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The Effects of Partial Hospitalization on Acute Psychiatric Hospital Readmission Days

William E. Turner III

Old Dominion University

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THE EFFECTS OF PARTIAL HOSPITALIZATION ON ACUTE PSYCHIATRIC
HOSPITAL READMISSION DAYS

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ABSTRACT

THE EFFECTS OF PARTIAL HOSPITALIZATION ON ACUTE PSYCHIATRIC HOSPITAL READMISSION DAYS

William E. Turner, III
Old Dominion University, 1995
Director: Dr. Clare Houseman

Using the theoretical construct of recidivism and pathway and gatekeeper variables associated with it, this study compared the effects of a combination of partial and acute psychiatric hospitalization and only acute psychiatric hospitalization on the total number of acute hospital readmission days over a 12 month period using a causal-comparative design. Two hundred and forty cases were randomly selected from an existing database which contained information on a population of urban insurance beneficiaries who had accessed psychiatric care during a two year period. The group accessing a combination of acute care and partial care had significantly higher readmission days. Age, number of outpatient sessions and Global Assessment of Functioning score at initial acute hospitalization also appeared to be influential pathway and gatekeeper variables. The highly skewed distribution of the data required use of nonparametric statistical tests and, therefore, further analysis was limited. It was concluded that treatment combinations can affect measures of outcome.
Dedication

This dissertation is dedicated to Sharon, Jessica, Matthew and Luke Turner without whose love and support I could not have ever completed such a task.
Acknowledgements

Special thanks go to Randall B. Farber and Joseph Q. Urbi for their faithful help and assistance in the management of the data base used for this research.
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Chapter I
Introduction and Review of the Literature

Introduction

Healthcare, in the minds of many, is in a state of crisis with rising costs and questionable efficacy. The United States spends a greater portion of its gross domestic product on health care than other developed countries, yet the gap between what the U.S. spends and what other countries spend continues to widen (U.S. Department of Health and Human Services, 1993). Despite this, U.S. health outcomes continue to lag in comparison to these other developed countries. For example, in 1990 Japan's infant mortality rate was one half of that in the U.S. despite the fact that Japan spent only 6.6% of its gross domestic product for health care compared to 13.2% in the U.S. (Department of Health and Human Services, 1993).

Starr (1992) reports that discontent with the U.S. health system is wide-spread. Mechanic (1994) states "almost everyone agrees that our health system is in disarray and that major reform is needed" (p.xi). Among prominent complaints are the notion that costs are rising, access is limited and quality is often lacking. Reform
efforts, therefore, have focused on controlling costs, increasing access and demonstrating effectiveness (National Business Coalition on Health, 1993).

The emphasis on effectiveness is demonstrated by the emphasis on outcomes and the search for what works (Weber, 1992). Within the healthcare arena, psychiatric services are often a target of focus because of the high percentage of the population that uses them. It is estimated that mental disorders affect 40.7 million adults, representing 22% of the total adult population (National Association of Private Health Systems, 1994). Additionally, psychiatric care is consuming an increasingly significant portion of the total health care dollar. For example, the percentage of healthcare dollars paid to private psychiatric hospitals increased from 6.75% in 1969 to 21.5% in 1990 (U.S. Department of Health and Human Services, 1993).

Unfortunately, psychiatric care is one of the least understood of healthcare interventions and one that is frequently questioned as to its effectiveness and even its overall validity. Treatment interventions are not well understood and have been traditionally difficult to document as effective. Stigma continues to run high especially for those individuals who access inpatient hospital care.

Psychiatric treatment, therefore, must be documented as effective based on sound empirical data if it is to continue
to be included in an overall healthcare plan. The psychiatric treatment industry can no longer rely on anecdotal evidence that has little or no generalizability or scientific merit.

A logical treatment modality to examine in this context is inpatient care and less restrictive alternatives to such care. Inpatient hospitalization is the most expensive of all treatments because of the overall operational costs. It is also the most restrictive in that it confines patients on a 24 hour per day basis and, therefore, the most disruptive to normal daily living. It was estimated as far back as the early 1970s that $1.7 billion could be saved each year in the United States if the hospital length of stay for psychiatric patients could be reduced by just one day (Guillette, Crowley, Savitz and Goldberg, 1978). Another estimate has put the cost of psychiatric hospitalization at 70% of the total annual mental health expenditures (Leibenluft and Leibenluft, 1988).

Patients confined to a hospital are separated from their families, have their jobs interrupted and are often stigmatized. Yet, inpatient hospitalization is one of the most frequently used treatment modalities, with a 1993 average daily census in short-term hospitals in the United States of 24,092 (American Hospital Association, 1994).
Effective alternatives and adjuncts to inpatient hospitalization that minimize lengths of stay are, therefore, of great importance. One such frequently used adjunct is partial hospitalization which involves patients receiving treatment services during the day with overnight living in the patient's own home. Although at times used as an alternative to inpatient care, it is increasingly used as an adjunct before or after inpatient care.

Thus, by investigating the effect of a combination of partial and acute care versus acute care only, insight into the potential for partial hospitalization as an effective, minimally intrusive level of care can be examined. Such empirical support can provide practitioners with guidance on effective combinations of treatments and may suggest alternative strategies to acute care only approaches.

Purpose

The purpose of this study was to determine the effects of a combination of partial and acute psychiatric hospitalization compared to only acute psychiatric hospitalization on the total number of acute hospital readmission days over a 12 month period.

Problem

The problem addressed in this research was the overall effect of partial hospitalization in combination with acute
care on hospital readmission days over a 12 month period. The specific research questions were:

1. Do patients who were treated in partial hospital settings either prior to or immediately following acute hospitalization have fewer readmission days over a 12 month period than those who were not treated in partial either prior to or immediately following inpatient hospitalization?

2. Is there any variation in readmission days between the two groups when age, sex, diagnosis, severity, initial inpatient length of stay and number of outpatient sessions received are considered?

Definitions

This research examined partial hospitalization as a treatment modality in combination with acute care compared to acute care only on an outcome measure of readmission days. The effects of the pathway variables age and sex and the gatekeeper variables diagnosis, patient severity, initial acute lengths of stay, number of outpatient sessions and treatment group were examined.

Complete operational definitions for each of the variables used in this study are described in Chapter III. Brief definitions are provided here for background information:

acute psychiatric hospital care: a treatment setting which provides 24 hour availability of a full range of
diagnostic and therapeutic services including physician and nursing care. This level of care is commonly referred to as inpatient hospitalization or acute care. For purposes of this research, crisis partial hospitalization, which involves continuous monitoring and assessment for up to 20 hours in an acute care hospital, was considered the same as an acute psychiatric hospitalization of one day. This decision was made because crisis partial is more intensive, more restrictive and more like acute hospitalization in terms of interventions than it is partial hospitalization.

**age:** the age of the patient at the first partial or acute hospitalization to occur during the period examined in this research.

**length of stay:** the total number of days the patient stayed in acute inpatient care during the first acute admission of the period examined in this research.

**diagnosis:** the patient’s primary diagnosis in DSM-III-R, Axis I format (American Psychiatric Association, 1987).

**Global Assessment of Functioning (GAF):** a measure of the therapist’s rating of psychological, social and occupational functioning (American Psychiatric
Association, 1987). Lower scores indicating more functional impairment or a more serious condition.

**outpatient therapy sessions**: the total number of treatment services received in a non-institutional setting that were billed and paid for during fiscal years (October 1st through September 31st) 1992 and 1993 by CHAMPUS. Typical examples include individual psychotherapy, family therapy or group psychotherapy. Partial hospitalization is a treatment setting which provides an interdisciplinary program of therapeutic services for at least four hours per day, five days per week.

**readmission days**: the total number of days a patient stayed in an acute inpatient psychiatric hospital within 12 months of discharge from the initial acute inpatient psychiatric hospital stay examined in this study.

**treatment group**: whether or not the patient was treated with a combination of partial hospitalization and acute inpatient hospitalization (Group 1) or in acute inpatient care only (Group 2).

**Theoretical Framework**

Recidivism. This outcome oriented study was based on a knowledge of the theoretical construct of recidivism and factors affecting it. Recidivism in psychiatric treatment
settings is a serious problem, especially for acute inpatient hospitalization. Polk-Walker, Chan, Metzer, Goldapp and Williams (1993) define recidivism as "the relapse of a disease, symptom, or behavioral pattern that results in the readmission of a patient to a treatment program" (p. 164). The authors view readmission as costly for the individual, the family and society. "Readmission also places tremendous strain on an already vulnerable individual and family system. In addition, the multiple readmissions of a patient frustrates and often demoralizes the treatment personnel" (Polk-Walker et al., 1993).

Since a primary goal of psychiatric treatment is to enable the individual to return to normal community based functioning, readmissions are considered a failure (Rosenblatt and Mayer, 1974). Either the hospital did not deliver effective care or inadequate aftercare was provided.

Because readmission statistics are typically readily available and easily collectible, Rosenblatt and Mayer (1974) refer to them as "the indicator par excellence of hospital effectiveness" (p. 698). Franklin, Kitthredge and Thrasher (1975) echo this belief by stating that "readmission has been singled out as a key criterion for assessing the effectiveness of both hospitals and community mental health centers" (p. 749).
Solomon and Doll (1979) refer to readmission rates as "a widely employed criteria for evaluating the effectiveness of hospital and aftercare treatment programs" (p.230). Similarly, Buell and Anthony (1973) indicate that the results of theirs' and others' studies support readmission as a criterion of psychiatric treatment outcome.

Many other researchers have utilized measures of recidivism as outcome measures and it has been a primary outcome measure in the literature (e.g., Hersen, 1979; Wan and Ozcan, 1991; Bedell, 1994). In addition, it is a key outcome criterion used today by the National Commission on Quality Assurance (1993) in its evaluation of managed care plans and delivery of mental health services.

The value of readmission data goes beyond that of just a measure of program effectiveness. By looking at factors that affect recidivism, a profile of the type patient who may be at risk can be developed and more rational aftercare planning can be developed (Miller and Willer, 1976).

Gruber (1982) and Solomon and Doll (1979), hypothesize that there are basically two classes of variables that affect recidivism, namely, pathway and gatekeeper variables. Solomon and Doll (1979) view readmission as a process rather than a single event. This process is influenced by a variety of patient decisions and social pressures that propel the patient toward the hospital. These influences
are called pathway variables. For example, the patient may recognize recurrence of particular symptoms or stressors and seek rehospitalization as a means of help. Similarly, families may put pressure on patients to return to the hospital because of low family tolerance or to scapegoat the patient for family dysfunction. Other pathway variables include age, sex, social class and number of dependents (Polk-Walker et al., 1993).

Gatekeeper variables, in the context of inpatient recidivism, are factors located within the hospital environment. Whereas the pathway variables get the patient to the hospital, the gatekeeper variables play a role once the patient has arrived. As Solomon and Doll (1979) state "once the decision has been made in the community to seek rehospitalization, a new set of contingencies arises at the hospital gate" (p.234).

Gruber (1982) states that "gatekeeper factors are located within the hospital environment and become salient as a result of the effects of the pathway factors. That is, these factors play a role "‘once the persons is at the gate’" (p.1197). Gatekeeper variables include diagnosis, physician attributes and patient admission history.

In addition to the gatekeeper variables listed above, Solomon and Doll (1979) include those related to the mental health delivery system itself. These include availability of
alternatives and hospital policy. For example, in a setting where no less restrictive alternative is available, a readmission to acute care may be approved even if clinically the patient could function in a less restrictive setting. Similarly, a hospital could have a policy that criteria for admission include certain risk factors and motivation for treatment on the patient’s part.

Buell and Anthony (1973) suggest that the treatment program or treatment type is a gatekeeper variable. These researchers state that "one factor that contributes to the patient’s rehabilitation success or failure is the treatment program to which the patient is exposed" (p.361). In fact, Anthony, Buell, Sharratt and Althoff (1972) reviewed the efficacy of various inpatient and outpatient procedures and examined their effects on recidivism.

