AN ABSTRACT OF THE DISSERTATION OF

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Title: Using Demographic and Clinical Variables to Predict the Length of Stay of
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Abstract approved:

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In Oregon, "Incompetent to Stand Trial (IST) Patients" were observed to be
increasing in number, remaining in the hospital longer, and costing more to treat. A
study was designed to investigate variables that could be used to predict their length of
stay at Oregon State Hospital.

Data for thirteen independent variables (gender, age, having an Axis I psychosis
level diagnosis, having an Axis I substance-related diagnosis, having an Axis II
personality disorder diagnosis, evidence of involuntary medications, being on atypical
medications at discharge, number of seclusion and restraint events, number of felony
charges, number of misdemeanor charges, and number of inter-ward transfers) and one
dependent variable (length of stay) were analyzed for 198 IST patients discharged
from Oregon State Hospital between January, 1999 and December, 2001. Bivariate
correlations for all variables, and length of stay (LOS) means for all levels of each
variable were examined and discussed.

A standard multiple regression analysis was performed. The regression model
accounted for 36.5% (32.7% adjusted) of the variability in (log) LOS. R for regression
was found to be significantly different from zero. Five variables were found to be
significant contributors to explaining the variability in (log) LOS: (square root) number

ABSTRACT (Continued)

of inter-ward transfers (16%), gender (5.8%), evidence of involuntary medications

(5.2%), (square root) number of felony charges (2.8%), and (square root) number of

seclusion and restraint events (1.6%). Despite accounting for more variability in LOS

than several previous studies with psychiatric patients, 67.3% of the variability was

unaccounted for by the regression model.

Unstandardized regression coefficients for untransformed variables were

interpreted, revealing that gender, number of inter-ward transfers, and evidence of

involuntary medications significantly predicted the largest increases in LOS.

Recommendations were made for further research related to LOS of IST patients.

Using Demographic and Clinical Variables to Predict the Length of Stay
of "Incompetent to Stand Trial" Patients

by
Carl Theodore Ficken

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APPROVED:

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I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

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Carl Theodore Ficken, Author

ACKNOWLEDGMENTS

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

LIST OF FIGURES (Continued)

LIST OF TABLES

DEDICATION

This dissertation is dedicated to Mary Candida Blackburn Ficken, whose love, support, and encouragement made it all possible.

USING DEMOGRAPHIC AND CLINICAL VARIABLES TO PREDICT THE LENGTH OF STAY OF "INCOMPETENT TO STAND TRIAL" PATIENTS

CHAPTER 1

INTRODUCTION

1.1 Statement of the Research Problem

The purpose of this study is to evaluate variables that may be used to predict the length of stay (LOS) of incompetent to stand trial (IST) patients at Oregon State Hospital (OSH) in Salem, Oregon. The following variables will be investigated: gender, referring county, length of stay, ethnic group, age at admission, having a psychotic level diagnosis, having a substance abuse diagnosis, having a personality disorder diagnosis, the number of seclusion and restraint events while in the hospital, the number of pending felony criminal charges, the number of pending misdemeanor criminal charges, evidence of use of involuntary medications, evidence of use of an atypical medication at the time of discharge, and the number of inter-ward transfers within the hospital. These variables will be defined and explained below.

Incompetent to Stand Trial (IST) patients are a subset of the increasing number of individuals who have mental health problems at the global, national and state levels. In Oregon, the number of IST patients has been increasing, and IST patients have been staying in the hospital for longer periods of time. The cost of treating IST patients has increased. Understanding what variables contribute to the LOS of IST patients is an important first step toward managing those variables, and reducing the costs of inpatient care.

According to Huntley et al. (1998), "Today psychiatric hospitals must meet the challenge of reducing costs of care while maintaining a high quality. One approach to reducing costs is to reduce an individual patient's length of stay." In the discussion section of their study, they conclude: "...our results strongly suggest that patient-related predictors of length of stay in a single hospital can be stable over time and can be readily discovered using relatively simple statistical procedures."

If factors that unnecessarily increase length of stay can be identified, those factors can be addressed and managed. Decreasing the length of stay can lead to shorter waiting lists, decreased unit costs, targeted treatment services, greater access to services, relief to ill-equipped county jails, and improved quality of care. Resources that are saved can be directed to other mental health services - including prevention programs - thereby benefiting the entire mental health system, and the public-at-large.

1.2 Background/Significance of the Study

This section will present background information regarding the growth of mental health needs at the international, national and state levels. Moving from the general to the specific, information will be provided about the growth of forensic psychiatry, and the problems of serving IST patients in Oregon. The importance of studying the LOS of IST patients will be explained, and the need for this study justified.

1.2.1 International, National, and State Mental Health Needs

At the international level, the World Health Organization (WHO) reports that 5 of the 10 leading causes of disability worldwide are the following mental health

problems: major depression, schizophrenia, bipolar disorders, alcohol use, and obsessive compulsive disorders (WHO, 1999). While progress has been made in areas of disease control and eradication, mental, behavioral, and social health problems have increased and contribute more to the global health burden (WHO, 1999). The DALY (Disability Adjusted Life Year) methodology is used to quantify both the number of deaths in a population and the impact of premature death and disability on that population. One "DALY" is a lost year of a healthy life. Using the DALY methodology, it was determined that mental health problems accounted for 11.5% of the global burden of disease. Contributing to this 11.5% were unipolar depression (36.5%), bipolar depression (10.4%), alcohol dependence (8.7%), psychosis (8.7%), and epilepsy (3.5%) (WHO, 1999). The WHO also predicts, "The future will bring an expotential increase in mental health problems." It cautions, "The burden of mental and neurological problems is likely to become even heavier in the coming decades and will raise serious social and economic obstacles to global development unless substantive action is taken (WHO, 1999)."

In response to the growing concern about mental health issues, a Department of Mental Health has been established within the World Health Organization. This department is focusing on populations that seem most vulnerable to mental health problems: children and adolescents experiencing disrupted nurturing, abandoned elderly, abused women, groups traumatized by war and violence, refugees, other displaced persons, many indigenous people, people exposed to disasters, long term institutionalized patients, and persons living in extreme poverty. This study focuses

on a subset of the long-term institutionalized population, and some of that subset

includes individuals from the other categories.

At the national level, in 1999 the U.S. Department of Health and Human

Services published the first ever Surgeon General's report on Mental Health (U.S.

Department of Health and Human Services, 1999). The report points out the

seriousness of mental health issues in the United States as public health problems:

> The current prevalence estimate is that about 20 percent of the U.S. pop-
> ulation are affected by mental disorders during a given year. This estimate
> comes from two epidemiologic surveys: the Epidemiologic Catchment
> Area (ECA) study of the early 1980's and the National Comorbidity Survey
> (NCS) of the early 1990's. Those surveys defined mental illness according
> to the prevailing editions of the *Diagnostic and Statistical Manual of
> Mental Disorders* (i.e. DSM-III and DSM-III-R). The surveys estimate
> that during a 1-year period, 22 to 23 percent of the U.S. adult population
> - or 44 million people - have diagnosable mental disorders, according to
> reliable established criteria. In general, 19 percent of the adult U.S. pop-
> ulation have a mental disorder alone (in 1 year); 3 percent have both
> mental and addictive disorders; and 6 percent have addictive disorders
> alone. Consequently, about 28 to 30 percent of the population have
> either a mental or addictive disorder.

Hall et al. (1993) studied long-stay patients in short-stay hospitals in the United States.

They reported:

> Mental disorders increased from 13 percent of long-stay diagnoses in 1980 to
> 19 percent in 1990. For all patients, mental disorders accounted for approx-
> imately 5 percent of discharges in both years. Psychoses was a major and
> dramatically increasing diagnostic category for long-stay patients, making
> up 5 percent of long-stay discharges in 1980 and 12 percent in 1990. The
> proportion of all patients with diagnoses of psychoses also increased from 1
> to 3 percent. The number and proportion of long-stay and all discharges for
> neurotic and personality disorders were lower in 1990 than in 1980.

At the state level, in Oregon, data received from the Mental Health and

Developmental Disabilities Services Division (G. Grob, personal communication, July

27, 1998) indicate that there is a growing need for mental health services for residents

of the state. Figures indicate that in biennium 1988-1989, Oregon served 26,662

adults in its mental health system. By biennium 1997-1998, that number had

increased to 51,527 adults.

1.2.2 The Growth of Forensic Psychiatry

Forensic psychiatry is the practice of psychiatric medicine with patients or

inmates who have both mental illness and legal problems. As a specialty, forensic

psychiatry has experienced growth in the United States. A recent report by the

Department of Justice (*Psychiatric Services,* 1999) reported that in mid-1998 there

were an estimated 283,800 mentally ill inmates in U.S. county jails, state prisons, and

federal prisons. Additionally, it was estimated that 547,800 mentally ill offenders

were on probation in communities. Mentally ill inmates were found to have higher

rates of violent offenses, longer criminal histories, higher rates of drug and alcohol

use, high rates of homelessness, high rates of unemployment, and histories of physical

and sexual abuse. The Department of Justice study is the most current and complete

study of mentally ill clients in correctional settings. Past studies are summarized by

Lamb and Weinberger (1998) and are consistent with these recent findings. According

to Lamb and Weinberger (1998) the phenomenon of mentally ill inmates in prisons

and jails is recently observed. They report that the issue was noticed and reported in

the 19th century, but began reemerging in the 1970's.

The numbers of mentally ill in correctional settings is just one part of the

forensic psychiatry picture. The other side of the coin is the number of mentally ill

individuals, with criminal charges or convictions, in hospitals. Way et al. (1991)

completed a survey of forensic psychiatric inpatients in hospitals in the United States. They found that in 1986 there were 5,400 patients found "not guilty by reason of insanity (NGRI)," and 3,200 patients who were found "incompetent to stand trial (IST)." They also reported regional and system differences in serving those patients, illustrating the need for studies at the local level.

Judging by the growth of state hospital beds devoted to forensic populations, it appears that numbers of forensic patients have increased. The National Association of State Mental Health Program Directors Research Institute, Inc. (2000) reports that over 35 states now provide acute, intermediate, and long-term services to forensic inpatients.

In the U.S. in 1986, only five states did not report having statutes providing for the identification and treatment of IST patients (Pendleton, 1980; Davis, 1985). Statutes in each state vary in subtle ways, but are similar in how they define an incompetent person and procedures for committing an incompetent person to inpatient mental health treatment. Statutes also specify time frames for LOS and written reports to the court (Roesch & Golding, 1979). Nestor et al. (1999) report that an estimated 25,000 "Competency to Stand Trial" evaluations are requested each year in the U.S.

Many of these types of patients are without private health insurance, but may be covered by Medicare or Medicaid. For example, in Oregon, Medicaid funds for mental health services are distributed to county mental health organizations or county-based health plans on a capitated basis (personal communication, Ralph Summers, 1998; confirmed, 2003). The entity receiving the Medicaid funds decides how to use the funds to best serve its clients. In the case of incompetent individuals charged with

crimes, those individuals may be found incompetent to proceed in court, and committed to the state hospital. This allows the incompetent individual to receive intervention, and allows the county to preserve its mental health funds for other clients. State hospital services for IST patients are paid for primarily from state general fund dollars, and this allows the county entities to save their Medicaid dollars for use in providing other services to non-criminal mentally ill persons.

1.2.3 The Growth of IST Patients in Oregon

In Oregon, IST patients are referred to as "370" patients, which identifies the statute under which they are committed to the state hospital. Oregon Revised Statute 161.370 (Appendix A) provides guidelines for the commitment of incompetent defendants to a state hospital. The statute allows judges to determine if a defendant is unfit to proceed in court, due to a mental condition or defect. The statute also outlines time frames for the ongoing evaluation of IST patients. The statute requires that IST patients be returned to court, to stand trial, if they are restored to competency. IST patients cannot be held beyond the period of time that would equal the maximum sentence for their charges, or beyond three years. If a patient remains incompetent at the end of three years, he/she may be committed to the hospital under other Oregon Revised Statutes.

The number of IST patients has been increasing in Oregon over the last decade (Oregon State Hospital, 1999). Table 1 shows the increase in IST admissions and discharges to Oregon State Hospital over the last fifteen years. The data show an increase from 94 IST admissions in 1988 to 188 admissions in 2002. Discharges

increased from 89 in 1988 to 176 in 2002. The difference between admissions and

discharges also increased, from a difference of 5 patients in 1988 to a difference of 27

patients in 2000, and declining to 12 in 2002. The "Actual Delta" and "Cum Delta"

columns in Table 1 reflect the difference between admissions and discharges each

year, and the cumulative number of patients remaining in the hospital at the end of the

fifteen years. This indicates that IST patients may be staying in the hospital for longer

periods than in the past, and demonstrates how IST patients contribute to

overcrowding at the state hospital.

Year	Admissions	Discharges	Total Bed Days	Average LOS at Discharge
1988	94	89	Not available	Not available
1989	83	71	Not available	Not available
1990	97	90	5485	64
1991	71	69	5551	88
1992	92	84	3252	62
1993	93	86	7592	91
1994	102	94	7655	83
1995	113	97	8322	88
1996	117	101	8593	87
1997	129	127	15074	119
1998	115	95	10561	114
1999	125	112	11767	110
2000	150	123	17679	145
2001	156	135	Not available	Not available
2002	188	176	Not available	Not available
Totals	1725	1549		

Table 1 – IST (370) Admissions, Discharges, Total Bed Days, and Average
LOSat OSH, 1988-2002
Source: focus report from the Oregon Patient Resident Care System (OPRCS)

370 Admissions and Discharges
1988-2002

$$y = 0.6433x^2 + 1.6971x + 8.3802$$
$$R^2 = 0.9944$$

Legend:
- No. of 370 Discharges
- No. of 370 Admissions
- Cumulitive Delta between 370 Discharges and Admissions

Year
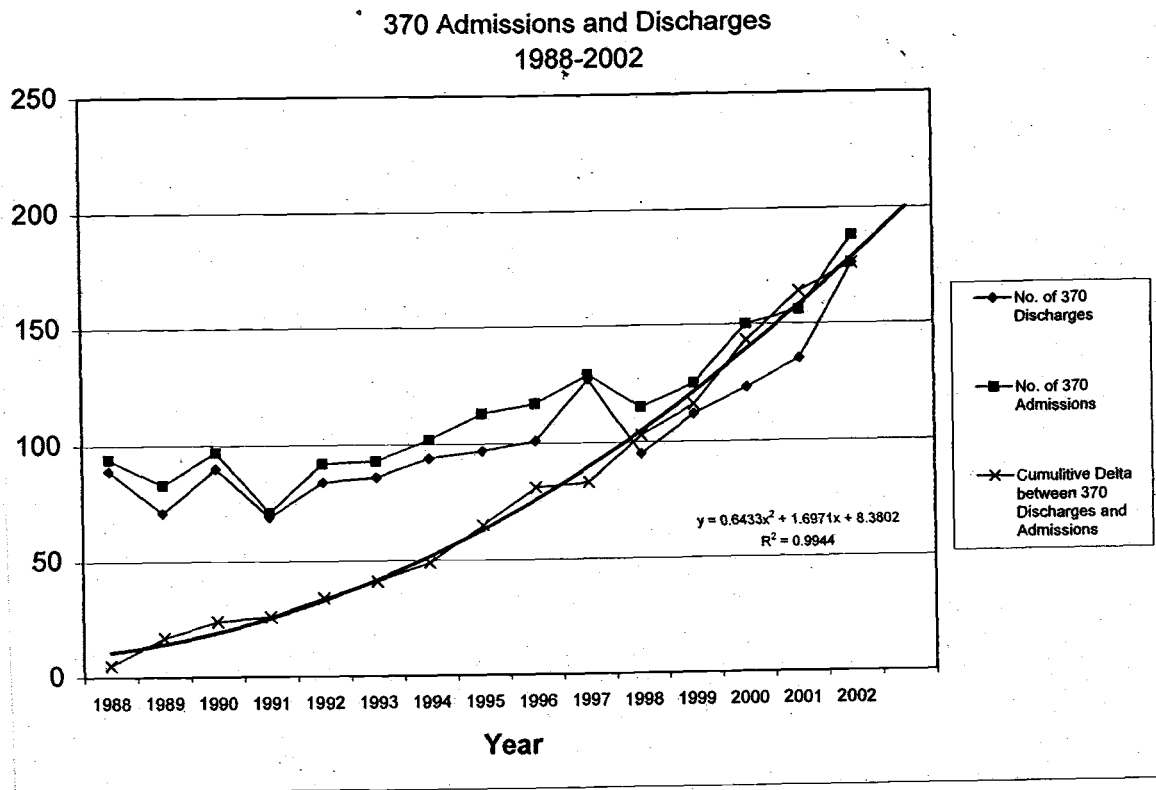
Figure 1 – IST (370) Admissions and Discharges to OSH 1988-2002
Source: focus report from the Oregon Patient Resident Care System (OPRCS)

Figure 1 presents graphic representation of some of the information from

Table 1. The trend line shows a definite ongoing increase in both IST patients and the

cumulative number of IST patients remaining in the hospital. The trend line accounts

for 99.44% of the variability in IST admissions, IST discharges, and the cumulative difference between the two.

Figure 2 shows the average LOS, at discharge, for IST patients at Oregon State Hospital during the decade from 1990 to 2000. The graph illustrates an increase in LOS from 64 days in 1990 to 145 days in 2000. This upward trend in LOS is not consistent with national efforts to decrease inpatient LOS for psychiatric patients.

Oregon State Hospital: ORS 161.370 Average Length of Stay (LOS) at Discharge in Days, 1990 - 2000
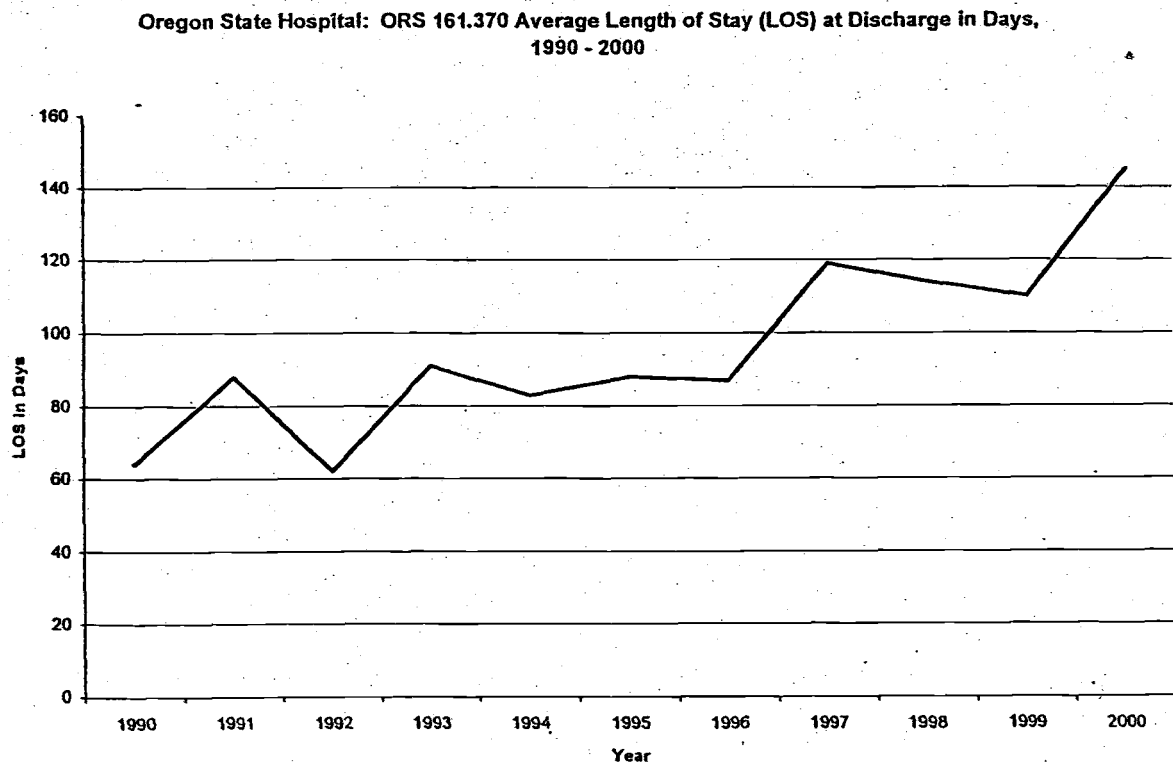
Figure 2 – Average LOS of IST patients at OSH, 1990-2000
Source: focus report from the Oregon Patient Resident Care System (OPRCS)

Figure 3 shows the number of total bed days used by IST patients at Oregon

State Hospital between the years of 1990 and 2000. IST patients used 5485 bed days

in 1990, and 17,679 bed days in 2000. One bed day equals one patient being in the

hospital for one day. The data reflect an increase of 222% in total annual IST bed

days over a decade.
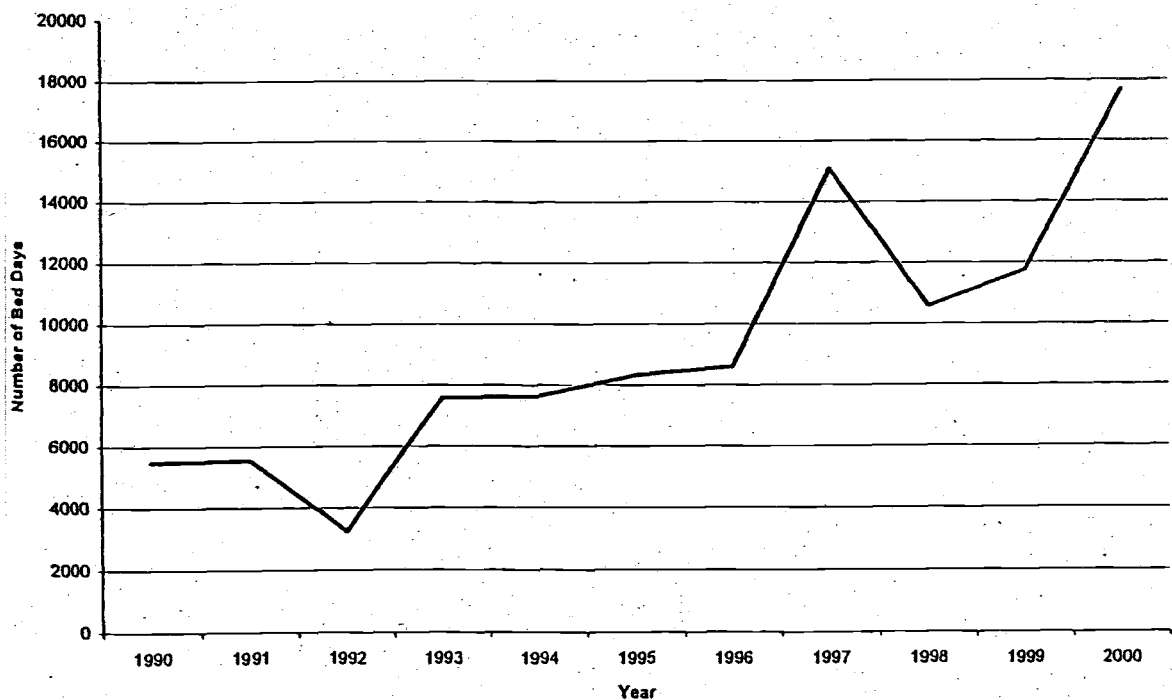
Figure 3 – Bed Days used by IST patients at OSH, 1990-2000
Source: focus report from the Oregon Patient Resident Care System (OPRCS)

Combined, Table 1 and Figures 1, 2, and 3 portray an IST patient population in

Oregon that is increasing and staying in the hospital longer. As Hopko et al. (2001)

put it, "…a subset of patients continues to use mental health resources to a disproportionate degree, as measured by length of hospitalization or repeated admissions over time."

The increase in forensic patients in Oregon is consistent with experience in other states. A report from the Mental Health Program Directors Institute, Inc. (2002) summarized:

> "SMHA's (State Mental Health Agencies) reported that adult forensic patients are increasing as a percentage of their overall state hospital population in 28 states, while 14 states reported the population was 'staying the same' as compared to the non-forensic population and only one (1) state (NY) reported the forensic population decreased."

The report also comments that "the most common forensic treatment services were: inpatient restoration to competency (41 states), inpatient services to persons found not restorable (38 states), and treatment of individuals found NGRI (Not Guilty by Reason of Insanity) (37 states)."

Information was received from Oregon's neighboring states, California and Washington. In Washington, 61 beds are allocated for IST patients, and 54 beds are allocated for pre-trial examinations. The beds are used somewhat interchangeably, depending on need. Over the past decade Washington has added approximately 25-30 beds for IST patients. This is due to a statutory change in 1997 which allowed competency restoration, for the first time, for individuals charged with misdemeanors. The average daily cost of treating patients at Washington's state hospitals is between 400 and 479 dollars, with the forensic population estimated to be higher. It is estimated that the daily cost of care has increased approximately 100 dollars per day

over the last decade (David Weston, Washington Department of Social and Health

Services, personal correspondence, March 21, 2003).

In California, the number of IST patients in the state hospital system grew

from 469 in 1993, to 878 in 2002. Total forensic patients grew from 1550 to 3313

during that same time period. The daily cost of treating forensic patients in California

increased from approximately 274 dollars in 1988 to 379 dollars in 2003 (Harry

Booth, Chief of Hospital Operations, State of California, personal correspondence,

March 22, 2003). The experiences in Washington and California demonstrate that

other states are experiencing increases both in numbers of IST patients, and the cost

associated with treating them.

1.2.4 Other Reasons for the Importance of the Study

The fact that IST patients in Oregon are increasing and staying in the hospital

longer is perceived as problematic, and justification for studying variables that

contribute to length of stay. This section will discuss other related reasons for the

proposed research, including the need to control costs, political pressures, the need to

reduce the criminalization of the mentally ill, additional reasons for studying LOS, and

public health relevance.

The primary reason for studying LOS in any hospital setting is to control costs

by determining how to shorten the length of expensive hospitalization. By shortening

the LOS for patients, resources can be redirected to other needs, or to serve more

people. With the advent of the Health Care Finance Administration's Diagnostic

Related Groups (DRG's) in the 1980's, and more recently, managed care, researchers

have been interested in "adequately categorizing diagnostic entities into homogenous groups that accurately estimate hospital expenditures (Brock and Brown, 1993)." DRG's were used as an attempt to control costs, by limiting the amount of payment received for each defined diagnostic group and forcing hospitals to operate within those financial limits. The use of DRG's to determine LOS for psychiatric patients has not proven effective (Tucker and Brems, 1993; English et al., 1986). DRG's have been found to explain only 3% to 15% of the variation in LOS (Lee et al. And Taube et al., as cited in McFarland et al., 1990, and Goldman et al.; English et al.; Light et al.; Essock-Vitale et al.; Horgan & Jencks; Essock & Norquist; and Horn et al., as cited in McCrone and Phelan, 1994). As Herr et al. (1991) put it, "Diagnostic related groups do not estimate duration of stay effectively, necessitating more robust predictors of length of stay (LOS)." Creed et al. (1997) felt that DRG's could only be effective if they include more detailed social, clinical and behavioral variables. Choca et al. (1988) warn, "The DRG system should be seen as a crude regression model originally based on the Yale-New Haven Study (derivative sample) and subsequently used to predict, regulate, and fund psychiatric treatment in other hospital settings (in effect, cross validation samples)." IST patients at Oregon State Hospital do not fall under the DRG payment system, but reducing the cost of treating them could free up resources for other mental health needs.

