

Twenty of the one hundred and sixty patients (11.9%) were discharged against medical advice (AMA) during the three-month period of the study. Seven were from the general hospital units and nine were from units at the Waterford Hospital. There were no significant differences between the proportions of AMA patients for the two types of admission sites.

3.1.4.1 Socio-demographic Variables – AMA and non-AMA Compared

Table 12 summarizes the results of data analysis comparing the socio-demographic variables for the AMA and non-AMA groups. The greatest proportion of AMA patients fell into the 30-39 year old age category. The percentage of males and females was 45% and 55% respectively. Forty percent of patients reported involvement in a stable relationship (Married or Common Law). The majority of the AMA patients were unemployed (80%). The proportion of patients who achieved a minimum educational level of high school was roughly equal to that of patients who did not successfully complete high school. Most of the AMA patients lived within the catchment area for St. John's. There were no significant differences in the distribution of socio-demographic variables, between the AMA and the non-AMA population (Table 13).

Table 12

The AMA and the non-AMA population: Patient variables

Variable	AMA (n=20)	Non-AMA (n=140)
Age (years):		
19-29	10.0% (2)	20.1% (28)
30-39	40.0% (8)	28.1% (39)
40-49	35.0% (7)	24.5% (34)
50-59	10.0% (2)	13.7% (19)
60+	5.0% (1)	13.6% (19)
Gender:		
Male	45.0% (9)	52.9% (74)
Female	55.0% (11)	47.1% (66)
Stable Relationship:		
Y (Married + Common Law)	40.0% (8)	37.1% (52)
N (Single/divorced/separated/widowed)	60.0% (12)	62.9% (88)
Employment Status:		
Employed	20.0% (4)	14.3% (20)
Unemployed	80.0% (12)	85.7% (120)
Education:		
High school complete	55.0% (9)	52.1% (73)
High school incomplete	45.0% (11)	47.9% (67)
Place of Residence:		
Within the catchment area for St. John's	70.0% (14)	60.4% (84)
Outside the catchment area for St. John's	30.0% (6)	36.7% (51)
Missing data	-	2.9% (4)

Table 13

AMA vs. non-AMA population: Chi-squared analysis for patient variables

Variable	X^2 (*)	Degrees of Freedom	p-value (2-sided)
Age (years)			
19-29	1.149*	1	0.371
30-39	1.244	1	0.265
40-49	1.054	1	0.305
50-59	0.196*	1	1.000
60+	0.634	1	0.426
Gender:	0.433	1	0.511
Stable Relationship:	0.061	1	0.805
Employment Status:	0.448*	1	0.507
Education:	0.057	1	0.811
Place of Residence:	0.423	1	0.515

*For cell sizes less than 5 The Fisher Exact Statistic is provided.

For cells with an expected frequency less than five the Yates Correction factor was applied and the associated p-value was recorded. For cell sizes less than 5, Chi-squared is generally invalid but this correction addresses this problem.

3.1.4.2 Illness Variables – AMA and non-AMA Compared

The distribution of illness variables for the AMA and non-AMA populations can be found in Table 14.

Table 14

The AMA and the non-AMA population: Illness variables

Variable	AMA (n=20)	Non-AMA (n=140)
Reason for Admission:		
Safety	35.0% (7)	40.7% (57)
Mood Symptoms	20.0% (4)	31.4% (44)
Psychotic Symptoms	25.0% (5)	13.6% (19)
Substance Symptoms	20.0% (4)	7.1% (10)
Other	-	7.1% (10)
Onset:		
Days	20.0% (4)	22.1% (31)
Weeks	55.0% (5)	41.4% (58)
Months	25.0% (5)	33.6% (47)
>364 days	-	2.9% (4)
missing data	20.0% (6)	
Diagnosis:		
Mood Disorder	30.0% (6)	48.6% (68)
Psychotic Disorder	15.0% (3)	20.0% (28)
Substance Use Disorder	40.0% (8)	9.3% (13)
Adjustment Disorder	15.0% (3)	12.9% (18)
Other	-	8.6% (12)
Missing data	-	0.7% (1)
Comorbid psychiatric diagnosis:		
Present	60.0% (12)	50.7%(71)
Absent	40.0% (8)	39.3% (69)
Comorbid medical diagnosis:		
Present	60.0% (14)	50.7% (71)
Absent	30.0% (6)	39.3% (69)

The most frequent reason for admission in both groups was safety issues. For the AMA group, this was followed in frequency by psychotic symptoms, mood symptoms and substance use symptoms. For the AMA population, in descending order of frequency was mood symptoms, psychotic symptoms and, then, substance related symptoms for the non-AMA population.

Some of these differences in proportions were statistically significant as can be seen in Table 15.

Table 15

AMA vs non-AMA population: Chi-squared analysis for illness related variables

Variable	X^2	Degrees of Freedom	p-value (2-sided)
Reason for admission:			
Safety	4.194	1	0.041
Mood Symptoms	1.455	1	0.228
Psychotic Symptoms	39.461*	1	0.000
Substance Symptoms	68.257*	1	0.000
Other	103.251*	1	0.000
Diagnosis:			
Mood Disorder	3.4338	1	0.064
Psychotic Disorder	16.341	1	0.000
Substance Use Disorder	34.140*	1	0.000
Anxiety Disorder	136.149*	1	0.000
Adjustment Disorder	53.295*	1	0.000
Other	103.251*	1	0.000
Onset:			
Days	0.047*	1	1.000
Weeks	1.314	1	0.692
Months	0.586	1	0.444
>364 days	0.586*	1	1.000
Co-morbid Psychiatric Diagnosis	0.604	1	0.437
Co-morbid Medical Diagnosis	0.315	1	0.574

* For cell sizes less than 5 The Fisher Exact Statistic is provided.

The difference in the proportions for two of the diagnostic categories were significant (adjustment disorders and other disorders) primarily as a result of cell values equal to zero. The proportion of patients in each category for "onset" was not significantly different however, nor was the difference between the AMA and non-AMA groups for co-morbid psychiatric or medical illness.

3.1.4.3 Treatment Variables – AMA and non-AMA Compared

Differences in the distribution of treatment variables for the AMA population were not considered. The AMA patients, by definition, did not remain in hospital and all self-discharged within the first day of admission. Thus, the only health care professionals involved in care were physicians and nursing staff.

3.1.5 Inter-institutional Variations

3.1.5.1 Socio-demographic Characteristics

In Section 1.3 the operation of the three inpatient acute care sites was described. For the most part the two general hospitals operate quite similarly and both differ from the Waterford Hospital on much the same parameters. As such, the two general hospitals were considered together in comparison to the Waterford Hospital for socio-demographic, illness and treatment characteristics. The comparison of the general hospital sites and the Waterford Hospital with respect to socio-demographic variables, excluding those discharged AMA, can be found in Table 16. To identify significant differences between the two types of hospitals, chi-squared analysis was performed. In cases where expected cell counts were less than five, the Fisher Exact

Test statistic was employed (Daniel, 1995). The chi-squared statistics for the patient

related variables can be found in Table 17.

Table 16

Distribution of socio-demographic variables by type of institution   (n = 140)

Variable	General Hospital Units (n)	Waterford Hospital Units (n)
Age (years)		
19-29	22.4%(13)	18.3% (15)
30-39	24.0% (14)	30.5% (25)
40-49	19.0% (11)	28.0% (23)
50-59	12.1% (7)	14.6% (12)
60+	22.4% (13)	8.6% (7)
Gender:		
Male	41.4% (24)	61.0% (50)
Female	58.6% (34)	39.0% (32)
Stable Relationship:		
Y (Married + Common Law)	55.2% (32)	24.4% (20)
N (Single/Divorced/Separated/Widowed)	44.8% (26)	75.6% (62)
Employment Status:		
Employed	24.1% (14)	92.7% (76)
Unemployed	75.9% (44)	7.3% (6)
Education:		
High school complete	50.0% (29)	53.7% (44)
High school Incomplete	50.0% (29)	46.3% (38)
Place of Residence:		
Within catchments area for St. John's	60.3% (35)	61.0% (50)
Outside catchment area for St. John's	37.9% (22)	35.4% (29)
Missing data	(1)	(3)

There was no significant difference between the two types of admission sites

for age categories, with the exception of patients older than 60 years of age. The two

admission sites differed significantly however, on the proportion of males versus

females, the presence or absence of stable relationship, and employed versus non-employed. There was no statistical inter-site difference between completion and non completion of high school. Place of residence showed the majority of patients were residents of St. John's, irrespective of site but again, any differences between the two types of units were not statistically significant.