The researchers surveyed the literature on the comparative effectiveness of various psychiatric treatment modalities and their effects on measures of recidivism and posthospital employment. The researchers found that most inpatient treatment modalities improved patients in-hospital behavior, "but the research does not indicate that these approaches can singularly effect posthospital adjustment" (p.447). The researchers also found that patients who attended aftercare had lower recidivism rates than non-attenders. Additionally, and particularly relevant to this
current study, the researchers found that transitional treatment programs such as halfway houses, sheltered workshops and day care centers were successful in reducing recidivism, but did not improve independent functioning.

As a gatekeeper variable, treatment type should have an effect on recidivism as a measure of outcome. The current research, therefore, looks at the effect of the gatekeeper variable of treatment type, namely acute and partial hospitalization versus acute hospitalization only, and its effect on readmission to acute hospital care over a twelve month period, while controlling for certain other gatekeeper and pathway variables.

**Factors Affecting Recidivism.** There has been considerable research on factors that affect recidivism. Lorei and Gurel (1973), for example, examined the relationship between background demographic characteristics and hospital readmission within a nine month follow-up period for 975 schizophrenic males discharged from Veterans Administration hospitals. The researchers defined readmission as a "return to the original or another hospital involving a minimum of 15 consecutive nights on a psychiatric ward" (p. 426).

Correlational analyses were performed on 20 demographic variables and readmission. These demographic variables included age, race, number of inpatient days, failure to
work, race and number of previous hospitalizations. The researchers found that the best predictor of readmission was the number of times that the patient had been in the hospital before ($r = .14, p < .01$).

In summarizing, the researchers profile the readmitted patient as tending to have been hospitalized more frequently in the past, to have been admitted to more different Veterans Administration hospitals, to have had more trouble with the law, to have had more pre-release work experience and not to have a valid driver's license. All six of the significant demographic variable correlations with readmission were considered small using Cohen's (1969) convention for correlations. The researchers, therefore, conclude that readmission is only "very slightly related to status on background characteristics" (p. 429).

Buell and Anthony (1973) examined the relationship between patient characteristics and recidivism. The researchers collected data on 10 demographic characteristics that they indicated were "most frequently found in the literature and that are typically available from a patient's hospital record" (p. 361). These factors included number of hospitalizations, length of last hospitalization, employment history, marital status, diagnosis, race, occupational level, age, educational level and sex.
The researchers hypothesized that only the variables, number of hospitalizations and length of last hospitalization, would be significant predictors of recidivism, which was defined as a readmission to the hospital within six months after discharge. The data showed that the largest amount of variance in recidivism was accounted for by number of previous hospitalizations (8.7%, F=17.47, p=.001). Length of last hospitalization was not significant, contrary to what was hypothesized. The other demographic factors did not account for a significant amount of variance. The researchers concluded that the results suggest that recidivism may be more efficiently predicted by using number of previous hospitalizations.

Rosenblatt and Mayer (1974) reviewed studies on readmission over the past 25 years. A consistent theme that the literature showed was that the more often a patient has been admitted to the hospital, the more likely they are to return in the future. Thus past behavior is a good predictor of future behavior. These researchers pointed out that even when controlling for variables such as age, sex, ethnicity, social class, education, marital status, diagnosis, degree of illness and attendance at aftercare, this trend remained.

Talbott (1974) reviewed 100 consecutive readmissions in an urban, state-run psychiatric hospital. One of the
primary questions the researcher sought to answer was why patients are readmitted. The data showed that the majority of readmissions were due to presenting symptoms resulting from psychosis or paranoid behavior. There was no difference in readmission by sex or age.

Anthony and Buell (1974) replicated the Buell and Anthony (1973) study outlined above. The subjects were 79 psychiatric patients selected the following year from the same state hospital. This study found that demographic characteristics accounted for 29.5% of the variance in this replication compared to 27.9% in the original study. In this replication, however, in contrast to the original study, marital status rather than the number of previous hospitalizations accounted for the greatest amount of variance in recidivism at six-month follow-up.

Franklin, Kittredge and Thrasher (1975) selected a random sample of 143 patients discharged from a southern state mental hospital in an attempt to differentiate those readmitted from those who were not on the basis of 52 factors. Data were gathered from personal interviews with ex-patients by research staff. Factors considered included age, sex, race, length of hospital stay, diagnostic category, marital status at first admission and follow-up care with community mental health center. The groups also were compared on prescribed medications, length of
prescription, dosage and related usage information as well as number of crimes charged and deviant behavior of family members.

There were no significant differences between those readmitted and those not readmitted on most of the factors examined. Source of income did differ significantly between those readmitted and those not readmitted. Those who received income from their own employment or employment of others in the household were less likely to be readmitted than those unemployed or receiving income from other sources. The profile of the readmitted patient was described as that of an individual in a state of socio-psychological-economic dependency, with poor interpersonal relationships with significant others, lacking in meaningful social outlets and with poor self-esteem. The researchers conclude, however, that the problem of readmission is very complex. "The data support that readmission is the result of interaction in and between a host of personal and environmental factors that influence the patient's life after discharge" (p. 751).

Miller and Willer (1976) examined social and other variables associated with recidivism to determine factors effective in predicting rehospitalization within six months of discharge. The subjects were 108 patients randomly sampled from a psychiatric hospital during a four-month
period. Independent variables included whether the patient was in the hospital during the previous year, the number of prior admissions, sex, scores on a self-assessment tool and type of ward on which they were treated.

The number of previous admissions was not a good predictor of recidivism, accounting for only 2% of the variance. The support scale of the self-assessment tool, which measured financial management, support and job behavior accounted for the most variance at 19%. The control of aggression scale added another 6.6%. The researchers concluded that social factors such as the person’s ability to handle money, work behavior and job-seeking behavior are important determinants of recidivism.

Fisher and Lohman (1977) examined 62 hospitalized patients and correlated readmission with various patient background factors, demographic information and staff ratings of patient behavior and competence. Sex, age, and marital status had non-significant correlations and thus appeared unrelated to readmission. There was a significant relationship between pre- and post-hospital admission rates ($r=0.24$, $p<0.05$), indicating that the greater the number of past hospitalizations, the greater the number of readmissions over the period studied. The best predictor items of readmission were staff ratings of patient behavior and competence.
Gruber (1982) hypothesized that recidivism would be more influenced by pathway variables than by gatekeeper variables. The pathway variables examined included age, sex, social class and numbers of dependents. The gatekeeper variables were previous admission, previous ward terms (average number of days per previous admission) and severity of patient disorder. Data were obtained from a random sample of 200 patient files.

The best pathway predictors of recidivism were number of dependents, followed by social class and age. The total variance accounted for by pathway variables was 13.9%. The best gateway predictors were severity of disorder followed by number of previous admissions, followed by previous ward terms. The total variance accounted for by the gateway variables was 12.8%. The researchers conclude that although pathway variables account for more variance than gateway variables, both are needed to adequately explain differences in recidivism.

Wan and Ozcan (1991) developed an analytic framework and methodology for estimating rehospitalization in a state hospital system. The researchers hypothesized that the readmission rate is influenced by four dimensions: community resources, socio-demographic factors, client characteristics and community services board organizational factors.
There were four statistically significant predictors of readmission. Average length of stay was negatively related to readmission rates and the percentage of the minority black population in the catchment area was positively associated with readmission rates. The other significant variables related to community services board organizational characteristics. The number of service categories offered and per capita dollars allocated to each community services board exerted a positive effect on rates of readmission.

Polk-Walker et al. (1993) did research to identify pathway and gatekeeper variables that differentiate those patients who were readmitted from those who were not and to identify those pathway and gatekeeper variables most predictive of readmission. The sample consisted of 233 patients above the age of 18 with at least one readmission and 83 patients with no readmissions. Patients meeting the criteria of readmitted or not readmitted were identified by the hospital data processing department. All data was obtained from medical records. The dependent variable was dichotomized into those with no readmissions within eight months and those with two to four readmissions to the facility.

The final model of variables related to readmission included the pathway variables of sex, child's residence (whether or not a dependent child lived with the patient)
and admissions to other psychiatric hospitals. The gatekeeper variables included evidence in the intake records, based on social histories, psychological and mental status evaluations and nursing care plans, of financial problems, sexual problems and impulse control problems.

In terms of pathway variables, patients who were married or divorced were more likely to have no readmission whereas readmitted patients were more likely to be single, separated or widowed. Patients who were readmitted tended to have more problems in the areas of marital, financial, social, work, sexual, antisocial, impulse control and central nervous system than those patients who were not readmitted. The researchers conclude that the profile of the patient at risk for readmission is a "female with a history of previous admissions, whose children reside with someone else, and who deny financial, sexual, and impulse control problems" (p.172).

Treatment Type as a Gatekeeper Variable. In considering treatment type as a gatekeeper variable, it is important to consider conceptually why it may have an effect in the current research, which examines the effectiveness of using partial hospitalization as an adjunct to acute inpatient care. In doing so, it is necessary to look at the negative effects of acute hospitalization and how partial hospitalization is seen as overcoming these effects.
Hospitals have been the traditional setting for health care, both medical and psychiatric, and have helped foster dependency. Taken to the extreme, hospitalization can become a type of total institution as referred to by Goffman (1961) that becomes a way of life that limits the individual’s ability to make independent judgements.

According to May (1991), "although such neglect is remediable, institutionalization, whether good or bad, often tends to afflict the afflicted more subtly, by depriving them of community" (p.147). Specifically referring to medical/surgical hospitals, May makes a strong point that has applicability to psychiatric hospitals as well:

...the hospital exacts a high price both psychologically and financially. Psychologically, it gnaws-with its alien machines, rhythms, language and routines-at the identity which a person previously maintained in the outside world. The patient must surrender his customary control of his world not only to the disease but to those who fight against it. (p.145)

Hospitalization, according to Shives (1994), can lead to emotional responses which include anxiety, fear, loneliness, powerlessness, helplessness and hopelessness. Shives feels that hospitalization can actually encourage a person to be passive which, in turn, can lead to regressive and dependent behavior.

Partial hospitalization, on the other hand, helps minimize these regressive effects and maximize the patient’s
involvement and motivation. Kiser, Wagner and Knight (1994), state that partial hospitalization simulates real life experience thereby minimizing disruption of daily routine and fostering good functional outcomes. "Therapeutic interventions offered in partial hospital programs are designed to improve functional outcomes by maintaining power within the patient/family subsystem and by viewing the patient as capable of making certain judgements and commitments" (p.33).

Goldberg and Goldwater (1977) outline several factors in partial hospitalization that contribute to its effectiveness. It minimizes the dependence and regression that often occur with hospitalization. It avoids the isolation, dehumanization and stigma associated with inpatient hospitalization. It encourages higher levels of patient functioning and it helps maintain family and community ties. Hoge, Farrell, Munchel and Strauss (1988) summarize the therapeutic factors in partial hospitalization by stating:

What seems striking is the ability of this modality to provide security and structure while simultaneously promoting patient responsibility and autonomy. This contrasts with outpatient treatment, which can facilitate patient autonomy but generally provides little structure, and with inpatient treatment, which provides considerable structure, but limits patient autonomy. The ability to provide structure while promoting autonomy may explain the particular effectiveness of partial hospitalization in the treatment of
certain acutely disturbed psychiatric patients. (p.208)

The value of partial hospitalization is its ability to minimize the regressive effects of hospitalization. To the extent that partial hospitalization fosters higher patient functioning, helps maintain family and community ties and minimizes the need for inpatient hospitalization, its inclusion in the treatment regimen should lead to more positive outcomes.