In Oregon, the costs of treating IST patients have increased. Figure 4 shows the rising daily costs of care for forensic patients at OSH.
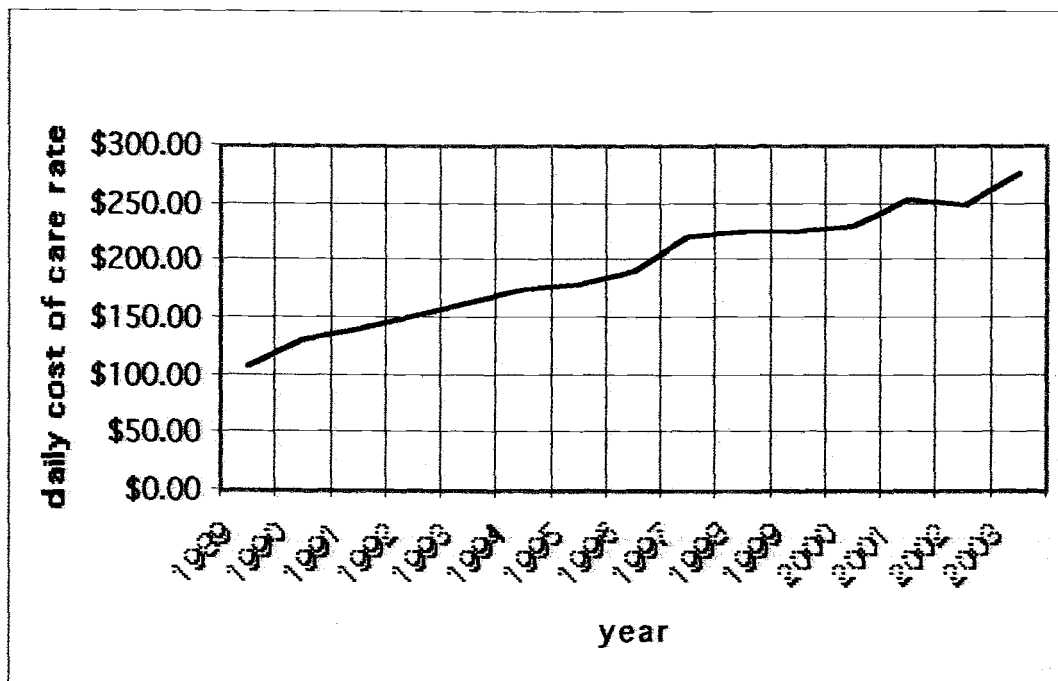
Figure 4 – Daily Cost of Care Rates for Forensic Patients
at Oregon State Hospital, by year (actual costs, not adjusted for inflation)
Source: Director of Finance, OSH

IST patients are treated within the Forensic Evaluation and Treatment Services

(FETS) Program at OSH. The daily cost of care for forensic patients has increased

from $107.59 in 1989 to a projected $276.27 in 2003, for an increase of 156% (Susie

Riley, Director of Finance at OSH, personal correspondence, Nov. 2002). Information

received from the U.S. Bureau of Labor Statistics (personal correspondence, Sharon

Gibson, March, 2003) showed that the Consumer Price Index (CPI) for all U.S. items

rose from 121.1 in January, 1989 to 181.7 in January, 2003, for an increase of 50

percent. The CPI for medical care rose from 143.5 in 1989 to 300.8 in 2003, and

increase of 109.6 percent. After examining the change in cost of care for IST patients

in Oregon, Gibson concluded, "...since your payment more than doubled, that it exceeds inflation rates." In other words, the cost of treating IST patients in Oregon is rising faster than observed inflation rates. Multiplying the total number of bed days for IST patients in 1990 (5,485) and 2000 (17,679) by the corresponding daily cost of care for 1990 ($131.43) and 2000 ($231.39), shows an actual increase in cost of treating IST patients from $720,894 per year, to $4,090,744 per year, over that decade. During the period from 1989 to 2003, the cost of care for forensic patients at OSH increased by 156%, compared to increases of 138% for geriatric patients and 134% for child and adolescent patients.

There are several perceived reasons for the increased cost of care for IST patients in Oregon. The cost of prescription drugs has increased, and new atypical medications (defined later in this chapter) are more expensive than conventional psychiatric medications. Many IST patients arrive at the state hospital with severe, active symptoms of mental illness, including hallucinations, delusions, physical aggression, suicidal ideation, and/or paranoia. Some patients require one-on-one staffing to help manage these symptoms until the patient is stabilized on medications. The one-on-one staffing leads to increased overtime costs, staff burnout, and increased use of sick leave by employees. In addition, improvements in the treatment environment - to assure safety, security, and therapeutic benefit - have increased costs. Law suits and accreditation surveys have facilitated an increase in treatment options for patients, and the addition of staff to provide those options. For example, mental health specialists (master's prepared therapists) were added to each OSH forensic ward, the Vocational Services Department added staff to increase the availability of

work programs for patients, and part-time recreation assistants were added to provide recreation programming in the evenings and on weekends. Finally, with the increase in the number of patients, there has been an increase in the number of required evaluations. This increased workload has required the use of additional contractor evaluators in some cases.

Political and legal concerns add to the importance of studying LOS of IST patients. In the court case of *Jackson v. Indiana*, the U.S. Supreme Court established the standard that IST patients cannot be hospitalized indefinitely. These patients can only be hospitalized for the "reasonable" length of time necessary to determine if they can be restored to competency. In addition, the standard specifies that continued hospitalization is allowed only as long as progress toward competency is being made (Nicholson and McNulty, 1992).

In Oregon, persons charged with a crime are guaranteed the right to a timely trial. Oregon Revised Statute 135.747 specifies that charges against an individual may be dropped if the person is not brought to trial within a reasonable period of time.

Four articles appeared in the *Statesman Journal* newspaper which presented legal and political issues surrounding the treatment of IST patients in Oregon ("Mentally ill suspects of crime in Catch-22," 2001; "Judge orders faster care for mentally ill," 2002; "Suit: Mentally ill aren't treated," 2002; "Court upholds decision on mentally ill inmates," 2003)). In the earliest article, an editorial, the author points out the problems surrounding the timely treatment of IST patients in Oregon, and offers three suggestions. First, consider the use of regional hospitals to relieve the pressure on the state hospital. Second, provide training for needed health care

professionals at Oregon universities. Third, develop a system of better medication management for the mentally ill in the community, so that they don't get into trouble with the law in the first place.

In the middle two newspaper articles, officials from Oregon State Hospital made the case for maintaining safe conditions at the hospital and protecting treatment milieus. The hospital cited overcrowding and difficulty in recruiting key personnel as problems. The hospital also cited the budget pressures of providing close supervision and expensive medications to IST patients. Representatives from county jails stated that they did not have the funding or trained staff members to deal with the mentally ill who were in jails waiting to be transferred to the state hospital. County spokespersons claimed that it cost them $158 per day to keep a mentally ill inmate, compared to $105 per day for a non-mentally ill inmate. The Oregon Advocacy Center said that holding mentally ill clients in jail without treatment was punitive. The articles reported on a lawsuit filed March 19, 2002 by the Oregon Advocacy Center and the Metropolitan Public Defenders Service in Multnomah County, which asked for the hospital to accept all IST patients from county jails within seven days of a judge's finding of incompetence to proceed in court. In reviewing the law suit, U.S. District Judge Owen Panner ruled that the hospital was denying patients of their constitutional due process rights, and stated that the hospital "demonstrates a deliberate indifference to these persons' health, safety, and constitutional rights."

The most recent article reported that the 9th U.S. Circuit Court of Appeals in San Francisco unanimously upheld Judge Panner's ruling that OSH must accept IST patients within seven days of a judge's order. Attorneys for OSH had argued that,

"forcing the Salem hospital to accept patients – regardless of whether a bed is available – risks the health and safety of patients and hospital staff." It was reported that OSH had been complying with Judge Panner's ruling since last May, and that the hospital has room for 374 patients, but was treating 408 at the time of the article.

The use of the legal system as a means to get access to treatment services is a problem facing mentally ill individuals. Two phrases, "Criminalization of the Mentally Ill," and "Psychiatricization of Inmates" have been coined to describe the interactions between the mentally ill and the mental health and correctional systems. The first phrase implies that mentally ill individuals become trapped within the correctional systems with inadequate care and treatment. The second phrase implies that criminals find their way into the mental health system, where they may not receive adequate punishment for their crimes (Lamb & Weinberger, 1998).

Torrey et al. (1992), in a study of the criminalization of the mentally ill, report:

> Most seriously mentally ill individuals are criminally charged when arrested; however, the vast majority of their "crimes" are trivial mis-demeanors that are often just manifestations of mental illness. Seriously mentally ill individuals are routinely arrested on charges such as disorderly conduct, trespassing and drunkenness and then jailed, when what they need is treatment.

Lengthy stays in a psychiatric hospital can prolong the criminalization of mentally ill individuals, and should be avoided. Lamb (1987) argues that procedures to determine competency to stand trial are being improperly used to get mentally ill individuals into hospitals when civil commitment laws are inadequate, there is a shortage of nonforensic hospital beds, or there are policies of rapid discharge from psychiatric hospitals.

Controlling health care costs is the primary reason given for studying LOS, but many researchers present other reasons. Altman et al. (1972) found that information concerning LOS helped clinicians plan more effectively for patient care, provided a sound basis for counseling with families, helped improve the ability to predict the course of treatment, and increased time for human interaction with patients. Munley et al (1977) felt that LOS information would help clinicians identify more appropriate short-term treatment candidates. Miller and Willer (1979) emphasized the utility of LOS information in program planning and the assignment of patients to appropriate levels of care. Kirshner (1982) pointed out that there are possible adverse effects of long LOS, and that knowledge of LOS could help shorten LOS and prevent those negative outcomes. He also felt that LOS information alerts administrators and physicians to the big picture of hospital utilization and prevailing trends. Cyr and Haley (1983) proposed that LOS information could also produce an earlier start for appropriate treatment. Caton and Gralnick (1987) found information about LOS could be used to help patients manage relapse through abbreviated stays, and could identify patients who would benefit most from long stays. Caton and Gralnick and (1987) and Herr et al. (1991) felt that studying LOS could inform and influence local policy makers. Oiesvold et al. (1999), stated, "Differences in LOS may not necessarily reflect differences in patient needs, but can also reflect differences in treatment philosophies, and practice patterns and resources, as well as more idiosyncratic factors." Barnett and Clendenen (1996) and Sprouse and Whitmore (1995) point out that LOS can both influence the development of critical clinicalpathways, or can be influenced by those pathways. There seem to be many good reasons for studying LOS.

Why study IST patients' LOS in Oregon? Research shows that there are regional differences in the LOS of inpatient psychiatric patients. Kirshner (1982) points out that the type of institution, staffing patterns, availability of outpatient options, theoretical orientation, treatment goals, referral patterns, and ward milieu differ from facility to facility, region to region. Caton and Gralnick (1987) offered another key to regional differences: "...confirms the existence of 'short-stay' and 'long-stay' hospital units, where duration of stay is determined in large measure by the policies and practices of the treating clinicians."

The need for local studies is confirmed by Choca et al. (1988) who conclude that there is a problem with generalizing the results of LOS studies done in one location, to another location. They write, "The problem is exacerbated when an inherently fallible predictive system is subsequently generalized from one population or treatment setting to another." Other studies have confirmed that IST patients have varying LOS in different states. California had a median LOS of 4.5 months, Colorado had a mean LOS of 3.8 months, Florida had LOS's between 2.3 months and 9 months, Oklahoma had a mean LOS of 2.3 months, and Michigan had a mean LOS of 9.6 months (Schulte et al., Cunningham, Mobray, and Nicholson and McNulty, as cited in Melton et al. (1997).

Warren et al. (1997) studied the forensic mental health evaluation systems in Michigan, Ohio, and Virginia. Even though all three states had similar laws and definitions of competence to stand trial and criminal responsibility, the study showed statistically significant differences in the number of patients found incompetent or not criminally responsible in each state. One conclusion was, "The significant interstate

differences in clinical opinion and diagnostic and offense characteristics of defendants referred for evaluation suggest that states may differ in their willingness to utilize the mental health system in the resolution of criminal cases."

The Centers for Disease Control (CDC) includes the following point in its vision statement for Public Health: "Evaluate effectiveness, accessibility, and quality of personal and population-based health services (Turnock, 1997)." This study will evaluate variables used predict the length of stay of incompetent mentally ill persons who have been charged with crimes. By identifying significant variables, they can be addressed and managed effectively. This may result in greater access to these services, and the design of treatment programs appropriate to a reasonable length of stay. Patients may receive better care, leading to better control of mental health symptoms, prevention of future illness-related problems, decrease in future criminal activities, decrease in future hospitalization or incarceration costs, and a decrease in societal victims. Cumulative money saved can be redirected to services addressing the prevention of mental health problems, the prevention of criminal activity, early intervention strategies, and strategies to prevent the hospitalization, jailing, and imprisonment of mentally ill individuals.

1.3 Research Hypotheses

A typical hypothesis in a regression study might be: One or more independent variables are significant predictors of LOS for IST patients. For this study, the first hypothesis is:

1. The group of eleven variables (excluding ethnic group and referring county, which will be reported descriptively) will explain a percentage of the variability in LOS, and will produce a significant prediction equation.

   The following additional hypotheses are proposed related to individual variables:

2. Males will have longer average LOS's than females due to the fact that male patients will have more inter-ward transfers. At OSH, during the time period of the study, male patients could be housed and treated in two maximum security wards and three medium security units. Female patients could only be treated in one medium security unit. This variable relates to policy, in that it is the policy of OSH to treat patients in the least restrictive environment. While male patients were sometimes moved from maximum to medium security wards, the hypothesis is that this actually contributes to increasing their LOS. Support for this hypothesis could indicate the need to imporve assessments of patients on arrival at OSH, and place them on one ward for the duration of their hospitalization.

3. Patients with a psychotic level diagnosis will have longer LOS's. It is believed that having a psychotic level diagnosis is an indicator of severity of illness, and that patients with more severe illness require longer LOS's. If this hypothesis is supported, it might influence policy by encouraging the use of critical clinical pathways which have been developed for these psychosis-level diagnoses. This will be explained further in the literature review chapter.

4. Having a substance abuse diagnosis will be positively and significantly correlated with LOS. This hypothesis contradicts previous research findings where substance abusers were found to have shorter LOS's. Oregon has seen an increase

in the use of methamphetamine (Office of National Drug Control Policy, 2000), which sometimes results in permanent brain damage (National Institute on Drug Abuse, 1998). In other states, patients with substance abuse diagnoses often stabilize quickly in a controlled environment, and are restored to competency quicker than non-abusing patients. The hypothesis here, reflects the belief that Oregon is different, due to methamphetamine use. In Oregon, it is hypothesized, substance abusers stay in the hospital longer than non-abusers due to the damaging effects of drugs being used in Oregon. Findings related to this hypothesis could also influence policy, by encouraging the use of substance abuse critical clinical pathways, or by encouraging the provision of more treatment related to specific drugs.

5. Having a personality disorder diagnosis will be positively and significantly correlated with LOS. Personality disorders are viewed as "fixed," and resistant to treatment and change. Some patients with personality disorders exhibit evidence of malingering, or faking mental illness symptoms. In some cases, patients attempt to stay in the hospital longer, to avoid severe sentences or more time in jail or prison. Support for this hypothesis will encourage the develop of new treatment approaches for working with patients who have personality disorders.

6. The use of seclusion and restraints (S & R) will be positively and significantly correlated with LOS. This relates to hospital policy, in that OSH has made strong efforts to reduce and eliminate the use of seclusion and restraints. Therefore, it is hypothesized that those patients who still require S & R are more severely ill than patients who do not require the use of S & R, and may need longer hospital stays.

7. The number of felony charges will be positively and significantly correlated with LOS. The number of misdemeanor charges will not be significantly correlated to LOS. This hypothesis supposes that patients who have more serious charges, and are facing more severe penalties, will stay in the hospital longer to provide greater confidence that they understand their legal predicaments.

8. Evidence of involuntary medication at discharge will be positively and significantly correlated with LOS. An unwillingness to take medications requires an override procedure that may lengthen hospitalization. Refusal to accept recommended medications may also indicate resistance to treatment.

9. Being on an atypical medication at discharge will be positively and significantly correlated with LOS. Atypical medications, known for having fewer side effects, are more expensive than conventional psychiatric medications (Mossman and Lehrer, 2000). They may be prescribed later in a hospitalization, after less expensive medications have been tried. In other cases, they may be tried immediately, but it may take time to reach a therapeutic dose. It is the policy of OSH to use medications that cause less side effects, but it is not known if the use of these atypicals influences LOS.

10. The number of inter-ward transfers will be positively and significantly correlated with LOS. This is due to the fact that with each transfer a new treatment team must familiarize itself with the patient, design continued care, and plan for restoration to competency. This process may sometimes slow the patient's progress, and increase LOS.

1.4 Limitations and Delimitations

Results from this study cannot be assumed to generalize to other states or patient populations. Due to evidence of regional differences in the treatment of IST patients, findings in Oregon may generalize only to other IST patients in Oregon.

The study will include patients admitted to OSH under Oregon Revised Statute 161.370, and discharged between January 1, 1999 and December 31, 2001. Changes in the treatment of IST patients both before and after this time period, pose a threat to the generalizability of the results to other time periods.

The study is limited to data from only 200 patients at OSH, discharged during the specified time period. While meeting the requirements for number of cases required to perform standard regression, this sample size is considered small.

The study will consider each hospitalization as a separate case. Patients who had more than one admission during the specified time period, will be counted more than once. Each admission may have different diagnoses, medications, charges, transfers, etc. for that individual.

Excluded from the study will be patients who were admitted to OSH under other Oregon Revised Statutes, who later converted to IST status, and patients who failed to regain competence after three years and were civilly committed to the hospital.

The study is limited to data found in the medical records of patients at OSH, or found in the database of the Oregon Patient Resident Care System (OPRCS). There are limits to what data are available through current information systems.

1.5 Definition of Terms

The following terms are defined for use in this study:

Incompetent to Stand Trial (IST) patients - Patients who are admitted to Oregon State Hospital pursuant to Oregon Revised Statute 161.370. Excluded are patients who are admitted to the hospital under other Oregon Revised Statutes, or who are admitted under ORS 161.370 but are converted to other commitment status prior to discharge from the hospital. Also referred to, in Oregon, as "370" patients.

Length of Stay (LOS) – Total number of days in the hospital, including the day of admission, but not including the day of discharge.

Diagnostic and Statistical Manual IV – Text Revision (DSMIV-TR) - The official diagnostic manual for mental disorders, published by the American Psychiatric Association. Development of the manual included comprehensive and systematic reviews of the published literature, reanalyses of already-collected data sets, and extensive issue-focused field trials. Diagnoses are made using five diagnostic axes.

Axis I Diagnosis – One of five diagnostic axes used in the DSMIV-TR. This axis includes clinical disorders and other conditions that may be a focus of clinical attention. These are diagnoses that are thought to be treatable, and in some cases, respond well to neuroleptic medications.

Axis II Diagnosis – One of five diagnostic axes used in the DSMIV-TR. This axis includes Personality Disorders and Mental Retardation. Axis 2 diagnoses are thought to be more "fixed" and less responsive to treatment.

Axis III, Axis IV, and Axis V Diagnoses - The final three diagnosistic axes used in the DSMIV-TR. These are not the focus of the present study. Axis III is used with

IST patients to diagnose co-existing medical problems. Axis IV and Axis V are not typically used with IST patients at OSH.

Psychosis Level Diagnosis – DSMIV-TR Axis I diagnoses that include schizophrenia, schizophreniform disorder, schizoaffective disorder, delusional disorder, brief psychotic disorder, shared psychotic disorder, psychotic disorder due to a general medical condition, substance-induced psychotic disorder, or psychotic disorder not otherwise specified. The diagnosis at the time of discharge will be used, as this diagnosis is assumed to be a better indicator of the severity of illness than the diagnosis at the time of admission, and is formulated with the benefit of multidisciplinary assessments and observations over time.

Substance Abuse Diagnosis – DSMIV-TR Axis 1 diagnoses that include dependence on, or abuse of alcohol, amphetamines, caffeine, cannabis, hallucinogens, inhalants, nicotine, opioids, phencyclidine, sedatives, hypnotics, anxiolytics, or to combinations of the above (polysubstance dependence or abuse). As above, the diagnosis at the time of discharge will be used, as this diagnosis is assumed to be a better indicator of the severity of illness, and is formulated with the benefit of multidisciplinary assessments and observations over time.

Personality Disorder Diagnosis – DSMIV-TR Axis 2 diagnoses that include paranoid personality disorder, schizoid personality disorder, schizotypal personality disorder, antisocial personality disorder, borderline personality disorder, histrionic personality disorder, narcissistic personality disorder, avoidant personality disorder, dependent personality disorder, obsessive-compulsive personality disorder, and personality disorder not otherwise specified. As above, the diagnosis at the time of

discharge will be used, as this diagnosis is assumed to be a better indicator of the severity of illness, and is formulated with the benefit of multidisciplinary assessments and observations over time.

Ethnic Group – This study uses ethnic group classifications as specified in the Oregon Patient Resident Care System (OPRCS). The groups include American Indian; Alaskan Native; Asian, Pacific Islander; Black, Non-Hispanic; Canadian Indian; Hispanic, Cuban; Hispanic, Mexican; Hispanic, other; Hispanic, Puerto Rican; Refused; Southeast Asian; Unknown; and White, Non-Hispanic. These classifications are different than those used in some previous research.

Number of Seclusion and Restraint (S & R) Events – The number of individual incidents of the use of seclusion and/or restraints, as indicated by the presence of the form, "Emergency Seclusion and Restraint Entry Note," in the progress note section of the patient's medical record.

Pending Felony Charges – The number of felony charges against the patient at the time of admission, as specified in the psychosocial history in the social work section of the medical record, the physician's admission note in the physician section of the medical record, or on legal documents received from the court in the legal or correspondence sections of the medical record. In Oregon, crimes are classified as Class A, B, or C felonies; or Class A, B, or C misdemeanors. Felonies are more serious crimes than misdemeanors. Class A crimes are considered more serious than Class B or Class C crimes, with Class A felonies considered the most serious crimes. A comprehensive list of all crimes and classifications is available on the web page of the Oregon State Bar Association (2003). For the purpose of this study, only the

number of felonies will be used in the regression analysis (to be explained in the methods chapter). Actual felony charges will be reported descriptively.

Pending Misdemeanor Charges - The number of misdemeanor charges against the patient at the time of admission, as specified in the psychosocial history in the social work section of the medical record, the physician's admission note in the physician section of the medical record, or on legal documents received from the court in the legal or correspondence sections of the medical record. For the purpose of this study, only the number of misdemeanors will be used in the regression analysis (to be explained in the methods chapter). Actual misdemeanor charges will be reported descriptively.

Evidence of Involuntary Medication – The presence of the form "Involuntary Administration of Significant Procedures to Committed Patients with Good Cause," with signed approval from the Chief Medical Officer of OSH, indicating that medications were administered involuntarily. This form indicates that the patient was either unwilling or unable to consent to the use of medications on a voluntary basis, and that a "three-physician review" resulted in the decision to administer medications involuntarily.

Atypical Medications at Discharge - The following medications were defined as "atypical" (generic drug names, followed by trade names in parentheses): clozaril (clozapine), risperidal (risperidone), zyprexa (olanzapine), seroquel (quetiapine), and Geodon (ziprasidone) (National Institute of Mental Health, 2002).

Number of Inter-ward Transfers – The number of times a patient was transferred to other wards within OSH during the time of hospitalization, as indicated by a transfer

note in the progress note section of the patient's medical record. Excluded are
temporary transfers to Salem Hospital for medical emergencies.

Referring County – The Oregon county which has pending charges against the
patient. If the patient has charges in more than one county, the county listed on the
face sheet of the patient's medical record will be used. There are 36 named counties
in Oregon. The referring county will be reported descriptively, and will not be used in
the regression analysis.

Ex post facto research – Non-experimental research that looks at relationships among
variables, based on data that have already been collected or using all attribute
variables (Portney and Walkins, 1993).

Dummy variable – In regression studies, a coded nominal variable. Dummy
variables become dichotomous variables indicating the presence or absence of certain
traits (Portney and Walkins, 1993).

1.6 Summary of the significance of the study

As detailed above, the number of IST patients in Oregon is increasing, and
they are staying in the hospital longer. The cost of treating these IST patients is
increasing. Understanding which variables influence the LOS for these patients can
lead to better care management, reduce costs, and redirect resources to other public
health needs. This study has the potential of providing evidence about which variables
are significantly related to LOS, or can explain the variability in LOS for IST patients.
Results can suggest future research related to this growing problem.

One way of looking at the restoration of competency process in IST patients is that it involves moving from mental illness to mental health. It is a health promotion process. McLeroy, Bibeau, Steckler, and Glanz (1988, as cited in Glanz, Lewis, and Rimer, 1997) propose an ecological model for health promotion that identifies primary sources of influence on health behaviors. They propose five levels of influence on health promotion: intrapersonal variables, interpersonal processes and primary groups, institutional factors, community factors, and public policy. This study will focus on intrapersonal and institutional variables. The researcher suspects that these two types of variables have the greatest influence on the LOS of IST patients.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction to Literature Review

Three areas of the literature are relevant to this study. First, research in the area of LOS for psychiatric patients, including forensic mental health patients, and especially IST patients. Second, literature related to clinical pathways in mental health settings. Third, articles related to the specific treatment of IST patients and methods for determining competency to stand trial.

2.2 Length of Stay

In reviewing research related to LOS with psychiatric patients, it was decided to organize the reviews of articles into several categories: research on single units within one hospital or agency, studies on multiple units within the same hospital, studies focusing on two or more facilities, investigations of single or limited variables, studies with expanded variables or enhanced data analysis, studies which used cross validation, research focusing on the opinions of professional groups of variables affecting LOS, articles summarizing the research of others, and studies with forensic patients. Appendix B contains a table (Table 16) summarizing LOS research with psychiatric patients, in chronological order.

Several studies have investigated LOS on single units in a single facility. Glynker et al. (2000) studied variables associated with LOS on an intensive rehabilitation unit. Data from 44 patients were entered into a regression analysis, and resulted in three significant predictive factors: gender, the PANSS (Positive and

Negative Symtom Scale) General subscale, and the SANS (Scale for the Assessment of Negative Symptoms) Attention Subscale. These three variables accounted for 42.2% of the variance in LOS. Focusing on patient diagnosed with depression, Barnow et al. (1997) studied 736 cases at the University of Berlin, and found that age, marital status, gender, and severity and type of depression had significant influences on duration of inpatient stay. In Finland, Nieminen et al. (1994) found that a long psychiatric stay was associated with young age, a psychosis-level diagnosis, and active participation in treatment. They used data from 1330 cases on a therapeutic community ward, looking at a total of 8 variables. The significant variables of young age, a psychosis-level diagnosis, and active, motivated participation in treatment were only able to explain up to 16.5% of the variability in LOS. Tucker and Brems (1993) looked at 291 cases on a single inpatient psychiatric unit at a large midwestern medical school. Only three variables were found to be related to LOS: Ethnicity, Axis I diagnosis, and the presence of any Axis II diagnosis. Chang et al. (1991) studied 200 cases at a Community Mental Health Center inpatient unit. Data for twenty variables were collected on each case. Analysis revealed that only five of the variables were significant predictors of LOS: past hospitalization, employment, living situation, substance abuse, and diagnosis of schizophrenia. Herr et al. (1991) took a different approach. They compared 50 long-stay patients on the psychiatric unit of a general hospital in Boston, Massachusetts to a comparable control group. Out of 16 variables studied, 7 were found to be significantly overrepresented in the long-stay group: use of electroconvulsive therapy, number of medical consultations, underemployment, dementia, discharge to a place other than home, absence of alcohol

or drug abuse, and presence of psychosis without affective symptoms. Michalon and Richman (1990) studied 423 cases on a psychiatric intensive care unit in Halifax, Nova Scotia. Out of 6 variables studied, only four were found to relate to LOS: year of admission, diagnosis, legal status, and transfers to other units. Grueber (1982) looked at variables that could predict both LOS and recidivism on a single psychiatric unit of a general hospital in the Midwest. Comparing four "pathway" variables to three "gatekeeper" variables, the researchers found that the gatekeeper variables were sufficient in predicting LOS. The variables of previous admission, previous ward, and severity of disorder combined to explain 15.6% of the variability in LOS. Focusing on schizophrenics, Hargreaves et al. (1977) compared short-stay and long-stay groups, and found that pre-hospital functioning related to LOS. Doherty (1976) compared genders and LOS on a short-term therapeutic community unit. He found that long-staying men were diagnosed with personality disorders, and that for women, verbal behavior, interpersonal relations, and family relationships were related to LOS. In 1975, Clum studied 119 subjects at the University of Virginia Hospital and found that a patient's role in the family was significantly related to LOS. The studies reviewed in this paragraph focused on single psychiatric units in a variety of geographic locations. There is little agreement as to generalizable predictors of LOS, and the percent of variance explained is low. None of these units focused specifically on IST patients.