Table 17

Chi-squared analysis for patient related variables (n=140)

Variable	X^2	Degrees of Freedom	p-value (2-sided)
Age (years)			
19-29	0.361	1	0.548
30-39	0.682	1	0.409
40-49	1.524	1	0.217
50-59	0.191	1	0.662
60+	5.343	1	0.021
Gender:	5.235	1	0.022
Stable Relationship:	13.787	1	0.000
Employment Status:	7.850	1	0.005
Education:	0.182	1	0.477
Place of Residence:	0.050	1	0.822

3.1.5.2 Illness Characteristics

The proportions for the illness variables are listed in Table 18. The corresponding chi-squared statistics can be found in Table 19.

Table 18

Distribution of illness variables by type of institution (n=140)

Variable	General Hospital Units (n)	Waterford Hospital Units (n)
Reason for admission:		
Safety	46.6% (27)	37.4% (34)
Mood Symptoms	32.8% (19)	27.5% (25)
Psychotic Symptoms	6.9% (4)	19.8% (18)
Substance Symptoms	3.4% (2)	11.0% (10)
Other	10.3% (6)	4.4% (4)
Onset:		
Days	8.6% (5)	31.7% (26)
Weeks	39.7% (23)	22.0% (18)
Months	39.7% (23)	29.3% (24)
>364 days	3.4% (2)	2.4% (2)
missing	(5)	(12)
Diagnosis:		
Mood Disorder	53.4% (31)	45.1% (37)
Psychotic Disorder	15.5% (9)	23.2% (19)
Substance Use Disorder	8.6% (5)	9.8% (8)
Adjustment Disorder	10.3% (6)	14.6% (12)
Other	12.1% (7)	6.1% (5)
missing		(1)
Co-morbid Psychiatric Diagnosis:		
Present	65.5% (38)	62.2% (51)
Absent	34.5% (20)	37.8% (31)
Co-morbid Medical Diagnosis:		
Present	70.7% (41)	63.4% (52)
Absent	29.3% (17)	36.6% (30)

The most common reason for admission, for all the inpatient units, was safety

issues and the differences between the two types of admission sites for any of the

reasons were not statistically significant. The proportion of patients that had been

experiencing symptoms for "days" and "months" was significantly different between

the two types of inpatient settings. The proportion of patients experiencing symptoms

for "weeks" was comparable for all sites.

Table 19

Chi-squared analysis for illness related variables (n=140)

Variable	X^2	Degrees of Freedom	p-value (2-sided)
Reason for admission:			
Safety	1.398	1	0.237
Mood Symptoms	0.081	1	0.776
Psychotic Symptoms	3.761	1	0.052
Substance Symptoms	2.038	1	0.153
Other	2.525	1	0..162
Diagnosis:			
Mood Disorder	0.593	1	0.441
Psychotic Disorder	1.507	1	0.220
Substance Use	0.052	1	0.820
Disorder	0.558		0.455
Adjustment Disorder	3.445*	1	0.074
Other		1	
Onset:			
Days*	10.503	1	0.001
Weeks	1.913	1	0.167
Months*	1.643	1	0.200
>364 days	0.125*	1	1.000
Co-morbid Psychiatric Diagnosis	0.162	1	0.687
Co-morbid Medical Diagnosis	15.808	1	0.000

* For cell sizes less than 5 The Fisher Exact Statistic is provided.

The general hospital units had a significantly higher proportion of patients

with co-morbid medical diagnosis. There ware no significant differences in the

diagnostic profiles or the presence of co-morbid psychiatric illness between the general hospital units and those at the Waterford Hospital.

3.1.5.3 Treatment Characteristics

The frequency distributions for the treatment related variables are listed in Table 20. The two types of hospitals did not vary significantly with respect to the number of health care professionals involved, the presence of a discharge plan or the duration of a discharge plan. There were significant differences between the two types of admission sites for the type of health care professional involved in care but only for Occupational Therapy and Dietetics/Nutritional Services. Table 21 contains the associated chi-squared statistics.

Table 20

Distribution of treatment variables by type of institution (n=140)

Variable	General Hospital Units (n)	Waterford Hospital Units (n)
Number of Additional Healthcare Professionals:		
1	27.6% (16)	32.9% (27)
2	41.4% (24)	36.6% (30)
>=3	31.1% (18)	30..5% (25)
Type of Healthcare Professional:		
Social work	41.4% (24)	46.3% (38)
Psychology	17.2% (10)	18.3% (15)
Physiotherapy	3.4% (2)	1.2% (1)
Occupational Therapy	31.0% (18)	12.2% (10)
Dietetics/Nutritional Services	17.2% (10)	2.4% (2)
Other	15.5% (9)	20.7% (17)
Discharge Plan:		
Present	81.0% (47)	67.1% (55)
Absent	19.0% (11)	32.9% (27)
Duration of Discharge Plan (days):		
Mean	3.46	2.82
Median	2	1
Standard Deviation	6.887	3.849

Table 21

Chi-squared analysis for treatment related variables

Variable	X²	Degrees of Freedom	p-value
The number of additional health care professionals:			
1	0.455	1	0.500
2	0.330	1	0.566
>=3	0.877	1	0.349
The type of health care professional providing additional care:			
Social Work	1.969	1	0.161
Psychology	0.026	1	0.873
Occupational Therapy	7.536	1	0.003
Physiotherapy	0.805	1	0.570
Dietician	9.498	1	0.004
Other	0.611	1	0.434
Presence of a discharge plan:	1.001	1	0.317

*Corrected chi-squared value: Yates' Correction for Continuity for chi-squared is recommended where the number of individuals expected in each class is less than 5.

3.2 Objective #1: What Factors Predict Length of Stay?

The first objective of this study was to identify the factors that were associated with length of stay on the inpatient psychiatry units in St. John's, Newfoundland. The sample size for this portion of the analysis was 140 because the AMA patients could not be included. The length of stay data was skewed and so was transformed to the logarithmic variant for the analysis. This allowed for the fulfillment of the assumptions for ANOVA since the natural logarithm of the length of stay data was a normal distribution (Figure 2).

Figure 2: The Distribution of Length of Stay and ln(length of stay)

Figure 2a)

Distribution of Length of Stay

Std. Dev = 29.08
Mean = 27.2
N = 140.00
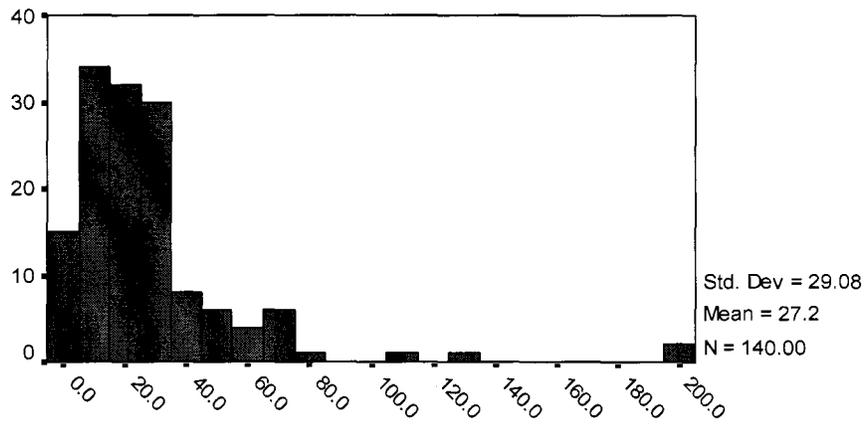
LOS