**Hypotheses**

As pointed out in the theoretical framework, readmission is a widely accepted measure of treatment outcome. Pathway and gatekeeper variables, as also reviewed in the theoretical framework section, are variables that affect outcome such that patients who have been readmitted can be differentiated from those who have not been readmitted. The gatekeeper variable treatment type, therefore, defined in the present research as acute and partial versus acute only, should effect whether or not an individual is readmitted, with the more effective treatment leading to fewer readmission days. Figure 1 provides a conceptual model for how the pathway and gatekeeper independent or predictor variables relate to the dependent measure of readmission.
Figure 1. Conceptual Model for Research Design Effects of Partial Hospitalization on Acute Hospital Readmission Days.

<table>
<thead>
<tr>
<th>Pathway Variables</th>
<th>Gatekeeper Variables</th>
<th>Dependent Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age; Sex</td>
<td>DX; GAF; LOS; Outpt; TX Group</td>
<td>Readmission Days</td>
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**Key:**
- Age- age at initial acute admission in study
- DX- diagnosis
- GAF- Global Assessment of Functioning score at initial acute admission in study
- LOS- length of stay at initial acute admission in study
- Outpt- total number of outpatient sessions received over 2 year study period
- Tx Group- treatment group: acute & partial or acute only
The variables used in this research were determined based on literature review and their availability within the database used for this research. This is in keeping with the approach of Buell and Anthony (1973) who stated that "the demographic characteristics investigated in the present study are those used most frequently in the literature and that are typically available from a patient's hospital record" (p.361). Therefore, the pathway and gatekeeper variables examined in this study are age, sex, diagnosis, severity of illness as measured by GAF, initial length of acute hospital stay, number of outpatient services and treatment group.

The hypotheses for this research, therefore, were as follows:

1. There will be no significant difference in the number of readmission days for patients treated with a combination of partial hospitalization and acute care as compared to those who are treated with acute only.

2. There will be no significant difference in the number of readmission days between patients treated with a combination of partial hospitalization and acute care as compared to those who are treated with acute only when controlling for the pathway variables age and sex and the additional gatekeeper variables of diagnosis, initial
inpatient length of stay, severity and number of outpatient therapy sessions.

Significance

The first partial hospital was founded in the early 1930s in Russia because of an acute bed shortage "...rather than from a theoretical or philosophical rationale proposed by the originator" (Luber, 1979a). This development was followed by programs in Canada and England. The passage of the Mental Retardation Facilities and Community Mental Health Center Construction Act of 1963 in the United States mandated partial hospitals in community mental health programs and served to expand this modality rapidly.

The early years of partial focused on defining what constituted partial programs and whether such programs should be called day treatment or partial hospitalization (Luber, 1979a). Day hospital or day treatment and partial hospitalization are basically synonymous terms today.

Next came issues of the types of patients that could most adequately be served in these programs (Luber, 1979b). For example, Hogarty (1971), commented that most of the programs he had seen to date were targeted toward depressed females and discriminated against schizophrenics.

The more modern concern is the effectiveness of partial programs in comparison or in conjunction with other levels of care. The issue now is whether or not partial
hospitalization can be used as a cost-effective clinically efficacious alternative to inpatient care by preventing full hospitalization. When full hospitalization is unavoidable, the issue becomes whether or not partial hospitalization as an adjunct can assist in decreasing the average length of stay. The present study addresses this very issue of the effectiveness of partial hospitalization as an adjunct to inpatient hospitalization when such hospitalization is unavoidable.

The urban east coast area in which this study took place was involved in a mental health demonstration project for the Civilian Health and Medical Plan for the Uniform Services (CHAMPUS), the health benefit plan for military dependents and retirees. The demonstration project started in 1986 and went through part of 1994. Under this program, mental health services available to approximately 280,000 CHAMPUS beneficiaries was managed by a private "gatekeeper" organization that controlled patient access to treatment. The original demonstration project vendor was a large not-for-profit hospital corporation, later replaced by a private, for-profit managed mental healthcare company.

One major goal of the demonstration project was to provide quality care in the least restrictive setting possible. In keeping with this philosophy, partial hospitalization was offered on a pilot basis under the
demonstration project. There has been no formal research
done nationally in a managed care setting, however, to
determine if partial hospitalization is effective in
reaching this goal. Nonetheless, partial hospitalization
was added as a standard CHAMPUS benefit and is a frequently
authorized treatment modality among managed care companies
today.

This study is different from most research on partial
hospitalization for three main reasons. First, it focuses
on an acute, private sector (non-state hospital or community
mental health center population) rather than a public sector
chronic population most often dealt with in the literature.
Second, the study attempts to control for a variety of other
variables that may influence outcome including age, sex,
diagnosis, outpatient therapy sessions and patient severity.
Thirdly, this study looks at the impact of partial as an
adjunct to acute hospitalization rather than a stand alone
treatment versus acute. As such, it examines partial as an
adjunct that may help shorten acute stays rather than an
intervention that replaces acute.

Finally, the demonstration project occurred in a large
urban catchment area with a total population of
approximately one million people. This population is
concentrated in two large East Coast cities and convenient
access to appropriate care must be provided within the
boundaries of these cities. Thus, the research has direct relevance not only to the field of healthcare but to urban health services as well.

**Assumptions**

The basic, broad-based assumption in this research was that by examining readmission days for a group of patients treated with either a combination of acute and partial hospitalization or acute only, valid conclusions could be made about the effects of partial hospitalization as a treatment modality. Similarly, it is assumed, based on the extensive literature on recidivism, that readmission days was a valid measure of outcome. It also assumed that the retrospective approach used in a causal-comparative design has sufficient power to detect the effects.

The research approach examined the sex, age, diagnosis, severity, number of outpatient sessions and initial acute length of stay and assumed that these variables were sufficient to rule out significant rival hypotheses and conclusions about the findings. Assumptions related to decisions underlying data analysis are presented in Chapter III.
Chapter II
Review of the Literature

Partial versus Inpatient

To date, most research on partial hospitalization has focused on public sector programs with chronic populations and has tended to demonstrate that partial hospitalization is an effective treatment modality. One of the earliest and most often cited studies was done by Zwerling and Wilder (1964). These researchers evaluated the applicability of the day hospital setting for acutely disturbed psychiatric patients. The study involved 189 patients who were treated in a day program housed in a large municipal hospital affiliated with a major medical school. During the study’s 18 month period, 39% of the patients received treatment exclusively in the day treatment program, with no inpatient hospitalization required. The researchers concluded that day hospitalization offered a viable treatment alternative to inpatient hospitalization for some patients.

In related research, Wilder, Levin and Zwerling (1966) conducted a follow-up study in which they examined the outcomes of a group of day hospital and a group of inpatient hospital patients 24 months after their initial contact with
the hospital. The patient population consisted of 189 patients initially admitted to an inpatient unit and 189 patients initially admitted to a day hospital program. The subjects were an unselected group of acute psychiatric admissions who were assigned at random to the two treatment conditions. No significant difference was found between the two groups in terms of sex, age, race, religion, marital status or diagnosis.

The primary outcome tool was a highly structured questionnaire that included information on the patient's and family's behavior post discharge, outpatient treatment, additional inpatient treatment, work adjustment, social adjustment and attitudes toward mental illness and the previous hospitalization. Additionally, patient and family members were asked to assess the patient's level of functioning. Two years after admission, 85% of the day hospital group and 81% of the inpatient group were living in the community. There were no significant differences on psychiatric status between the two groups. The researchers conclude that on several gross parameters, that day hospitalization was generally as effective as traditional inpatient care in the treatment of acutely disturbed patients. They are quick to point out, however, that day treatment "...is not a magical treatment for psychiatric
illness; not all psychiatric illness is a product of institutionalism." (p.1100).

The researchers also found differences in the outcomes based on sex and diagnosis. For example, both men and women with diagnoses of affective psychosis showed significantly longer intervals between admission and readmission if they had been treated in the day program rather than the inpatient program. Similarly, schizophrenic women admitted to the day hospital seemed to do better in their posthospital adjustment than schizophrenic women admitted to the inpatient unit.

Hogarty, Dennis, Guy and Gross (1968) compared patients admitted over a 14 month period to a psychiatric day center with those admitted to an inpatient facility on detailed psychiatric history and clinical evaluations. The researchers concluded that the types of patients admitted to day treatment were different from those admitted to inpatient in terms of symptomatic behavior and overall pathology. The researchers concluded that day hospital care was not a true alternative to inpatient care when symptomatology was considered.

Herz, Endicott, Spitzer and Mesnikoff (1971) examined the relative effectiveness of day hospitalization as an alternative to inpatient hospitalization. In addition, the researchers sought to delineate characteristics of the
patients for whom day hospital was a clinically feasible alternative to inpatient care. The study was conducted in a psychiatric institute of a major medical center.

A total of 424 patients were evaluated and those deemed inappropriate for the study were screened out. The most common reason for exclusion was a determination that the patient was too ill psychiatrically. Twenty-two percent of the admissions (90 patients) were ultimately included in the study. The 90 patients that were selected, therefore, were all new admissions to the inpatient service at the research site who were not excluded from the study.

These 90 patients were randomly assigned to either day or inpatient hospitalization, with each group consisting of 45 patients. Day and inpatients were treated in the same inpatient setting, so that the only difference in treatment was that the day patients went home at night. Thus, the treatment interventions and modalities were the same for both groups. As the researchers state, "therefore, the differences in outcome for the two groups cannot be attributed to differences in staff-patient ratios, administrative policies regarding criteria for discharge, treatment approaches, or levels of clinical competence" (p.115).

Patients were evaluated on psychopathology and role functioning. The researchers found that at every point in
follow-up, the inpatients had higher readmission rates. For example, at three and nine months, the readmission rate for the inpatients was almost twice that of the day treatment patients. The researchers indicated that on virtually all of the measures used to assess treatment outcomes, there was clear evidence that day treatment was superior. In explaining why day treatment was superior, the researchers hypothesize that it minimizes the regressive effects of hospitalization since "...day patients have a greater opportunity to maintain healthy areas of functioning, including the preservation of social and instrumental roles" (p.115).

Ruiz and Saiger (1972) showed that a partial program could help limit the need for inpatient hospitalization at a state facility when offered as an adjunct treatment. The study was done over a two year period and tracked 343 patients who were originally admitted to an inpatient psychiatric unit. After an average inpatient stay of 3.3 days, the patients were transferred to partial hospitalization. Approximately two-thirds of the patients were able to be maintained in a community setting while in the partial program.

Michaux, Chelst, Foster, Pruim and Dasinger (1973) examined 45 patients in day treatment and 52 inpatients at two and 12 months after their return to the community. At
two months the symptom reduction differences which initially favored inpatient care were less pronounced than at the time of discharge. Self-report of adjustment at two months favored the day treatment group. After one year, symptomatology differed only in that day patients had a significantly higher score on the Anxious Intropunitiveness scale of the Inpatient Multidimensional Psychiatric Scale.

Incidence and duration of relapse were not significantly different for the two groups. Rather than concluding that one level of care was better than the other, the researchers concluded that both were effective in different and potentially complementary spheres. Inpatient was more effective in quick symptomatic relief while day care was more effective in lasting gains in social adjustment.

Washburn, Vannicelli, Longabaugh and Scheff (1976) compared inpatient and partial treatment within a sample of 59 seriously ill female patients, all of whom were randomly assigned after a two to six week inpatient evaluation. Thirty patients were assigned to inpatient and 29 were assigned to partial. The results favored the day hospital group who had lower subjective distress, higher community functioning, lower family burden ratings, lower total treatment costs and higher days of attachment to the program. The researchers conclude that the study
demonstrated the "...feasibility of treating in a day setting a large number of patients who until recently would have been treated in an inpatient setting" (p.673). Just as importantly, Washburn et al. conclude that partial's positive effects occur because patients are able to avoid the guilt, anxiety and stigma associated with inpatient care and the patient maintains an active role in the family.