A few researchers have looked at LOS issues across units within the same facility. Brock and Brown (1993) studied 21 variables related to LOS for both military and civilian patients treated on two psychiatric units at an Air Force tertiary care hospital. Thirty-one percent of the variance in LOS was explained by 6 of the

variables: active military status, ethnicity, severity of illness, personality disorder, suicidality on admission, and diagnosis. Casper and Pastva (1990) studied the post-index admission patterns of two cohorts of "heavy user" psychiatric patients on acute, intermediate, and long-term units of a state hospital in the Harlem area of New York City. Variables found to be associated with longer stays included age, gender, ethnicity, marital status, diagnosis of schizophrenia, abuse of drugs and/or alcohol, arrest histories, and medication and program non-compliance. Although not a predictive study, it was found that characteristics of an earlier cohort were similar to characteristics of a later cohort. Essock-Vitale (1987) studied 1,122 psychiatric discharges at the seven psychiatric units of the Neuropsychiatric Hospital affiliated with the University of California at Los Angeles. Her study used costs as the dependent variable, and found that psychiatric patients with medical complications were more expensive. This does not necessarily mean that their LOS was increased. In a study limited to 116 medical surgical patients from three units at the New York Hospital-Cornell Medical Center, Fields et al. (1986) found that the LOS for "impaired" patients was longer than that of "intact" patients. Munley et al. (1977) studied 181 psychiatric patients on five units of a Veteran's Administration Hospital in New Jersey. They were interested in variables that could predict both LOS and readmission. Only 5 out of 21 variables formed the optimal set of predictors, accounting for only 20.3% of the variability in LOS. The five variables were age, history of commitment, prior hospitalizations, recent employment, and history of suicidal behavior. Cancro (1969) studied LOS with schizophrenic patients at a large city hospital. He found that nine variables explained 34.6% of the variability in LOS.

The variables were formal signs, depression, marital status, abstraction score,

precipitating events, disturbance of affect, intrusions, though processes, and premorbid

adjustment. These studies looked a multiple units, which is the case for IST patients at

OSH. Male IST patients are treated on five different units at OSH. Like the single-

unit studies, findings looked at different variables, and failed to account for a large

amount of LOS variability.

Goodban et al. (1987) looked at LOS issues across two facilities, a mental

health center and a state hospital in Connecticut. They found that the predictors of

LOS at the two facilities differed greatly. Only three variables related to longer LOS

seemed to be shared between the two facilities: being on Medicare, previous

hospitalizations within six months, and age. They concluded that comparing variables

between more than one facility is highly complex. They summarize:

> Hospitals may serve markedly different functions within a system of care.
> Such differences may not readily be accounted for by the most frequently
> used predictors of length of stay. Administrative decisions – decisions that
> consider not only the hospital's function within a larger system, but also
> its patient and program needs – seem to exert a strong influence on length
> of stay. Such functional and administrative factors result in quite different
> patterns of care within different institutions – patterns that are not reflected
> in simple statistical measures such as mean and median length of stay.

Fulop et al. (1987) studied whether psychiatric comorbidity would influence the LOS

of medical surgical patients at Mount Sanai Hospital in New York, and Northwestern

Memorial Hospital in Chicago. Comparing 50,259 cases, they found that patients with

psychiatric comorbidity had longer stays than patients with no psychiatric

complications.

Frank and Lave (1985) used two large national databases to study 976 discharges from general hospital psychiatric units. They were able to explain 17% of the variability in LOS with the following variables: diagnosis, benefit structure, ethnic group, marital status, gender, education level, and alcohol use. Heiman and Shanfield (1980) compared psychiatric patients from a VA hospital, a freestanding private psychiatric hospital, a general hospital, a general hospital affiliated with a university, and a county general hospital. Studying 903 cases, they found that diagnosis and type of hospital influenced LOS, but that age and sex did not. In a very large study of all psychiatric units in non-Federal general hospitals, Faden and Taube (1975) compared data for 515,537 discharges, and found that the gender, ethnic group, age, diagnosis, substance abuse, and source of payment all influenced LOS. Blackburn (1972) completed an informal study of 12 mental hospitals and concluded that ward teams, management philosophy, admission and transfer policies, location of the hospital, and availability of aftercare were important predictors of LOS. In 1968, Daniel et al. reported on a study of variables used to predict LOS for psychiatric patients in all of the state hospitals in Oklahoma. Applying Bayes' Theorem to demographic data from 13,731 patients, they were able to predict LOS with 86% accuracy for patients with LOS's less than 30 days and 30 days or more. There have been no studies across facilities for IST patients.

A large number of studies investigated the effects of single variables on LOS. Boronow (2001) studied the type of patient insurance on LOS at units of the Sheppard Pratt Health System in Maryland. He found, "Length of stay was comparable within programs regardless of insurance type." Fisher et al. (2001) found that co-morbid

medical problems increased LOS in 330 long-stay patients in 8 inpatient facilities within the Massachusetts Department of Mental Health. Gender was the primary variable of interest to Sajatovic et al. (2000) in their study of 1358 female patients in a large urban state mental health facility. They concluded that "women constitute the majority of patients over age 50 in a state psychiatric facility and that they have longer stays than younger women." In a very large study, Federman et al. (2000) studied the effects of weather on the LOS at 99 Veterans Health Administration hospitals. They found that LOS was longer in cold and wet climates, which could certainly be true for Oregon. Depending on location of the hospital, the researchers found that weather accounted for between 6 to 14% of the variance in LOS. Sloan et al. (1999) investigated comorbid physical diagnoses as a predictor of LOS at a metropolitan medical center in Cleveland, Ohio. Considering 2323 cases, they found that LOS was significantly longer for patients with comorbid medical problems, and was significantly longer for patients with comorbid medical conditions who also suffered from depression. In another large study, Hendryx and DeRyan (1998) studied type of insurance as a predictor of LOS for 46,998 patients within 91 acute care hospitals in the State of Washington. They found that LOS was longest among patients who had commercial insurance or Medicare. McCrone and Phelan (1994) were interested in how diagnosis related to LOS. They collected data on 5482 clients at the Bethlem Royal and Maudsley Joint Hospitals in London. Diagnostic information was broken down into 43 categories. Their disappointing results showed that diagnostic categories contained limited homogeneity, and could only explain 3% of the variance in LOS. However, when combined with other variables, diagnosis has some potential for

explaining LOS variance. Lyons et al. (1991) were interested in whether the attending psychiatrist could be used as a predictor of LOS. By studying 2000 cases at an 800-bed private teaching hospital, they found that variation in length of stay for patients of physicians who admitted a low number of patients was much greater than for psychiatrists who had many admissions. High-volume psychiatrists seemed to be most efficient. In Oregon, McFarland et al. (1990) researched whether there was a difference in LOS for involuntary mental health patients served at two facilities, a community mental health center and a state hospital. Even though case mix was similar at the two facilities, involuntary patients stayed longer in the state hospital. This study did not include IST patients, but could indicate a need to develop options for IST patients in alternate settings. Lyons and McGovern (1989) were interested in the relationship of LOS to patients who had both a mental health diagnosis and a chemical dependency diagnosis. They collected data on 127 subjects at a large midwestern state hospital. The LOS for chemical abusers was significantly shorter than those with nonabusing patients, even when the patients also had a mental illness. Since many IST patients have secondary chemical dependency problems, this may be an important variable to look at in the present study. It may be that in a controlled setting, where illicit chemicals are not available, baseline mental health is regained rapidly. Gordon et al. (1985) limited their study to the variables of stress and level of functioning. They reviewed 105 cases at the Shands Hospital psychiatric inpatient units in Florida. They found that a formula of level of functioning (e.g. DSM axis IV score) divided by level of stress (e.g. DSM axis V score) produced a result that correlated significantly with LOS, regardless of age. At the Lakeshore Psychiatric

Hospital in Toronto, Ontario, Miller and Willer (1979) studied the use of a Self Assessment Guide that measured social competence in predicting LOS. They collected data on 72 admissions and found that the accuracy of LOS predictions ranged from 68 to 79% for males and 65 to 79 % for females, when compared to base line predictions using other variables. The researchers concluded that social competence variables were much better predictors of LOS than demographic variables. In an earlier study, Anker (1961) studied if items on the Minnesota Mutiphasic Personality Scale (MMPI) could be used to predict membership in various LOS groups. Studying 358 male veterans at a large VA hospital, he concluded, "A 21 item scale was generated which was able to predict the 'long stay' patient at various dichotomies in duration of stay better than one could by chance or by base rate information." All of the articles reviewed in this paragraph focused on single or limited numbers of variables in predicting LOS. While many variables showed promise in predicting LOS in specific settings, the challenge with this study was to select variables that seem most relevant to IST patients.

Several researchers tried to improve on predicting LOS, either by expanding the number of variables studied, or by attempting to use more robust statistical methods. Stevens et al. (2001) studied 43 variables, measured for 4706 psychiatric inpatients at a general hospital in Tubingen, Germany. They applied a survival analysis (Cox regression), based on their observation that a previous study of LOS had found "an exponential decay, rather than a normal distribution." Results showed that only five variables were strong predictors of LOS: diagnosis, mediation, ethnicity, education level, and being on an open ward. Oiesvold et al. (1999) did an expanded

study of 25 variables, collected on 837 subjects, at seven psychiatric hospitals in four Nordic countries. They also performed survival analyses. There were considerable LOS differences between the hospitals, and the factors analyzed in the study could not explain the variance. However, they did find that certain variables seemed to be related to LOS: age, gender, having children at home, employment status, diagnosis, having a planned admission, and having previous outpatient care or aftercare. Creed et al. (1997) added scores on the Social Behavior Scale, living alone, specific psychiatric symptoms, and variables available at discharge to their study, investigating a total of 30 variables. Data were collected on only 115 patients at the Manchester Royal Infirmary in Manchester, England. They found that combining Social Behavior Scale score, living alone, use of a major tranquilizer, previous psychiatric admission, social role, use of electroconvulsive therapy (ECT) and problems with the BSO subscore of the Present State Examination combined to explain 49% of the variance in LOS. However, their small sample size brings the generalization of their results into question. A computerized recursive partitioning program called Classification and Regression Trees (CART) was used by Boerstler and de Figueiredo (1991) to predict high use of outpatient psychiatric services. They studied variables for 382 patients at an outpatient psychiatric clinic. According to the researchers, "Discharge from inpatient treatment right before admission to outpatient services was found to be the most consistent, the most powerful and the only necessary predictor of high use of outpatient psychiatric services." Pre-admission and discharge sites for all IST patients are county jails in the referring counties. Also, since IST patients are currently all inpatients, this study of outpatients may not generalize. However, the study does

demonstrate that a single variable may be all that is necessary to predict some use of psychiatric services. Kiesler et al. (1990) completed an extensive study of 10,123 subjects at 400 non-Federal short-stay hospitals. They measured a total of 36 variables affecting LOS, using a weighted least squares regression model. They found that knowledge of the type of treatment units available in the treating hospital, especially presence of a chemical dependency unit, coupled with knowledge of chemical dependency comorbidity, "substantially increased the proportion of variance accounted for in the analysis." These researchers accounted for up to 34% of the variance in LOS. Cyr and Haley (1983) attempted to increase their ability to predict psychiatric LOS, by increasing the number of variables to 43, and using multiple regression with the maximum R-squared improvement method. Eleven of their 43 variables were found to be significant predictors of LOS, explaining 30.72% of the variance. Cyr and Haley concluded, "It would seem more promising at this stage to investigate a host of variables in an untapped domain." Increasing the number of variables and using more robust statistical procedures have improved the ability to explain variance in LOS, but a large amount of variance remains unaccounted for. Given the fact that LOS for IST patients is underreseached, it seems practical to start with variables that have been found to be significant predictors in other studies and not to explore untapped domains at this time.

Several studies have used cross validation samples to study variables predicting LOS. As mentioned above, Choca et al. (1988) used a comparison sample in their study, and found that the amount of variance explained shrunk from 27% in the derivation sample, to 24% in the cross-validation sample. This illustrated a

phenomenon known as "shrinkage" when conducting cross-validation comparisons in LOS studies. Hopko et al. (2001) studied the ability of ratings on the Brief Psychiatric Rating Scale – Anchored Version (BPRS-A) to predict LOS for both a primary sample and a replication sample. Only four variables were found to be consistent predictors of LOS for both samples. Based on the findings of the primary sample, the researchers were able to correctly predict the LOS of the replication sample up to 78% of the time. They also concluded that scores on the BPRS-A were better predictors of LOS than traditionally studied variables. Huntley et al. (1998) were interested in the stability of predictor variables over time. They studied LOS-related variables for two groups of patients; each discharged in one of two six-month periods. Eight variables were used, and data were collected on 760 patients from the Metropolitan St. Louis Psychiatric Center in Missouri. They found that five variables remained stable over time: diagnosis of schizophrenia, diagnosis of mood disorder, age, previous admissions, and a secondary diagnosis of chemical dependence. This finding is important in that facilities and systems are always in a state of flux, most with required programs of continuous quality improvement. It is interesting to note that even with ongoing improvements in treatment programs and systems, some predictors of LOS have been found to remain stable. At OSH, attempts have been made to improve systems and practices for the treatment of IST patients, but the LOS has continued to increase. In an earlier study, Altman et al. (1972) divided 5743 patients from five Missouri state hospitals into a derivative sample and a cross validation sample. Using stepwise linear descriptive analysis, the authors found that 85 variables correlated significantly with LOS. Using those variables, the authors were able to predict actual

LOS 73% of the time, and felt that this was more accurate than clinicians' predictions

of LOS, which they estimated to be close to 60%. Altman and his colleagues

concluded, "Clinicians using their own intuitive judgement seem to predict somewhat

less well than actuarial methods." The *Journal of Consulting Psychology* published

three early cross validation studies related to LOS prediction with the VA hospital

system. Johnson and McNeal (1964) were able to cross validate their findings that

23.9% of LOS variability could be explained by marital status, high paranoia or

schizophrenia, psychosis, and scores on certain scales. Anker (1961) cross validated

his study of MMPI variables, described above, and Lindemann et al. (1959) cross

validated an index which used variables related to marital status, diagnosis, degree of

incapacity, legal competence, and alcohol use. Both studies found some accuracy in

predicting placement in short-stay and long stay groups.

Two researchers were also interested in the opinions of professionals in the

predicting of LOS for psychiatric patients. Mezzich and Coffman (1985) surveyed

psychiatrists (N=37), social workers (N=29), psychologists and nurses (N=19) and

administrators or others (N=12). The following variables were found to be the most

important in predicting inpatient psychiatric stays: symptomatology, level of adaptive

functioning, social supports, specific psychiatric disorders, chronicity of illness, and

insurance coverage. As will be seen in the methods section, this researcher's pilot

study found similar results. However, given the conclusions of Altman et al. given

above, a combination of actuarial variables and variables coming from professionals

may produce the best results.

Mattes (1982), Kirshner (1982), and Caton and Gralnick (1987) presented articles summarizing previous research done about psychiatric LOS. While they discussed some of the key issues mentioned above, and identified key studies, both summary articles are considered dated. Saravay and Lavin (1994) reviewed 26 international and American outcome studies assessing the effect of psychiatric comorbidity on LOS for medical/surgical patients. As expected, LOS was increased for patients with psychiatric complications. Pfeiffer et al. (1996) summarized 54 studies of variables associated with outcomes for psychiatric patients. They found that the five most powerful predictors of outcome were type of onset of illness, previous hospitalization, age at onset of illness, use of medication, and marital status. However, LOS showed no significant relationship to outcome. The field of mental health treatment has evolved over the past decade, and there seems to be a need for updated studies, especially with groups of psychiatric patients who appear to be somewhat homogenous, such as IST patients.

Very few studies have investigated LOS for forensic mental health patients. While forensic mental health patients have some of the same characteristics of general psychiatric patients, they have the added concern of legal problems. Moran et al. (1999) studied factors affecting LOS of maximum-security patients in a forensic psychiatric hospital in Maryland. Using a small sample size (N=101) they analyzed 36 variables. Five variables were found to be related to LOS: prior employment, gender, age, education level, and ethnic group. These authors recommended, "...one must seriously consider providing meaningful work and educational programs for these patients while they are hospitalized. These experiences may have long-term

beneficial effects that will improve the quality of life not only for the individual but also for the community following the offenders' release." These comments seem to verify that it is not only important to shorten the LOS of these patients, but to provide services during their hospitalization which may do more than just prepare them to stand trial. With IST patients, the focus is on restoration to competency. However, there may be an optimal LOS to accomplish that, and there may be other services that can be provided within that optimal LOS. Melton et al. (1997), in their book about psychological evaluations for the courts, summarize some LOS research with IST patients, and conclude: "The studies are relatively consistent in finding that the large majority of defendants referred for treatment are recommended as 'restored' within six months, and often earlier." Again, the goal is restoration to competency, not full remission of symptoms. An individual can experience symptoms of a mental illness or defect, but be found competent to proceed in court. For example, a patient may have fixed delusions, but is capable of understanding the charges against him, his plea options, his possible sentences, and other court procedures. One of the studies referred to by Melton and his co-authors was conducted by Nicholson and McNulty (1992) and Eastern State Hospital in Oklahoma. They analyzed data from 493 IST patients, including variables related to demographics, available resources, and admission status. Performing multiple regression analysis showed that a combination of all significant variables could only explain 10% of the variance in LOS. They were pessimistic about the ability to predict LOS for IST patients. Rodenhauser and Khamis published two studies in 1988 related to LOS with forensic hospital patients. In the first study, they compared 376 forensic patients and found that schizophrenia, previous

hospitalizations, felony charges, drug treatment refusal, and absence of personality disorders were related to increased LOS. The second study was with 380 patients, and concluded that LOS was significantly related to the seriousness of criminal charges, and admission legal status. Cuneo et al (1983), in a study of 816 male forensic patients, also found a positive correlation between LOS and seriousness of alleged offense. LOS for IST patients is underresearched when compared to other LOS studies with general psychiatric patients.

2.3 Mental Health Clinical Pathways

The relevance of the literature about mental health clinical pathways to IST LOS will be explained below. First, it will be helpful to define what clinical pathways are, and the pro's and con's of their use. Originally called "critical pathways", the process that evolved into clinical pathways in medicine was first used in project planning in the mid-50's, in fields such as construction (Barnette and Clendenen, 1996). Later, clinical pathways began to be used in medical settings, with medical diagnoses that had very predictable courses of care. For example, clinical pathways were used for cardiac surgery and rehabilitation, and knee/hip replacement surgery and recovery (Jones, 2000; McKinsey et al., 1999). According to Jones (1999a), care pathways began in the US health care system in response to the use of DRG's. Efforts were made to study past care episodes, and to discover the treatment route for all patients within particular DRG's. The first medical care pathway was utilized at the New England Medical Center (Dykes, as cited in Jones, 1999b).

What is a clinical pathway? Townend (1997) offers this definition: "A Care Pathway is a process usually developed by a multidisciplinary team to identify and describe the anticipated care for a client or clinical need." Pathways define optimal sequencing and timing of interventions by all professional disciplines on the treatment team (Brown et al., 1998; Jones & Kamath, 1998; Jones, 2000). They are typically used for high risk, high cost, and high volume diagnoses and procedures (Jones, 1999a; Barnette and Clendenen, 1996), which fits IST patients in Oregon. Like logic models and intervention mapping used in health education program design and evaluation, clinical pathways provide a visual representation of a typical case. A number of terms are used when describing clinical pathways, including integrated care pathways, critical pathways, critical paths of care, care maps, algorithms, treatment decision trees, and clinical flow charts (Barnette and Clendenen, 1996; Boerstler and de Figueiredo, 1991; Suppes et al., 1998; Slayton, 1998; Chan and Wong, 1999; Nott, 2000). The main difference between these terms is the level of specificity and detail in their description of steps of care. For the purpose of this study, the term "clinical pathway" will be used. Clinical pathways are tools to reduce variation in the management of classes of patients, with the result being improved quality of care and reduced overall costs (Sprouse and Whitmore, 1995) - both of which are previously identified reasons for studying LOS. Each step in the pathway is determined by the patient's response to the previous step (Suppes et al., 1998). Stayton (1998) claims that clinical pathways "minimize the need for clinical judgment by spelling out a treatment in exact detail." All treatment team members are focused on shared outcomes. Clinical pathways may also indicate the process between agencies, or from

one care boundary to the next. Jones (2000) states that another feature of clinical

pathways is that they are frequently monitored by a case manager to assure

compliance, and identify patients who vary from the norm. Because of the built-in

structure for monitoring clinical pathways, they also support documentation of patient

progress and quality improvement activities (Hancock and Sherer, 2000).

Advantages of clinical pathways are evident in the definition given above.

However, authors have expressed other advantages. These include: facilitation of safe

nursing practice, elimination of unnecessary patient restriction and supervision,

development of a common language between providers, provision of staff support,

provision of a framework for staff development, facilitation of clear communication,

the elimination of treatment redundancies (Townend, 1997), decreasing the need for

outpatient services (Boerstler and de Figueiredo, 1991), use in the authorization of

payments, as a marketing tool for market differentiation, to help identify variances,

enhancing the consistency of quality decision making across disciplines, allowing

profiling of providers, accelerating advances in behavioral health, strengthening the

argument for psychiatric patients to gain parity in healthcare benefits (Pigott, 1995),

providing for the dissemination of research findings (Smith and Docherty, 1998),

allowing for consumer involvement and choice, demonstrating compliance with

accreditation standards and licensing requirements, facilitation of enhanced clinical

supervision and peer review (Barnette and Clendenen (1996), facilitation of the move

to integrated delivery systems, decreasing legal claims and lawsuits, risk minimization

(Sprouse and Whitmore, 1995), identification of a balance between psychotherapy and

pharmacotherapy (Kisely and Jones, 1998), the creation of more time for

individualized care, improved patient satisfaction (Chan and Wong, 1999), allowing

for comparisons to the evidence base (Browning and Hollingbery, 2000), and

provision of a clear statement of the standards of care a patient can expect while in the

hospital (Nott, 2000). The literature makes a clear case for the advantages of using

clinical pathways in mental health settings.

However, the use of clinical pathways in mental health has not been without

problems, objections, and resistance. Jones (2000) studied the implementation of

clinical pathways on an adult psychiatric ward in London. She found that

implementation was difficult due to staff turnover, poor information systems, lack of

previous experience, and because the pathways were too simple for the complex

psychiatric care. Some clinicians did not like the use of clinical pathways because

they were too diagnosis-based, labeled patients, and took too much attention away

from direct patient contact. Hancock and Sherer (2000) also shared that they had

difficulties implementing mental health clinical pathways at a community-based acute

care facility due to few resources in the literature, shortened LOS which allowed only

crisis stabilization, and the need to rely on managed care and Medicare reimbursement

guidelines. Physicians have been resistant to clinical pathways because they object to

outside interference in how they practice medicine. Some clinicians are invested in

maintaining the status quo (Barnette and Clendenen, 1996). Chan and Wong (1999)

cautioned that the use of clinical pathways could interfere with the development of

expert judgment. Sprouse and Whitmore (1995) cautioned that use of clinical

pathways could create antitrust and liability exposure, weaken the use of professional

judgment, and give the false impression that there is only one best approach. Brown

et al. (1998) found obstacles in the implementation of psychiatric clinical pathways. They reported that some professionals saw the use of the pathways as extra paperwork, redundant, and difficult to access in the medical record. Chan and Wong (1999), Browning and Hollingbery (2000), and Smith and Docherty (1998) all pointed out that the development of psychiatric clinical pathways was difficult due to the presence of many comorbidities. Slayton (1998) summarizes some of the concerns:

> ...chronic and persistent mental illness doesn't lend itself to simple standardized treatments like those for hip replacement or coronary bypass surgery. Moreover, the industry-sponsored expert panels charged with developing and validating psychiatric algorithms may be biased toward an end result of care limited to 8-12 visits, favoring cost savings and paying little regard to improved outcome or to the great range of phenotypic variability expressed by those suffering from complex illnesses such as schizophrenia or bipolar disorder. Simplistic algorithms, by favoring 'a cookbook approach,' may also cause some providers to feel marginalized in the way they practice the art of medicine. Finally, patients with severe and persistent mental illness may simply be unable to adhere to the algorithm-prescribed treatments because of cognitive or characterlogical reasons, in spite of their own best intentions.

Given the definition, and pro's and con's of clinical pathways, how are they relevant to a study of LOS with IST patients? Mental health clinical pathways may identify steps and processes that contribute to the LOS of general psychiatric patients, who share many characteristics with IST patients. Studying IST LOS may also contribute to the future development of clinical pathway tools for the IST patient population. LOS and clinical pathways seem to have an ongoing and circular relationship. To develop clinical pathways, knowledge is needed about LOS. To understand LOS, clinical pathways can indicate interdisciplinary consensus on tasks to

be completed within each hospitalization, and the time required to complete those tasks.

Very little research has been done investigating the use of clinical pathways in mental health settings (Chan and Wong, 1999; Jones and Kamath, 1998; Suppes et al., 1998; Jones, 2000). No literature could be found that specifically addresses clinical pathways developed for IST patients. The few studies of clinical pathways with schizophrenics, individuals with bipolar disorder, individuals diagnosed with mania, and individuals with substance abuse problems – all diagnoses which can be found within the population of IST patients – indicated that knowledge of LOS is important (Hancock and Sherrer, 2000; Brown et al., 1998; Chan and Wong, 1999; Barnette and Clendenen, 1996; Sprouse and Whitmore, 1995; Slayton, 1998; Jones, 2000).

Of importance to the current study is: What elements are present in the few mental health clinical pathways that have been reported? Can those elements translate into variables for studying LOS of IST patients? The following elements were identified: routine assessments (Townend, 1997, Chan and Wong, 1999; Jones, 1999), consultations, treatments, medication use, safety precautions, teaching events, discharge planning (Barnette and Clendenen, 1996; Chan and Wong, 1999; Jones, 1999), assessment of dangerousness as reflected by seriousness of charges (Callahan and Silver, 1998), medical treatments, and occupational therapy sessions (Jones, 2000). As will be seen in the methods section of this study, many of these elements can be relevant to a study of LOS of IST patients.

2.4 Incompetent to Stand Trial Patients

The literature related to psychiatric LOS studies and mental health clinical pathways has provided background information about variables used in previous research and components of typical mental health treatment. However, IST patients are different than general psychiatric patients. Davis (1985) wrote, "…there appears to be only minimal research or literature available on the topic of restoration to competency, even in major sources," and "…we struggle in nonempirical darkness about what to do when the IST patient is hospitalized." There has been renewed interest in this area of research since 1985, but the literature is still limited.

One important characteristic of IST patients is that the focus of their treatment is on the restoration of competency. An important standard that relates to this is from the federal court case, *Dusky v. United States* (Roesch, 1979). This case resulted in what is now called the "Dusky" standard. The Supreme Court ruled (as cited in Roesch, 1979; Nicholson et al., 1988; and Nicholson and Kugler, 1991):

> It is not enough for the district judge to find that "the defendant is oriented
> to time and place and has some recollection of events," but that the test
> must be whether he has sufficient present ability to consult with his lawyer
> with a reasonable degree of rational understanding – and whether he has a
> rational as well as factual understanding of the proceedings against him.

With IST patients, the goal of restoring them to competency may or may not have to do with normal indicators of readiness for discharge seen with general psychiatric patients. Davis (1985) puts it this way: "That a patient does not have marketable job skills, lacks a high school diploma, or evidences residual psychotic symptoms may be valid clinical findings, but they are not germane to continued

hospitalization unless they affect the individual's competency to stand trial."

Nicholson et al. (1988) elaborate:

> …mental health experts tend to rely largely on traditional psychological concepts (e.g. psychosis) and traditional assessment methods (e.g. clinical interview, the Minnesota Multiphasic Personality Inventory) in evaluating competency to stand trial, instead of using interviews or instruments designed specifically to evaluate defendants' legally relevant functional abilities.