(in days)

Figure 2b)

Distribution of ln(Length of Stay)

Std. Dev = .97
Mean = 2.88
N = 140.00
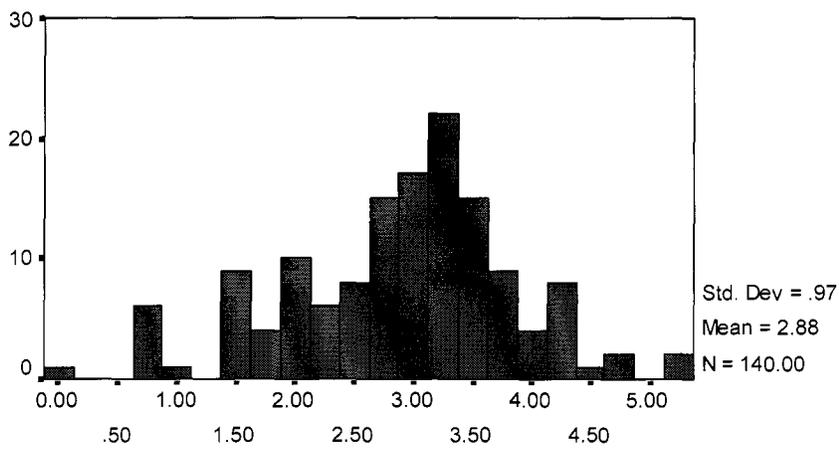
LNLOS

(in days)

3.2.1 Patient Related Variables and Length of Stay

Five patient variables were examined for an association with length of stay. These included patient age, gender, the presence of social support (stable relationship), level of education, employment status, and place of residence. Only patient age correlated significantly with length of stay.

Table 22

Patient related variables and length of stay

Variable	F	df	p	eta^2	Observed Power (%)
Age*	3.678	5	<0.005	0.121	92.1
Gender	1.917	1	0.168	0.014	28.0
Stable Relationship	0.010	1	0.920	0.000	5.1
Employment Status	0.042	1	0.837	0.000	5.5
Level of Education	0.032	1	0.859	0.000	5.4
Place of Residence	2.126	1	0.147	0.016	30.5

*correlated with ln(length of stay)

3.2.2 Illness Related Variables and Length of Stay

The six illness variables considered for analysis were reason for admission, duration of illness prior to admission (onset), primary diagnosis, presence of co-morbid psychiatric diagnosis, and presence of co-morbid medical diagnosis. Even though patients admitted with psychotic symptoms had the longest average length of stay, none of the reasons for admission were significantly associated with length of

stay (Table 23). The only diagnostic category that was significantly associated with length of stay was that of "other".

Table 23

Illness related variables and length of stay

Variable	F	df	p	eta^2	Observed Power (%)
Reason for Admission:					
Safety Issues	0.201	1	0.654	0.001	7.3
Mood Symptoms	0.264	1	0.608	0.002	8.0
Psychotic Symptoms	0.016	1	0.899	0.000	5.2
Substance Use Symptoms	0.274	1	0.602	0.002	8.1
Other	0.049	1	0.826	0.000	5.6
Diagnosis:					
Mood Disorder	2.355	1	0.127	0.017	33.3
Psychotic Disorder	0.159	1	0.690	0.001	6.8
Substance Use Disorder	0.009	1	0.925	0.000	5.1
Adjustment Disorder	2.601	1	0.109	0.019	36.0
Other*	3.273	1	<0.05	0.023	43.5
Onset:	0.652	3	0.627	0.019	20.8
Co-Morbid Psychiatric Diagnosis:	0.278	1	0.599	0.002	8.2
Co-morbid Medical Diagnosis:	0.794	1	0.375	0.006	14.3

*correlated with ln(length of stay)

3.2.3 Treatment Related Variables and Length of Stay

Two of the four treatment variables were significantly correlated with length of stay: the presence of discharge plan, and the duration of discharge plan. Of all disciplines providing services in the inpatient setting, only the involvement of occupational therapists and "other" professionals correlated with length of stay. For

the variables of "number of health care professionals" and "duration of discharge plan", the degrees of freedom are specified and are based on the number of categories under these variables. For example, "number of health care professionals" had three categories (1, 2, and >=3) and the duration of discharge" had seventeen categories.

Table 24

Treatment Related Variables and Length of Stay

Variable	F	df	p	eta^2	Observed power (%)
Number of Health Care Professionals involved in care	2.552	2	0.083	0.51	49.9
Type of Health Care Professional Involved in care:					
Social Work	0.309	1	0.579	0.002	8.6
Psychology	2.926	1	0.089	0.021	39.7
Physiotherapy	0.011	1	0.917	0.000	5.1
Occupational Therapy*	5.544	1	<0.05	0.039	64.7
Dietitian	1.684	1	0.197	0.012	25.2
Other*	9.864	1	<0.005	0.067	87.7
Discharge Plan*	20.975	1	<0.001	0.132	99.5
Duration of Discharge Plan*	2.777	16	<0.005	0.265	99.4

*correlated with ln(length of stay)

3.2.4 Results That Failed To Reach Statistical Significance

The ability to identify significant statistical relationships is dependent on study power. The power to identify a significant association, in turn, relies on sample size and the magnitude of the relationship. With smaller sample sizes, the power to detect any particular difference will also be smaller and therefore the ability to

capture a significant result in analysis is limited. As can be seen in Tables 22-24, the observed power for the variables that were not correlated with length of stay was rather small (<50%). As such, it would have been difficult to capture small effect sizes.

Table 25

Non-Significant Results

Variable	r-value	Observed Power (%)
Patient:		
Gender	0.118	28.0
Stable Relationship	0.000	5.1
Level of Education	0.000	5.4
Employment Status	0.000	5.5
Place of Residence	0.130	33.2
Illness:		
Reason for Admission:		
Safety	0.032	7.3
Mood symptoms	0.045	8.0
Psychotic symptoms	0.000	5.2
Substance Symptoms	0.045	8.1
Other	0.000	5.6
Diagnosis:		
Mood Disorder	0.130	33.3
Psychotic Disorder	0.032	6.8
Substance Use Disorder	0.000	5.1
Anxiety Disorder	0.063	11.0
Adjustment Disorder	0.138	36.0
Onset	0.138	20.8
Co-morbid psychiatric Illness	0.045	8.2
Co-morbid medical illness	0.077	14.3
Treatment:		
Number of Health Care Professionals:	0.51	49.9
Type of Health Care Professional:		
Social Work	0.045	8.6
Psychology	0.145	39.7
Physiotherapy	0.000	5.1
Dietetics	0.110	25.2

3.2.5 The Influence of Interaction

The uni-variate analysis of variance identified associations between specific factors and observed length of stay (Table 26).

Table 26

Factors correlated with length of stay

Factor	p value	r-value
Age	< 0.005	0.348
Diagnosis of "other"	<0.001	0.508
Presence of Discharge Plan	<0.001	0.363
Duration of Discharge Plan	<0.005	0.515
Involvement of Occupational Therapy	<0.05	0.197
Involvement of "Other"	<0.005	0.259

The eta^2 values provided in Section 3.2.3, however, indicate that there are varying degrees to which a particular factor accounts for the variability in length of stay. Indeed, there remains the possibility that observed associations are the result of relationships within and among other factors. To determine the extent to which a particular factor impacts on length of stay, the associations summarized in Table 26 must be analyzed while controlling for the influence of the other factors.

Indeed, the multivariate analysis showed that age, diagnosis of "other", the presence of a discharge plan, and the duration of the discharge plan correlated with length of stay once the effects of other independent variables were removed. This implies that the portion of the variance in length of stay that was associated with the involvement of "Occupational Therapy", and the involvement of "Other" professionals, was shared with the variance associated with age, a diagnosis of "other", the presence of a discharge plan, and the duration of the discharge plan. Of

note, one of the variables was correlated with a shorter length of stay (Diagnosis of "other") while all the other variables were correlated with increased length of stay.