Penk and Charles (1979) compared the effects of partial hospitalization with full-time inpatient care on measures of intellectual efficiency and targeted behaviors related to social interaction. They outlined the advantages of partial as being less disruptive to social and vocational roles; family ties to remain more intact; allowing clients to maintain healthier functioning and causing less regression than is common in hospital settings. The researchers used a group psychological test battery at admission and then five weeks post-discharge. The results showed that the partial hospital group improved more on social interaction and intellectual efficiency. The researchers concluded that "these findings support the notion that partial hospitalization is accompanied by larger test score gains than full-time hospitalization" (p.839).

Dick, Cameron, Cohen, Barlow and Ince (1985) did a study to determine if day treatment offered a clinically effective and efficient alternative to conventional
inpatient care. The inpatient settings for their study were a 21 bed mixed sex ward and a 20 bed female ward at one hospital and a 20 bed female and 11 bed male ward at another hospital. The day hospital was located in another setting and had a 25 patient capacity. The study was undertaken during a 30 month trial period. Patients admitted as emergencies with a diagnosis of neurosis, adjustment reaction or personality disorder were assessed by the treatment team. If the patient was deemed suitable for transfer by the treatment team and the patient agreed to the transfer, the patients were randomized between continued inpatient and day hospital. A clinical interview was used as the evaluation tool and from that a severity score was determined.

A total of 91 patients were involved in the study. Forty-eight were randomized to inpatient and 43 were randomized to day treatment. The research showed little difference between the two groups. Clinical outcomes were similar with no statistically significant differences in the mean severity scores. Overall satisfaction was higher for the day treatment group and the total cost for this group was approximately 65% of the cost of those in inpatient care.

Creed, Black, Anthony, Osborn, Thomas and Tomenson (1990) and Creed, Black, Anthony, Osborn, Thomas, Franks,
Polley, Lancashire, Salleem and Tomlenson (1991) randomly allocated patients presenting for admission in two district psychiatric services to day hospital or inpatient care. The purpose of the study was to compare the effectiveness of day-hospital and in-patient treatment at two separate treatment centers. The researchers used a mental status test and a social functioning test at admission, three months and one year after admission. The outcome of day and in-patient treatment was very similar and the researchers concluded that day treatment is a feasible alternative for acutely ill patients.

Kluiter, Giel, Nienhuis, Ruphan and Wiersma (1992) studied 160 patients who were referred for inpatient care and randomly assigned to two different treatment modalities. Of the 160 patients, 57 patients were randomly assigned to an inpatient care setting for the duration of their treatment (control group) and 103 patients were randomly assigned to day treatment (experimental group). Although group assignment was random, actual initiation of day treatment in the experimental condition varied. Some patients started day treatment immediately, some started after a period in acute inpatient care and some never started based on his or her psychiatric and social condition as assessed by a psychiatrist. Additionally, day treatment patients could be hospitalized overnight if the psychiatrist
made a medical necessity determination. Thus the two groups were not necessarily mutually exclusive since some patients in the day treatment program had acute hospitalization.

The dependent measure was the average number of nights spent away from the inpatient hospital setting for the two groups, again since both groups could have overnight hospital stays. The results showed that the average number of nights the patients in the experimental condition spent away from the hospital substantially exceeded the average for the control subjects. The researchers state that their most important finding was that there appeared to be no absolute contraindications against day treatment. The researchers reported that their study did not use stringently selected groups of patients like other studies had done. In fact, the only patients that had to be excluded from the study were court-ordered forensic patients and patients suffering from dementia. The researchers concluded that "if we accept the premise that each patient is entitled to the least restrictive environment possible, given his or her condition, it seems to be well worth considering day treatment as a potential alternative to hospitalization for all patients" (p.1205).

Thus, there is considerable literature on the effectiveness of partial hospitalization across a wide range of measures. As pointed out, however, the research has

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tended to focus on public sector, chronic patients and has not always focused on differential effects by diagnosis, sex or age group. Finally, there has not been a strong focus on the effects of partial hospitalization on readmission to acute care hospitals. The current research overcomes these limitations.

**Partial Hospital as Transitional and Adjunct**

A large amount of research has also focused on the role of partial hospitalization in transition between levels of care or as an adjunct to another type of treatment modality. Lahey and Kupfer (1979), for example, speaking in general about part-time programs, indicate that such programs can be used to ease the transition between inpatient and outpatient. Goldstein, Cohen, Lewis and Struening (1988) describe partial programs as preventing hospitalization entirely or making inpatient stays briefer. Hoge, Farrell, Munchel and Strauss (1988) state that from a systems perspective the role of day hospital is to serve as an alternative to inpatient care. This can be done either by averting direct admissions to inpatient or by shortening inpatient lengths of stay and "...thus serving as a transitional program for inpatients" (p.200).

Guy, Gross, Hogarty and Dennis (1969) compared the therapeutic effectiveness of a drugs plus day treatment program to drug treatment alone for a sample of 137 patients...
from two community based public treatment services in a large urban area. From the original sample, 92 patients were evaluated using a battery of assessment devices. On global judgements of severity of illness and degree of improvements, the drugs plus day treatment group was favored. The effects of this combination of modalities was particularly noticeable with the schizophrenic patients. Although hospitalization rates did not differ significantly, when patients who had been treated in the drugs plus day treatment modality were readmitted, they had shorter lengths of stay.

Linn, Caffey, Klett, Hogarty and Lamb (1979) examined the use of day treatment with psychotropic drugs versus psychotropic drugs only for the after care of schizophrenic patients. Patients referred for day treatment post-discharge from 10 different Veterans Administration hospital settings were randomly assigned to receive either day treatment plus drugs or drugs only. The primary outcome measure was time spent in the community, that is, time between readmissions to the hospital. Additional measures included rating of social functioning, symptoms, attitudes and cost.

There were no significant differences between the two groups on time in the community and costs, but day treatment patients showed significant improvement in measures of
social functioning. Symptoms and attitudes showed mixed results by location of the day treatment centers. Unfortunately, there were mixed results between the ten day care centers such that some centers were more effective than others, making the straight comparisons of day treatment and drugs versus drugs only more difficult.

Greene and De La Cruz (1981), in an important review article, summarize the results of studies on the use of day treatment as transitional. Citing the results of several major research studies (e.g., Wilder et al., 1966; Herz et al., 1971; Michaux et al., 1973; Washburn et al., 1976) the authors conclude that day treatment as a transitional treatment from hospital to community has some empirical support but that the research is still too incomplete to make unequivocal statements about its effectiveness. "Empirical evidence derived from several informants (i.e., patient, family, therapist, researcher) using a variety of assessment instruments administered over a wide span of time converge on the finding that day treatment facilitates the reintegration of the patient into the community. On the other aspects of outcome, conclusions must be more tentative either because of the limited or somewhat inconsistent trends" (p.199).

Additionally, several authors advocate the role of partial hospitalization as an adjunct to other treatment
modalities. Goodnick (1971), for example, examined the role of the psychiatric day hospital in the post-hospitalization of the chronic schizophrenic patient. Goodnick assessed the traditional follow-up care of schizophrenic patients which utilized one-to-one relationships in psychotherapy as having poor outcomes.

Because of this, Goodnick saw a greater need for mental health resources to be allocated to day treatment settings for this population. Day hospitalization helps bridge the gap between hospitalization and traditional outpatient psychotherapy. "It is the psychiatric day center that can most appropriately and most economically meet the therapeutic needs of the psychotic patient who has recovered from the acute episode and requires an all-day program, two to five days a week, for a considerable period of time" (p.120).

Evangelakis (1974) points out that day treatment has been used to provide treatment as an alternative to inpatient as well as a transition between residential treatment and full return to the community. According to Evangelakis, partial can even be used as a transitional adjustment phase for individuals moving from the community to residential care. Similarly, Hersen and Luber (1977) see partial hospital as serving a needed bridge between inpatient care and return to a community setting.
Conclusions

Partial hospitalization is seen in the literature as both an effective alternative and as an adjunct to inpatient hospitalization. It has lead to improvements in social functioning, reduced measures of psychopathology, increased time spent in the community and lower recidivism rates.

Partial hospitalization’s effectiveness has been attributed to the fact that it minimizes dependency and regression, helps the patient avoid isolation and allows for family and community ties to be maintained. As Goldberg and Goldwater (1977) point out, there are several factors in partial hospitalization that contribute to its effectiveness. These factors include that partial minimizes dependence and regression that often occurs with hospitalization; avoids the isolation, dehumanization and stigma associated with inpatient hospitalization; encourages higher levels of patient functioning; and helps maintain family and community ties.

These positive influences of partial encourage higher levels of patient functioning and, thus, partial as an adjunct to acute hospitalization should be more effective in reducing recidivism. Treatment type as a pathway variable, therefore, should be able to differentiate patients on a measure of recidivism, with the combination of acute and
partial being a more effective treatment modality which leads to fewer readmissions.
Chapter III
Methodology

Purpose
The purpose of this study was to determine the effects of a combination of partial and acute psychiatric hospitalization compared to only acute psychiatric hospitalization on the total number of acute hospital readmission days over a 12 month period.

Design
A causal-comparative research design was used for this study. The purpose of such a design is to investigate cause-and-effect relationships by observing a result, the dependent variable, and attempting to look back through existing data to determine plausible causal factors, the independent variables (Isaac and Michael, 1981). Causal-comparative studies are retrospective in nature and are often used in human studies where ethical considerations limit the applicability of experimental manipulation (Morton, Hebel and McCarter, 1990). In such a study the researcher can specify the conditions, or at least some of them, but is not able to control them (Lilienfeld and Lilienfeld, 1980).
This study is causal-comparative in that it investigated the possible cause and effect relationships by observing patient psychiatric acute hospital readmissions and searching back for causal factors of treatment type, age, sex, diagnosis, global assessment of functioning, length of stay and number of additional outpatient services. Furthermore, it is clearly "ex post facto" in nature since data were examined after the actual treatment had occurred.

Variables

The primary independent variable in this research was the dichotomous variable patient treatment type. That is, one group of patients sampled were treated with a combination of acute psychiatric inpatient care and partial hospitalization in combination and the other group was treated with acute psychiatric inpatient care only. Patient treatment type was chosen as the primary independent variable because of its importance as a treatment modality.

Those patients treated with a combination of partial and acute were purposefully not subdivided into those that had partial before acute and those that had partial after. The effects of partial were assumed to be the same irrespective of order. All patients treated with partial participated in partial care within three days of acute care. This allowed for patients discharged on Friday who
started partial on Monday or patients discharged from partial on Friday and admitted to acute on Monday.

The primary dependent variable was the number of acute psychiatric hospital readmission days within a 12 month period after discharge from initial acute hospitalization identified during the study period. Readmission was chosen as the dependent measure because it has been targeted as a key indicator in psychiatric care by the National Committee for Quality Assurance (1993) and has been a primary outcome measure in the literature (Hersen, 1979; Wan and Ozcan, 1991; Bedell, 1994). Actual hospital days were used rather than number of readmissions to allow for a weighted measure, i.e., a readmission with a length of stay of 10 days is a poorer outcome than a readmission with a length of stay of three days.

The study also examined age and sex as additional pathway variables and diagnosis as an additional gatekeeper variable since treatment modalities can have differential effects on different patients. What works for one particular diagnostic category, age group or sex may or may not be effective with a different diagnostic category, age group or sex. Thus a fundamental question that should be asked about any psychiatric treatment modality, according to Kluiter et al. (1992), is the categories of patients for which the treatment is feasible and effective.
Total number of outpatient therapy sessions for both fiscal years 1992 and 1993 and GAF score at initial acute hospitalization were collected as covariates. Covariates, according to Norusis (1993), are continuous predictor variables. Outpatient therapy was used to control for the effects of additional treatment beyond partial and acute while GAF score was used to control for patient severity at time of initial acute treatment authorization.

Operational definitions of each of the variables used in this study follow.