Of importance to this study is what factors indicate competency, what factors cause a patient to be found incompetent and in need of further hospitalization, and which of those factors are related to mental health treatment.

What would indicate competency in an IST patient? Davis (1999) recommends that treatment plans for an IST patient address several areas – knowledge of the charges against him, the ability to rationally communicate with an attorney, knowledge of courtroom procedures, the capacity to use knowledge and abilities in either a trial or plea-bargain setting. A patient could conceivably master these knowledges, skills, and abilities (KSA's) yet still have active symptoms of mental illness. However, psychotic thinking or severe depression could prevent a patient from gaining these KSA's. It seems that the indicators of competency and indicators of improved mental health often overlap.

In an early article describing the development of an instrument for measuring competency to stand trial, Lipsitt et al. (1971) identified the following patient response characteristics as possible indicators of incompetence: substantial disorganization in grammatical structure or content, verbalizing an inability to relate to or trust, seeing a lawyer's role as punitive or rejecting, extreme concreteness, perseveration, self-defeating statements, flattened affect, and other thought disorders. These authors also

found that patients who were returned to trial were classified as "other than schizophrenic." Roesch (1979) also found that patients diagnosed as schizophrenic were often overrepresented in a group of patients found to be incompetent to stand trial. Pendleton (1980) lists 13 dimensions of competency: knowing available legal defenses, having manageable behavior, relating to an attorney, planning a legal strategy, knowing courtroom roles, understanding charges, understanding possible sentences, understanding the possible outcome of a trial, the ability to share facts with an attorney, the ability to challenge witnesses, the ability to testify, and having self-serving motivation. All of these dimensions could be affected by mental illness. These dimensions were supported by Davis (1985). Nestor et al. (1999) applied modern neuropsychological models of cognition to assessing competency to stand trial. They found that competent patients showed significantly higher intelligence, social intelligence, attention, and memory – especially verbal memory and episodic memory. These variables directly relate to mental health, and are often included in routine mental status exams. The competent patients did not significantly differ from incompetent patients in the areas of academics, executive function, or semantic memory. All of these studies seem to indicate that indicators of mental illness/mental health and indicators of competency to stand trial seem to be intertwined. Nicholson and Kugler (1991) compared 30 studies of competent and incompetent criminal patients. They found that three characteristics were most strongly related to incompetency: poor performance on psychological tests or interviews designed to assess the patients' legally relevant functional abilities, a psychotic diagnosis, and severe psychiatric symptoms. Brown (1992) in an article describing a group therapy

program for IST patients stated that patients in the group exhibited problems of preoccupation with delusional thought, flight of ideas, loose associations, deficits in knowledge of the legal system, distrust of attorneys, distorted cognitions, and hostile and disruptive behavior. Ustad et al. (1996) studied competency screening tests and found that the best predictors of incompetency were diagnoses of either a psychotic disorder or a nonpsychotic affective disorder, in tandem with low measured IQ. Again, competency and mental health go hand in hand.

Nicholson et al. (1988) found that incompetent patients had lower IQ's than competent patients. However, they also speculated that patients diagnosed with mental retardation might be found competent even if they show lack of motivation, poor cooperation, problems with alcohol abuse, or signs of malingering. In other words, a person who has a low intelligence could still be found to be competent to stand trial. Rosenfeld and Ritchie (1998) studied whether the seriousness of the charges against a patient had an influence on clinicians conducting competency evaluations. They found that "misdemeanor defendants, however, were significantly more likely to be found incompetent to stand trial than felony defendants." This suggests that some patients may be held in the hospital longer due to the nature of the charges against them.

Farnsworth (1989) discussed the concept of competency in medical patients. He cites a presidential commission on ethical problems in medicine, which found that core elements of competency included possession of values and goals, the ability to communicate and understand information, and the ability to reason and deliberate.

While not totally relevant to IST patients, the article served to illustrate an ongoing debate in the medical field of what constitutes competency.

Medications often play a role in restoring patients to competency, and finding the right medication could decrease the LOS. Roesch and Golding (1979) point out that many patients show quick improvement in symptoms of mental illness when their treatment involves the use of psychotropic drugs, and that most states allow "drug-induced competency." They advocate for short hospitalizations and rapid use of medications. Even when medications are given involuntarily, competency can be regained. Ladds et al. (1993), in a study in a New York state hospital, found that 87% of the patients who received involuntary medication were restored to competency.

Even when a patient is found competent to proceed in court, their stay in the hospital could continue. For some patients, returning to jail to wait for a trial may result in a return of their mental health symptoms. They may stop taking needed medications and relapse. Schutte et al. write, "The delay occurs because clients are kept in the state hospital until a court hearing is held on whether they have regained competency." This practice assures that mental health issues are managed and that the competent patient remains competent until any scheduled court proceeding.

2.5 Summary statement

The literature provides many examples of variables that influence the LOS of psychiatric patients. The small, but growing body of literature related to mental health clinical pathways provides insight into the treatment components found to be present during the hospitalization of mentally ill individuals. Articles related to IST patients,

particularly what constitutes competency, provide additional variables for

consideration when trying to predict LOS. The challenge for this study is to select a

reasonable number of appropriate variables thought to be significant in predicting LOS

of IST patients in Oregon.

CHAPTER 3

RESEARCH DESIGN

3.1 Introduction

There is an evident need to study variables that contribute to the LOS of IST patients in Oregon. This chapter will present specifics of the research design, the setting for the study, how variables were selected, how cases were identified, how data were collected, and how the data were analyzed.

3.2 Study Design

This study used a retrospective correlational research design. The study was *ex post facto* research, looking at past variables that were not manipulable. The study was a predictive correlational study, in that it looked at how a variety of independent variables could be used to predict LOS for IST patients in Oregon. A standard multiple regression analysis procedure was used to account for the maximum amount of variability in the dependent variable (DV), LOS. In standard multiple regression, also known as the simultaneous model, all independent variables (IV's) are analyzed at the same time. The worth of each IV is determined by what it contributes uniquely to the regression formula, regardless of its correlation to the DV (Woods, 2000). As was seen in the literature review, standard multiple regression has been used by other researchers to study the LOS of psychiatric patients in a variety of settings.

Beyond the use of standard multiple regression, bivariate correlations and frequencies of all variables were analyzed for additional information related to the hypotheses stated in Chapter 1.

3.3 Setting

The study was conducted at Oregon State Hospital (OSH) in Salem, Oregon.

OSH first opened in 1883, in part to control costs associated with treating mentally ill

patients at the private Oregon Insane Asylum, operated by Drs. J.C. Hawthorne and

A.M. Loryea in Portland. Prior to opening OSH, 52% of all state revenues were used

to cover the costs of operating the Portland hospital (Dickel, 1977).

During the time period of focus for this study - January, 1999 through

December, 2001 – OSH included patient treatment wards on two campuses, in Salem

and Portland. The following programs and wards were in operation during the time

period of the study: Child and Adolescent Treatment Services (CATS) included one

ward for children, one ward for younger adolescents, and one ward for older

adolescents; Geropsychiatric Treatment Services (GTS) included two general geriatric

wards, one ward specializing in brain-injured patients, and a ward for patients with

physical medicine problems; Adult Treatment Services (ATS) included two wards in

Salem and three wards in Portland, all serving civilly committed adult patients;

Forensic Rehabilitation and Transition Services (FRTS) included a transitional living

cottage, and five forensic wards for patients committed to the hospital under the

jurisdiction of the Psychiatric Security Review Board (PSRB); Forensic Evaluation

and Treatment Services (FETS) included five wards serving patients under the

jurisdiction of the PSRB, civilly committed patients, and IST patients. One of the

FETS wards, 50E, specialized in the treatment of Developmentally Disabled forensic

patients. Female IST patients were housed on ward 50J and male IST patients were

housed on wards 48B, 48C, 50E, 50I, and 50J, all within FETS. Oregon State Hospital is the primary treatment facility for IST patients in Oregon.

Since the time period of the study, some changes in OSH wards have taken place. The ward for children was closed in CATS, the transitional living cottage was closed in FRTS, and a new ward, 50H, was added to FETS. Ward 50H now houses some IST patients, but was not in existence during the time frame of this study. The primary consideration for selecting the time frame of the study was to achieve an adequate sample size for regression analysis, during a recent period of ward stability. In other words, no wards treating IST patients were opened or closed between January, 1999 and December, 2001. While the opening of 50H raises questions about the ability to generalize results from this study's time frame to the current hospital situation, only one variable, inter-ward transfers, is affected by this historical change. In reality, patients who may have been transferred from 48C or 48B (maximum security) to 50E, 50I, or 50J (medium security) during the time period of study, may now be transferred to 50H (medium security). It was felt that the actual number of transfers would not have increased in the current situation.

3.4 Selection of Variables

As was illustrated in the literature review, a large number of variables have been used for this type of study. Some of those variables were obviously not appropriate, or not available for this sample of IST patients. For example, history of past hospitalizations is only available for previous hospitalizations in the Oregon mental health system. Other previous hospitalizations may be accounted for through

the securing of records from other institutions, or from self-reports of patients. However, this information was not considered to be reliable. Special assessments, such as the Social Behavior Scale and the Self-Assessment Guide have not been routinely performed on IST patients in Oregon. Type of health care insurance was not relevant, since the majority of patients do not have insurance, and their cost of care is paid by state General Fund dollars. Type of pre- and post- hospitalization living situation was not relevant, since all IST patients come from, and return to a county jail. Active military status was not relevant, because Oregon State Hospital is not a Veteran's Administration facility. ECT has not been used with this population. The weather was not relevant, as all of the patients were treated in the same geographic location. Being on an open ward was not a factor, because all of the IST patients in Oregon are treated on locked wards.

Oregon State Hospital's primary database is the Oregon Patient Resident Care System (OPRCS), which has limitations for storing and retrieving patient data. Some focus reports from OPRCS were utilized for this study. However, the unavailability of more sophisticated information systems limited the variables to be studied.

After ruling out variables which were not considered relevant, available, or reliable (as explained above), many variables remained. To help identify the most relevant variables a pilot study was performed. Physicians who conduct "return to court" evaluations at OSH were interviewed in February and March, 2001, using qualitative research methods. "Probes" for the qualitative interviews were derived from a preliminary literature review. The interviews were transcribed, and analyzed to determine variables that were thought to effect the LOS of IST patients. A total of 77

variables were identified by the pilot study. There was a need to reduce the number of independent variables, due to the limited sample size.

The final selection of 14 variables was based on the results of the pilot study, the literature review, and this researcher's 5 years of clinical experience with IST patients. It was felt that the combination of these three methods established both face and content validity for the variables. The 14 variables, and the support for their selection, are presented in Table 2.

Variable	Type of variable; and how reported	Present in Pilot Study?	Suggested by Clinical Experience?	Suggested by Previous Literature? (first author listed and year; five most recent)
Length of Stay	Continuous; reported as number of days	N/A	N/A	Yes, Dependent variable in numerous studies.
Referring County	Nominal; reported descriptively	Yes	Yes	Nicholson (1992)
Ethnic Group	Nominal; reported descriptively	Yes	Yes	Rodenhauser (1988), Choca (1988), Brock (1993), Tucker (1993), Moran (1999)
Gender	Dichotomous Reported as 1=male, 0=female	Yes	Yes	Boelhouser (1983), Pfeiffer (1996), Moran (1999), Oiesvold (1999), Sajatovic (2000)
Age at Admission	Continuous; reported as years	Yes	Yes	Goodban (1987), Lyons (1991), Moran (1999), Oiesvold (1999), Huntley (1998)
Psychosis level Axis I diagnosis at discharge	Dichotomous; reported as 1=yes, 0=no	Yes	Yes	Brock (1993), Tucker (1993), Niemenan (1994), Oiesvold (1999), Huntley (1998)
Substance abuse Axis I diagnosis at discharge	Dichotomous; reported as 1=yes, 0=no	Yes	Yes	Lyons (1991), Chang (1991), Tucker (1993), Brock (1993), Huntley (1998)
Personality disorder Axis II diagnosis at discharge	Dichotomous; reported as 1=yes, 0=no	No	Yes	Altman (1972), Caton (1987), Choca (1988), Rodenhauser (1988), Tucker (1993)
Seclusion and Restraint events	Continuous; reported as number of events	Yes	Yes	Rodenhauser (1988b), Michalon (1990), Brock (1993)
Felonies	Continuous; reported as number of charges	Yes	Yes	Daniel (1967), Cuneo (1983), Rodenhauser (1988b)
Misdemeanors	Continuous; reported as number of charges	Yes	Yes	Daniel (1967), Cuneo (1983), Rodenhauser (1988b)
Evidence of Involuntary Medications	Dichotomous; reported as 1=yes, 0=no	Yes	Yes	Rodenhauser (1988a, 1988b), Pfeiffer (1996), Casper (1990)
Evidence of atypical medications at discharge	Dichotomous; reported as 1=yes, 0=no	Yes	Yes	Sajatovic (2000)
Inter-ward transfers	Continuous; reported as number of transfers	Yes	Yes	Blackburn 91972), Jencks (1985), Cyr (1983), Michalon (1990)

Table 2 – Reasons for the Selection of Study Variables

Table 2 also indicates the type and method of reporting for each variable.

Regression analysis often utilizes dummy variables, which were defined in Chapter 1.

Portney and Watkins (1993) state, "Several dummy variables can be combined with

quantitative variables in a regression equation. Because so many variables are

measured at the nominal level, the use of dummy variables provides an important

mechanism for creating a fuller explanation of clinical phenomena." Tabachnick and

Fidell (1996) concur, "Regression analyses can be used with either continuous or

dichotomous IV's (independent variables). A variable that is initially discrete can be

used if it is first converted into a set of dichotomous variables (numbering one fewer

than the number of discrete categories) by dummy variable coding with 1's and 0's."

Two variables, referring county and ethnic group would have required the

creation of too many dummy variables for the available sample size. For example,

there are 36 counties in Oregon. To include referring county as a variable in the

regression analysis would have required the creation of 35 dichotomous variables,

scoring yes (1) or no (0) for each one. Therefore, referring county and ethnic group

were reported descriptively and were not entered into the regression analysis. This left

11 independent variables that were entered into the regression analysis.

Because this study used both continuous and dichotomous variables,

standardized coefficients were used in the final regression equation. This allowed for

variables measured on different scales to be included in the equation.

3.5 Selection of Cases

Tabachnick and Fidell (1996) suggest an appropriate ratio of cases to IV's is $N \geq 50 + 8m$ (m is the number of IV's) for testing the multiple correlation, and $N \geq 104 + m$ for testing individual predictors. This assumes a medium-sized relationship between the IV's and the DV, $\alpha = .05$, and $\beta = .20$. Since there was an interest in both the overall correlation and the individual IV's, it was recommended to calculate the N both ways and select the larger number of cases. Since the regression analysis in this study utilized 11 IV's, an appropriate sample size was either 138 or 115. However, data were collected for 200 cases to allow for any need to exclude specific cases due to missing data, or skewing of the results due to outliers. The sample size was small, but met the assumption of ratio of cases to IV's in standard regression.

Patients who were admitted to the hospital under an Oregon Revised Statute (ORS) other than 161.370, remained in the hospital for more than three years (e.g. the legal limit for IST patients in Oregon), converted to another form of commitment during their hospitalization, or were not under ORS 161.370 at the time of their discharge were excluded from the study. For patients who had multiple admissions during the time period of the study, each admission was treated as a separate case.

Cases included 200 patients from a randomized list of patients discharged from OSH between January 1, 1999 and December 31, 2001. The list was obtained from the OPRCS by the Assistant Director of the Medical Records Department.

3.6 Collection of Data

Approval for the research protocol was received by the Institutional Review Boards (IRB's) of both Oregon State Hospital and Oregon State University. No data were collected prior to receipt of IRB approvals.

Data were collected by the principal researcher and two paid research assistants. Both paid assistants were employees of the OSH Medical Records Department, and agreed to help with the study on their own time. Both assistants completed a web-based course on research ethics prior to the start of data collection. Data for the variables of gender, age at admission, ethnic group, referring county, and LOS were included on the OPRCS focus report list. Data for the variables of Axis 1 diagnoses, Axis 2 diagnoses, S & R events, pending criminal charges, evidence of involuntary medication, evidence of use of atypical medications at discharge, and number of inter-ward transfers were collected through a retrospective medical record review conducted in the basement storage room of the OSH Medical Records Department. Data were collected in a manner so that no identifying information of individual patients was retained. Cases were numbered in the sequence that the data were collected. Once all data were collected, the list containing medical records numbers was returned to the Medical Records Department of Oregon State Hospital. Since the data were collected in a way that prevented identification of the patients, no treatment of subjects was involved, and the results were to be reported in aggregate form, the study was exempt from requiring informed consent from the patients.

A data collection worksheet was developed for use by raters (Appendix C). The principal investigator provided a thorough orientation of the data collection

process to the research assistants. Two medical records were used as practice records for each data collector. Interrater reliability was established through the percent agreement method, by comparing ratings by each rater, on the same cases, at the beginning, mid-way, and end of the data collection process. At each point, two cases were compared for percent agreement. One hundred percent rater agreement was found for all six compared cases.

3.7 Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) program in the Milne computer lab at Oregon State University. SPSS REGRESSION, SPSS FREQUENCIES, and SPSS EXPLORE were all utilized. Data were scrutinized for accuracy of entry, missing values, appropriate ranges, appropriate means, and to identify obvious outliers. One case was eliminated due to unreliable information about pending charges. In that case, the medical record indicated that there were 15 charges (instant offenses), but the names of only two of the charges were given. This was considered "missing information", and that case was dropped from the study. A second case was identified as an outlier during the analysis phase, and was also eliminated from the study (this will be described in Chapter 4). All other data were found to be acceptable for analysis. The final number of cases was 198 (N=198).

Several methods were used to test for the assumptions of normality, linearity, and homoscedasticity. Results showed the need for some variables to be transformed

to meet the assumptions of regression. Analysis was repeated after transformation of variables, to see if the transformed variables met the assumptions of regression.

SPSS FREQUENCIES and SPSS EXPLORE were used to produce some descriptive information about the sample. Actual criminal charges, actual diagnoses, and use of atypical medications were tallied by hand.

SPSS REGRESSION was used to produce analysis of multiple R^2 and F ratio; adjusted multiple R^2, overall proportion of variance accounted for; significance of regression coefficients, squared semipartial correlations, post hoc significance of correlations, unstandardized weights with confidence limits; standardized weights, unique versus shared variability, suppressor variables, and the prediction equation.

CHAPTER 4

RESULTS

4.1 Introduction to Results

Results of the study include a check of the assumptions of standard multiple

regression; a description of sample characteristics; discussion of the relationships of

those characteristics to LOS; the use of standard multiple regression to produce a LOS

prediction formula and related statistics; analysis of the contribution of individual

variables to that formula; and reviews of the research hypotheses. Prior to analysis, the

data were inspected to check for missing values, incorrect data entry, and appropriate

value ranges. Two instances of incorrect data entry were corrected. One case was

eliminated due to unreliable data. In that case, the data collection sheet indicated the

subject was charged with 15 crimes, but the names of only two crimes had been noted.

A second case was eliminated after transformation of variables, when it was found to

be an outlier.

4.2 Checking Assumptions

Regression assumes that there is an acceptable ratio of cases to independent

variables (IV's); that scatterplots of residuals indicate normality, linearity, and

homoscedasticity between predicted DV scores and errors of prediction; and that there

is no evidence of multicolinearity or singularity.

As stated in Chapter 3, an appropriate ratio of cases to IV's is $N \geq 50 + 8m$ (m

is the number of IV's) for testing the multiple correlation, and $N \geq 104 + m$ for testing

individual predictors. This assumes a medium-sized relationship between the IV's and

the DV, $\alpha = .05$, and $\beta = .20$. Since this study had 11 IV's, an appropriate sample size was either 138 or 115. Data were collected on 200 cases. One case had unreliable data, and was dropped from the study. After transformation of some variables, one additional case was determined to be an outlier, as will be described below, and was also dropped from this study. That left 198 cases (N=198) for the final analysis, which met the assumption of ratio of cases to IV's.

Tabachnick and Fidell (1996) state, "Assumptions of analysis are that residuals (differences between obtained and predicted DV scores) are normally distributed about the predicted DV scores, that residuals have a straight line relationship with predicted DV scores, and that the variance of residuals about predicted DV scores is the same for all predicted scores." To test these assumptions, SPSS REGRESSION was used for an initial run, using untransformed variables in a standard multiple regression to produce a scatterplot of residuals against predicted DV scores (Figure 5).

Scatterplot

Dependent Variable: length of stay

Regression Standardized Residual
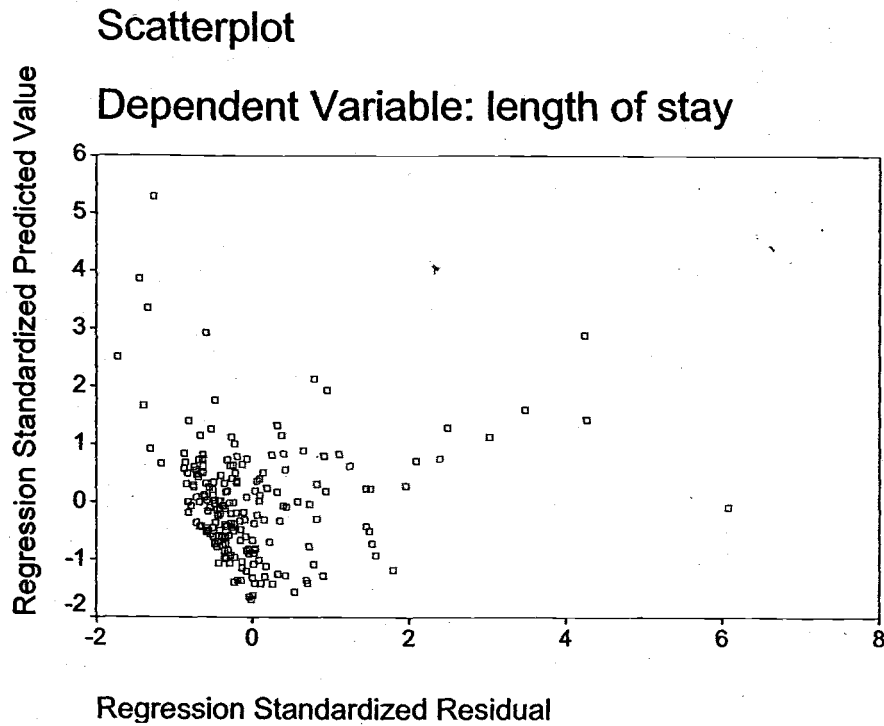
Figure 5 – SPSS REGRESSION residuals scatterplot for original variables

The execrable overall shape of the scatterplot in Figure 5 indicated violation of many of the assumptions of regression. In addition, a P-P plot of the observed and expected standardized residuals (figure 6) indicated departure from a straight line, which violated the assumption that residuals have a straight line relationship with predicted DV scores.

Dependent Variable: length of stay
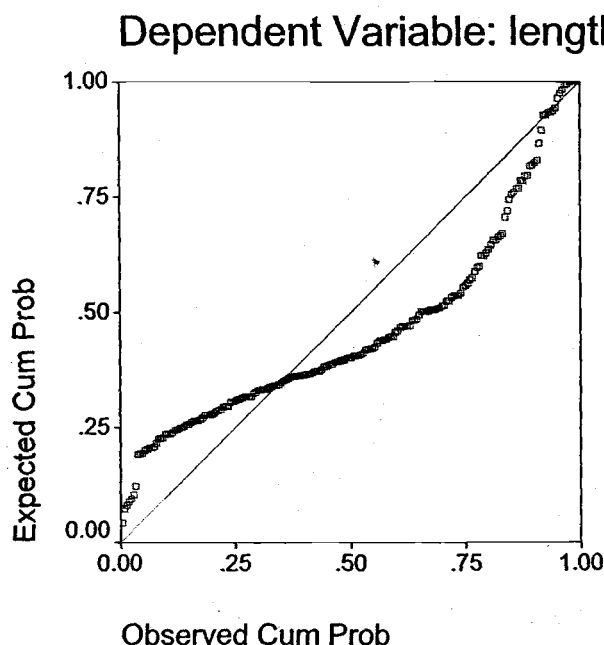
Figure 6 - P-P plot of the observed and expected standardized residuals
for untransformed variables

An examination of the Mahalanobis D^2 statistic associated with each case

indicated that there were seven outliers among the untransformed data (CV = 31.264,

df = 11, p = .001). There were no values >1 for Cook's statistic for influential

outliers.

For dichotomous variables, uneven splits between variables can produce

outliers. Rummel (1970, as cited in Tabachnick and Fidell, 1996) recommends

deleting dichotomous variables with splits that exceed 90-10. The dichotomous

variables in this study had the following splits: gender, 78-22; psychotic level Axis I

diagnosis, 63-37; Substance abuse Axis I diagnosis, 71-29; personality disorder Axis

II diagnosis 40-60; evidence of involuntary medications, 59-41; atypical medications at discharge, 56-44. Therefore, none of the dichotomous variables were deleted.

Given these initial findings with untransformed data, it was decided to examine each variable for possible transformation to reduce skewness and/or kurtosis, reduce the number of outliers, and improve the normality, linearity, and homoscedasticity of residuals.

After trials of various transformations, Length of Stay was transformed to its logarithm, becoming LOGLOS. The number of seclusion and restraint events, number of felony charges, number of misdemeanor charges, and number of inter-ward transfers were all transformed to square roots – becoming SQSR, SQFEL, SQMIS, and SQTRANS. Table 3 shows skewness and kurtosis statistics for all variables before and after transformation. In all cases, both skewness and kurtosis improved and moved closer to 0. After transformation of the variables, one case remained as an outlier, and was dropped from the study. Mahalanobis Distance statistics for the remaining 198 cases ranged from 3.846 to 30.830 and did not exceed the critical value for outliers (CV = 31.264, df = 11, p = .001). There were no values for Cook's distance > 1, the default value for outliers.

Untransformed Variable	Skewness before transformation	Kurtosis before transformation	Transformed Variable	Skewness after trans-formation	Kurtosis after transformation
LOS	2.894	10.565	LOGLOS	.146	.067
Gender	-1.347	-.189	Gender	same	same
Age	.562	.427	Age	same	same
Psychosis level diagnosis	-.526	-1.741	Psychosis Level diagnosis	same	same
Substance Abuse diagnosis	-.917	-1.171	Substance Abuse Diagnosis	same	same
Personality Disorder Diagnosis	.416	-1.846	Personality Disorder Diagnosis	same	same
S&R events	4.100	25.352	SQSR	1.657	2.340
Felony charges	3.137	12.964	SQFEL	.826	.351
Misdemea-nor charges	1.392	3.177	SQMIS	-.074	-.893
Evidence of Involuntary Meds.	-.351	-1.896	Evidence of Involuntary Meds	same	same
On Atypical Meds.	-.246	-1.959	On Atypical Meds.	same	same
Inter-ward transfers	2.254	7.665	SQTRANS	.529	-.848

Table 3 – Skewness and kurtosis statistics for all variables, before and after transformation

SPSS REGRESSION was used for a second run, using transformed variables in a standard multiple regression to produce a scatterplot of residuals against predicted DV scores (Figure 7). The scatterplot shows a much improved picture of homoscedasticity. Tabachnick and Fidell (1996) point out, "...that heteroscedasticity is not fatal to an analysis. The linear relationship between variables is captured by the analysis but there is even more predictability if the heteroscedasticity is accounted for.

If it is not, the analysis is weakened, but not invalidated." The results here indicated that the assumption of homoscedasticity was met.