Table 27

Regression analysis of factors correlated with length of stay

	Un-standardized Co-efficients		Standardized Co-efficients	t	Sig.
	β	Std. Error	β		
(Constant)	1.296	0.525		2.469	0.015
Age	0.134	0.048	0.206	2.807	0.006
Duration of Discharge Plan	0.030	0.014	0.175	2.163	0.023
"Other" Health Care Professionals	0.430	0.188	0.173	2.293	0.071
Occupational Therapy	0.247	0.180	0.102	1.371	0.173
Presence of a Discharge Plan	0.542	0.173	0.249	3.124	0.002
Diagnosis of "Other"	-.605	0.288	-.153	-2.101	0.037

3.3 Objective #2: Does Length of Stay Vary Among Sites?

The second objective of this study was to assess the accuracy of the psychiatrists' perception that length of stay varies among the three institutions that provide acute psychiatric inpatient care in St. John's. To do this, the average length of stay, the median length of stay and the associated standard deviation were calculated. Then the average ln(los) values were compared using ANOVA. Length of stay did

not differ significantly across sites even when the AMA population was included (F= 0.155, df = 2, p = 0.856, eta^2 = 0.002).

Table 28

Mean length of stay by institution (n=140)

Institution	n	Mean Length of Stay (days)	Mean ln(length of stay)	Standard Deviation
The Waterford Hospital	82	26.45	3.28	33.67
The Health Sciences Center	33	22.84	3.13	19.50
St. Clare's Mercy Hospital	25	21.66	3.08	17.44

3.4 Objective #3: Accuracy of psychiatrists opinions re length of stay

The third objective of this study was to assess the accuracy of the psychiatrists' opinions with respect to the factors that impact on length of stay in St. John's, Newfoundland.

3.4.1 Characteristics of the Sample

Nineteen of twenty-one (90%) psychiatrists responded to the questionnaire. Most of the psychiatrists involved in the study were less than fifty years of age. Forty-two percent were between the ages of 30 and 39 years, 31.6% percent were 40-49 years of age, and 26.3% percent were 50 years old or older. Approximately, 69% of the physicians were male. Ninety percent of participants had FRCP qualification as

specialists in psychiatry and half had obtained this qualification between 1980 and 1989. Only five of the psychiatrists were practicing in a sub-specialty area of psychiatry. The sub-specialty areas represented were Forensic, Geriatric, and Psychoanalytical Psychotherapy.

Forty percent of the physicians had been practicing psychiatry for five years or less. Fifteen percent had been practicing for 6 to 10 years. Twenty-five percent had practiced 11 to 15 years, 20% had been doing so for greater than 15 years. Forty percent of physicians saw, on average, 0 to 50 patients per week, 35% saw 51 to 75 patients per week and 20% saw between 76 and 100 patients per week. Seventy percent of physicians had one or two elective admissions per week but nearly 60% admitted between three and five patients when on-call.

3.4.2 Psychiatrists' Opinions on Factors Predictive of Length of Stay

The psychiatrists surveyed were of the opinion that race and gender had low impact on length of stay patterns for the patient population they were working with. They did feel however, that age, level of education, marital status, employment, and income had moderate impacts on length of stay. Place of residence was felt to have slightly higher impact than the other patient-related variables. All of the patient variables, according to the majority of psychiatrists, had a low impact on length of stay (Table 29).

Table 29

Patient related factors and length of stay: The psychiatrists' opinions (n=19)

Factor	Low Impact	Moderate Impact	High Impact
Age	31%	57%	11%
Gender	68%	26%	-
Level of Education	37%	47%	16%
Marital Status	26%	47%	26%
Employment Status	21%	42%	37%
Income Level	26%	47%	26%
Place of Residence	21%	42%	53%
Race	74%	26%	-

Psychiatrists were also able to identify illness factors that influenced length of stay. Level of stress experienced by the patient, presence of a co-morbid medical diagnosis, primary diagnosis and presence of co-morbid psychiatric illness were believed to have substantial impact on length of stay (Table 30). Psychiatrists were also asked to rate the impact of "treatment issues" on length of stay.

Table 30

Illness related factors and length of stay: The psychiatrists' opinions (n=19)

Factor	Low Impact	Moderate Impact	High Impact
Level of Patient Stress	-	37%	63%
Primary Diagnosis	-	21%	79%
Co-morbid medical diagnosis	-	37%	63%
Co-morbid psychiatric diagnosis	-	16%	84%
Treatment Issues	-	37%	63%

The psychiatrists' opinions of themselves in terms of impact on length of stay are listed below (Table 31). The psychiatrists believed that physician age and gender had little impact on length of stay for patients. Level of expertise and composition of practice were rated as having moderate and high impact on length of stay, respectively.

Table 31

Physician related factors and length of stay: The psychiatrists' opinions (n=19)

Variable	Low Impact	Moderate impact	High Impact
Age of Psychiatrist	63%	37%	0%
Gender of Psychiatrist	79%	21%	0%
Level of Expertise	21%	32%	47%
Composition of Practice	5.0%	42%	53%

Chapter 4: Discussion

4.1 Objective #1: Factors Associated with Length of Stay in St. John's

The first objective of this study was to determine which factors are associated with length of stay on the acute acre psychiatry units in St. John's, Newfoundland.

4.1.1 Patient-Related Factors

Several factors were significantly associated with length of stay in St. John's. Age was associated with increased length of stay. This finding is consistent with numerous other studies (Baker & Rochon, 1989; Boelhouwer & Rosenberg, 1983; Gordon et al., 1985; Gruber, 1982).

Not infrequently in previous studies, being female has also been associated with a slightly increased likelihood of longer stay in hospital (Altman et al., 1972; Baker & Rochon, 1989; Boelhouwer et al., 1983; Oiesvold et al., 1999). An association between gender and length of stay was not identified in this study. However, it is possible that there was insufficient power to capture such a small correlation (r= 0.118, observed power= 28.0%).

The effect of intact support networks on length of stay has been examined previously (Allodi & Cohen, 1978; Altman et al., 1972; Babiker, 1980; Baker & Rochon, 1989). While the results of these studies are somewhat contradictory, most often, being single has been associated with longer lengths of stay. Similarly a marital status of Married or Common Law is more often associated with a shorter length of stay. This suggests that the presence of a stable relationship, and not marital status per

se, could be predictive of length of stay. In this study, the presence of a stable relationship was not significantly associated with length of stay. There are several possible explanations for this inconsistency. First, the assumption that being in a stable relationship (married or common law) confers a greater degree of social support may have been faulty. For example, a patient may report being married, but if there is substantial discord in the relationship, he/she may experience limited social support. Second, variability in the method used to measure the degree of social support or in the population studied could account for discrepant results. Third, there may have been insufficient power to detect such a small effect.

A significant association between education, employment status and length of stay was not observed. As such, capacity for independent living does not appear to be associated with length of stay, if we are to assume that these variables are good proxy indicators for the ability to live independently. Differences in the method of measurement of capacity for independent living may account for the discrepancy in results between this study and others (Gordon et al., 1985; Gruber, 1982). On reflection, it is possible that education level may not be indicative of the capacity for independent living given that many patients do not experience a first episode of illness until they have completed adolescence and thus their high school education. Once again, the power to detect a small effect size for this variable was low and could also explain the inconsistent observations.

Place of residence was not shown to correlate with length of stay. This is contrary to what was expected and certainly inconsistent with the literature (Dalagalarrondo & Gattaz, 1992; Fortney et al., 1999). Quite possibly, the failure to

detect this relationship between place of residence and length of stay may have been a function of inadequate power.