**acute psychiatric hospital care:** a treatment setting which provides 24 hour availability of a full range of diagnostic and therapeutic services. This includes 24 hour physician availability (i.e., physicians are available by telephone for consultation or for direct examination of the patient if necessary), 24 hour skilled nursing care and continuous monitoring and assessment of the patient’s condition and response to treatment (Health Management Strategies International, Inc., 1992). For purposes of this research, crisis partial hospitalization, which involves continuous monitoring and assessment for up to 20 hours in an acute care hospital, was considered the same as an acute psychiatric hospitalization of one day. This decision was made because crisis partial is more
intensive, more restrictive and more like acute hospitalization in terms of interventions than it is partial hospitalization.

**age:** the age of the patient at the first partial or acute hospitalization to occur during the period examined in this research.

**length of stay:** the total number of days the patient stayed in acute inpatient care.

**diagnosis:** the patient's primary diagnosis in DSM-III-R, Axis I format (American Psychiatric Association, 1987). The diagnosis was either obtained from the case management system, which has diagnosis assigned at various points in the hospital stay, or from discharge billing information.

**Global Assessment of Functioning (GAF):** Therapist's rating of psychological, social and occupational functioning on a hypothetical continuum of 0 to 90 (American Psychiatric Association, 1987). A patient with a score of 1-10 is considered imminently dangerous. A patient with a score of 11-30 is considered serious. A patient with a score of 31-60 is considered moderate. A patient with a score of 61-80 is considered mild and a patient with a score of 81-90 is considered to have no functional problems.
outpatient therapy sessions: the total number of treatment services received in a non-institutional setting that were billed and paid for during fiscal years (October 1st through September 31st) 1992 and 1993 by CHAMPUS. Typical examples include individual psychotherapy, family therapy or group psychotherapy, although actual type of therapy could not be determined (i.e., therapy was under the general heading of "doctors office" or "outpatient hospital", which was hospital-based intensive outpatient).

partial hospitalization: a treatment setting which provides an interdisciplinary program of therapeutic services for at least four hours per day, five days per week. Typical treatment modalities include individual, group and family therapy as well as psychiatric assessment and adjunctive therapies. Partial hospitalization is a time limited treatment program designed to restore functioning and prevent or shorten acute hospitalizations (Health Management Strategies International, Inc., 1992).

readmission days: the total number of days a patient stayed in an acute inpatient psychiatric hospital within 12 months of discharge from the initial acute inpatient psychiatric hospital examined in this study; historical data on readmissions prior to the time
period studied was not readily available and, therefore, was not able to be collected.

**treatment group**: whether or not the patient was treated with a combination of partial hospitalization and acute inpatient hospitalization (within three days of each other since this would allow for a discharge from one level of care on Friday and an admission to another level on Monday) or in acute care only. Those patients treated with a combination of acute and partial are identified as Group 1 and those treated in acute only are identified as Group 2.

**Hypotheses**

The hypotheses for this research study were:

1. There will be no significant difference in the number of readmission days for patients treated with a combination of partial hospitalization and acute care as compared to those who are treated with acute only.

2. There will be no significant difference in the number of readmission days between patients treated with a combination of partial hospitalization and acute care as compared to those who are treated with acute only when controlling for the pathway variables age and sex and the additional gatekeeper variables of diagnosis, initial inpatient length of stay, severity or number of outpatient therapy sessions.
Treatment Groups

Two treatment groups were determined retrospectively based on whether or not they received partial and acute hospitalization or acute hospitalization only. Group 1 received a combination of partial and acute together (within 3 days of each other). Thus Group 1 patients either went partial to acute or acute to partial. Group 2, on the other hand, only had acute care. The sample included 111 patients in Group 1 and 129 patients in Group 2.

Major Threats: Internal and External Validity

The primary threat to internal validity is inherent in the causal-comparative design which does not allow for controlled selection of subjects or random assignment to treatment. Any relationship determined, therefore, may not necessarily imply causation. Additionally, there may be a host of other causative factors that have not been identified or controlled. The approach in this particular study, however, attempted to rule out as many rival hypotheses as possible by accessing data from three separate primary data sources (i.e., the utilization management system, the intake record and the claims payment system). Additionally, data were gathered on as many relevant factors as possible, including age, sex, diagnosis, length of stay, patient severity and number of outpatient therapy sessions.
History, or specific events that may have occurred over the 12 months of follow-up, may also be a threat to internal validity. Patients may have had a variety of life events such as separation, divorce, deployment of spouse or job changes that may have affected their readmission to acute care, the dependent variable. There was no attempt to examine these variables in this study. Random sampling from the two patient groups, however, helped minimize this threat by distributing the risk equally between the two groups.

Given that the population being studied was limited to CHAMPUS dependents who were associated with an active military sponsor, there potentially is a high degree of mobility. There is, therefore, a risk of experimental mortality as CHAMPUS dependents access care and then leave the area. The researcher did not have access to data to identify whether or not those patients included in the study moved from the area during the 12 month follow-up period. This experimental mortality could lead to a Type I (alpha) Error. This would occur if a large number of patients in Group 1 left the area and were readmitted outside the study catchment area. Similarly, it could lead to a Type II (beta) Error if a high number of Group 1 patients left the area and had low readmission rates outside the study catchment area. Due to the sample size and the relatively brief time period of two years the data represented, it was
assumed that this was not a significant problem, although there was no way of assuring this.

The primary threat to external validity is that of generalization beyond the demonstration project. Since the findings are within the context of a major managed care project limited to CHAMPUS beneficiaries in one large Eastern United States urban area, an argument could be made as to the limited generalizability of the study.

Scope

This research examines the effects of partial and acute hospitalization, two standard treatment modalities prevalent in psychiatric care today, and the effects of combining them in a treatment episode. As such, it begins to look at the broad area of treatment pathways and protocols in psychiatric treatment. It is limited in scope, however, to the effects of acute and partial treatment compared with acute only and does not consider all of the possible combinations of services that a patient can receive. It also does not consider the utilization of partial hospitalization as an adjunct to acute hospitalization when partial care is received more than three days before or after acute hospitalization.

Limitations

In causal-comparative studies, the researcher is necessarily limited in the ability to isolate every
potential causative factor. Most notably among the other potential causal factors that could have affected readmission days in this study is medication usage and compliance with medication regimes. It was assumed, that since medications are widely used in many diagnoses and across all levels of care, that their effects would be equal in both the partial and no partial groups. Still, this is a limitation of the study. Other potentially influential factors for which no data were collected include family structure and therapist competency.

Another limitation of this study relates to the source of the data in the utilization management system (UMS). The researcher did not collect primary data and thus had no control over the integrity of the data. Like any automated information system, the data extracted are only as good as the data input. To the extent that there were keying errors or other inaccuracies (the UMS had over 19,000 records, each record representing one treatment event that happened to a patient), the results may not be reflective of what really happened to the patients. Similarly, although the researcher checked and re-checked all data extraction, errors could have been made in extracting the data.

Additionally, the Management Information System Department staff indicated to the researcher that at some point early in the demonstration project, the UMS system was
converted into another format. Thus, there is a possibility that further data integrity issues exist. This limitation, however, is probably not a major threat. All data entry personnel were trained in the use of the current system and the system had been in use continually since 1989. Thus, there had been three years to make corrections and changes since this research used fiscal years 1992 and 1993.

**Population**

The population used for this study was all CHAMPUS beneficiaries in a large, East Coast urban area who accessed acute and partial care in combination or acute care only during fiscal year 1992 (October 1, 1991 through September 31, 1992). Fiscal year 1992 was chosen because it, and the follow up year 1993, were the two most recent complete years available in the UMS. There were a total of 691 beneficiaries who accessed acute and partial care in combination and 579 beneficiaries who accessed acute care only, for a total patient population of 1,270.

**Method of Data Collection/Procedure**

The UMS database was maintained in a DBXL file format and was extracted for the researcher by a programmer from the Management Information Systems Department of the managed care organization. The researcher then converted the data into an SPSS PC+ for Windows file. The programmer had divided the database into the two groups to be studied.
Thus, one file contained only those patients that had accessed a combination of partial and acute care and the other contained those patients that accessed acute care only. In addition to the DBXL file, the researcher was given a hard copy of the file containing the following data fields: patient name, sponsor social security number and dds number (unique patient identifier) sex, date of birth (from which age was automatically calculated by the system), level of care, treatment begin date, treatment end date, total number of days, disposition and diagnosis (where available).

The researcher then randomly selected 125 cases from each group so that there were a total of 250 subjects. Of the 125 cases selected from Group 1, 11 had to be reclassified to Group 2 because no actual partial care had been received, although it had been authorized (i.e., the patient never showed up for care). Three additional cases were dropped from Group 1. One was dropped because residential treatment was given in the 12 month follow-up (a level of care not anticipated and not included in the study as a variable); one had acute and partial but not in combination (i.e., it was in the same calendar year but not in the same treatment episode, therefore violating the three day proximity requirement) and one had acute care for the first time split across fiscal years 1992 and 1993 (i.e.,
care started in 1992 but went into 1993). Therefore, Group 1 had 111 valid cases for analysis.

Of the 125 cases randomly sampled for Group 2, seven had to be deleted. Three had to be deleted since no acute care had ever been received because the patient did not show up for admission (although an admission had been authorized). Two had to be deleted because residential care had been received within the 12 month follow-up period. Two more were deleted because initial inpatient care was split across the two fiscal years. Eleven cases were added because of reclassification from Group 1. These reclassifications occurred because partial had been authorized but never received and thus the patients received acute care only. Group 2, therefore, consisted of 129 valid cases for further analysis.

GAF score at initial acute intake was available from the Healthcare Record Intake/Preadmission Assessment. This assessment was done by an Intake Counselor who was typically a masters prepared licensed clinician. For cases that were directly admitted to the hospital, no GAF score was obtained since the patient did not go to an Intake Center and the researcher did not have access to hospital medical records.

For those cases where no GAF score was available, the researcher gave the Continued Treatment Review forms (the document the case manager uses to review the patient’s
inpatient stay on a daily basis) and any other Healthcare Record documentation (e.g., Intake/Preadmission Assessments that may have been done within a couple of weeks of the admission) to a Licensed Clinical Social Worker (LCSW) who regularly performed intake assessments for the organization. This LCSW made a clinical judgement based on the documentation and assigned a GAF score. If there was insufficient information to make an accurate clinical judgement, the LCSW did not assign a GAF score.

Group 1 had 18 GAF scores assigned this way while Group 2 had 26 assigned this way. The LCSW was not able to assign a GAF score because of insufficient clinical information to one case in Group 1 and seven cases in Group 2. These cases, therefore, had missing data for GAF score but were still included in the analysis.

The claims system was used to look up diagnosis when it was not available through the UMS. Diagnosis was determined for the first acute admission by entering the patient's sponsor's social security number and DDS number (unique patient identifier) for the admission. The diagnosis was in DSM-III-R Axis I format, or occasionally, International Classification of Diseases format (World Health Organization, 1977) with a fifth-digit subclassification which allows for further delineation of intensity and
duration of the disorder. For example, 304.23 means cocaine dependence in remission.

During data collection, the researcher had to make a variety of decisions as to how certain data would be recorded. This created a series of decision rules that allowed the researcher to be consistent across all cases when there was ambiguity in the data.

The first decision rule related to cases that had crisis partial hospitalization with no acute hospitalization. This scenario could occur in either group. Since crisis partial can last up to 20 hours and involves an intense level of evaluation and observation, it was classified as acute care. One day of crisis was, therefore, considered one day of acute care.

The next set of decision rules related to GAF score. Some GAF scores were listed as ranges rather than discrete scores, e.g., the GAF may have been listed as "45-50". For GAF scores given as a range, a midpoint was determined and then rounded to the next lowest number if it included a fraction, since GAF scores do not include decimals. A GAF score of "47-50" would have a midpoint of 47.5 which would be rounded down to 47. As mentioned above, for those cases where a GAF score was not available, the researcher had an experienced clinician make a determination based on written clinical information rather than have missing data. Those
cases that do have a missing GAF score were ones where the information was too minimal to make any kind of reasonable or valid determination.