Scatterplot

Dependent Variable: LOGLOS
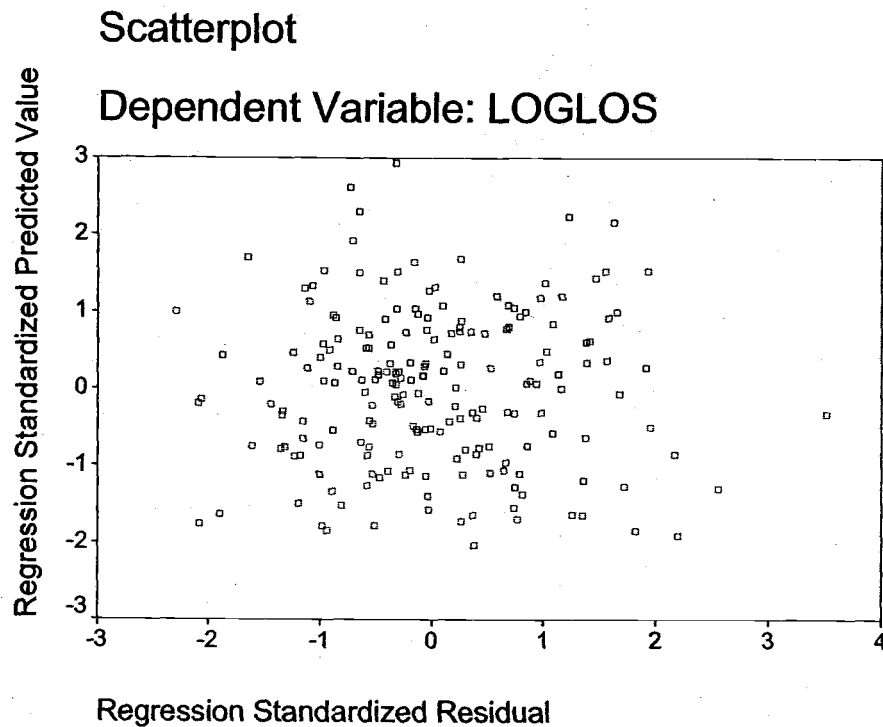
Figure 7 – SPSS REGRESSION residuals scatterplot for transformed variables

A P-P plot of the observed and expected standardized residuals (figure 8) indicated a better fit of residuals to a straight line. This supported the assumptions of normality and linearity.

Normal P-P Plot of Regression Sta

Dependent Variable: LOGLOS
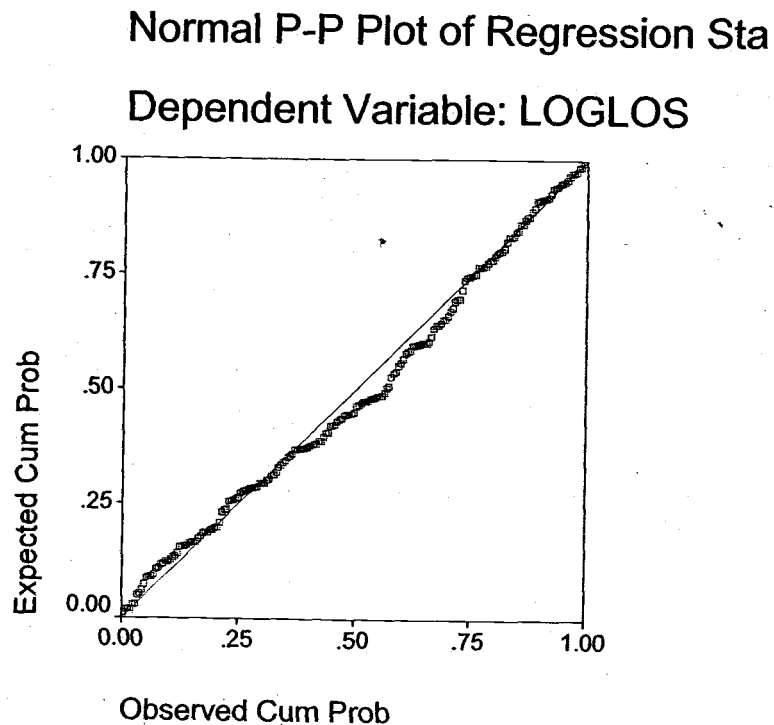
Figure 8 - P-P plot of the observed and expected standardized residuals
for transformed variables

The assumptions of no evidence of either singularity or multicolinearity were

checked by examining the colinearity statistics produced by the SPSS REGRESSION

program using the transformed variables, and by inspecting all bivariate correlations.

There were no tolerance statistics $< .01$, no VIF scores ≥ 10, and no condition index

scores > 30, all of which were default values. Variance proportions showed only one

dimension that had two scores $> .5$. Because of this one dimension, it was decided to

examine all bivariate correlations. Table 4 shows all bivariate correlations for both

untransformed and transformed variables. There were no correlations $> .9$, except for

correlations between original variables and their transformed selves. According to

Tabachnick and Fidell (1996), "Regression will be best when each IV is strongly

correlated with the DV but uncorrelated with other IV's." The correlation table

showed that none of the variables were highly correlated with the DV, nor with each

other. As related to singularity and multicolinearity, the bivariate correlations

indicated that there was no problem. The testing of assumptions was complete, and all

assumptions were deemed met.

	LOS	Gender	Age	Axis I Psycho-sis	Axis I Subst. Abuse	Axis II Person-ality D/O	S&R events	Felony charges	Misde-meanor charges	Invol. Meds.	Atypi-cal Meds.	Trans-fer #	LOG LOS	SQSR	SQFEL	SQMIS	SQ TRAN
LOS	1	-.032	.156*	-.013	-.134	.017	.058	-.003	.015	.229**	.040	.379**	.853**	.091	.082	-.026	.355**
Gender	-.032	1	-.009	-.036	.030	.187**	.049	.140*	.008	-.079	.090	.361**	-.040	.034	.140*	-.027	.443**
Age	.156*	-.009	1	-.128	-.235**	.029	-.133	-.033	.003	-.039	-.089	.238**	.192**	-.153*	.018	.010	.225**
Axis I Psycho-sis	-.013	-.036	-.128	1	.007	-.095	-.020	-.350**	.182*	.219**	.263**	.023	.067	.037	-.344**	.226**	.099
Axis I Subst. Abuse	-.134	.030	-.235**	.007	1	.207**	-.074	.058	.038	-.136	-.033	-.044	-.147*	-.057	.064	.061	-.075
Axis II Pers.Dis	.017	.187**	.029	-.095	.207**	1	.032	.197**	-.084	-.215**	-.151*	.017	.017	.047	.242**	-.137	-.205
S&R events	.058	.049	-.133	-.020	-.074	.032	1	-.097	.038	.183**	-.065	.039	.120	.915**	-.116*	.067	.059
Felony charges	-.003	.140*	-.033	-.350**	.058	.197**	-.097	1	-.216**	-.292**	-.154*	-.099	-.042	-.125	.902**	-.301**	-.151*
Misde-meanor charges	.015	.008	.003	.182*	.038	-.084	.038	-.216	1	.151*	.081	-.027	.013	.046	-.301**	.932**	-.012
Invol. Meds.	.229**	-.079	-.039	.219**	-.136	-.215**	.183**	-.292**	.151*	1	.123	.181*	.342**	.209**	-.289**	.222**	.187**
Atypi-cal Meds.	.040	.090	-.089	.263**	-.033	-.151*	-.065	-.154*	.081	.123	1	.020	.019	-.042	-.153*	.093	.030
Trans-fer #	.379**	.361**	.238**	.023	-.044	.017	.039	-.099	-.027	.181*	.020	1	.421**	.012	-.032	-.046	.929**
LOG LOS	.853**	-.040	.192**	-.342**	-.147*	.017	.120	-.042	.013	.342**	.019	.421**	1	.167*	.013	.012	.424**
SQSR	.091	.034	-.153*	.037	-.057	.047	.915**	-.125	.046	.209**	-.042	.012	.167*	1	-.143*	.074	.041
SQFEL	.082	.140*	.018	-.344**	.064	.242**	-.116	.902**	-.301**	-.289**	-.153*	-.032	.013	-.143*	1	-.431**	-.093
SQMIS	-.026	-.027	.010	.226**	.061	-.137	.067	-.301**	.932**	.222**	.093	-.046	.012	.074	-.431**	1	-.017
SQ TRAN	.355**	.443**	.225**	.099	-.075	-.025	.059	-.151*	-.012	.187**	.030	.929**	.424**	.041	-.093	-.017	1

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2 tailed)

4.3 Sample Description

Table 5 summarizes descriptive frequencies and statistics for the dependent variable (LOS), and 12 of the independent variables. Descriptives of the remaining independent variable, referring county, are summarized in Table 6.

LOS for the sample ranged from 10 to 971 days, with a standard deviation of 151.661. The mean LOS was 146.9 days. With such a broad range and large standard deviation, the need to study what contributes to the variability is evident.

The sample included 154 male patients (77.8%) and 44 female patients (22.2%). The mean LOS for male patients was 144.32 days. The mean LOS for female patients was 155.91 days. Figure 9 presents a visual representation of the comparison of mean LOS's for both genders. It appears that female patients may stay in the hospital slightly longer than male patients, but the results may be skewed due to the low number of female cases in the sample. With unequal N for the two gender groups, comparison of means is tentative. Both genders contain extreme cases that also tend to skew the means. Table 4 indicates that gender has a very low, negative correlation to LOS ($R = -.032$) that is not significant at either the 0.01 or 0.05 levels (2-tailed). The hypothesis that males will have longer LOS's than females, due to more opportunities for inter-ward transfer, is not accepted for this sample.

Variable	N or Mean	Range	Standard Deviation	%	Mean LOS
Length of Stay	146.9	10 to 971	151.661		
Gender					
Male	154			77.8	144.32
Female	44			22.2	155.91
Age at Admission	37.37	15 to 77	11.949		
Ethnic Group					
White, Non-	161			81.3	147.44
Hispanic	20			10.1	129.30
Black, Non-	5			2.5	195.60
Hispanic	5			2.5	116.20
Hispanic, Mexican	3			1.5	163.33
American Indian	2			1.0	242.50
Hispanic, Other	1			.5	N/A
Asian, Pacific	1			.5	N/A
Island					
Southeast Asian					
Unknown					
Axis I psychotic-level diagnosis?					
Yes	124			62.6	145.41
No	74			37.4	149.39
Axis I substance abuse diagnosis?					
Yes	140			70.7	133.89
No	58			29.3	178.29
Axis II personality disorder?					
Yes	79			39.9	150.04
No	119			60.1	144.82
# of S & R events					
0	139	0 to 15		70.2	137.73
1	24			12.1	132.42
2	14			7.1	234.14
3	11			5.6	166.55
4	2			1.0	150.50
5	2			1.0	174.00
6	1			.5	N/A
7	2			1.0	167.00
8	2			1.0	115.00
15	1			.5	N/A

Table 5 – General Characteristics of the Sample

Variable	N or Mean	Range	Standard Deviation	%	Mean LOS
# of felony charges					
0	92	0 to 13		46.5	119.03
1	45			22.7	191.06
2	33			16.7	187.73
3	12			6.1	112.33
4	5			2.5	130.40
5	3			1.5	157.00
6	2			1.0	174.50
7	1			.5	N/A
9	2			1.0	52
10	1			.5	N/A
13	2			1.0	115.5
# of misdemeanor charges					
0	55	0 to 12		27.8	160.49
1	42			21.2	147.76
2	39			19.7	140.92
3	20			10.1	128.30
4	24			12.1	117.29
5	7			3.5	79.29
6	7			3.5	139.86
7	1			.5	N/A
8	2			1.0	711.00
12	1			.5	N/A
Evidence of involuntary medications?					
Yes	82			41.4	175.99
No	116			58.6	105.74
On atypical medications at discharge?					
Yes	111			56.1	152.32
No	87			43.9	139.99
# of inter-ward transfers	103			52	106.36
0	71			35.9	154.93
1	16			8.1	261.44
2	4			2.0	466.00
3	2			1.0	220.50
4	1			.5	N/A
5	1			.5	N/A
6					

Table 5 – General Characteristics of the Sample (Continued)
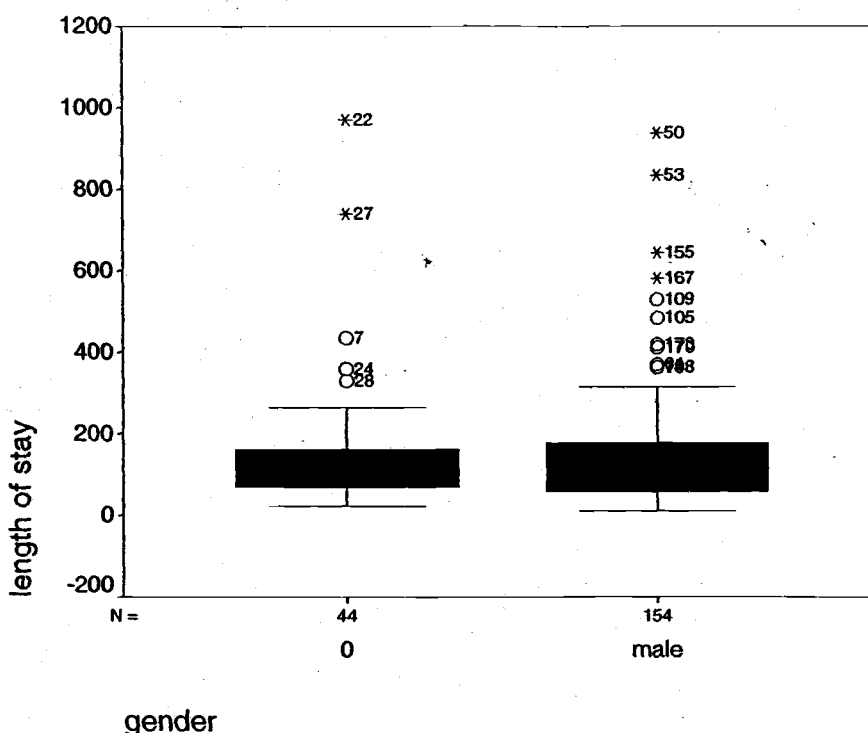
Figure 9 – Boxplot of comparison of means of LOS
between male and female cases (SPSS EXPLORE output)

Ages of subjects ranged from 15 to 77 years, with the mean age being 37.37,

and standard deviation being 11.949. It was surprising to find a 15-year old among the

sample, because typical IST patients are adults above the age of 18. There were also

some older patients in the sample (age > 65), and some of these older patients might

have qualified for transfer to a geriatric ward, thus increasing the number of transfer

options for the sample. Since only the number of transfers was collected, no data were

available related to transfer location. The range of ages, and the limited number of

cases at each age, prevented any meaningful comparison of means of LOS by age.

However, table 4 shows that age has a positive correlation with LOS (R = .156) that is

significant at the 0.05 level. There was no hypothesis related to age, and it is only reported descriptively.

White, non-Hispanic subjects accounted for 81.3% of the sample, with N = 161. The next largest group was Black, non-Hispanic – accounting for 10.1% of the sample, with N = 20. The remaining ethnic groups were much smaller, including: Hispanic, Mexican (2.5%, N = 5); American Indian (2.5%, N = 5); Hispanic, other (1.5%, N = 3); Asian, Pacific Islander (1%, N = 2); Southeast Asian (.5%, N = 1); and Unknown (.5%, N = 1). Mean LOS's for each ethnic group were compared using SPSSEXPLORE, and are displayed in figure 10. Mean LOS varied across the ethnic groups, from a low mean LOS of 116.33 for American Indians, to a high mean LOS of 242.50 for Asian, Pacific Islanders. Again, the low number of cases in some ethnic groups explains how mean LOS's may be skewed. White, Non-Hispanics – the largest group in the sample - had a mean LOS of 147.44 days, but also showed the most extreme cases. Black, non-Hispanics – the second largest group in the sample – had a mean LOS of 129.30 days, and had fewer extreme cases than White, Non-Hispanics. Since data for ethnic groups was at the nominal level, no correlations with LOS were calculated, and ethnic group was not used as a variable in the final regression analysis.
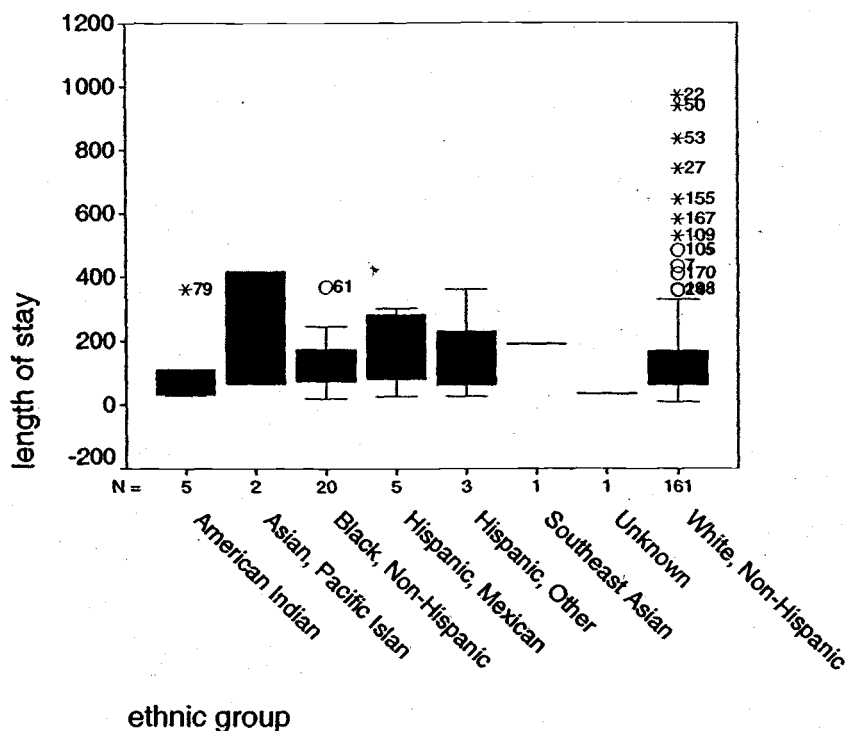
Figure 10 - Boxplot of comparison of means of LOS
between ethnic groups (SPSS EXPLORE output)

Additional research, using Analysis of Variance (ANOVA) with matched

ethnic groups may shed more light on any significant differences in LOS for ethnic

groups. LOS data for ethnic groups are reported purely descriptively, and is

inconclusive. The difference in LOS between ethnic groups may be due to use of

interpreter services, cultural differences in response to mental health treatment

strategies, lack of multi-cultural experience on the part of hospital staff,

differing medication responses between ethnic groups, differences in community

and/or family support for members of certain cultures, or other variables. It should be

noted that the groups with the highest mean LOS – Asian, Pacific Islander (mean LOS

= 242.50 days); Hispanic, Mexican (mean LOS = 195.60 days); and Hispanic, others (mean LOS = 163.33 days) – were small groups of primarily non-English speaking patients. Many of these patients required the use of interpreters. Written treatment materials were mostly in English at the time of the study, with some items translated to Spanish. Language barriers may have played a role in increasing LOS.

Table 6 contains data about the second nominal-level variable, referring county. The table also contains information about the percent of Oregon population located in each county, and the mean LOS for the sample cases from each county. All counties are presented in descending order, by the number of sample cases that were referred by that county. Multnomah County referred the most number of patients (N = 66), or one-third of all cases (33.3%). However, Multnomah County only accounts for 19.27% of Oregon's population. As the largest county, including the greater Portland metropolitan area, it may attract larger numbers of mentally ill individuals and/or criminal activity than smaller, rural counties. These characteristics may be stressors on both the community mental health system and the county correctional system in Multnomah County, resulting in the need for greater utilization of state-level services at OSH. The highest mean LOS was for Josephine County (442.00 days). There were only two cases from Josephine County, so this might explain the skewed mean LOS when compared to counties with larger numbers of cases. Figure 11 shows a comparison of mean LOS by county. No distinct pattern is discernable, except for the higher mean LOS for the two cases in Josephine County.

County	N	%	% of Oregon Population (2000 Census) *	Mean LOS
Multnomah	66	33.3	19.27	124.30
Lane	23	11.6	9.43	254.43
Marion	22	11.1	8.32	115.73
Coos	11	5.6	1.83	156.09
Washington	11	5.6	13.07	212.55
Jackson	8	4.0	5.30	129.38
Linn	8	4.0	3.00	137.63
Tillamook	7	3.5	0.71	79.00
Deschutes	5	2.5	3.40	130.60
Clackamas	4	2.0	9.90	87.00
Klamath	4	2.0	1.86	180.00
Lincoln	4	2.0	1.29	115.75
Polk	4	2.0	1.83	59.00
Yamhill	4	2.0	2.49	75.00
Douglas	3	1.5	2.93	79.67
Wasco	3	1.5	0.69	140.33
Benton	2	1.0	2.28	192.50
Josephine	2	1.0	2.21	442.00
Lake	2	1.0	0.22	80.50
Clatsop	1	.5	1.04	N/A
Curry	1	.5	0.62	N/A
Grant	1	.5	0.23	N/A
Hood River	1	.5	0.60	N/A
Umatilla	1	.5	2.06	N/A
Columbia	0	0	1.27	N/A
Malheur	0	0	0.92	N/A
Union	0	0	0.72	N/A
Crook	0	0	0.56	N/A
Jefferson	0	0	0.56	N/A
Baker	0	0	0.49	N/A
Morrow	0	0	0.32	N/A
Harney	0	0	0.22	N/A
Wallowa	0	0	0.21	N/A
Sherman	0	0	0.06	N/A
Gilliam	0	0	0.06	N/A
Wheeler	0	0	0.04	N/A

Table 6 - Referring County Demographics

* Source: Bureau of Economic Analysis, U.S. Department of Commerce
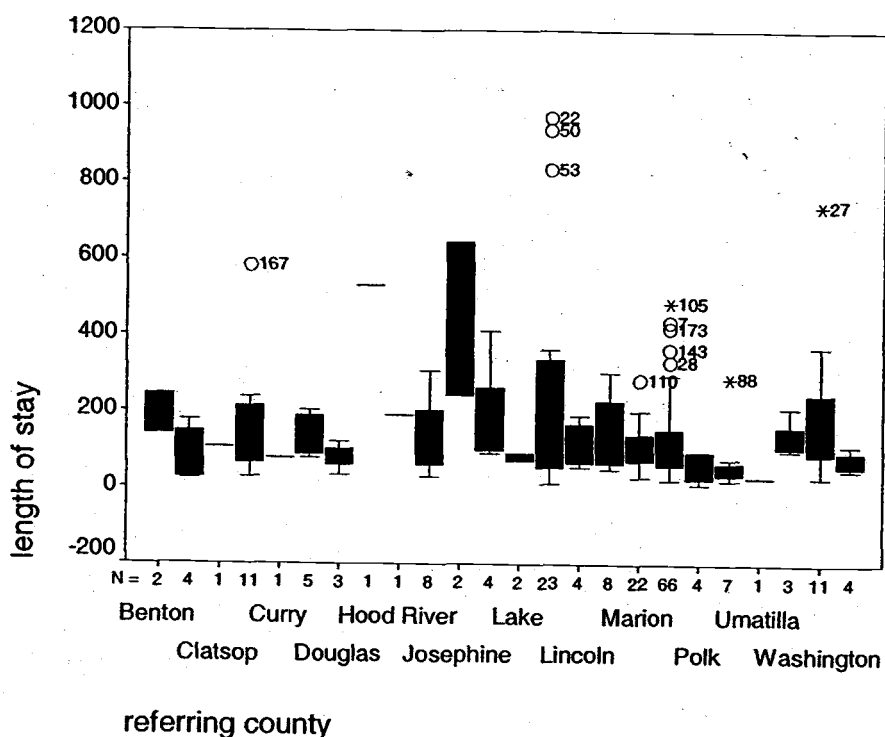
Figure 11 - Boxplot of comparison of means of LOS
between referring counties (SPSS EXPLORE output)

The top seven counties, whose combined populations represented 60.22% of

the state's population, accounted for 75.2% of the cases in the sample. Twelve

counties, occupied by 5.43% of the state's population, had no IST patients in the

sample population. The twelve non-referring counties were Columbia, Malheur,

Union, Crook, Jefferson, Baker, Morrow, Harney, Wallowa, Sherman, Gilliam, and

Wheeler. These are among the smallest counties in the state, and may have less

developed mental health and correctional systems. Matched county groups, with equal

and larger sample sizes, could be analyzed to determine if there are any significant

differences in LOS for IST patients between counties. Because referring county was

at the nominal-level, no bivariate correlation was calculated between referring county

and LOS. There was no hypothesis related to the relationship between LOS and

referring county.

Psychotic-level diagnoses were received by 124 patients (62.6%). Seventy-

four patients had no psychotic-level diagnosis (37.4%). Figure 12 shows a

comparison of means between the two groups.

Axis 1 psychotic level diagnosis
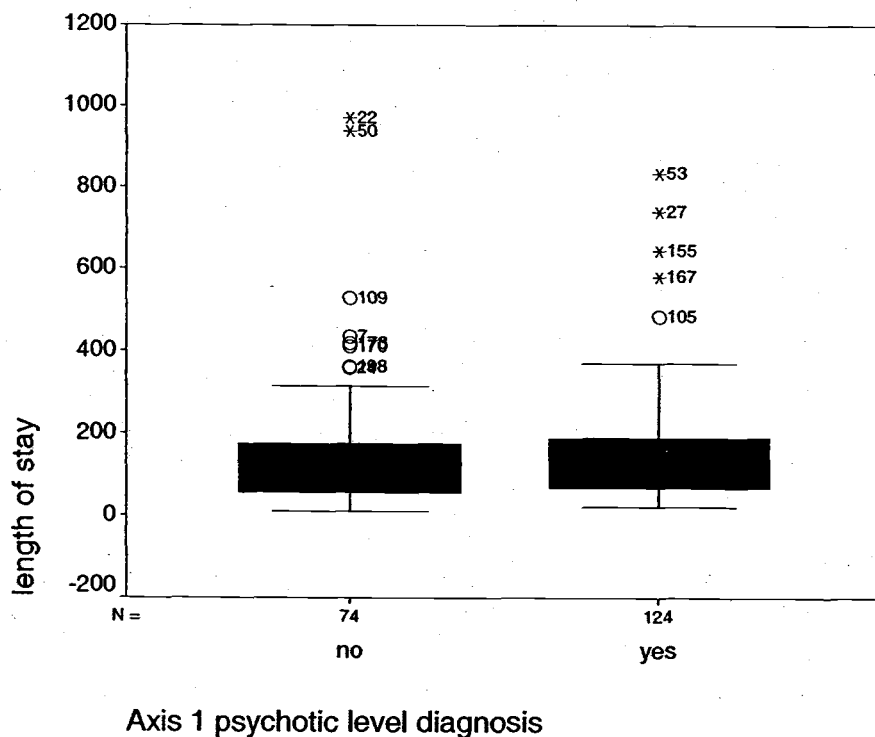
Figure 12 - Boxplot of comparison of means of LOS
between cases with and without psychotic-level diagnoses (SPSS EXPLORE output)

Patients with a psychosis-level diagnosis had a mean LOS of 145.41 days, compared to a mean LOS of 149.39 days for patients without a psychosis-level diagnosis. Given that the two groups were of unequal size, results are inconclusive. Figure 11 shows that the two groups have very similar LOS profiles. In this study, patients with psychotic-level diagnoses had shorter LOS's on average. This could certainly be attributed to the larger number of cases in the group that had the more severe diagnosis. Table 4 shows that having a psychotic-level diagnosis had a low correlation with LOS ($R = -0.13$), and that the correlation was not significant at the 0.01 or 0.05 levels (2-tailed). There was no support for the hypothesis that patients with psychotic-level diagnoses have longer LOS's.

Table 7 summarizes the actual Axis I mental health diagnoses for the sample. The top five diagnoses were schizophrenia ($N = 48$); psychotic disorder, not otherwise specified ($N = 40$); bipolar disorder ($N = 37$); schizoaffective disorder ($N = 29$); and malingering ($N = 13$). Malingering, or the faking of mental illness symptoms, has been observed to be used by some IST patients who are trying to avoid jail, prison, or stiff sentences. Some patients feel that life in the state hospital is preferred over life in a correctional facility. The amount of time necessary to observe, document and justify the diagnosis of malingering may increase LOS for some patients.