4.1.2 Illness Related Factors

Only one illness variable was significantly associated with length of stay: primary diagnostic category of "other". The link between length of stay and primary diagnosis has often been considered. In this study, the presence of psychotic illness was not associated with length of stay. This is inconsistent with previous studies (Altman et al., 1972; Baker & Rochon, 1989; Boelhouwer et al., 1983, Creed et al., 1997; Huntley et al. 1998). If the sample size were larger in this study, a positive correlation between several other diagnostic categories may have been detected. Reason for admission also failed to be associated with length of stay. While power may once again have been the issue, it is also possible that any variance attributable to reason for admission is likely to be shared with diagnosis. For example, if the psychotic diagnostic category were to be associated with length of stay then one might expect that psychotic symptoms as "reason for admission" may also be correlated with length of stay. In regression analysis, however, such a relationship may fail to persist due to overlap between the two variables (i.e. reason for admission) also averaged a longer duration of stay. Symptoms of psychosis are, associated with specific diagnoses, so perhaps, in this instance, reason for admission may be mirroring the influence of a particular underlying diagnosis.

It was hypothesized that the longer the duration of the symptoms prior to admission (onset), the longer the observed length of stay. However, no such association was found. This variable has not been examined by previous studies. It was also hypothesized that having a co-morbid illness, psychiatric or medical, would be associated with an increased length of stay since previous literature had reported this (Allodi & Cohen, 1978; Boelhouwer & Rosenberg, 1983). Several studies had failed to identify any such relationship, however, and thus it was equally likely that co-morbid illness may not have impacted on length of stay (Fulop et al. as cited in Jayaram et al., 1996; Jayaram et al.) This finding of this study was consistent with the latter.

4.1.3 Treatment Related Factors

The treatment variables examined in this study do not appear to have been studied before (number of health care professionals involved in care, the discipline of healthcare workers providing care and the duration of the discharge plan). The number of health care professionals involved in care did not correlate with length of stay. It was expected that the more people providing care to a given patient, the more comprehensive the care would be, and the shorter the observed length of stay. However, it is also possible that the more complex the illness, the longer the patient stays in hospital, and thus, the more diverse the complement of professionals needs to be in order to maximize recovery and to warrant subsequent discharge. While the involvement of occupational therapy in patient care was associated with length of stay in the uni-variate analysis, this association did not hold once the interaction of the

other factors was controlled. This suggests that there was significant interaction between the other factors associated with length of stay and this particular treatment factor. This is also the case for the impact of involvement of "other" health care professionals. It is also possible; however, that irrespective of the number of interventions a patient receives or of the type of health care provider that provides the intervention, the pace of recovery is, to some extent intrinsic to the diagnosis and individual variability in response to treatment.

The presence of a discharge plan and the duration of that plan correlated with length of stay. It was assumed that a longer duration of the discharge plan, the earlier it was devised in the admission process. Furthermore, early discharge planning was assumed to be associated with more efficient illness management and potentially, a shorter length of stay. The longer the duration of the discharge plan however, the longer the hospital was hospitalized. There is one possible explanation for this. There are two groups of patients who most often have formally documented discharge plans: those with more severe and complex illnesses and those who have exceeded the average length of stay for the inpatient unit. More straightforward cases are often handled without a formally documented discharge plan because the choices are familiar and easily made. In the first case, discharge plans help multi-disciplinary teams to organize management and to ensure all aspects of treatment are being implemented. The more complex a case, the more important it is that the team be organized so as to maximize efficiency and the more useful a discharge plan becomes. In the second case, when a patient exceeds the expected length of stay, the multi-disciplinary team re-evaluates the reasons for prolonged admission. At those

times, discharge plans are devised to facilitate a speedy discharge and the failure of a
clinician to document a formal discharge plan in the chart is not an accurate measure
of whether or not a discharge plan was in operation over the course of the admission.
It is possible that all patients had discharge plans but only those of complex treatment
regimes or prolonged stays were documented. It is understandable, then, how
discharge plan might not correlate with an increased length of stay. To clarify this
matter, it would be important to consider the impact of severity of illness on length of
stay and whether or not the duration of the discharge plan will be associated with
length of stay independent of illness severity.

4.2 Objective #2: Does Length of Stay Vary Among Sites

The psychiatrists employed by The St. John's Health Care Corporation have
speculated that there is significant variability in length of stay among the inpatient
admission sites in their region. The second objective of this study was to assess the
accuracy of the psychiatrists' speculation. In this study, length of stay did not vary
significantly among sites. This was true whether or not AMA patients were included
in the analysis. Thus, the psychiatrists' opinions on this matter are inaccurate.

4.3 Objective #3: Accuracy of psychiatrists' opinion re length of stay

The third objective of this study was to assess the accuracy of the
psychiatrists' opinions regarding the impact of specific factors on length of stay for
their region. The results of the survey demonstrate that the psychiatrists believe that
there is a number of factors that impact on length of stay on the inpatient units in St.

John's. Some of these opinions were inconsistent with the findings of this study while some were not.

4.3.1 Patient –Related Variables

The psychiatrists believed that gender had low impact on length of stay. This study failed to identify any significant association between gender and length of stay and so the psychiatrists' opinions on this matter are accurate. The majority of psychiatrists reported that patient age had moderate impact on length of stay. Since this study did find a significant association between age and length of stay, the perception of the psychiatrists that age impacts substantially on length of stay is also accurate. It is noteworthy, however, that the psychiatrists believed that the impact was similar, in magnitude, to the impact of factors for which no correlation was found. This suggests that while the physicians can accurately identify the factors that impact on length of stay for their region, they may be poor at estimating the degree to which these factors influence length of stay.

Of the remaining patient related factors, the psychiatrists rated the variables of level of education, marital status, employment status, and level of income as having moderate impact on length of stay. This is not consistent with the results of this study, but is an opinion that is supported by the literature (Altman et al., 1972; Durbin et al., 1999; Fortney et al., 1999). The psychiatrists were also of the opinion that the impact of place of residence on length of stay was high but this was not consistent with the results of this study. The accuracy of the psychiatrists' opinions for these factors, then, is inaccurate.

4.3.2 Illness and Treatment Related Variables

The majority of psychiatrists were of the opinion that the level of patient stress, primary diagnosis, co-morbid psychiatric diagnosis and co-morbid medical diagnosis impact heavily on length of stay. Of these variables, only diagnosis was significantly associated with length of stay (despite there having been sufficient power to capture such correlations). As such, psychiatrists' seem to over-estimate the role of these factors in determining length of stay.

The survey results also identified 'treatment issues' as having high impact on length of stay and, indeed, analysis of the chart review demonstrated that several treatment variables were significantly associated with longer lengths of stay. However, the survey failed to question psychiatrists regarding specific treatment factors. They were only asked if "treatment issues" impacted on length of stay. In retrospect, it would have been useful to poll opinions for the specific variables considered for Objective #1 so as to minimize the ambiguity of what is understood as "treatment issues". Thus, no conclusion regarding the accuracy of these opinions is possible.

4.3.3 Physician Related Variables

The psychiatrists were asked to rate the impact of physician related factors on length of stay. Whether or not physician related factors actually impacted on length of stay, in this clinical setting, was not determined due to the limitations imposed by the sample size of 19 physicians and the assurance to physicians that individual responses

would remain confidential. Analysis of the data would have compromised the confidentiality of their responses.

4.4 Limitations and Future Considerations

One limitation of this study was the limited sample size of the chart review and the physician survey. Smaller sample sizes can be associated with limited study power. While one can be confident that statistically significant results reflect real differences, it is not possible to draw the same conclusion for the results that did not reach significance. In this study a sample size of 160 was determined to be sufficient to identify the association between the factors and length of stay. It was not anticipated that such a relatively large number of the records chosen would contain so many discharges against medical advice. This effectively reduced the sample size to 140, which may not have had sufficient enough power to detect small effect sizes. The most obvious solution to this problem is to repeat the study with a larger sample size and this would be an important consideration for future researchers.

Large enough sample sizes might be difficult to establish in St. John's, where the number of psychiatric admissions is small, relative to other areas in the country. One solution would be to draw samples from multiple locations as was done by Oiesvold et al. (1999). However, this may introduce the effects of regionality and compromise the generalizability of the data to local practitioners. Another option would be to extend data collection over a prolonged period of time. Choosing a longer time frame would allow for a larger sample size and control over the possible impact of seasonal variation on admission patterns. If the duration of data collection

were substantially prolonged, however, then any evolution in treatment practices could bring other problems of interpretation in to play.