The next decision rule related to GAF score was what to do if a crisis partial was followed by a regular acute admission. In these cases, there were intakes for crisis where a GAF was assigned and then a second intake for acute, with another GAF assigned. In all cases, the crisis hospitalization was followed immediately by an acute hospitalization. Therefore, the GAF scores for the crisis and the acute were averaged and rounded down to the next lowest whole number. By averaging these scores, a more accurate assessment of severity could be made.

A combination of crisis and acute also required a decision as to how this would be counted in terms of length of stay. Since crisis partial was considered acute for this study, if crisis was followed immediately by acute, the crisis day was added to the acute length of stay in determining the overall length of stay. Thus, one day of crisis followed by three days of acute equaled a length of stay of four days.

Materials

This research utilized three primary sources for the data: the organization's Utilization Management System (UMS), the organization's claims system and the
organization’s Healthcare Record. UMS is the proprietary utilization management system that includes data related to all treatment authorizations and treatment events for inpatient acute psychiatric hospitalization, crisis partial hospitalization, partial hospitalization and residential treatment. Specifically, UMS includes the following data that were used for this research: patient name, sponsor social security number and DDS number (unique patient identifier) sex, date of birth (from which age was automatically calculated by the system), level of care, treatment begin date, treatment end date, total number of days, disposition and diagnosis (when available). It does not include any data on outpatient services. UMS was chosen because it is an accurate reflection of everything that happens to a CHAMPUS patient whether the care was authorized or not and whether the care was paid for or not, since the organization was responsible for monitoring all care.

UMS has three main purposes. First, it serves to track and document a CHAMPUS beneficiaries’ course of inpatient and partial care from intake or admission to discharge to an outpatient status or out of care status. Second, it provides the case manager with the census information necessary to efficiently manage the patient’s care by tracking the duration and level of the care. Finally, it provides a management tool that allows utilization
information to be readily available so that overall use of
treatment resources can be allocated efficiently.

The claims system is an IBM computer system that serves
as the payment method for the organization. It provides a
computerized record of all paid services across all levels
of care. The system allows authorized users to access
patient specific information on diagnoses, treatment
services paid for and location of services provided (e.g.,
doctors office, hospital, etc.) Additionally, the claims
system can provide aggregate reports by patient and time
period across all levels of care. This allows the user to
identify a patient population, specify begin and end dates
and get a report of all paid claims for all levels of care.

The Healthcare Record is a written record of all
authorizations, intake assessments and ongoing continued
treatment reviews. Although it is more of a record of
ongoing case management decisions, it does include certain
types of clinical information. This includes a clinical
evaluation by intake center staff containing a review of the
chief complaint, a brief treatment history, medication
usage, relevant family and developmental history, an
assessment of present danger, a severity of psychological
stressors, a global assessment of functioning, a clinical
impression and a level of care recommendation. Continued
treatment reviews include comments on the care being
provided, assessment of the adequacy of treatment planning and an assessment of the patient's current condition. From time to time the record could also include documentation from the patient's provider in support of a continuing level of care authorization or a consultation report from a licensed practitioner other than the primary case manager.

Treatment of Data

All data were input into an SPSS PC+ for Windows database. The software was on the local area network (LAN) at the organization's corporate headquarters and accessed via a 66 megahertz personal computer. Statistical analysis was performed using the base, professional and advanced statistic modules available in SPSS PC+ for Windows. Both descriptive and predictive statistical tests were performed. The specific statistical tests used to analyze the data were t-test of independent samples, multiple regression, logistic regression analysis and discriminant analysis.

Human Subject Review

Since the study design utilized a retrospective analysis of an existing data base, no human subjects were involved. The research, therefore, was submitted and approved for expedited review by the Institutional Review Board at Old Dominion University. All data reviewed were treated as strictly confidential and the researcher was the only one involved in the research who had access to
identifying information, other than staff within the organization that used this data within the scope of their job duties. After the initial data sort, each case was assigned a unique number and other identifying information was not used.
Chapter IV  
Presentation and Analysis of Data

Purpose

The purpose of this study was to determine the effects of a combination of partial and acute psychiatric hospitalization compared to only acute psychiatric hospitalization on the total number of acute hospital readmission days over a 12 month period.

Descriptive Statistics

There were a total of 111 subjects in Group 1 (acute and partial) and 129 subjects in Group 2 (acute only). The total patient sample of 240 subjects, therefore, was comprised of 46.3% from Group 1 and 53.8% from Group 2.

The mean age of the sample was 28.10 years with a minimum age of 6, a maximum age of 64 and a standard deviation of 13.76. For Group 1, the mean age was 26.85 years, with a minimum of 6, a maximum of 63 and a standard deviation of 14.71. For Group 2, the mean age was 29.17 years, with a minimum of 11 and a maximum of 64. There were no significant differences between the two groups in age (t=-1.31, p=.193)
There were 171 (71.3%) females and 69 (28.8%) males. Although there were significantly more females than males in the sample, this was to be expected since CHAMPUS covers dependents of active military duty personnel, the majority of which are male. There were, however, no significant differences in the number of males and females in the two groups (Phi Coefficient=.00162, p=.98003). Group 1 had 32 males and 79 females while Group 2 had 37 males and 92 females.

The initial average acute length of stay was 9.35 days with a minimum of one day, a maximum of 50 and a standard deviation of 12.04. For Group 1, the average initial acute length of stay was 11.36 days, with a minimum of 1, a maximum of 50 and a standard deviation of 7.83. For Group 2, the average was 7.63 days, with a minimum of one day, a maximum of 38 and a standard deviation of 7.134. There was a significant difference between the two groups on initial acute length of stay (t=3.86, p=.000) with Group 1 having a longer initial length of stay.

The average GAF score at acute admission was 37.94, with a minimum of 10, a maximum of 65 and a standard deviation of 12.04. For Group 1 the mean was 37.10, with a minimum of 15, a maximum of 65 and a standard deviation of 11.23. For Group 2, the mean was 29.17, with a minimum of 11, a maximum of 64 and a standard deviation of 12.86.
There was no significant difference between the two groups on GAF at initial acute hospitalization ($t=-1.01$, $p=.312$).

The average number of outpatient sessions was 29.85, with a minimum of zero, a maximum of 212 and a standard deviation of 37.52. For Group 1 the mean was 37.46 sessions, with a minimum of 0, a maximum of 212 and a standard deviation of 39.23. For Group 2, the mean was 29.85 sessions, with a minimum of 0, a maximum of 212 and a standard deviation of 37.53. There were significant differences in the number of outpatient sessions for the two groups ($t=2.96$, $p=.003$), with Group 1 having significantly more outpatient sessions.

The average number of readmission days was 4.78, with a minimum of 0 and a maximum of 48. For Group 1, the mean was 6.14 days with a minimum of 0, a maximum of 48 and a standard deviation of 10.88. For Group 2 the mean was 3.61 days, with a minimum of 0, a maximum of 45 and a standard deviation of 8.12. There was a significant difference in readmission days between the two groups ($t$-test for Equality of Means with unequal variance=2.02, $p=.05$) with Group 1 having significantly higher days. Table 1 lists the descriptive statistics for all the variables used.

The Levene's Test for Equality of Variances, however, resulted in an $F=12.38$, $p=.001$. Readmission days, the dependent variable, was, therefore, extremely abnormal in
Table 1

Mean, Range, Standard Deviation and Group Differences for Pathway, Gatekeeper and Dependent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total Mean</th>
<th>Total Range</th>
<th>Acute &amp; Partial Mean</th>
<th>Acute &amp; Partial Range</th>
<th>Acute Only Mean</th>
<th>Acute Only Range</th>
<th>Group Difference Mean</th>
<th>Group Difference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean S.D.</td>
<td>Mean S.D.</td>
<td>Mean S.D.</td>
<td>Mean S.D.</td>
<td>Mean S.D.</td>
<td>Mean S.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>28.10 13.76</td>
<td>26.85 14.71</td>
<td>29.17 N.S.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>58.00 12 .04</td>
<td>57.00 14.71</td>
<td>53.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13.76 12 .04</td>
<td>14.71 14.71</td>
<td>12.86</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>37.94 12.04</td>
<td>37.10 11.23</td>
<td>38.71 N.S.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>55.00 12.04</td>
<td>50.00 11.23</td>
<td>55.00</td>
<td></td>
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<tr>
<td></td>
<td>12.04 12.04</td>
<td>11.23 11.23</td>
<td>12.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute LOS</td>
<td>9.35 7.68</td>
<td>11.36 7.83</td>
<td>7.63 *</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>49.00 49.00</td>
<td>49.00 49.00</td>
<td>37.00</td>
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<td></td>
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<tr>
<td></td>
<td>7.68 7.68</td>
<td>7.83 7.83</td>
<td>7.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outpt Sessions</td>
<td>29.85 37.52</td>
<td>37.46 39.23</td>
<td>22.84 **</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>212.00 212.00</td>
<td>212.00 212.00</td>
<td>159.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>37.52 37.52</td>
<td>39.23 39.23</td>
<td>34.59</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readmission Days</td>
<td>4.78 9.56</td>
<td>6.14 10.88</td>
<td>3.61 ***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>48.00 48.00</td>
<td>48.00 48.00</td>
<td>45.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N.S. = not significant
* \( t = 3.86, \ p = .000 \)
** \( t = 2.96, \ p = .003 \)
*** \( t = 2.02, \ p = .045 \)
its distribution, with 166 of the 240 patients having had no readmissions within 12 months of discharge from the initial hospitalization. A histogram of readmissions is provided in Figure 2.

The researcher, therefore, attempted to create a more normally distributed dependent variable by collapsing it into number of readmissions. This new variable of number of readmissions was also skewed since the number of patients having 0 readmits was still 166. Forty-two patients had one readmit, 15 had two readmits, seven had three readmits, eight had four readmits and one patient had six readmits.

Because of the extreme abnormality of the dependent variable even after collapsing it into number of readmissions, it was recoded into a dichotomous variable of not readmitted (1) readmitted (2). One hundred and sixty-six (69%) of the patients had no readmissions and 74 (31%) had readmissions. This abnormality, and the violation of the homogeneity of variance requirement which will be discussed below, necessitated the use of non-parametric statistics for further analysis.

There were 16 different diagnoses. One hundred sixty-two patients, however, had depression type diagnoses, making diagnosis limited in its variability. The other diagnoses included substance abuse disorders (25), schizophrenia (18),
Figure 2. Histogram of Readmission Days.
psychotic disorder not otherwise specified (1), bulimia (1), adjustment disorder (1), post-traumatic stress disorder (1), conduct disorder (1) and attention deficit hyperactivity disorder (3).

The variable diagnosis, therefore, was recoded into a new dichotomous variable of depression (1) and other (2). The DSM-III-R (American Psychiatric Association, 1987) diagnoses 309, 309.28, 311, 300.40 and 296.00 through 296.99 were recoded into depression (diagnostic cluster 1). All other diagnoses were coded into other (diagnostic cluster 2). There were 162 patients categorized as depressed, and 72 categorized as other. The diagnoses of 6 patients could not be determined and diagnosis was listed as a missing variable in the data base. All 6 cases, however, were used in the analysis.

Predictive Statistics

The basic assumptions of equality of variance and distribution assumptions necessary for general factorial analysis of variance (Shott, 1990; Gibbons and Chakraborti, 1992; Norusis, 1993a) were violated thus necessitating that nonparametric statistical analysis be used for further analysis.