Diagnosis	N
Schizophrenia	48
Psychotic Disorder, Not Otherwise Specified	40
Bipolar Disorder	37
Schizoaffective Disorder	29
Malingering	13
Cognitive Disorder	8
Substance-induced pyschotic D/O	7
Depression	7
Mood disorder	4
Other (N ≤ 3, for each)	23

Table 7 – Summary of Axis I Mental Health Diagnoses of Sample

Axis I substance-related diagnoses (dependence or abuse) were received by

140 patients, compared to 74 patients who had no substance-related diagnoses. Many

of the 140 patients received multiple substance-related diagnoses. The mean LOS for

patients with any substance-related diagnosis was 133.04 days. Patients without a

substance-related diagnosis had a mean LOS of 178.29. It appeared that patients with

no substance abuse comorbidities had longer LOS's than those with substance abuse

complications. However, Table 4 showed that having an Axis I substance-related

diagnosis had a low correlation with LOS (R = -.134) and was not significant at the

0.01 or 0.05 levels. The hypothesis that a substance-related diagnosis would be

positively and significantly correlated with LOS is not accepted for this sample. It

was noted that the correlation was in a negative direction, which is consistent with

previous studies.

The visual representation shown in Figure 13 illustrates that patients with Axis

I substance-related diagnoses have a shorter mean LOS than patients without

substance-related diagnoses. As was seen with previous variables, this finding is based on comparing unequal groups, and is tentative.
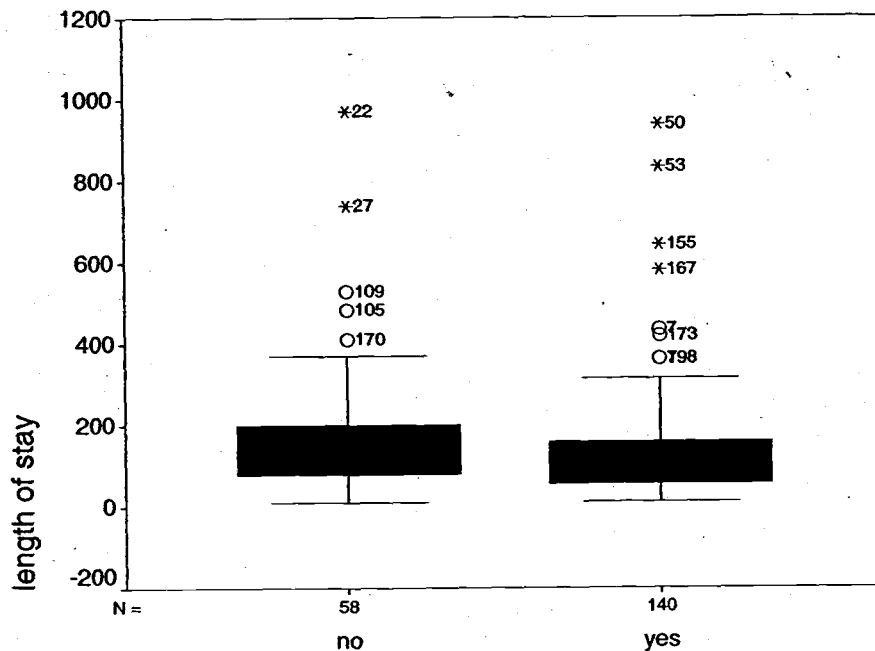
Axis 1 substance abuse diagnosis

Figure 13 – Boxplot of comparison of means of LOS
between cases with and without substance-related diagnoses
(SPSS EXPLORE output)

Table 8 summarizes the actual substance-related diagnoses received by patients in the sample group. Many patients received multiple individual substance-related diagnoses, as opposed to the all-encompassing diagnosis of polysubstance abuse or dependence. Alcohol was the most common problem substance, with 20 patients diagnosed as being dependent on alcohol and 73 patients being diagnosed as abusing alcohol. Cannabis dependence or abuse came next, with 62 cases showing diagnoses

of problems with this drug. Several physicians assigned the diagnosis of methamphetamine abuse, which is usually combined with other amphetamine-like substances under an amphetamine dependence or abuse diagnosis. When these two diagnoses are combined from table 8, amphetamines become the third most problematic substance in the sample. However, since only 13 cases received the diagnosis of methamphetamine abuse, and it is not known what was included under the 47 amphetamine diagnoses, it is difficult to determine the exact number of patients who had problems with methamphetmine. In addition, 18 patients had diagnoses of either polysubstance dependence or abuse, and it is not known what drugs were included in those diagnoses. Cocaine was the fourth most problematic substance, with 43 patients diagnosed as either being dependent on cocaine or abusing it.

Substance	Dependence N	Abuse N	Total N
Alcohol	20	73	93
Cannabis	3	59	62
Amphetamines	7	40	47
Cocaine	5	38	43
Hallucinogens	0	19	19
Polysubstance	4	14	18
Opioids	2	15	17
Methamphetamines		13	13
Inhalants	0	7	7
Sedatives, hypnotics, or anxiolytics	0	2	2
Phensylidine	0	1	1
Other	0	2	2

Table 8 – Axis I Substance-related diagnoses of sample

Other substance-abuse diagnoses, including both dependence and abuse, were:

hallucinogens (N = 19); opioids (N = 17); inhalants (N = 7); sedatives, hypnotics, or

anxiolytics (N = 2); phensylidine (N = 1) and other (N = 2).

Seventy-nine patients carried one or more personality disorder diagnoses, and

119 patients had no personality disorder diagnoses. The mean LOS for patients with a

personality disorder diagnosis was 154.04 days, and the mean LOS for patients

without a personality disorder diagnosis was 144.82 days. Figure 14 provides the box

plot representation comparing the mean LOS of both groups. Again, the groups are

unequal and unmathched, so any conclusions are tentative. It appears that there is

very little difference in LOS between patients who had personality disorders and those

who did not.
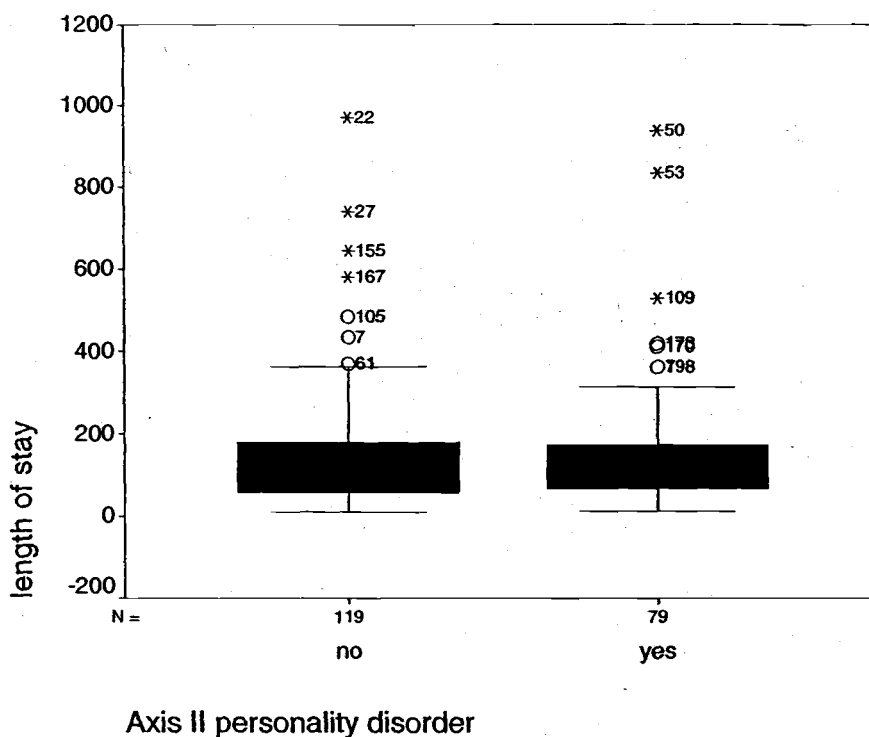
Figure 14 - Boxplot of comparison of means of LOS between cases with and without
personality disorder diagnoses (SPSS EXPLORE output)

Table 4 shows that having an axis 2 personality disorder diagnosis has a low correlation with LOS (R = .017) and is not significant at either the 0.01 or 0.05 levels (2-tailed). Therefore, the hypothesis that having a personality disorder diagnosis would be both positively and significantly correlated with LOS is not accepted.

Table 9 summarizes the actual Axis II diagnoses of the sample. Some patients had more than one Axis II diagnosis. A diagnosis of personality disorder, not otherwise specified, was given to 53 patients. Seventeen patients were diagnosed with anti-social personality disorder. Twelve patients had diagnoses of borderline IQ, and 4 patients were found to be mentally retarded. The remaining diagnoses were paranoid personality disorder (N = 2), obsessive compulsive personality disorder (N = 2), passive aggressive personality disorder (N = 2), and dependent personality disorder (N = 1).

Diagnosis	N
Personality Disorder, Not Otherwise Specified	53
Antisocial Personality Disorder	17
Borderline IQ	12
Mental Retardation	4
Paranoid Personality Disorder	2
Obsessive Compulsive Personality Disorder	2
Passive Aggressive Personality Disorder	2
Dependent Personality Disorder	1

Table 9 – Axis II diagnoses of the sample

One hundred and thirty-nine patients had no incidents of seclusion and/or restraint (S & R). Of those patients who did have incidents of S & R, the number of incidents ranged from one to 15. Only one patient had more than 8 incidents of S & R, expanding the range from a high of 8 incidents (N = 2) to a high of 15 incidents (N = 1). Figure 15 presents the boxplot of LOS means by the number of S & R incidents. There does not appear to be any discernable pattern or trend. Table 4 shows that the number of S & R events has a low correlation with LOS (R = .058) that is not significant at either the 0.01 or 0.05 levels (2-tailed). The hypothesis that the number of S & R events would be positively and significantly correlated with LOS is not accepted for this sample. Again, the different levels of numbers of S & R events are unequal and unmatched, so failure to accept this hypothesis based on the data is weak.
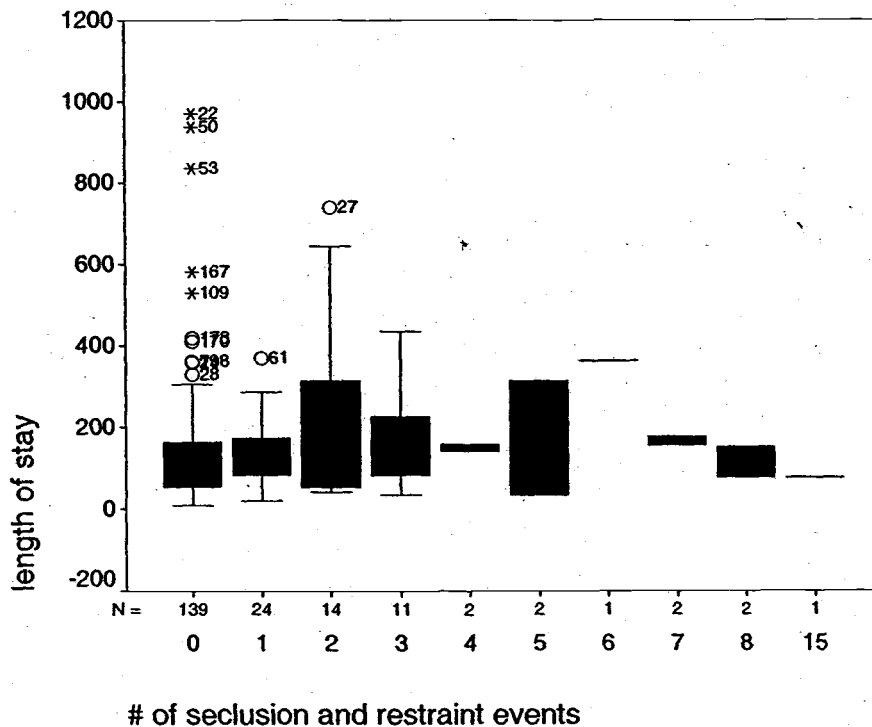
Figure 15 - Boxplot of comparison of means of LOS
by number of S & R events (SPSS EXPLORE output)

Ninety-two patients had no felony charges, and fifty-five patients had no

misdemeanor charges. Some patients had both felony and misdemeanor charges. Of

the patients who had felony and/or misdemeanor charges, the range for felony charges

was from 0 to 13 and the range for misdemeanor charges was from 0 to 12. Table 4

shows low correlations between LOS and both felony (R = -.003) and misdemeanor (R

= .015) charges. Neither correlation is significant at either the 0.01 or 0.05 levels (2-

tailed). Boxplots comparing means of levels of felony charges (figure 16) and means

of levels of misdemeanor charges (figure 17) do not reveal any trends or patterns. As

stated for other variables, levels of criminal charges are unequal and unmatched, so any conclusions are guarded.
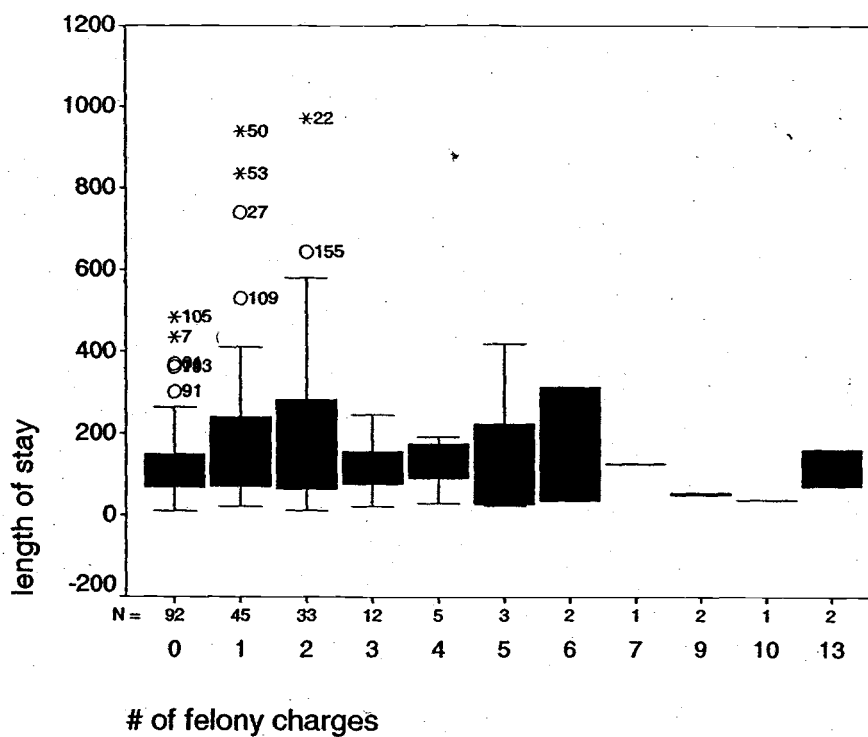
Figure 16 - Boxplot of comparison of means of LOS
by number of felony charges (SPSS EXPLORE output)
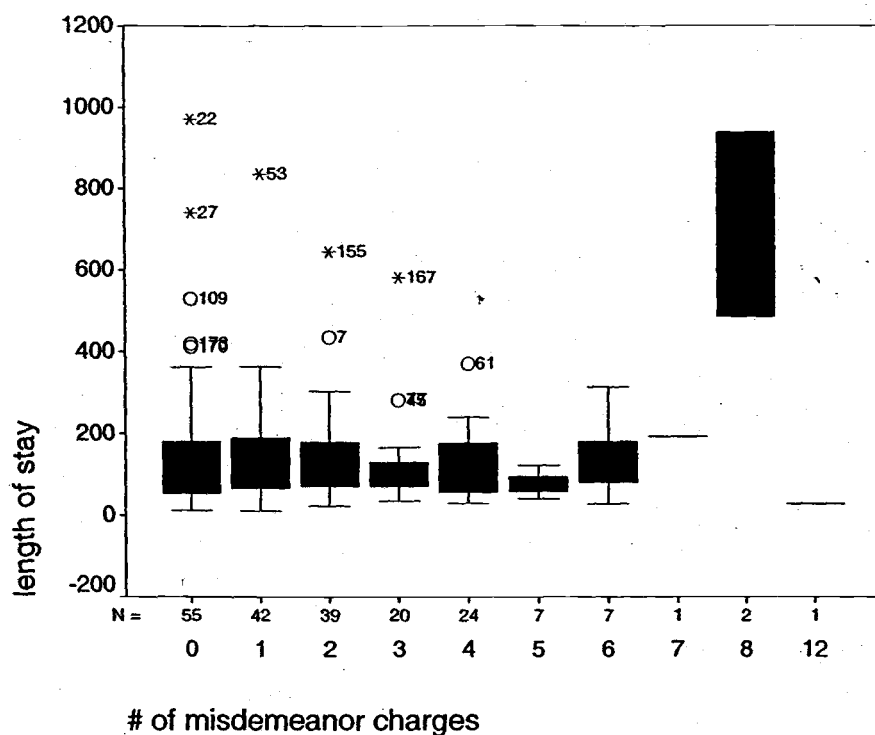
Figure 17 - Boxplot of comparison of means of LOS by number of misdemeanor charges (SPSS EXPLORE output)

Table 10 summarizes all criminal charges for the sample, listed in order of total frequency for all degrees of each crime. The top 10 charges are indicated by bold numbers in the Total N column. The most frequent charges were assault (N = 47), criminal trespass (N = 46), robbery (N = 41), criminal mischief (N = 40), harassment (N = 33), burglary (N = 31), theft (N = 31), resisting arrest (N = 28), disorderly conduct (N = 27), attempted possession of a controlled substance (N = 20), and menacing (N = 20). It should be stressed that these are charges only, and that individuals were presumed to be innocent until proven guilty.

Crime	Total N	1st Degree	2nd Degree	3rd Degree	4th Degree	Classification Not given
Assault	47	(AF)	12 (BF)	3 (CF)	31 (AM)	1
Criminal Trespass	46	15 (AM)	29 (CM)	2 (CM)		
Robbery	41	8 (AF)	21 (BF)	12 (CF)		
Criminal Mischief	40	14 (CF)	23 (AM)	3 (CM)		
Harassment	33		1 (BM)			32 (BM)
Burglary	31	29 (AF)	2 (CF)			
Theft	31	4 (CF)	14 (AM)	13 (CM)		
Resisting Arrest	28					28 (AM)
Disorderly Conduct	27					27 (BM)
Attempted Possession of Controlled Substance	20	3 (CF)	4 (AM)			13
Menacing	20					20 (AM)
Kidnapping	19		9	10		
Probation Violation	15					15
Sex Abuse	15	7	5	3		
Assault of Public Safety Officer	13					13
Unauthorized Use of Motor Vehicle	12					12
Trespassing	11	1	9			1
Contempt of Court	10					10
Reckless Driving	10					10
Arson	9	7	2			
Failure to Appear	9					9
Attempt to Elude	8					8
Escape	7		3	3		1
Failure to Appear	7					7
Delivery of Controlled Substance	6	1				5
Driving Under the Influence	6					6
False Information to Officer	5					5
Rape	5	4	1			
Recklessly Endangering Another	5					5
Violation of Restraining Order	5					5
Other (N ≤ 4 each)	68					68

AF = Class A Felony   AM = Class A Misdemeanor
BF = Class B Felony   BM = Class B Misdemeanor
CF = Class C Felony   CM = Class C Misdemeanor

Table 10 – Criminal charges for sample

The medical records of 82 patients (41.4%) contained evidence that the patients were taking medications involuntarily. One hundred and sixteen medical records (58.6 %) contained no evidence of involuntary medications. This finding sheds light on another source of increased cost in treating IST patients, namely three-physician reviews. When the treating physician feels that a patient will benefit from medications, but the patient is either unwilling or unable to give informed consent for the medications, a three-physician review may be used as an override procedure. The treating physician serves as the first review, an outside contracting physician serves as the second review, and the Chief Medical Officer of OSH serves as the third review. If all three physicians agree that the patient could benefit from the suggested medications, the medications may be administered against the will of the patient. The use of the outside contracting physician results in increased costs related to the costs of the contract.

Evidence of involuntary medications provided another significant correlation with LOS from among the independent variables (Table 4). The correlation was relatively low (R = .229) but was significant at the 0.01 level. This may indicate that evidence of involuntary medication will be an important contributor to the regression model. The hypothesis that evidence of involuntary medication will be positively and significantly correlated with LOS is not rejected.

The mean LOS for patients with evidence of involuntary medications was 175.99 days, while the mean LOS for patients with no evidence of involuntary medications was 105.74 days. Figure 18 shows the boxplot representation comparing the mean LOS of the two groups. The visual representation shows that patients on

involuntary medications had a higher mean LOS, a broader range of LOS, and more

extreme cases.
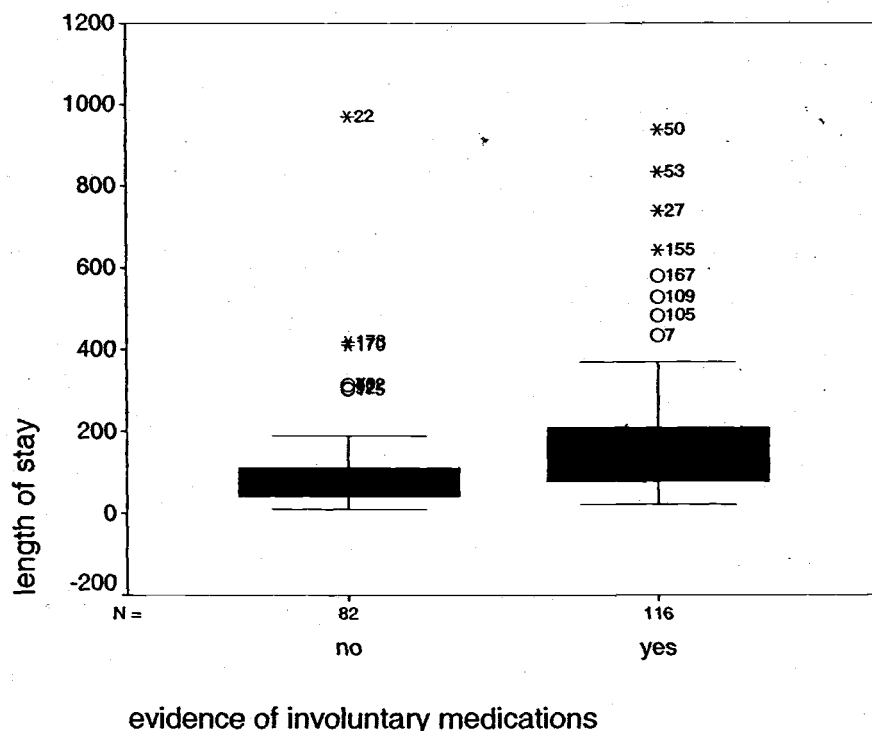
Figure 18 - Boxplot of comparison of means of LOS by patients with and without evidence of involuntary medications (SPSS EXPLORE output)

One hundred and eleven patients (56.1%) were taking one or more atypical

medications at the time of discharge, and 82 patients (43.9%) were not. Being on an

atypical medication at discharge had a low correlation with LOS (R = .040, table 4),

and was not significant at either the 0.01 or 0.05 levels (2-tailed). The mean LOS for

patients on atypical medications was 152.32 days, compared to 139.33 days for

patients either not on medications or on conventional medications. Figure 19

compares the mean LOS's of the two groups. Patients on atypical meds had a slightly

higher mean LOS, a larger range of LOS, and more extreme cases. The hypothesis that evidence of atypical medications at discharge will be positively and significantly correlated with LOS is not accepted.
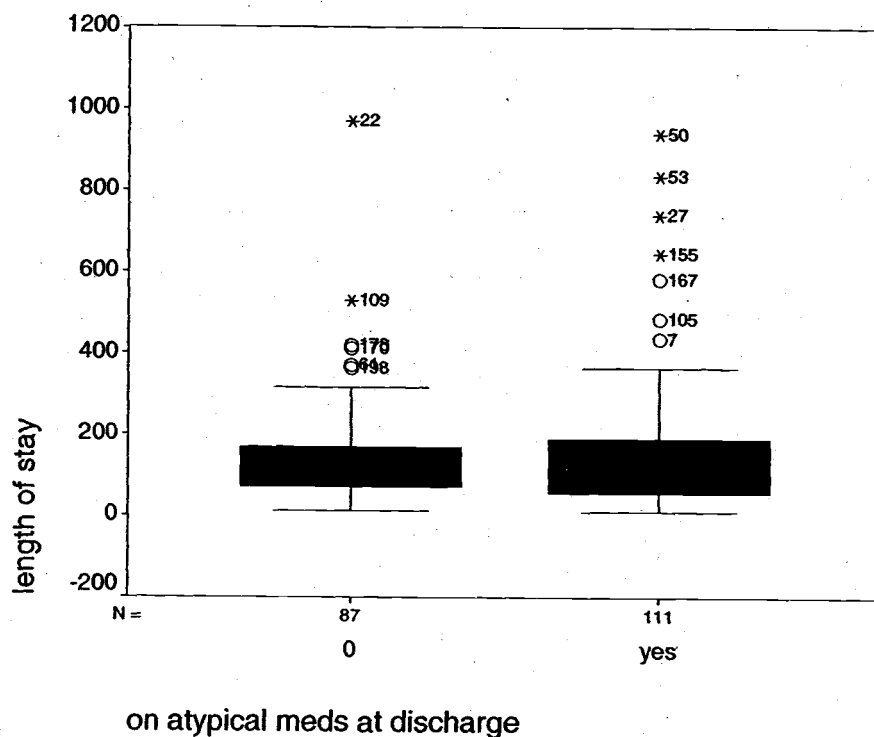
Figure 19 - Boxplot of comparison of means of LOS by patients with and without evidence of being on atypical medications at discharge (SPSS EXPLORE output)

Table 11 presents the tally of atypical medications used by patients in the sample. Zyprexa was used by 51 patients, Resiperidal by 48 patients, Seroquel by 10 patients, Clozaril by 4 patients, and Geodon by 1 patient. Sixty-eight patients were on conventional medications, and 21 patients were taking no medications.

Generic Name	Trade Name	N
Zyprexa	Olanzapine	51
Risperidal	Risperidone	48
Seroquel	Quetiapine	10
Clozaril	Clozapine	4
Geodon	Ziprasadone	1
Patients on typical medications		68
Patients on no medications		21

Table 11 – Atypical medications used by sample

The final independent variable was the number of inter-ward transfers. One hundred and three patients (52%) were never transferred from their admission unit. Of those who were transferred, 71 transferred one time (35.9 %), 16 transferred twice (8.1%), 4 transferred three times (2 %), 2 transferred four times (1 %), 1 transferred five times (.5 %), and 1 transferred six times (.5 %). Table 4 shows that the number of inter-ward transfers was positively correlated with LOS ($R = .379$), which was the highest correlation score of any independent variable with LOS and was significant at the 0.01 level. This indicates that the number of inter-ward transfers may be an important contributor to the regression model. Figure 20 provides the boxplot representation comparing means between the levels of inter-ward transfers. Mean LOS seems to increase with each transfer, up to three transfers. Patients with more than three transfers were too few in number to identify a pattern. The hypothesis that the number of inter-ward transfers would be positively and significantly correlated with LOS is not rejected.
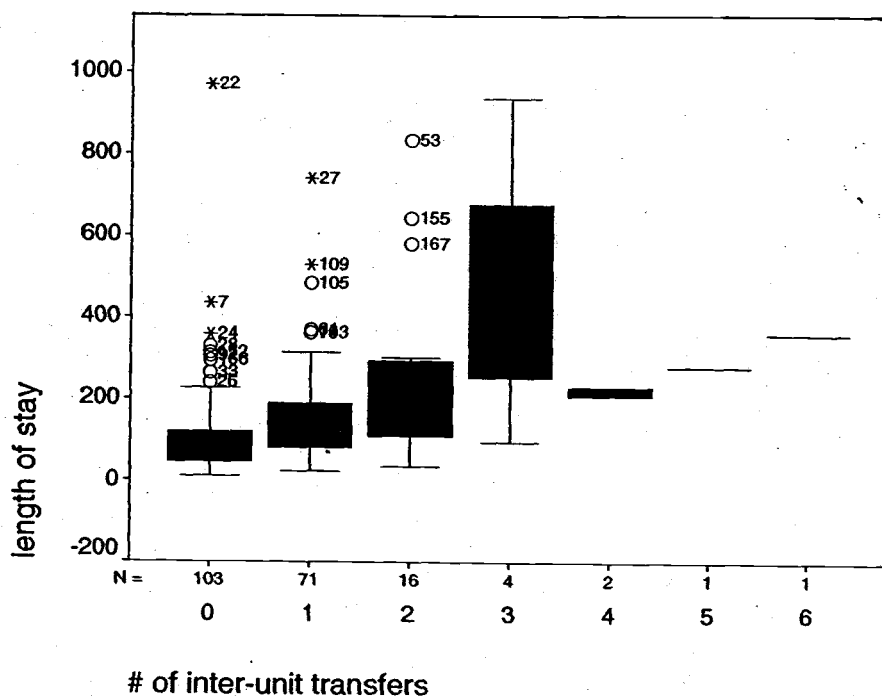
Figure 20 - Boxplot of comparison of means of LOS by number of inter-ward transfers
(SPSS EXPLORE output)

4.4 Regression Analysis

A standard multiple regression was performed between LOGLOS as the

dependent variable, and the following variables as independent variables: gender, age,

having an Axis I psychosis-level diagnosis, having an Axis I substance-related

diagnosis, having an Axis II personality disorder diagnosis, evidence of the

involuntary use of medications, being on an atypical medication at the time of

discharge, SQSR (the square root of the number of seclusion and/or restraint events),

SQFEL (the square root of the number of felony charges), SQMIS (the square root of

the number of misdemeanor charges), and SQTRANS (the square root of the number of inter-ward transfers).