In contrast, relatively little can be done to increase the number of psychiatrists polled in the second part of the study. This is particularly the case if the opinions sought are unique to a given region where physician cohorts are apt to be small. More globally, however, one could conduct surveys across regions so that psychiatrists' opinions and the impact of physician-related factors on length of stay might be measured. Of course, in such a situation, there is a trade off between the generalizabilty to a given region and the ability to detect significant associations. In addition, factors influencing length of stay may change from region to region and these differences may be reflected in psychiatrists' opinions.

A second potential limitation relates to having had all of the study data collected by a single individual. With only one person doing chart reviews, the quality of the information may be influenced by subjective interpretations. To maximize consistency in data collection and minimize subjective bias, information obtained from charts was recorded on a standardized abstraction form in a uniform manner. All information required on the form was specifically documented in the chart and of a factual nature. The data collector was not required to interpret clinical notes. This then, is exactly the reason why the association between severity of illness and length of stay was not examined. Measuring severity of illness using a chart review method is difficult because it is not consistently documented in patient charts. As such, in order to rate severity of illness, a subjective interpretation of recorded data would have been necessary.

An additional limitation of this study is applicable only to the physician opinion survey. In retrospect, for this particular study, it would have been more useful if the opinions of physicians in regard to specific treatment variables were examined. The rating of "treatment issues" as a predictor of length of stay was ambiguous and open to interpretation. Given that this variable was unclear and nonspecific, the physicians' opinions on this matter were difficult to interpret.

4.5 Clinical Implications of the Study

In spite of its limitations, this study paves the way for further exploration of the factors associated with length of stay in St. John's, Newfoundland. With a new awareness of the factors associated with length of stay, prospective studies are now possible. As well, an accurate appreciation of which patients are at increased risk for longer hospital stays helps to identify those populations for future investigation and to tailor program development in inpatient and outpatient settings.

Having knowledge of the factors associated with length of stay affords us with a means to decrease length of stay by altering clinical practice and streamlining clinical management. Such an understanding could facilitate efforts to improve quality of care, minimize hospital expenditures and maximize the efficiency of bed-utilization. Without studies that examine the impact of changes in clinical practice and hospital protocols, however, we cannot be sure that we have improved upon the current state of affairs.

To do this, first mandates that we know the true extent to which a given factor impacts on length of stay. Future studies need to examine a larger number of factors

simultaneously and to focus on analytical methods that can control for interaction between factors. This way, the contribution of a given factor to the observed length of stay can be more accurately quantified. Additionally, it would be useful to conduct studies where the modification of a variable occurs and the resulting outcome is measured. Such evidenced based study protocols are perhaps the most powerful when it comes to rationalizing changes in treatment protocols and hospital policies.

So far, the implications for future studies are primarily applicable to factors that are modifiable. At first glance, the value of understanding the relationship between non-modifiable factors and length of stay is questionable. If physicians and healthcare administrators were to become aware of the impact of such non-modifiable factors, however, efforts to target and manage at risk individuals could be more concerted, organized and efficient. Additionally, knowing which non-modifiable factors are correlated with length of stay allows for improved statistical analysis in future studies. For example, age is accepted as being one of the non-modifiable factors associated with length of stay. Let us assume for a moment that there exists a modifiable factor that correlates with length of stay but interacts with age. By including age in a multivariate analysis, the extent to which this modifiable factor determines length of stay can be more accurately measured. This point is worth making since the interaction of factors with one another in the prediction of length of stay is a reality.

4.5.1 How can shorter lengths of stay impact on the patient?

Being admitted to hospital provides support and treatment to severely ill individuals. Patients receive assessment, education, counseling and medications that have high potential to improve quality of life. Inpatient admission allows a patient to establish connections to a health care system, to initiate and develop a relationship that will impact on the course of illness over time. Furthermore, it allows for precipitous management of relapse.

Unarguably these are some of the positive outcomes of hospitalization. But what if access to hospitalization is limited by the number of beds available? In this circumstance, rapid access to inpatient admission for an acutely ill individual would be restricted. To ensure a rapid response time to those who are acutely ill, patients must have timely access to inpatient services. To offset the restricted access to inpatient admission due to a reduction in the number of inpatient beds, length of stay must decrease simultaneously.

Still, being admitted to hospital interferes with day to day living. Patients are living in an artificial home environment, removed from family and friends. As well, patients who are hospitalized are often unable to maintain gainful employment for the duration of the admission. Hospitalization then, has the potential to limit socialization, to impact on financial security and to affect the well-being of the patient and any dependent family members. While the financial burden of being unemployed should not be minimized, the impact it has on self efficacy and self esteem must also be noted. The same can be said for the impact of limitations on socialization. As such, while one can rightly argue that hospitalization is beneficial, one must also

consider that it comes at a personal and psychological cost for some individuals. While patients with illnesses such as schizophrenia may benefit from longer admissions, it is possible that minimizing length of stay for other groups of patients may offer the best of both worlds. That is to say that treatment can occur and a relationship with a health care team can be established whilst having a minimum effect on income, social relations and a sense of self-efficacy.

4.5.2 How can shorter length of stay impact on hospital functioning?

To maintain and administer any inpatient unit is costly. Hospital administrators frequently target length of stay reduction as a means to minimize spending. Their goals are to maximize efficiency, to curtail expenditures, to serve a larger population of users, and to optimize resource utilization without compromising quality of care. Reducing length of stay, on a per patient basis, has the potential to reduce expenditures associated with the provision of inpatient services. To do this, without compromising quality of care, treatment has to be implemented more rapidly or a portion of the care may have to be transferred to outpatient services so as to complete treatment plans that are initiated in the inpatient setting. In the latter case, administrative efforts must shift towards funding and staffing alternate care programs, particularly in the outpatient and community settings. In the end, the savings associated with decreasing length of stay on an inpatient unit could be offset by the cost of maximizing outpatient services. One would still expect that the overall cost of care provision would be less since inpatient services are often more expensive to provide than outpatient services.

Minimizing length of stay, so as to maintain ready access to inpatient services, can further impact on length of stay. For example, consider that a shorter duration of acute symptoms might be associated with a more rapid response to treatment. The shorter the waiting lists for admission to psychiatry inpatient units, the more rapidly a patient can gain access to necessary treatment. The more rapid initiation of treatment, the shorter the duration of symptoms, the sooner the patient is ready for discharge. More rapid response of inpatient units for patients who are acutely ill, will allow for quicker response times for treatment, more rapid stabilization of illness and thus, allow for further reduction in length of stay.

4.5.3 How can shorter lengths of stay impact on the Community?

When patients are discharged from hospital settings, there exists the possibility that the patient's illness is still in the acute phase and requires ongoing treatment. Certainly, continuing care must be available in ambulatory settings to prevent the adverse effects that might be associated with early discharge. Outpatient resources are also limited however, and therefore, there is an increased reliance on community based services and the community will need to be responsive to the needs of the mentally ill patients. The pursuit of new initiatives for the establishment and development of mental health clinics, crisis teams and home care services for psychiatrically ill patients will be important but it will also cost money. New service initiatives will also need to undergo evaluation and management review so as to ensure that they are beneficial and cost-effective. Program evaluation itself can be costly with respect to human and financial resource utilization.

The discharge of partially remitted patients not only mandates increased resources for the affected patients. Family members who are overseeing the care of and supporting an ill family member through convalescence will also need a variety of resources. Respite services will be necessary to guard against care-giver burn-out. Financial issues such as accessing disability benefits for the ill family member, managing the cost of expensive medications or obtaining affordable transportation to hospital appointments or community agencies will be crucial. The ongoing education of family members with respect to the natural course of the illness, the warning signs of relapse and the side effects of medications will be critical. All of these supports will be required until the patient reaches the level of independent functioning. Those patients for whom independent functioning is an unrealistic goal, due to the severity and associated sequelae of their illness, the reliance on these and other resources will be long-term.