The t-test results were considered valid based on Shott’s (1990) outline of the assumptions that must be met in a separate-variance t-test used to compare two
independent groups. Shott states that the samples should be random or at least not biased and they were. Furthermore, the samples must be independent and the observations within each sample must be independent. The current data base met both of these requirements. Finally, based on the central limit theorem, Shott states that "the separate-variance t-test can be used to analyze nonnormal data if the sample is large enough to compensate for nonnormal populations" (p.120). A sample size of 240, constituting a 19% random sample of the population, was assumed to be large enough to compensate for nonnormality for purposes of the t-test analysis.

Although the central limit theorem would have allowed factorial analysis of variance given this sample size, the unequal variance requirement (Norusis, 1993a) would not (Levene's Test for Equality of Variance, $F=12.383$, $p=.001$). Since neither a factorial analysis of variance nor a multiple regression could be done on the data in its highly skewed form, a logistic regression was used. A logistic regression allows for the prediction of an event either occurring or not occurring while controlling for one or more predictor variables or covariates (Norusis, 1993a). Furthermore, it requires limited assumptions about the distribution of the data.
A logistic regression analysis was performed using whether or not the patient was readmitted as the dependent variable and initial acute length of stay, age, diagnostic cluster, GAF score, group number, number of outpatient sessions and sex added as covariates or predictor variables. All variables were entered using the forced entry default of SPSS. In this method, all variables in the block are entered in a single step.

This regression was able to correctly predict 69.68% of the patients in terms of whether they were readmitted or not based on the predictor variables. The model correctly predicted 90.60% of those not readmitted but only 26.39 of those readmitted. The significant variables in the equation were age (p=.0268), GAF score (p=.0020) and number of outpatient sessions (p=.0031). Group number was not a significant variable in the equation. The results are presented in Table 2.

Discriminant analysis is a method of identifying variables that help distinguish between two groups. The concept underlying discriminant analysis is that "linear combinations of the independent, or predictor, variables are formed and serve as the basis for classifying cases into one of the groups" (Norusis, 1993b, p.1).
Table 2

Logistic Regression Analysis

Pathway and Gatekeeper Variables Predicting Readmission

<table>
<thead>
<tr>
<th>Classification Table for Readmission-No or Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predicted</td>
</tr>
<tr>
<td>Observed</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Overall</td>
</tr>
</tbody>
</table>

Variables in the Equation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Wald</th>
<th>Sig</th>
<th>R</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>4.9066</td>
<td>.0268*</td>
<td>.1021</td>
<td>1.0261</td>
</tr>
<tr>
<td>DXCLUSTR</td>
<td>.0185</td>
<td>.8918</td>
<td>.0000</td>
<td>1.0249</td>
</tr>
<tr>
<td>GAF</td>
<td>9.5205</td>
<td>.0020*</td>
<td>-.1642</td>
<td>.9581</td>
</tr>
<tr>
<td>LOS</td>
<td>2.0623</td>
<td>.1510</td>
<td>.0149</td>
<td>1.0308</td>
</tr>
<tr>
<td>OUTPT</td>
<td>8.7366</td>
<td>.0031*</td>
<td>.1554</td>
<td>1.0126</td>
</tr>
<tr>
<td>SEX</td>
<td>.7449</td>
<td>.3881</td>
<td>.0000</td>
<td>1.1753</td>
</tr>
<tr>
<td>TX GROUP</td>
<td>.0504</td>
<td>.8223</td>
<td>.0000</td>
<td>.9641</td>
</tr>
<tr>
<td>Constant</td>
<td>.5494</td>
<td>.4586</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*=p<.05
df=1

Key:

AGE- age at initial acute admission in study
DXCLUSTR- diagnosis of depressed or other
GAF- Global Assessment of Functioning score at initial acute admission in study
LOS- length of stay at initial acute admission in study
OUTPT- total number of outpatient sessions received over the 2 year study period
SEX- sex of the patient
TX GROUP- treatment group: acute & partial or acute only

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Table 3

Discriminant Analysis Predicting Readmission from Pathway and Gatekeeper Variables

Classification results -

<table>
<thead>
<tr>
<th>Actual Group</th>
<th>No. of Cases</th>
<th>Predicted Group Membership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>149</td>
<td>135 (90.6%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14 (9.4%)</td>
</tr>
<tr>
<td>Group 2</td>
<td>72</td>
<td>51 (70.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21 (29.2%)</td>
</tr>
</tbody>
</table>

Percentage of groups correctly classified: 70.59%

A step-wise discriminant analysis with prior probabilities computed from group size was able to correctly classify 70.59% of the cases in terms of readmitted or not readmitted using the same predictor variables. Table 3 presents the results of this discriminant analysis.

For purposes of further analysis and in an attempt to meet the equality of variance assumption, the researcher deleted all cases with no readmissions to see if there were any differences in readmission days between the two groups. This left 38 patients in Group 1 (51.4%) and 36 patients in Group 2 (48.6%) for a total of 74 total patients. The mean number of readmission days for Group 1 was 17.95 and Group 2 was 12.92. The Levene’s Test for Equality of Variances yielded an $F=.284$ (p=.596) and thus the equality of
variances assumption was not violated. Using this approach, the two groups approached significant differences with a \( t = 1.93 \) (\( p = .058 \)).

With all zero readmission cases deleted, a multiple regression using the pathway variables sex and age and the gatekeeper variables acute length of stay, GAF, treatment group, number of outpatient sessions and diagnostic cluster as the predictor variables and readmission days as the dependent variable yielded an \( R^2 \) of .15400 and an \( F = 1.66425 \) (\( p = .1339 \)). No variables in the equation were significant.
Chapter V
Summary, Findings, Conclusions

Findings

In looking at the pathway variable age, no significant differences were found between the groups in age. It is important to note, however, that Group 1 (acute and partial) was comprised of 40.5% of patients 18 years old and younger while Group 2 only had 27.9% in this age group. Thus, Group 1 had a larger child and adolescent population.

For gatekeeper variables, no significant differences were found in severity of illness as measured by GAF score at initial hospitalization. Group 1 had a significantly higher initial acute length of stay at 11.36 days compared to Group 2 which had an initial acute length of stay of 7.63 days (t=3.86, p=.000). Group 1 also had significantly higher outpatient sessions over the two year period with an average of 37.64 compared with 22.84 for Group 2 (t=2.96, p=.003). Group 1 also had significantly higher readmission days with an average of 6.14 days compared with 3.61 in Group 2 (t=2.02, p=.045). The 95% confidence interval for the difference was .062, 5.017, thereby indicating that the difference was not zero.
Since the data were highly skewed with 166 of the 240 cases having zero readmissions, the dependent measure of readmission days was collapsed into a dichotomous variable of not readmitted or readmitted. Because of the non-normal distribution of the data and the dichotomous nature of the dependent variable, nonparametric statistics were used for further analysis.

Using a logistic regression with not readmitted or readmitted as the dependent variable, 69.68% of the cases were successfully classified into not readmitted or readmitted. The classification was more accurate for the not readmitted cases with 90.60% of that category being successfully classified compared with only 26.39% of the readmitted category. The significant variables in the regression (those significantly different from 0) included age (Wald=4.9066, p.=.0268), GAF (Wald=9.5205, p.=.0020) and number of outpatient sessions (Wald=8.7366, p.=.0031).

Although in a logistic regression the contribution of each variable depends on the other variables in the model, a partial correlation between the dependent variable and each independent variable can be found in the R statistic. Age had a positive R of .1021 indicating that as the age of the patient increased, so does the likelihood of readmission occurring. GAF score had a negative R of .1642 indicating that as GAF goes down, representing an increase in severity,
the likelihood of readmission goes up. Similarly, the $R$ for number of outpatient sessions was .1554, indicating that as the number of outpatient sessions increased, the likelihood of readmission goes up. Because of the small values of $R$ the variables appear to have a small partial contribution to the model, accounting for only approximately 6% ($R^2$) of the total.

Using a discriminant analysis with not readmitted or readmitted as the dependent variable, 70.59% of the cases were correctly classified. The classification was more accurate for those patients not readmitted, with 90.6% correctly classified and only 9.4% misclassified. For those patients readmitted, only 29.2% were correctly classified and 70.8% were misclassified.

GAF, number of outpatient sessions and age were variables whose means were most different between the two groups. GAF resulted in a Wilks' Lambda of .9385 ($p=.0002$), number of outpatient session had a Wilks' Lambda of .8945 ($p=.0000$) and age had a Wilks' Lambda of .8776 ($p=.0000$). The interpretation of the discriminant analysis, although very similar in results to the logistic regression results, must be viewed with caution. Discriminant analysis requires an assumption that the sample was drawn from a multivariate normal population and that the population covariance matrices are equal (Norusis, 1993b).
A test of the equality of group covariance matrices, however, yielded a Box's M of 18.6753 (p.=.0054) indicating that the group covariances are significantly different.

The analysis of the differences between Group 1 and Group 2 after all of the cases with zero readmissions were deleted, yielded a Levene's Test for Equality of Variances of F=.284 (p.=.596) and thus the equality of variance assumption for parametric statistics was not violated. The difference between the two groups in this analysis approached significance (t=1.93, p.=.058). The 95% confidence interval was -.117, 10.239, however, indicating that the difference could be zero and the null hypothesis of no difference could not be rejected.

With the equality of variance assumption met, a multiple regression analysis was done using the continuous variable of readmission days. The analysis of variance was not significant (F=1.6643, p.= .1339) and no variables in the equation were found to be significant. The regression model accounted for only approximately 15% of the overall variance in the dependent variable ($R^2=.15400$).

**Discussion**

Based on the results, the following conclusions are made about the hypotheses:

1. There will be no significant difference in the number of readmission days for patients treated with a
combination of partial hospitalization and acute care as compared to those who are treated with acute only.

Rejected: There was a significant difference between Group 1 (acute and partial) and Group 2 (acute only) such that Group 1 had readmission days of 6.14 days and Group 2 had 3.61 days (t=2.02, p.=045).

2. There will be no significant difference in the number of readmission days between patients treated with a combination of partial hospitalization and acute care as compared to those who are treated with acute only when controlling for the pathway variables age and sex and the additional gatekeeper variables of diagnosis, initial inpatient length of stay, severity or number of outpatient therapy sessions.

Fail to Reject: Because the assumptions of distribution, normality and equality of variance were not met, statistical analysis could not be undertaken to adequately address this hypothesis. Logistic regression and discriminant analysis, however, did show effects for the variables GAF, number of outpatient sessions and age.

The results of this study support the concept of treatment type as a gatekeeper variable. Since there was a significant difference in the number of readmission days in Group 1 versus Group 2, this variable differentiated between the two groups on recidivism as a measure of outcome. This
finding is consistent with the ideas expressed by Buell et al. (1972), Buell and Anthony (1973) and Anthony and Buell (1974) on treatment programming effecting patient outcome. What is more important in understanding the results of this study, however, are how the results compare to other research in the area of partial hospitalization.

The literature indicated that partial hospitalization was an effective alternative and adjunct to inpatient hospitalization (e.g., Wilder et al., 1966; Hogarty et al., 1968; Herz et al., 1971; Michaux et al., 1973; Washburn et al., 1976; Penk and Charles, 1979; Creed et al., 1990; and Kluiter et al., 1992). As an adjunct, it is often used to enhance the effectiveness of other modalities or, in the case of inpatient care, reduce the necessary lengths of stay. Its positive effects have been attributed to its ability to minimize dependency and regression, avoid isolation, maintain family and community ties and thus encourage higher levels of patient functioning. Therefore, the combination of partial and acute versus acute only examined in this study was expected to lead to more positive outcomes, defined as fewer readmission days. Additionally, as a gatekeeper variable, it was expected to differentiate between those patients readmitted and those patients not readmitted.
In fact, as shown, there was a significant difference between Group 1 (acute and partial) and Group 2 (acute) and, therefore, treatment type did differentiate the two groups. It was, however, not in the direction expected. Group 1 actually had significantly higher readmission days. Thus, when patients in Group 1 were readmitted, they stayed in the hospital longer.