Assumptions of regression were checked, using SPSS REGRESSION and SPSS FREQUENCIES, as reported at the beginning of this chapter. Results of the evaluation of assumptions led to the transformation of some variables, as previously described. Bivariate correlations of all variables, both non-transformed and transformed, are displayed in Table 4, and have also been previously discussed.

A suppressor variable is an IV that is found to be useful in predicting the DV and in increasing the multiple R^2 solely because of its correlations with other IV's (Tabachnick and Fidell, 1996). This type of variable "suppresses" variance that is irrelevant to prediction of the DV. Tabachnick and Fidell (1996) describe the method for identifying suppressor variables. Simple correlations between each IV and the DV are compared to the standardized regression coefficient (beta weight) for the IV. Suppressor variables are identified if the absolute value of the simple correlation is substantially smaller than the beta weight, or if the single correlation and beta weight have opposite signs. It was determined that there were no suppressor variables present.

Table 12 displays the model summary, showing that the set of independent variables explains 36.5 % of the variability in (log of) LOS (R Square = .365). The adjusted R Square value, a correction of overestimation of R Square, shows that the set of independent variables explains 32.7% of the variability in (log of) LOS. The standard error of the estimate shows that the prediction formula will be in error .29929 units of (log of) LOS, on average.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.604[a]	.365	.327	.29929

a. Predictors: (Constant), SQTRANS, SQMIS, SQSR, on atypical meds at discharge, Axis 1 substance abuse diagnosis, Axis II personality disorder, Axis 1 psychotic level diagnosis, age in years, evidence of involuntary medications, gender, SQFEL

b. Dependent Variable: LOGLOS

Table 12 – Summary of the Regression Model (SPSS REGRESSION output)

Table 13 is the F ratio table for the model. R for regression was significantly different from zero, $F (11, 186) = 9.719$, $p > .001$.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.576	11	.871	9.719	.000[a]
	Residual	16.661	186	.090		
	Total	26.237	197			

a. Predictors: (Constant), SQTRANS, SQMIS, SQSR, on atypical meds at discharge, Axis 1 substance abuse diagnosis, Axis II personality disorder, Axis 1 psychotic level diagnosis, age in years, evidence of involuntary medications, gender, SQFEL

b. Dependent Variable: LOGLOS

Table 13 – F table to test significance of the model (SPSS REGRESSION output)

As shown in Table 14, five regression coefficients were found to differ significantly from zero: gender (p < 0.01), evidence of involuntary medications (p < 0.01), (square root) number of seclusion and restraint events (p < 0.05), (square root) number of felony charges (p < 0.01), and (square root) number of inter-ward

transfers ($p < 0.01$).   Table 14 also provides regression coefficients, for use in the

prediction formula.

Coefficients[a]

Model 1	Unstandardized Coefficients B	Unstandardized Coefficients Btd. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	1.685	.120		13.989	.000
Gender **	-.252	.061	-.294	-4.117	** .000
Age in years	2.765E-03	.002	.091	1.396	.164
Axis I psychotic level diagnosis	1.286E-02	.049	.017	.261	.794
Axis I substance abuse diagnosis	-5.755E-02	.050	-.072	-1.145	.254
Axis II personality disorder diagnosis	7.993E-02	.048	.108	1.678	.095
Evidence of involuntary meds. **	.189	.049	.256	3.890	** .000
On atypical meds at discharge	3.801E-02	.046	.052	.832	.406
SQSR *	6.340E-02	.030	.132	2.144	* .033
SQFEL **	8.996E-02	.031	.205	2.879	** .004
SQMIS	2.084E-02	.030	.047	.704	.482
SQTRANS **	.299	.044	.502	6.872	** .000

1.   Dependent Variable: LOGLOS
Significant variables: ** = $p < 0.01$, * = $p < 0.05$

Table 14 – Regression coefficients and their significance

SPSS REGRESSION produced 95% confidence limits for all regression coefficients, as displayed in Table 15. 95% confidence limits for the five significant regression coefficients were the following: gender (-.372 to -.131), evidence of involuntary medications (.093 to .285), (square root) number of seclusion and restraint events (.005 to .122), (square root) number of felony charges (.028 to .152), and (square root) number of inter-ward transfers (.213 to .385). None of the confidence intervals contained 0.

	95% Confidence Interval for B		Correlations		
	Lower Bound	Upper Bound	Zero-order	Partial	Part
(Constant)	1.447	1.922			
gender	-.372	-.131	-.025	-.289	-.241
age in years	-.001	.007	.192	.102	.082
Axis 1 psychotic level diagnosis	-.084	.110	.067	.019	.015
Axis 1 substance abuse diagnosis	-.157	.042	-.147	-.084	-.067
Axis II personality disorder	-.014	.174	.017	.122	.098
evidence of involuntary medications	.093	.285	.342	.274	.227
on atypical meds at discharge	-.052	.128	.019	.061	.049
SQSR	.005	.122	.167	.155	.125
SQFEL	.028	.152	.013	.207	.168
SQMIS	-.038	.079	.012	.052	.041
SQTRANS	.213	.385	.424	.450	.402

Table 15 – 95% Confidence Intervals and correlations for all regression variables

Table 15 also displays zero-order, partial, and part correlations for all regression coefficients. Part correlations were squared to find the unique contributions of each significant variable to the prediction of (logarithm) LOS. (Square root) number of inter-ward transfers contributed the most with 16%

$(sr_1^2 = .162)$, followed by gender with 5.8 % $(sr_1^2 = .058)$, evidence of involuntary medications with 5.2 % $(sr_1^2 = .052)$, (square root) number of felony charges with 2.8 % $(sr_1^2 = .028)$, and (square root) number of seclusion and restraint events with 1.6% $(sr_1^2 = .016)$. Subtracting the total sr_1^2 for all eleven variables (.339) from R^2 (.365) indicates that all variables contribute another 2.6 % in shared variability.

Unstandardized coefficients for untransformed variables were inspected to determine which independent variables resulted in the most predicted change in LOS in the regression equation. Gender resulted in the most predicted change, with being male resulting in LOS being reduced 80.5 days. For each increase in the number of inter-ward transfers, LOS increased 70.6 days. Evidence of involuntary medications can predict an increase in LOS by 50.4 days. Having an Axis I substance abuse diagnosis predicted a decrease in LOS by 31.8 days. Being diagnosed with an Axis II personality disorder predicted an increase in LOS by 27.6 days. LOS was predicted to be reduced by 10.8 days if there was an Axis I psychotic level diagnosis. Each additional felony charge is predicted to have an increase in LOS by 8.8 days. The three variables which contributed the least to LOS were the number of misdemeanor charges (3.2 days added for each charge), number of seclusion and restraint events (2.6 days added for each event), and age (0.544 days added for each year of age). Only the coefficients for gender, inter-ward transfers, and evidence of involuntary medications were at significant levels $(p < .05)$. These three variables also contributed the most to the variability in LOGLOS in the regression model using transformed variables, although gender and evidence of involuntary medications were not transformed. The transformation of number of inter-ward transfers appears to result in

an overestimation of its importance. The results indicate that these three variables are the most important for this sample.

A check of the casewise diagnostics indicated that there was one outlier in the solution, meaning that the regression formula was not accurate in predicting that case's LOS. That case had a standard residual that was greater than 3.29 standard deviations from the predicted regression line.

Using unstandardized regression Beta coefficients, the prediction equation for this sample is: LOGLOS = 1.685 + (-.252) (gender) + (2.765E-03) (age) + (1.286E-02) (Axis I psychotic level diagnosis) + (-5.755E-02) (Axis I substance abuse diagnosis) + (7.993E-02) (Axis II personality disorder) + (.189) (evidence of involuntary meds) + (3.801E-02) (atypical medications at discharge) + (6.340E-02) (square root of number of seclusion and restraint events) + (8.996E-02) (square root of number of felony charges) + (2.084E-02) (square root of number of misdemeanor charges) + (.299) (square root of number of interward transfers).

The hypothesis that the group of eleven variables would explain a percentage of the variability in (log) LOS and would produce a significant prediction equation is not rejected.

CHAPTER 5

DISCUSSION

5.1 Introduction

Chapter 5 presents further discussion of the results of this study. Findings are

compared to previous research to identify confirmation or contradiction of earlier

results. The relevance of the findings to the real clinical setting is explored.

Recommendations are made for improvement of the study, and additional research.

5.2 Discussion

For several decades, there has been an interest in studying variables that

influence and predict the LOS of psychiatric patients (summarized in table 16,

Appendix B). The driving force behind these studies has been the desire to shorten the

LOS of psychiatric patients, in an effort to control costs. Prevailing thought has been

that if homogenous groups of psychiatric patients could be identified, their treatment

and LOS could be better managed. The implementation of DRG's in the 1980's, and

managed care in the 1990's, applied pressure on administrators and health systems to

provide quality psychiatric care with limited resources. Many different variables

related to LOS have been studied, as reviewed in Chapter 3. While several types of

analyses have been used, some form of multivariate regression has frequently been the

method of choice – some examples include Johnson and McNeal (1964), Cancro

(1969), Clum (1975), Doherty (1976), Munley et al. (1977), Miller and Willer (1979),

Boelhouwer and Rosenberg (1983), Cyr and Haley (1983), Frank and Lave (1985),

Goodban et al. (1987), Choca et al. (1988), McFarland et al. (1990), Herr et al.

(1991), Chang et al. (1991), Nicholson and McNulty (1992), Brock and Brown (1993), Creed et al. (1997), Huntley et al. (1998), and Galynker et al. (2000).

A growing subset of psychiatric patients in Oregon, and across the U.S., is the group of incompetent to stand trial (IST) patients. Only a few studies have investigated variables that influence or predict the LOS of IST patients (Nicholson and McNulty, 1992; Moran et al., 1999). This study was designed to evaluate the relationships between 13 variables – suggested through a review of the literature, this researcher's clinical experience, and results of a pilot study – and LOS for 198 IST patients at Oregon State Hospital. The thirteen variables included referring county, ethnic group, gender, age, having a psychosis-level Axis I diagnosis, having a substance-related Axis I diagnosis, having an Axis II diagnosis of personality disorder, number of seclusion and restraint events, the number of felony charges, the number of misdemeanor charges, evidence of involuntary medication, evidence of taking atypical medications at the time of discharge, and number of inter-ward transfers.

All variables were analyzed using SPSS FREQUENCIES, SPSS EXPLORE, and SPSS REGRESSION. Additional analysis was done through manual frequency counts. Variables were compared for their correlation to LOS and to each other, and the mean LOS at different levels of each variable was examined. Finally, SPSS REGRESSION was used to produce a regression model for 11 independent variables with LOGLOS as the dependent variable.

Several variables in the regression model required transformation to meet the assumption of normal distribution. The variables of referring county and ethnic group were reported descriptively, and were not used in the regression analysis. This is

because they would have required the use of too many dummy variables for the

sample size used in this study. Using the other 11 variables, the regression model

accounted for 36.5% of the variability in the LOS (R square = .365), or 32.7% when

adjusted to account for overestimation (Adjusted R square = .327). The use of

transformed variables produced an improved model over use of non-transformed

variables, which accounted for 23.4% of the variability in LOS (R square = .234), or

an adjusted amount of 18.9 % of the variability (Adjusted R square = .189).

According to Tabachnick and Fidell (1996), transformation of variables is not

universally recommended, due to difficulty of interpretation. For example, what does

LOGLOS represent in the real world? However, they state, "...transformations may

improve the analysis, and may have the further advantage of reducing the impact of

outliers. Our recommendation, then is to consider transformation of variables in all

situations unless there is some reason not to." In this study, the transformed variables

definitely improved the analysis and reduced the number of outliers. The transformed

variables were also highly correlated with their non-transformed selves (R's are all >

.9), and significant (p = 0.01, two tailed). Therefore, discussion in terms of real

variables will be used, when appropriate, below.

Looking at bivariate correlations alone, only four variables had significant

correlations with LOS: age, evidence of involuntary medications, number of inter-

ward transfers, and SQTRAN. Using LOGLOS as the dependent variable increased

the significant correlations to the following six variables: age, having an Axis I

substance-related diagnosis, evidence of involuntary medications, number of transfers,

SQSR, and SQTRAN. However, the regression analysis indicated that only five

variables were significant in explaining the variance in LOGLOS: gender, evidence of involuntary medications, SQSR, SQFEL, and SQTRANS. Age did not hold up as a significant contributor in the regression model - but gender, SQSR, and SQFEL assumed new importance.

The group of 11 variables, including those that were transformed, explained 36.5% (32.7% adjusted) of the variability in LOGLOS. Therefore, this group of variables accounted for more of the variability in the LOGLOS of IST patients than the variables used in other studies with psychiatric patients. Other studies accounted for 23.9% (Johnson and McNeal, 1964), 20.3% (Munley et al., 1977), 15.6% (Gruber, 1982), 20% (Bolhouwer and Rosenberg, 1983), 30.72% (Cyr and Haley (1983), 17% (Frank and Lave, 1985), 9% (Goodman et al., 1987), 27% (Choca et al., 1988), 22% (McFarland et al., 1990), 20% (Chang et al., 1991), 10% (Nicholson and McNulty 1992), 31% (Brock and Brown, 1993), 16.5% (Nieminen et al., 1994), and 16% (Huntley et al., 1998). It seems that selection of variables for this study benefited from the results of previous studies, the researcher's clinical experience, a pilot study and the transformation of some variables. However, 63.5 % of the variability (67.3% adjusted) in LOS is unaccounted for, and must be explained by other variables. Other variables for research will be discussed later in this chapter.

The variable that contributed most to explaining the variability in LOGLOS was the (square root) number of inter-ward transfers. This variable had a modest bivariate correlation with both LOS (R = .355, significant at 0.01 level, 2-tailed) and LOGLOS (R = .424, significant at 0.01 level, 2-tailed). The untransformed number of inter-ward transfers also had modest bivariate correlations with both LOS (R = .379,

significant at 0.01 level, 2-tailed) and LOGLOS (R = .421, significant at the 0.01 level, 2-tailed). By itself, (square root) inter-ward transfers accounted for 16.2% of the variability in LOGLOS. The unstandardized regression coefficient for inter-ward transfers indicated that the number of transfers was the second most important variable in predicting an increase in LOS.

Blackburn (1972) commented on transfer policies within psychiatric hospitals stating that they can have an effect on patient turnover and LOS. He argued, "Systems that do not evenly rotate admissions tend to penalize the risk-taking doctor by giving him more than his share of admissions, which increases both professional duties and paperwork." At OSH there is a higher admission rate on certain wards. Jencks et al. (1985), in a discussion of the failure of DRG's to describe resource needs, advocated for better data on inter-ward transfers. Cyr and Haley (1983) advocated for including transfer policies as a variable when studying LOS. The finding in this study is consistent with the result of Michalon and Richman (1990) who concluded, "The subgroup with the longest LOS is composed of involuntary patients who were subsequently transferred within the hospital."

At Oregon State Hospital, male IST patients can be admitted to several wards, but female IST patients can only be admitted to one ward. As pressure mounts from the county jails and courts to accept patients within seven days of a judge's order, some male patients are transferred from maximum-security admitting wards to medium-security wards, to make room for incoming patients. Male patients admitted to maximum-security wards, and demonstrating evidence of stabilization and behavioral control, are often transferred to a medium-security ward. As previously

stated, it is the policy of OSH to treat patients in the least restrictive environment. Conversely, if a male patient admitted to a medium-security ward demonstrates instability or lack of behavioral control, he may be transferred to a more restrictive environment. If a male patient is identified as having a developmental disability (DD), he may be transferred to a unit that specializes in treating DD clients. It seems important for OSH to review its inter-ward transfer policies and to improve initial screening procedures, so that patients can be housed on an appropriate ward as quickly as possible, and that transfers are kept to a minimum. Use of clinical pathways across wards might also allow uninterrupted care, and minimize the amount of time needed for a new treatment team to familiarize itself with a patient. Currently, placement of new patients is determined administratively, using available screening information, and taking into account the situational factors on each ward. The best initial patient placement may be assured by increasing clinical input into the screening process.

Of note is the fact that inter-ward transfers, a system-related variable, contributed the most to explaining variability in LOGLOS. Other studies have focused on demographic and clinical variables, and have not emphasized system variables. It could be that variables related to systems influence LOS more than previously thought. A study comparing more system-related variables to other variables should be considered.

It is interesting to note that female patients had a slightly longer mean LOS than male patients and that the interpretation of regression coefficients showed that gender predicted the most increase in LOS. It was hypothesized that males would have longer LOS, on average, due to the increased opportunities for inter-ward

transfers. Gender had a modest, significant bivariate correlation with inter-ward transfers (R = .361, significant at 0.01 level, 2-tailed). This seems to support the observation that males have more transfers. However, in this sample, gender had low, non-significant bivariate correlations with both LOS (R = -.032) and LOGLOS (R = -.040). This finding could be partially explained by the smaller number of female cases in the sample. The alternate explanation is that other variables, besides inter-ward transfers, contribute to longer LOS for female patients.

Despite having low bivariate correlations with LOS and LOGLOS, gender contributed the second highest significant amount to explaining the variability in LOGLOS (5.8%, p = .000) in the regression model. Mean LOS was 155.91 days for female patients and 144.32 days for male patients. However, there were only 44 female patients, compared to 154 male patients in the sample group. The number of subjects, outliers and extreme cases in the male group could have lowered the mean LOS for that gender.

Gender was found to be related to LOS in numerous other studies. Faden and Taube (1975) found that females in the VA Hospital system had slightly longer stays than males, irrespective of other variables. Doherty (1976) studied sex-role stereotypes and differing valuation of those stereotypes. He found a "powerful, negative assessment of women," among clinical raters. However, he also found that shorter-staying male and female patients both tended to show characteristics at the "feminine" end of a hypothetical masculinity-femininity continuum, contradicting Fade and Taube. Hargreaves et al. (1977) found that "women with good prehospital functioning did better when assigned to long-term treatment, while women with poor

pre-hospital functioning did better when assigned to short-term treatment." OSH does not currently measure pre-hospital functioning, except as a descriptive element in the patient psychosocial histories completed by ward social workers. Closer scrutiny of pre-hospital functioning, at the time of admission, could help treatment teams target patients for short-term or long-term interventions.

Long LOS was associated with being female by Sajatovic et al. (2000), Oiesvold et al. (1999), Boelhouwer and Rosenberg (1983), Gruber (1982) and Altman et al. (1972). Results in this study support those earlier findings. Gender was found to have a moderate association with psychiatric outcome by Pfeiffer et al. (1996), although outcome was not equated with LOS. Heiman and Shanfield (1980), in a study of LOS across five different types of hospitals, found that gender did not influence LOS. Moran et al. (1999), in a study of forensic patients on a maximum-security ward, found that females had shorter LOS's than males. It could be that female forensic patients differ from female patients in a non-forensic psychiatric hospital setting. Since female IST patients are treated on one ward at OSH, characteristics of that ward could contribute to their having a longer LOS. Another theory is that mentally ill females might be charged with crimes less often than mentally ill males, and that women who are found incompetent to stand trial may be more severely ill than men who are found incompetent. It may be that more community treatment options exist for females, and that females can locate treatment for mental illness without being charged with a crime. Society may view males as more criminal than females.

Gender also has positive, significant correlations with having an Axis II personality disorder (R = .187. significant at 0.01 level, 2-tailed), the (square root) number of felony charges (R = .140, significant at the 0.05 level, 2-tailed), and the (square root) number of inter-ward transfers (R = .443, significant at the 0.01 level, 2-tailed). It could be that women stay in the hospital longer than men due to more severe diagnoses or charges. Comments have been heard from some OSH staff members that they prefer not to work on the ward that treats female IST patients, due to the high number of "borderline" females. It is not known if the female IST patients have a higher rate of being diagnosed with a borderline personality disorder, but these types of comments add credence to the suggestion that some female IST patients are perceived negatively by those assigned to assess and treat them.

The variable contributing the next largest amount to explaining the variability in LOGLOS was evidence of involuntary medications. Evidence of involuntary medications accounted for 5.2% of the variability in LOS in the regression model. The interpretation of regression coefficients also indicated that this variable predicted the third largest increase in LOS. This variable had moderate bivariate correlations with both LOS (R = .229, significant at 0.01 level, 2-tailed) and LOGLOS (R = .342, significant at 0.01 level, 2-tailed). Evidence of involuntary medication may indicate that a patient is either unwilling or unable to give informed consent for voluntary medications. Inability to give informed consent may indicate severity of illness; unwillingness to give informed consent may indicate resistance to treatment, malingering, denial of symptoms of mental illness, fear of side effects, a desire to avoid future expense, or a general mistrust of the use of medications. Rodenhauser and

Khamis (1988a) demonstrated significant relationships between medication refusal, length of hospitalization, admission legal status, and previous incarceration. In a second article, Rodenhauser and Khamis (1988b) reported that involuntary medication was associated with increased LOS. Pfeiffer et al. (1996), in an article summarizing other research studies, found six of seven studies reported that patients who took medication had better outcomes than unmedicated patients, but outcome was not equated with LOS. Casper and Pastva (1990) also found that "heavy users" of psychiatric services demonstrated medication noncompliance in over 75% of cases. In the present study, the findings agree with the previous results of Rodenhauser and Khamis (1988b).

Forty-one percent of the sample in this study was receiving involuntary medications, and 59% was not. The mean LOS for the group receiving involuntary medications was 175.99 days, compared to a mean LOS of 105.74 for the other group. This may indicate that patients who accept medications are more cooperative, in general, with treatment. It could be that they have previously been on medications and recognize that their symptoms of mental illness are diminished by the medicine. Patients who refuse to take medications voluntarily may have limited resources, and may fear the added expense required to continue medications after hospitalization.

The use of involuntary medication had significant bivariate correlations with LOS (R = .229, significant at 0.01 level, 2-tailed), LOGLOS (R =.342, significant at the 0.01 level, 2-tailed), having an Axis I psychosis-level diagnosis (R =.219, significant at the 0.01 level, 2-tailed), having an Axis II personality disorder diagnosis (R = -.215, significant at the 0.01 level, 2-tailed), number of S & R events (R =.183,

significant at the 0.01 level, 2-tailed), number of felony charges (R =-.292, significant at the 0.01 level, 2-tailed), number of misdemeanor charges (R =.151, significant at the 0.05 level, 2-tailed), number of transfers (R =.181, significant at the 0.05 level, 2-tailed), SQSR (R =.209, significant at the 0.01 level, 2-tailed), SQFEL (R = -.289, significant at the 0.01 level, 2-tailed), SQMIS (R =.222, significant at the 0.01 level, 2-tailed), and SQTRAN (R =.187, significant at the 0.01 level, 2-tailed). One explanation of these interrelated correlations is that patients who refuse to take voluntary medications are more severely impaired. The correlations with number of felony charges and SQFEL were in a negative direction, which might indicate that the patients who do not take voluntary medications are not organized enough to commit more serious crimes.

If involuntary medications relate to increased LOS, efforts should be placed on better patient education concerning the benefits of psychotropic medications. Patients should be informed of community resources for securing needed medications, and family members should be enlisted to support medication compliance. Educating patients about medications early in their hospitalization might result in more patients voluntarily taking their medications, regaining competency and returning to court. At OSH, psychosocial rehabilitation modules on medication management have been purchased for use with patients. These modules should be incorporated into the treatment programs for IST patients. It may also be advantageous to pursue legal and financial capability for incompetent patients to begin to receive involuntary medications while still in jail, prior to their transport to the state hospital.

The variable which contributed the next significant amount to explaining the variability in LOGLOS was (square root) number of felony charges, which contributed 2.8% to the regression model. Both the number of felony charges and (square root) number of felony charges had very weak, non-significant bivariate correlations with both LOS (R's = -.003 and .082) and LOGLOS (R's = -.042 and .013). Patients with no felony charges had a mean LOS of 119.03 days. Patients with felony charges had mean LOS's that ranged from 112.33 days (3 felony charges) to 191.06 days (1 felony charge). The majority of patients who had felony charges had longer mean LOS's than patients with no felony charges.

Daniel et al. (1967) found that having criminal charges was one variable that helped predict hospital LOS with 86% accuracy for groups with lengths of hospitalization either less than 30 days or greater than 30 days. Cuneo et al. (1983) went further when they concluded, "There was a positive correlation between length of hospitalization and seriousness of the alleged offense. This correlation was greatly increased when those found unfit to stand trial on misdemeanor charges were excluded." Rodenhauser and Khamis (1988b) found that length of hospitalization had a "significant relationship with the kind of charge (felony or misdemeanor)." Despite the insignificant bivariate correlations,the results of the regression analysis in this study seem to support these previous findings.

As mentioned in Chapter 1, Torrey et al. (1992) concluded that most seriously mentally ill individuals are criminally charged when arrested, and that most of their crimes are trivial misdeameanors. This was not true in the present study. One hundred and two cases had one or more felony charges. Table 10 shows that the

patients in this sample were charged with very serious crimes including assault, kidnapping, sex abuse, and rape.

The contribution of SQFEL to explaining the variability in the dependent variable is small. However, since SQMIS was not a significant contributor to the regression model, it appears that felony charges are more important than misdemeanor charges in predicting LOS. Another way of measuring the seriousness of a charge is to calculate the length of a possible jail or prison sentence if convicted of the charge. The total amount of possible incarceration for all crimes may be used, or the longest amount of incarceration for the most serious crime may be used. Further research using different methods of measurement might shed light on how the number and type of criminal charges relate to LOS.

The final significant contributor to the explained variance in LOGLOS was (square root) number of S & R events. SQSR contributed 1.6% to the explained variance in the dependent variable in the regression model. This finding was much weaker than the result reported by Brock and Brown (1993). They reported, "...the need for physical restraint during treatment was an independent predictor of LOS, and had the highest simple correlation (multiple r = 0.32) accounting for 10.2% ($r^2 = 0.102$) of the variation observed in LOS." The present study included both restraint and seclusion, which may explain the diminished contribution of this variable. Rodenhauser and Khamis (1988b) included the use of restraints as a variable in their study of relationships between legal and clinical factors among forensic hospital patients. They did not arrive at any conclusions about the use of restraints. Michalon and Richman (1990), in a study of factors affecting LOS in a psychiatric intensive care

unit, considered the role that seclusion and restraint played in prolonging LOS. They hypothesized that the absence of seclusion rooms, the minimal use of mechanical restraints, and the underutilization of male staff on their unit resulted in the excessive use of psychotropic medications. They felt that this led to increased risk of side effects for patients, and increased fear on the part of staff members. As their unit added the use of seclusion, restraints, and male staff, Michalon and Richman recommended further research to measure the results of those changes on LOS.