It is important to recognize that any understanding we have of length of stay carries with it the possibility that the delivery of care can be further optimized. By implementing changes that minimize length of stay however, we run the risk of altering quality of care and the cost-effectiveness of the delivery of care. The challenge of balancing cost-effectiveness and quality of care cannot be understated. By being more cost effective we run the risk of compromising the care delivered because some services may be minimized and/or eradicated. Alternatively, streamlining the services provided by inpatient units could free up monetary and human resources that can be of benefit in the development of more effective inpatient, outpatient and community programs. Indeed, quality of care and cost-effectiveness

are closely intertwined. The application of this and other length of stay studies has far-reaching but intricately complex implications. Further research is necessary to substantiate whether modification of these factors will actually impact positively on expenditures and quality of care. Toward this end, it would be important to consider the entire framework within which we provide care to mentally ill patients both inside and outside of the hospital setting.

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Appendix A: Data Collection Form

Factors Associated with Length of Stay Among Acute Care Psychiatry Inpatient Units

(Abstract: to record information obtained from inpatient chart review)

A. General Information

Chart Number: _____
Admission Site: _____
Date of Admission: _____
Date of Discharge: _____
Recorded Length of Stay _____

B. Patient Variables

Age: a) 19-29
       b) 30-39
       c) 40-49
       d) 50-59
       e) 60-69
       f) >or =70

Gender:
       a) M
       b) F

Marital Status:
       a) Single
       b) Married
       c) Divorced
       d) Widowed
       e) Separated
       f) CL

Employed
       a) Y
       b) N

Education
       a) Primary Completed (Up to grade 3)
       b) Elementary Completed (Grade 4-6 incl.)
       c) Junior High Completed (Grade 7-9 incl)
       d) High School Completed (Grade 10-12 incl.)
       e) Post-Secondary Incomplete
       f) Post-Secondary Complete

Place of Residence: _____

C. Illness Variables

Documented reason for admission _____

Duration of Illness prior to date of admission:

        a) Days (1-7days)   _____
        b) Weeks (8-31days)   _____
        c) Months (32-364days) _____
        d)Years (>364 days)   _____

Primary Diagnosis:

        a) Mood Disorder   _____
        b) Psychotic Disorder   _____
        c) Anxiety Disorder   _____
        d) Substance Use Disorder _____
        e) Personality Disorder   _____
        f) Adjustment Disorder   _____
        g) Delirium   _____
        h) Dementia   _____
        i) Other   _____

Concurrent Psychiatric Dx

        a) Mood Disorder   _____
        b) Psychotic Disorder   _____
        c) Anxiety Disorder   _____
        d) Substance Use Disorder _____
        e) Personality Disorder   _____
        f) Adjustment Disorder   _____
        g) Delirium   _____
        h) Dementia   _____
        i) Other   _____

Concurrent Medical Dx:

        a) Y
        b) N

D. Treatment Variables

of Health Care Professionals involved in patient care during stay: _____

Discipline of Health Care Professional involved:

        a) Psychiatrist   ___
        b) Nurse   ___
        c) Social Worker   ___
        d) Psychologist   ___
        e) Physiotherapist   ___
        f) Occupational Therapist ___
        g) Dietitian   ___
        h) Other   ___

Clearly documented discharge plan:

        Y : # of days prior to discharge _____
        N

Discharge AMA?

        Y
        N

Appendix B: Physician Questionnaire

FACTORS ASSOCIATED WITH LENGTH OF STAY AMONG ACUTE PSYCHIATRY INPATIENT CARE

Dear Doctor,

I am currently a psychiatry resident (PGY-4) here at Memorial University with an avid interest in research. As such, I have enrolled in the Masters of Epidemiology at Memorial University. To complete this Masters program I have chosen to complete a thesis in the form of a research project. This project will investigate the importance of certain variables that may impact on length of stay (LOS) of psychiatry patients on inpatient units in St. John's. Variables being considered include patient factors, illness factors, treatment factors and attending physician factors.

This research project will consist of analysis of data obtained from patient chart reviews and a survey of psychiatrists in St. John's. Physician factors to be surveyed include physician demographics, practice demographics and physician opinion as related to determinants of LOS.

Enclosed you will find a questionnaire pertaining to these primary physician variables. It would be greatly appreciated if you would complete the questionnaire and then forward it to the Department of Psychiatry at the Janeway in the envelope provided. If you do not wish to complete this questionnaire then I would kindly request that you simply forward the uncompleted questionnaire in the envelope provided. Your prompt response would certainly be greatly appreciated. All responses will remain confidential and will be used for the purposes of this research project only. Should you be interested, results of the study will be available upon completion of data analysis.

Thank you, in advance, for your co-operation.

Cherie Jones-Hiscock (PGY-4)

A. Demographics Information

Please circle the **single** most applicable answer:

1. Your age:
   - a) 30 – 39 y
   - b) 40 – 49 y
   - c) 50 – 59 y
   - d) 60+ y

2. Sex
   - a) M
   - b) F

3. Are you currently certified by The Canadian Royal College of Physicians and Surgeons (for psychiatry)?
   - a) Y_____ (Year attained)
   - b) N

4. Do you have <u>formal</u> training, in one of the subspecialty areas of psychiatry?
   (beyond the normal training of a residency program in psychiatry)
   - a) Y
   - b) N

   If yes, in which field:

   - a) Child and Adolescent Psychiatry
   - b) Forensic Psychiatry
   - c) Geriatric Psychiatry
   - d) Other (please specify)

5. How many years have you been practising as a psychiatrist?
   - a) 0 – 1 y
   - b) 2 – 5 y
   - c) 6 – 10y
   - d) 11- 15y
   - e) 16 –20y
   - f) > 20 y

B. Practice Demographics

6. On average how many patients (new and in follow-up) do you see in a typical week?
    a) 0 – 25
    b) 26 – 50
    c) 51 – 75
    d) 76 – 100
    e) >100

7. On average, how many patients do you admit to acute care psychiatry units in a typical week?
    a) 0
    b) 1 – 2
    c) 3 – 5
    d) 6 – 9
    e) >or= 10

8. On average, in a one month period, how many patients would you expect to admit to acute care psychiatry units as the on-call psychiatrist?

    a) 0
    b) 1 – 2
    c) 3 – 5
    d) 6 – 9
    e) >or= 10

9. Within your clinical **outpatient** practice, in a typical one-week period, approx. how many patients would you expect to see with the following <u>primary</u> diagnosis (as defined by DSM IV)?
    a) Mood disorders _____
    b) Psychotic Disorders _____
    c) Anxiety Disorder _____
    d) Substance Abuse Disorder _____
    e) Personality Disorder _____
    f) Adjustment Disorder _____
    g) Delirium _____
    h) Dementia _____
    i) Other (please specify) _____

10. Within your clinical **inpatient** practice, in a typical one-week period, how many patients would you expect to see with the following <u>primary</u> diagnosis (as defined by DSM IV)?

    a) Mood disorders _____
    b) Psychotic Disorders _____
    c) Anxiety Disorder _____
    d) Substance Abuse Disorder _____
    e) Personality Disorder _____
    f) Adjustment Disorder _____
    g) Delirium _____
    h) Dementia _____
    i) Other (please specify)_____

C. Physician Opinion

11. In your professional opinion which of the following *patient* variables do you feel are responsible for increased length of stay for patients admitted to acute psychiatric inpatient units? (0 = no impact, 3 = some impact, 5 = extreme impact)

a) Patient Age	0	1	2	3	4	5
b) Patient Gender	0	1	2	3	4	5
c) Patient Education	0	1	2	3	4	5
d) Patient Marital Status	0	1	2	3	4	5
e) Patient Employment Status	0	1	2	3	4	5
f) Patient Race	0	1	2	3	4	5
g) Family Income	0	1	2	3	4	5
h) Patient Place of Residence (ie. rural vs city)	0	1	2	3	4	5
i) Patient Level of Experienced Stress	0	1	2	3	4	5

12. In your professional opinion which of the following *illness* variables do you feel are responsible for increased length of stay for patients admitted to acute psychiatric inpatient units? (0 = no impact, 3 = some impact, 5 = extreme impact)

a) Primary Diagnosis	0	1	2	3	4	5
b) Presence of Comorbid Medical Illness	0	1	2	3	4	5
c) Presence of Comorbid Psychiatric Illness	0	1	2	3	4	5

13. In your professional opinion which of the following *physician* variables impact on length of stay for patients admitted to acute psychiatric inpatient units? (0 = no impact, 3 = some impact, 5 = extreme impact)

a) Physician Age	0	1	2	3	4	5
b) Physician Gender	0	1	2	3	4	5
c) Level of experience of attending physician	0	1	2	3	4	5
d) Composition of practice of attending physician	0	1	2	3	4	5
e) Other (please specify) _____	0	1	2	3	4	5

Thank You!