The first possible explanation is that partial hospitalization does not have the positive effects that were pointed out in the literature. It appears even to have some negative effects since Group 1 had 33% longer initial inpatient lengths of stay and 40% higher readmission days. Furthermore, since GAF at initial hospitalization was not significantly different between the two groups, it appears that the two groups were equal in severity.

A more plausible explanation, however, is that Group 1 was actually a more severe and chronic group of patients than Group 2. Thus, the two groups may have been different in symptomatic behavior and overall pathology. This is similar to the finding of Hogarty et al. (1968) that patients admitted to day treatment were clinically different from those patients admitted to inpatient in terms of symptoms and pathology.

GAF was probably not a good measure to use to try to differentiate the two groups because of the strict
demonstration project criteria for inpatient admission. That is, to be authorized for inpatient admission, a certain GAF score had to be assigned. This is not to imply that intake clinicians would assign an inaccurate GAF score just to approve an inpatient admission. Instead, it means that every individual appropriate for admission to inpatient care, by definition, is going to have a similar GAF score regardless of other treatment modalities they may have received.

One factor that may have influenced the apparent higher severity level in Group 1 was the fact that this group had a much higher percentage of children and adolescents (40.5% versus 27.9%). Children and adolescents had a longer length of stay for inpatient services overall for the demonstration project and their treatment was more complicated. Also, adults may be more inclined to seek services for their children than themselves or to need someplace to put their psychiatrically disturbed children while they work. Additionally, Group 1's longer length of initial hospitalization and 39% higher number of outpatient sessions over the two fiscal years indicate that this group might have been more severe and more chronic because they required more services.

Group 1 patient's might have been those that had been treated in virtually every level of care in an attempt to
try any and everything that might be effective. This is in contrast to Group 2 whose members may very well have had one transient acute episode, and little or no further treatment beyond outpatient sessions.

Another plausible explanation is that the sample obtained was not representative of the population. If the sample was representative, the relationship hypothesized may have been found. The possibility of the sample not being representative of the population is further supported by the seemingly higher severity of patients in Group 1 as evidenced by their longer initial length of stay, higher number of outpatient sessions and higher readmission days. Since partial hospitalization is a less restrictive level of care typically targeted at less severe patients, Group 1 would be expected to be less severe. Thus, finding this group more severe may indicate that the sample selected from the Group 1 population is not representative of patients accessing partial and acute care in combination.

There are several other alternative explanations for the results obtained. One alternative explanation is based on the limitation in the data related to diagnosis. First, only the primary Axis I diagnosis was available, which gave information on the clinical syndrome presented at intake and no information on comorbid conditions. Thus no information was available on Axis II personality disorders or Axis III
physical conditions and disorders since these data were not available in the data base to which the researcher had access.

Given "...that the simultaneous presence of more than one disorder can complicate both diagnosis and treatment..." (Angold and Costello, 1993, p.1779), the absence of such additional diagnostic information presents an incomplete clinical picture. For example, a chronically depressed patient with a personality disorder, a substance abuse disorder and brittle diabetes, would be identified in the sample the same as an otherwise healthy individual with a transient, exogenous depression.

Another related limitation of the diagnosis variable was that it was the diagnosis related to the condition at admission and, therefore, not necessarily an accurate reflection of the patient’s psychopathology. An excellent example of this limitation was seen when reviewing more detail on one particular case. The patient selected by random sampling was a well-known patient with a diagnosis of multiple personality disorder who had been the subject of several case study reviews and clinical peer reviews. In the study sample, however, she had been admitted for depression. This diagnosis did not provide an adequate clinical picture of this patient’s functioning but rather provided only a "snapshot" view of her at the time of
admission. Additionally, it appeared from a casual review of the treatment histories available from the intake record that depression was often a diagnosis that was conveniently used when a more definitive diagnosis could not be determined.

Yet another limitation of the diagnosis variable in this study that may have affected interpretation of the results, was that the diagnosis was not consistently available from the same source. At times the diagnosis was obtained from the intake record (at admission), at other times it was obtained from the ongoing case management review records (probably based on the hospitals admitting diagnosis) and at other times it was obtained from the claims record (discharge diagnosis).

The fact that the majority of diagnoses were depression related, however, points out the limited ability of this variable to differentiate between the two groups. The actual differences in severity and chronicity, therefore, may have been more distinguishable if better diagnostic data would have been available.

A final consideration in interpreting the results relates to the nature of a retrospective, causal-comparative study. As Issac and Michael (1990) point out, "to reach sound conclusions, the investigator must consider all the other possible reasons or plausible rival hypotheses which
might account for the results obtained" (p.51). A further limitation with the design is the uncertainty that all the relevant causative factors were included. Although the variables of age, sex, GAF, diagnosis, initial acute length of stay and number of outpatient sessions appeared to be a reasonable list of the factors shown in the literature, there are doubtless many, many others.

Psychiatric disorders and the individuals that suffer from them are multi-faceted and infinitely complex. Psychiatric disorders are not just somatic, but are rather "psycho-spiritual-socio-somatic" in nature as well (Peck, 1993,p.58). By failing to capture these other variables, the actual results of which treatment setting worked better and how the two settings affected outcome may have been limited.

Furthermore, Moos and Smail (1974) view the treatment environment as having a critical impact on the patients who are treated in them. In fact, there is a whole area of social ecology and sociotechnical systems that looks at both human adaptation and human milieu as they impact on the individual (e.g., Moos, 1974; Weisbord, 1987). These views would support the notion that both individual and institutional variables can have an impact on the way individuals adapt to situations in general and how treatment affects individual outcome. Thus, given that both

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individual and environmental aspects are important in determining system effectiveness, to the extent that all variables are not identified, a complete explanation may not be possible.

Because of the nature of the managed care contract from which data were obtained, disposition decisions were at times based on intimate knowledge of the patient's history rather than strict application of level of care criteria. Since the contractor was the exclusive gatekeeper for all CHAMPUS beneficiaries, many frequent users of care were well-known to the intake staff. Their previous histories were known as well as what treatment types had and had not worked in the past. At times, therefore, more chronic patients might be placed in partial hospitalization even though they would present to a clinician not knowing them as needing inpatient care.

This phenomenon was made evident during an audit by an external monitoring contractor that reviewed the quality and appropriateness of the level of care decisions made by the managed care organization. During this review, the monitoring contractor found a significant number of cases that were identified as meeting criteria for inpatient but approved for partial. The managed care contractor's response to the finding was that these patients were well-known to them and the decisions were made based on what had
worked historically rather than how a single isolated criteria may have applied. In other words, the intake staff had a much broader perspective and context in which to make the level of care decision which was not necessarily reflected in what the external monitoring agency reviewed. For example, a patient may have presented with expressed suicidal ideation or even intent which would meet criteria for inpatient care. However, given the managed care organizations knowledge of this patients history of manipulation and borderline characteristics, a decision may have been made to put him or her in partial treatment initially. Additionally, the managed care contract required that the lowest level of care always be attempted where possible. More chronic difficult cases may have, therefore, been referred to a partial/acute combination leading to higher recidivism in Group 1.

Where this research assumed that the critical variable affecting recidivism was treatment group assignment, it may instead have been the individual patient characteristics and the tacit knowledge that the intake counselors used in making level of care decisions. Thus, patient assessments may have been based on the counselors "hunch" or "gut-level feeling" about the patient's treatment needs and their intimate knowledge of the patient's treatment history, rather than strict application of level of care criteria.
Again, to the extent that the data did not capture this use of tacit knowledge, an incomplete picture of causal factors may have been obtained.

The study results are valuable, however, despite any limitations. These results relate to the important area of treatment pathways and combinations of modalities which lead to positive outcomes. They should provide stimulus to continue to look at the types of modalities that are effective and the pathway and gatekeeper variables that lead to success. Finally, by raising questions about the value of diagnosis, actual acuity, and other factors related to treatment success, further research opportunities are created.

Conclusions

The conclusions based on the findings from this study are as follows:

1. The highly non-normal distribution of the data limited the extent of the further analysis that could be done. For example, a general factorial analysis of variance that would allow for the effects of group membership while controlling for the various independent variables could not be done.

2. Patients treated with a combination of acute and partial hospitalization during a single treatment episode have higher readmission days than those treated with acute
only and thus treatment type as a gatekeeper variable did differentiate between the two groups on the outcome measure of recidivism.

3. The significant variables related to the probability of being readmitted or not are age, GAF score and number of outpatient sessions and not patient's group membership (Group 1 versus Group 2).

Recommendations

As this study showed, the variables collected were probably not sufficient to adequately explain variation in recidivism between the two groups. Therefore, future research should include the following additional factors:

1. Axis II and III to determine comorbid conditions;
2. Information on family and community support systems as other pathway variables;
3. Facility treatment approach and philosophy as other gatekeeper variables;
4. Information on medication usage and compliance as other pathway variables;
5. Detailed information on the specific type of outpatient treatment received (i.e., individual psychotherapy, family therapy, etc.).

The first five additional pathway and gatekeeper factors relate to individual, social and contextual variables that may have an influence on treatment outcome.
Collection of these additional variables, however, would require access to considerably more confidential data and would have many human subjects review implications, unless they were part of the database to be used. Logistically, it would be a much harder study, although the results would probably be more meaningful.

If the same methodology were used again, it is recommended that patients be sampled from the population of patients in Group 1 who were readmitted and separately from the patients in Group 2 who were readmitted. This would overcome the problem of the skewed data because there would be no patients in the samples with zero readmissions. This is similar to the approach used by Polk-Walker et al. (1993) in the research on psychiatric recidivism.

A related study that would further knowledge in the area of treatment pathways in psychiatric care could also be done in the causal-comparative design. This would involve tracking data on every treatment event, in sequence, that happened to a random sample of patients and comparing these treatment combinations as they impact on some set of dependent measures. For example, the effects of x number of days of partial, followed by x number of days of inpatient, followed by x number of outpatient sessions for a diagnosis of x could be compared to another combination of treatment
as it effects measures of recidivism, psychopathology and functioning.

To overcome the limitations of the causal-comparative research, a true experimental design could be used. This would utilize a randomized control-group pretest-posttest design similar to that utilized by Dick et al. (1985), Creed et al. (1990) and Kluiter et al. (1992). Patients entering treatment would be randomly assigned to either inpatient care or a combination of inpatient and partial care. No patients would be excluded from either group for severity reasons since those needing inpatient care because of suicidal or homicidal risk would be placed in acute and later stepped down to partial (as in the current study). Recidivism rates could then be determined while controlling for other pathway and gatekeeper variables.

From this research, a sophisticated model of treatment pathways in psychiatric care could be developed. This could ultimately lead to a knowledge base of what works best, for what types of patients, and help in developing more cost-effective treatment systems. Ultimately, this is the challenge for psychiatric care providers if such care is going to be funded in an overall health insurance delivery system.

Finally, the significance of the tacit knowledge theory could be examined further by developing a methodology to
assess all the factors, both implicit and explicit, that clinicians use in determining appropriate level of care. This finding would be valuable to managed care organizations because it would lend further support to level of care decisions and would help support more discretionary decisions (i.e., those decisions that appear to be contrary to established criteria). Ultimately, understanding the decisions clinicians make regarding level of care would allow for targeted strategies on ways to improve clinician decision-making to meet changing quality and cost objectives more effectively.
References


Autobiographical Statement

William E. Turner, III was born in Charlottesville, Virginia on April 29, 1955. He received his B.A. in Psychology from Hampden-Sydney College in May of 1977, his M.A. in Psychology from James Madison University in May of 1979 and his M.H.A. in Health Administration from Medical College of Virginia/Virginia Commonwealth University in August of 1992. He completed an administrative residency under the Commissioner and Assistant Commissioner for Administration at the Virginia Department of Mental Health and Mental Retardation in August of 1982 and earned fellowship in the American College of Healthcare Executives in 1992.


Mr. Turner has held a variety of senior management positions in the healthcare field since completion of his
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