Appendix C: Ethics Approval

6. Introduction to study.

(a) What is the scientific background to the study?

There has been little research on factors associated with length of stay on acute care psychiatry inpatient units.

There has been some effort to characterize the patterns and associated factors in Hospital utilization for psychiatric patients by Zilber, Popper, and Lerner in 1990who found that the main predictors of long cumulative stay were old age, being single, longduration and high frequency of previous hospitalization. (Zilber, Popper, and Lerner. Patterns and Correlates of Psychiatric Hospitalization in a Nationwide Sample. 1990, 25: 144-148)

In 1993, Richardson, Barwick, Bagust et al. analysed the factors which contribute to length of stay in England on acute care medical inpatient units. They subsequently found there were certain targetable factors strongly associated with increased with length suchas physician discharge practices, lack of a structured system of discharge, and lack of interim care options (ie. Transition units from acute care to community living. (Richardson, Barwick, Bagust et al. Dissecting the Patient Stay in the UK. 1993: 8, 25-36.)

(b) What is the rationale for the study?

Recently there has been local discussion about variations in length of stay for the three acute care psychiatry sites in St. John's. This study hopes to identify factors associated with increased length of stay so as to provide direction as to how to streamline efforts to reduce length of stay in this subgroup of patients.

(c) Summarize any relevant human or animal studies already conducted.

   N/A

7. Blood or other tissue sampling.

(a) List samples to be taken from participants. State type of sample, frequency and amount

   N/A

Will any samples be kept after the completion of the study?   N   If yes, include section 9 on consent form.

8. Research interventions.

(a) List any procedures, tests or substances to be administered to participants: e.g. imaging, special diets, drugs (state dose and frequency), isotopic tracers, ECGs etc. **List only those that are not part of normal patient management.** A questionnaire will be administered to practising psychiatrists who admit to acute care psychiatric inpatient units in St. John's.
(b) List questionnaires, interview scripts or chart audit forms to be used: Attach copies of each. See attached study protocol.

9. For studies involving patients.

(a) What treatment do *you* now use for patients who would meet the inclusion criteria for this study? (i.e. How would you manage these patients if they did not go into this study?) Is this considered "standard treatment"?   N/A
(b) Is this an application for a clinical trial?   No If yes, what phase is this trial?   I   II   III   IV What is the design of the trial (e.g. open, double blind, crossover etc.)?

10. In the space provided, give a brief description of the design of the study, including participant selection, interventions and outcome measurement. (Attach one copy of a protocol if available).

This study is based on a review of inpatient charts, hospital databases, and findings from a physician questionnaire affiliated with the psychiatric inpatient units in St. John's. Data obtained from chart review and hospital databases will be relevant to patients admitted over an arbitrary but uniform three month period. Patients will be excluded from the study if they have been discharged from a psychiatric unit 30 daysprior to the admission being studied. Patients less than age 19 will also be excluded. The physician questionnaire will be administered to practising psychiatrists in the St. John's area who admit to acute care psychiatry inpatient units. The questionnaires will be distributed to these physicians at a regularly scheduled faculty meeting and collected at the end of the meeting in unmarked envelopes to maximize confidentiality.

11. Participants.

Number of participants at this site. 400 patients/ 30 psychiatrists	Will pregnant women be excluded? N
Is this part of a multi-centre study? N If Yes, what is the total number of participants at all sites? _____	

How will participants be recruited?

Recruitment will be based on admission date and site (ie. acute care psychiatry inpatient units). Of note, a patient will be excluded if his/her age is less than 19 and/or he/she has been discharged within 30 days prior to the hospital stay under study.

12. What is the basis for the choice of sample size? (Consider the total number of participants for multi-centre studies).

Given 10 variables per patient, numbers suffice as supplied.

13.What risks, discomforts or inconveniences are involved?

(a) risks: NIL

(b) discomforts: NIL

(c) inconveniences: NIL

14. Benefits.

Are there any immediate benefits arising out of the study for the participants (including controls)?   N   Please specify.

15. Confidentiality.

(a) What steps will be taken to preserve confidentiality?

No identifying data will be attached to information obtained from data sources.

(b) List names of all personnel who can access information that could be linked to individual participants.

Principal Investigator only.

16. Consent process.

(a) Who will make the initial contact with the participant? N/A

(b) Who will obtain the consent of the participant?   N/A

(c) Explain procedure for obtaining consent.   N/A

17. Vulnerable populations.

Will participants include: Minors (less than 19yrs) ? N   or   Persons incompetent to give consent?* N

If so, please justify. Outline the measures that will be used to protect their rights (attach separate sheet if required)

* Usually prohibited by Provincial legislation on Advanced Health Care Directives. (Situation as of November 1997)

18. Debriefing.

Explain the mechanism, if any, for feedback to participants. Findings will be communicated to the medical community primarily through presentation of results at Grand Rounds for psychiatry. As well, participating physicians will be supplied with a written summary of the results upon request. As well, the results will be submitted as thesis requirement for the Masters program in Community Health.

19. Payments.

(a) Will participants receive: reimbursement for expenses incurred? N payment for participation in the study? N	Please specify on separate sheet according to "Guidelines for the Remuneration of Research Subjects."*
(b) Will there be any payment to a third party for referral of patients? N	Please specify on separate sheet according to "Guidelines for Payment of Finders' Fees."*

* Available in the HIC office and on HIC web page.

20. Budget

Please enclose a copy of the budget for this study, including source of funding.   N/A
Will the budget be administered through the University Finance Office?   N   If no, where?
Will any investigator receive financial or other benefit by virtue of conducting this study? N. If yes, specify.

21. Ownership of data.

Will data become the exclusive property of a pharmaceutical company or other external agency?   N
If yes, what is the policy of the company regarding publication of the data?

22. Reminders.

We would like to remind you that it is your responsibility to ensure that permission is obtained from clinicians, departments, institutions or communities whose patients / residents will be involved in the study.
We would also like to remind you that you must read "Guidelines on Research Involving Human Subjects" (MRC. 1987) or such guidelines as may supercede these. (available in the HIC Office and on HIC Web Page.)

Signature of principal investigator.	Signature of supervisor, in case of student application.
Date	

Signature Page

Title of Project:

Name of Principal Investigator:

To be signed by participant

I, _____ , the undersigned, agree to my participation or to the

participation of _____ (my child, ward, relative) in the research study described above.

Any questions have been answered and I understand what is involved in the study. I realise that participation is voluntary and that there is no guarantee that I will benefit from my involvement.

I acknowledge that a copy of this form has been given to me.

(Signature of Participant)   (Date)

(Signature of Witness)   (Date)

To be signed by investigator

To the best of my ability I have fully explained the nature of this research study. I have invited questions and provided answers. I believe that the participant fully understands the implications and voluntary nature of the study.

(Signature of Investigator)   (Date)

Phone Number

Assent of minor participant (if appropriate)

(Signature of Minor Participant)   (Age ____)

Relationship to Participant Named Above