At OSH, as is true across the U.S. (Applebaum, 1999; American Psychiatric Nurses Association, 2001), there have been strong efforts to decrease the use of seclusion and restraints in psychiatric hospitals. The use of seclusion and restraints at OSH has decreased since the time period of this study, and is now below the national average. Since (square root) number of seclusion and restraint events has a positive and significant correlation with (log) LOS (R =.167, significant at the 0.05 level, 2-tailed) it appears that continued work to decrease the use of S & R may result in shorter LOS for IST patients. As the use of S & R at OSH has decreased, there have been ongoing efforts to increase the skills of staff members in using alternative treatment methods with patients who appear to be escalating in aggressive behavior. It is hoped that the combination of decreased use of S & R and increased staff skills will lead to shorter LOS for some IST patients.

The number of S & R events (untransformed) had a weak, yet significant, bivariate correlation with the use of involuntary medications (R =.183, significant at the 0.01 level, 2-tailed). SQSR had weak, significant bivariate correlations with age (R = -.153, significant at the 0.05 level, 2-tailed), the use of involuntary medications

(R =.209, significant at the 0.01 level, 2-tailed), LOGLOS (R =.167, significant at the 0.05 level, 2-tailed), and SQFEL (R = -.143, significant at the 0.05 level, 2-tailed). The interrelation of variables presents a profile of patients who may be uncooperative, resistant to treatment, malingering, or too severely ill to make voluntary choices. IST patients who are found competent usually display cooperation, participation in treatment, and a decrease in symptoms of mental problems.

Other variables were not significant contributors to the regression model, but are deserving of some discussion. A patient being on atypical medications at the time of discharge had a moderate significant bivariate correlation with having an Axis I psychosis-level diagnosis (R = .263, significant at the 0.01 level, 2-tailed), and weak significant bivariate correlations with having an Axis II personality disorder (R = -.151, significant at the 0.05 level, 2-tailed), number of felony charges (R = -.154, significant at the 0.05 level, 2-tailed), and SQFEL (R =-.153, significant at the 0.05 level, 2-tailed). In a study of female psychiatric patients, Sajatovic et al. (2000) hypothesized that, "medication interventions more specifically focused on older women could have led to shorter hospital stays – for example, more aggressive use of atypical antipsychotic medications in a population prone to extrapyramidal side effects." Mosman and Lehrer (2000) present information showing that atypical drugs can cost 70 to 100 times more than conventional neuroleptics, so it is important to consider their use with IST patients. Timing their use for maximum effect in the shortest amount of time is important. In addition, helping IST patients find resources to purchase the medications after leaving the hospital is recommended. The results of

the present study are inconclusive in relation to the effects of atypical medications on LOS. Mosman and Lehrer (2000) warn:

> Recent data on antipsychotic prescription practices and court decisions issued through September 2000 suggest that proper use of the older drugs is not a deviation from the standard of care. However, case law suggests that psychiatrists have a legal obligation to tell patients about novel anti-psychotic agents even if they continue to prescribe conventional neuro-leptics.

Future studies should consider other methods of measuring the effects of medication on LOS, including the total number of medications tried; the number of times medications were adjusted; whether conventional medications were tried before, after, or in combination with atypical medications; which atypical medications were used, availability of medications in county jails, whether patients were taking medications at the time of admission, and dosage levels. As new, more effective medications become available, it is believed that they will play a major role in decreasing LOS for IST patients.

The results of this study did not provide any conclusive findings regarding the relationship of age of IST patients to LOS. Age was not a significant contributor to the regression model and its regression coefficient predicted the least amount of change in LOS. However, age showed moderate, significant bivariate correlations to having an Axis I substance-related diagnosis ($R = -.235$, significant at the 0.01 level, 2-tailed), the number of inter-ward transfers ($R = .238$, significant at the 0.01 level, 2-tailed), SQTRAN ($R = .225$, significant at the 0.01 level, 2-tailed), and LOGLOS ($R = .192$, significant at the 0.01 level, 2-tailed). Age showed weak, significant bivariate correlations with LOS ($R = .156$, significant at the 0.05 level, 2-tailed) and SQSR ($R =$

-.153, significant at the 0.05 level, 2-tailed). Comparisons of mean LOS at different ages did not identify any trends. Future research might identify age groupings, and compare those groups on different variables thought to relate to LOS.

Daniel et al. (1967) divided patients into groups of patients less than 25 years old, between 25 and 64 years of age, and age 65 or older. They found that age was one variable that could be used to predict LOS. Faden and Taube (1975) also found that "maximum lengths of stay occurred in the youngest and oldest age groups." Clum (1975) found that age was negatively related to LOS in one sample, and concluded that younger patients were "expendable" to families for longer periods of time. Munley et al. (1977) found that age was included in the optimal set of predictors for LOS. Heiman and Shanfield (1980) found that age did not influence LOS in their study of psychiatric patients in five hospitals in one city. Gruber (1982) reported that older patients generally had longer LOS, and that their hospitalization could be longer because they are not involved in the labor force and therefore do not jeopardize their family's income. Goodban et al. (1987) also concluded that "older patients tended to stay longer." Lyons et al. (1991) summarized that age was one of only two factors that were consistently found to be related to LOS. Huntley et al. (1998) found that age was one of five variables that predicted LOS over time. In contrast to other studies, Moran et al. (1999) found that age at time of offense was related to LOS, and that forensic patients older than 44 years of age at the time of their offense had shorter LOS. Also in 1999, Oiesvold et al. reported that older age was associated with increased LOS.

In the sample used in the present study, the mean age of patients was 37.37. There were only 14 patients below the age of 21, and only 14 patients above the age of 55. Therefore, the groups of very young patients and older patients were small. The majority of IST patients were neither young nor old, but fell in the middle. The results of the regression analysis in this study indicate age does not seem to be a contributing factor in predicting LOS for IST patients.

This study considered three diagnostic variables in the prediction of LOS: having an Axis I psychosis-level diagnosis, having an Axis I substance-related diagnosis, and having an Axis II personality disorder. All three diagnostic variables had been found to relate to LOS in previous studies - the first two relating to increased LOS, and substance-related diagnosis related to decreased LOS. In the present study, none of these diagnostic categories had significant bivariate correlations with LOS, and only having a substance-related diagnosis was significantly correlated with LOGLOS (R =-.147, significant at the 0.05 level, 2-tailed). The correlations between having a substance-related diagnosis and both LOS and LOGLOS were in a negative direction, indicating that having a substance-related diagnosis may result in a shorter LOS. This was supported by the interpretation of the regression coefficients, which showed that having a substance abuse diagnosis predicted a decrease in LOS.

A glance at the descriptive statistics shows that almost 63% of the sample in this study had a psychotic-level diagnosis, and that 40% had a diagnosis of personality disorder. These two diagnoses are do not appear to be significantly related to each other in this sample (R = -.095). The mean LOS for patients both with and without these two diagnoses are very similar (see Figures 12 and 14 in Chapter 4).

For patients with a substance-related diagnosis, their mean LOS was 133.89 days, compared to a mean LOS of 178.29 for patients with no substance-related diagnosis. This offers some support for previous findings that patients with substance-related comorbidity tend to have a shorter LOS. As discussed earlier, patients may experience substance-related symptoms of mental illness that stabilize quickly in a controlled environment. The top four substances of choice for this sample were alcohol, cannabis, amphetamines and cocaine. In 13 cases, methamphetamine abuse was diagnosed separately from other amphetamines. It is not known how many of the 47 cases of amphetamine abuse or dependence included methamphetamine. The diagnosis of polysubstance abuse or dependence was used in 18 cases, and it is not clear which substances were included in those diagnoses. Having a substance abuse diagnosis also had a negative, significant correlation with age (R = -.235, significant at the 0.01 level, 2-tailed), and a positive, significant correlation with having a personality disorder (R = .207, significant at the 0.01 level, 2-tailed). It seems that substance-related problems are a factor with young, personality-disordered IST patients. Treatment should focus on establishing mental health, avoiding future substance abuse, and regaining legal competence. Treatment related to substances should emphasize recovery from the abuse or dependence on alcohol, cannabis, amphetamines (including methamphetamine), and cocaine.

Two of the variables in this study, ethnic group and referring county, were not included in the regression analysis. As presented descriptively, the majority of cases (81.3%) were white, non-Hispanic. The mean LOS for white, non-Hispanic patients (147.44 days) was slightly higher than black, non-Hispanic patients (129.30 days).

This could possibly be due to the smaller sample size for the black, non-Hispanic group. Non-English speaking groups (Hispanic, Mexican; Hispanic, other; and Asian, Pacific Islander) all had mean LOS's that were longer than English-speaking groups. American Indians had the shortest mean LOS (116.20 days), but the reason for this is not obvious. There were only five American Indian cases. The main reason for differences in LOS by ethnic group seems to be language. Non-English speaking IST patients must rely on interpreter services, and translations of written legal information into their primary language. Other cultural differences affecting LOS may be the size of support networks, acceptance of psychiatric treatment modalities, confusion over legal procedures, the perception of judges, and attitudes of staff members. OSH has been sponsoring quality improvement activities to improve the cultural competence of its staff, including efforts to recruit a more diverse work force. These efforts should continue.

Table 6 (Chapter 4) provides data related to LOS by referring county. A third of all OSH IST patients came from Multnomah County, and the mean LOS for that county was 124.30 days. The county referring the second most IST patients to OSH was Lane County (11.6%), which had a mean LOS of 254.43 days - nearly double the mean LOS of Multnomah County. It is not known why the mean LOS varies so widely between counties, but this finding is consistent with Nicholson and McNulty (1992), who reported, "interestingly, LOS varied as a function of county of residence." The differences in mean LOS for IST patients from each county may be partially related to unequal sample sizes from each county.

Multnomah County accounts for 33.3% of the IST patients at OSH, but only 19.27% of the state's population. As the most populated county, it may attract more mentally ill individuals and/or criminal activity. One theory to explain its large referral of IST patients is that its county mental health and correctional systems cannot meet the local mental health needs - resulting in more mentally ill persons being charged with crimes, being found incompetent to stand trial, and being sent to OSH. An article in the December, 1999 issue of the *Oregon Health Forum*, was titled, "Mental health system gets a scathing review," and reported that, "Multnomah County's public mental health system is rapidly deteriorating." The article stated that the number of mentally ill inmates in county jails had doubled since 1996, and that 30-35% of the mentally ill individuals in the county had chemical dependency problems. Based on these reports, it seems that the state of county mental health and correctional systems can influence the LOS of IST patients at OSH. Josephine County had the longest mean LOS (442 days), but referred only two cases. Other possible reasons why referring counties may influence LOS of IST patients are their distance from Salem, the inability of county jails to administer medications involuntarily, the lack of treatment alternatives in the community, backlogs of cases waiting to go to court, and the system of transport services to and from county jails. Some IST patients must remain at OSH until transportation is available, resulting in a LOS that exceeds the amount of time necessary to restore competency. Patients found competent to stand trial may wait at OSH until the time of their trial, to prevent decompensating into incompetency while waiting in a county jail.

One possible strategy is for counties to develop alternatives to the state hospital for the treatment of IST patients. The Salem newspaper, the *Statesman Journal*, reported on April 8, 2003 on proposed legislation (Senate Bill 21) which would allow the Oregon Department of Human Services (DHS) to designate alternatives to the state hospital for treatment of IST patients. The article reports that OSH is currently 30 patients over its budgeted capacity for forensic patients. DHS has already begun talks with Lane County to conduct a pilot project to treat IST patients locally (personal communication, Ralph Summers, DHS, April 9, 2003). It is not known if local options will be less expensive than treatment at OSH.

This section has discussed results of the present study, and related those findings both to past literature and to the current clinical situation for IST patients in Oregon. The next section will summarize some of the major recommendations, and discuss how this study may have been improved.

5.3 Recommendations for Further Research

A number of recommendations were previously suggested, and will be re-emphasized in this section. Further research related to the LOS of IST patients should be conducted using additional or different variables. A large amount of the variability in LOGLOS (63.5%. or 67.3% adjusted) is not accounted for by the variables used in this study. There are many additional variables to choose from for further study. For example, Altman et al. (1972) found 55 variables related to long LOS, and 33 variables related to short LOS. The pilot study preceding this study identified 77 possible variables influencing the LOS of IST patients. Since number of inter-ward

transfers was related to LOS in this study, exploring other systems-related variables seems warranted. Other promising variables might include staffing levels, initial screening procedures, gender-specific factors, physician practice styles, the influence of critical clinical pathways, more detailed analysis of medication use patterns, ways to promote voluntary medication compliance, staff attitudes, or variables related to the structures of mental health and correctional systems in each county. Staff members should be surveyed to see if they can identify additional variables that seem to influence the LOS of IST patients. Finally, some of the same variables used in this study might be re-examined, but measured in different ways, such as measuring seriousness of charges by the length of the longest possible sentence for the most serious crime.

The results of this study should be considered in the context of some current policies. If it is the policy to house female IST patients on a single ward at OSH, and female patients have a longer mean LOS than male patients, the policy should be reviewed. Additional research may help identify factors influencing the LOS of female patients. Further research is needed to determine if negative assessments of women by clinicians, ward characteristics, severity of illness, societal perceptions, diagnosis, type of charges, or pre-hospital functioning contribute to the longer LOS for women at OSH. Additional research should compare variables between equal-sized groups of males and females, matched by equal number of inter-ward transfers. Characteristics of the ward that currently houses female IST patients may be stronger predictors of LOS than gender.

Further research is recommended to determine how OSH policies influence the LOS of IST patients. If it is OSH policy to treat patients in the least restrictive environment, but inter-ward transfers increase LOS, then pre-admission screening, admitting and transfer policies should be scrutinized. If evidence of involuntary medications is related to longer LOS, then hospital policies and practices related to the use of medications should be revisited. Policies related to the use of seclusion and restraint at OSH have been reviewed on an ongoing basis, and have resulted in a decrease in the use of S & R at the hospital. Additional investigation should be done to check if policy changes influence the LOS of IST patients.

In a broader context, the policy of treating all Oregon IST patients at OSH should be reviewed. Can less expensive alternatives be developed in the community? Can IST individuals receive medications and other mental health services in jail, reducing the need for hospitalization? Can IST patients be treated as outpatients? One thing seems clear: placing IST patients on the psychiatric units of private hospitals in the community will probably be more expensive than treating them at OSH. The DHS plans to conduct a pilot study in Lane County should be supported. Additional research comparing different treatment settings for IST patients is recommended.

The policy of treating IST patients until "fit to proceed" should be reviewed in the context of a prevention model. Improving county mental health services, increasing the availability of medications in the community, and teaching police officers skills to recognize and interact with mentally ill individuals could help decrease the number of mentally ill persons who are charged with crimes in the first

place. Jail workers should also receive training in how to recognize symptoms of mental illness and provide some basic interventions. Statewide mental health policies should be reviewed to minimize the criminalization of the mentally ill. This may include the creation of additional bed space for civilly committed patients. Mental health maintenance strategies should be studied in relation to IST patients. Can research demonstrate that community efforts to protect and maintain mental health decrease the number of IST patients in the first place?

At OSH some immediate actions are recommended which may influence the LOS of IST patients. Guidelines should be established to promote rapid initiation of appropriate psychotropic medications. The effectiveness of those guidelines should be researched. Physician practice style should be evaluated to see if certain physicians achieve medication compliance and therapeutic doses in their patients quicker than other physicians. Peer review and support should be utilized to help physicians achieve efficient and effective use of medications. Critical clinical pathways should be developed for IST patients, to structure and guide their treatment. Research to see if the use of clinical pathways can reduce LOS is suggested.

Patient education processes should be reviewed for improvement in content and timeliness. It seems obvious that IST patients require treatment and information related to legal processes, mental illness, and substance-related problems. IST patients will require enhanced information regarding the risks and benefits of recommended medications. Efforts need to continue to integrate and coordinate all of these areas of need. Additional research is recommended to investigate which clinical interventions have the most influence on LOS for IST patients.

Quality Improvement activities designed to increase the cultural competence of staff members at OSH should continue. Patient education materials should be developed in a variety of languages and formats for non-English speaking IST patients. For non-English speaking IST patients, research should be done to determine which cultural factors have the most influence on LOS.

There are several ways that the present study could have been improved. First, multiple admissions of the same patient were treated as separate cases. There was some rationale for this, but other studies have utilized data only from a patient's first admission. Any replication or cross validation efforts should only use data from a patient's first time in the hospital. Second, there may be some benefit in studying males and females separately. Since female IST patients are treated on one OSH ward, their situation is different from male IST patients. The unique characteristics of that ward may have more influence on the LOS of female IST patients than gender. Third, variables such as Axis I diagnoses, Axis II diagnoses, and being on atypical medications were all measured as being "at the time of discharge." It was felt that this information was more reliable at discharge because it benefited from multi-disciplinary assessments and observations over the course of a hospitalization. However, for a regression formula to be used to predict a patient's LOS, it makes more sense to use data that are available at the time of admission. Checking to see if a patient was on atypical medications at the time of discharge, does not present a full picture of the course of medication trials.

A final recommendation is that Oregon State Hospital needs to upgrade its computer and information systems. The amount of time needed to collect and analyze

data for this study was excessive. Some data were not available in current databases, and had to be collected manually. A more extensive database should be developed and include additional variables. Statistical analysis of data was performed in computer labs at Oregon State University. OSH should develop the capability to perform sophisticated data collection and analysis quickly, and in-house. Improved information systems are recommended to support ongoing research efforts.

CHAPTER 6

SUMMARY AND CONCLUSIONS

Data for thirteen independent variables (gender, age, having an Axis I psychosis level diagnosis, having an Axis I substance-related diagnosis, having an Axis II personality disorder diagnosis, evidence of involuntary medications, being on atypical medications at discharge, number of seclusion and restraint events, number of felony charges, number of misdemeanor charges, and number of inter-ward transfers) and one dependent variable (length of stay) were collected for 200 IST patients discharged from Oregon State Hospital between January, 1999 and December, 2001. Two cases were dropped from the study because one had missing data and the other was found to be an outlier (after transformation). A check of the assumptions of regression resulted in some variables being transformed. Data for the remaining 198 cases were analyzed using SPSSFREQUENCIES, SPSSEXPLORE, and SPSSREGRESSION. Bivariate correlations for all variables were examined. LOS means for all levels of each variable were examined.

A standard multiple regression analysis was performed. The regression model accounted for 36.5% (32.7% adjusted) of the variability in (log) LOS. R for regression was found to be significantly different from zero. However, the regression model leaves 67.3% of the variability in (log of) LOS unexplained. Additional research is recommended to investigate variables that may explain the remaining variability in LOS for IST patients.

There were no suppressor variables. There was one outlier in the solution. Five variables were found to be significant contributors to explaining the variability in (log) LOS: (square root) number of inter-ward transfers (16%), gender (5.8%), evidence of involuntary medications (5.2%), (square root) number of felony charges (2.8%), and (square root) number of seclusion and restraint events (1.6%). Standardized regression coefficients were used to generate a prediction equation. The standard error of the estimate showed that the prediction equation would be in error .29929 units of LOGLOS, on average.

Unstandardized regression coefficients were interpreted, and indicated that the three variables of gender, inter-ward transfers, and evidence of involuntary medications predicted the most change in LOS. These were the same three variables that explained the largest amount of variability in the regression model.

A review of hypotheses resulted in the following:

1. Failure to reject the hypothesis that the group of eleven variables would explain a percentage of the variability in LOS and would produce a significant prediction equation.

2. Failure to accept the hypothesis that males would have longer average LOS's than females.

3. Failure to accept the hypothesis that patients with a psychotic-level diagnosis would have longer LOS's than patients without that diagnosis.

4. Failure to accept the hypothesis that having a substance abuse diagnosis would be positively and significantly correlated with LOS.

5. Failure to accept the hypothesis that having a personality disorder diagnosis would be positively and significantly correlated with LOS.

6. Failure to accept the hypothesis that the number of felony charges would be positively and significantly correlated with LOS.

7. Failure to reject the hypothesis that evidence of involuntary medication would be positively and significantly correlated with LOS.

8. Failure to accept the hypothesis that being on an atypical medication at discharge would be positively and significantly correlated with LOS.

9. Failure to reject the hypothesis that the number of ward transfers would be positively and significantly correlated with LOS.

It appears that the most important variables in predicting LOS for IST patients in this sample are gender, number of inter-ward transfers, and evidence of use of involuntary medications.

Very little research has been conducted to study variables that influence or predict the LOS of IST patients. Literature suggests that there are regional differences in how IST patients are treated. Therefore, the results of this study should be considered preliminary. Results should not be assumed to generalize to other locations, time periods or patient populations. Further research is recommended to investigate variables that might influence or predict LOS of IST patients. The advantage to the State of Oregon is to provide information that can improve the care and treatment of IST patients, decrease their LOS at OSH and reduce costs.

The complexities of health care in general, and of treating IST patients in Oregon, are evident in this study. Findings in this study improved on previous, similar investigations reported in the literature. Results indicate the need for additional research, with a focus on research that can improve care, and inform and influence policy.

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APPENDICES

APPENDIX A

OREGON REVISED STATUTE 161.370

161.370 Determination of fitness; effect of finding of unfitness; proceedings if fitness regained; pretrial objections by defense counsel. (1) When the defendant's fitness to proceed is drawn in question, the issue shall be determined by the court. If neither the prosecuting attorney nor counsel for the defendant contests the finding of the report filed by a psychiatrist or psychologist under ORS 161.365, the court may make the determination on the basis of such report. If the finding is contested, the court shall hold a hearing on the issue. If the report is received in evidence upon such hearing, the party who contests the finding thereof shall have the right to summon and to cross-examine any psychiatrist or psychologist who submitted the report and to offer evidence upon the issue. Other evidence regarding the defendant's fitness to proceed may be introduced by either party.

(2) If the court determines that the defendant lacks fitness to proceed, the proceeding against the defendant shall be suspended, except as provided in subsection (12) of this section, and the court shall commit the defendant to the custody of the superintendent of a state mental hospital designated by the Department of Human Services or shall release the defendant on supervision for so long as such unfitness shall endure. The court may release the defendant on supervision if it determines that care other than commitment for incapacity to stand trial would better serve the defendant and the community. It may place conditions which it deems appropriate on the release, including the requirement that the defendant regularly report to the Department of

APPENDIX A (continued)

Human Services or a community mental health and developmental disabilities program for examination to determine if the defendant has regained capacity to stand trial. When the court, on its own motion or upon the application of the superintendent of the hospital in which the defendant is committed, a person examining the defendant as a condition of release on supervision, or either party, determines, after a hearing, if a hearing is requested, that the defendant has regained fitness to proceed, the proceeding shall be resumed. If, however, the court is of the view that so much time has elapsed since the commitment or release of the defendant on supervision that it would be unjust to resume the criminal proceeding, the court on motion of either party may dismiss the charge and may order the defendant to be discharged or cause a proceeding to be commenced forthwith under ORS 426.070 to 426.170 or 427.235 to 427.290.

(3) The superintendent shall cause the defendant to be evaluated within 60 days from the defendant's delivery into the superintendent's custody, for the purpose of determining whether there is a substantial probability that, in the foreseeable future, the defendant will have the capacity to stand trial.

(4) In addition, the superintendent shall:

(a) Immediately notify the committing court if the defendant, at any time, gains or regains the capacity to stand trial or will never have the capacity to stand trial.

(b) Within 90 days of the defendant's delivery into the superintendent's custody, notify the committing court that:

APPENDIX A (continued)

(A) The defendant has the present capacity to stand trial;

(B) There is no substantial probability that, in the foreseeable future, the defendant will gain or regain the capacity to stand trial; or

(C) There is a substantial probability that, in the foreseeable future, the defendant will gain or regain the capacity to stand trial. If such a probability exists, the superintendent shall give the court an estimate of the time in which the defendant, with appropriate treatment, is expected to gain or regain capacity.

(5) If the superintendent determines that there is a substantial probability that, in the foreseeable future, the defendant will gain or regain the capacity to stand trial, unless the court otherwise orders, the defendant shall remain in the superintendent's custody where the defendant shall receive treatment designed for the purpose of enabling the defendant to gain or regain capacity. In keeping with the notice requirement under subsection (4)(b) of this section, the superintendent shall, for the duration of the defendant's period of commitment, submit a progress report to the committing court, concerning the defendant's capacity or incapacity, at least once every 180 days as measured from the date of the defendant's delivery into the superintendent's custody.

(6) A defendant who remains committed under subsection (5) of this section shall be discharged within a period of time that is reasonable for making a determination concerning whether or not, and when, the defendant may gain or regain capacity. However, regardless of the number of charges with which the defendant is accused, in

APPENDIX A (continued)

no event shall the defendant be committed for longer than whichever of the following, measured from the defendant's initial custody date, is shorter:

(a) Three years; or

(b) A period of time equal to the maximum sentence the court could have imposed if the defendant had been convicted.

(7) The superintendent shall notify the committing court of the defendant's impending discharge 30 days before the date on which the superintendent is required to discharge the defendant under subsection (6) of this section.

(8) When the committing court receives a notice from the superintendent under either subsection (4) or (7) of this section concerning the defendant's progress or lack thereof, the committing court shall determine after a hearing, if a hearing is requested, whether the defendant presently has the capacity to stand trial.

(9) If under subsection (8) of this section the court determines that the defendant lacks the capacity to stand trial, the court shall further determine whether there is a substantial probability that the defendant, in the foreseeable future, will gain or regain the capacity to stand trial and whether the defendant is entitled to discharge under subsection (6) of this section. If the court determines that there is no substantial probability that the defendant, in the foreseeable future, will gain or regain the capacity to stand trial or that the defendant is entitled to discharge under subsection (6) of this section, the court shall dismiss, without prejudice, all charges against the defendant and:

APPENDIX A (continued)

(a) Order that the defendant be discharged; or

(b) Initiate commitment proceedings under ORS 426.070 or 427.235 to 427.290.

(10) All notices required under this section shall be filed with the clerk of the court and delivered to both the district attorney and the counsel for the defendant.

(11) If the defendant regains fitness to proceed, the term of any sentence received by the defendant for conviction of the crime charged shall be reduced by the amount of time the defendant was committed under this section to the custody of a state mental hospital designated by the Department of Human Services.

(12) The fact that the defendant is unfit to proceed does not preclude any objection through counsel and without the personal participation of the defendant on the grounds that the indictment is insufficient, that the statute of limitations has run, that double jeopardy principles apply or upon any other ground at the discretion of the court which the court deems susceptible of fair determination prior to trial.

(13) As used in this section, "superintendent" means the superintendent of the state mental hospital of the Department of Human Services to which the defendant has been committed. [1971 c.743 §52; 1975 c.380 §5; 1993 c.238 §3; 1999 c.931 §§1,2]

Table 16 – Chronological listing of LOS research studies

Authors	Year	Setting	Statistical Method	Number of Subjects	Type of Subjects	Variables related to Length of Stay	Variance Explained
Lindeman, Fairweather, Stone, Smith, and London	1959	Large Veterans Admin. Hospital	Chi square	248	Male veterans on general psych. unit.	Diagnosis, degree of incapacity, legal competence, alcoholism, marital status	N/A
Anker	1961	Large VA Hospital	Chi square	358	Male veterans on general psych. unit	21 items from MMPI predict long LOS	N/A
Johnston and McNeal	1964	Large VA Hospital	Multiple regression	668	Male veterans on general psych. unit	Marital status, high paranoia or schizophrenia, psychosis, scores on scales	23.9%
Daniel, Brandt, and Costiloe	1968	4 state hospitals in Oklahoma	Baye's theorem	13,731	Coed mentally ill	Baye's probability scores on multiple variables	N/A
Cancro	1969	Large city hospital	Multiple regression	51	Males diagnosed with schizophrenia	Formal signs, depression, marital status, abstraction, precipitating events, affect, intrusions, thought processes, premorbid adjustment	34.6%
Altman, Angle, Brown and Stetten	1972	Five Missouri State Hospitals	Stepwise linear discriminant analysis	5743	Coed mentally ill	55 variables (long LOS) 33 variables (short LOS)	N/A

Table 16 – Chronological listing of LOS research studies (CONTINUED)

Authors	Year	Setting	Statistical Method	Number of Subjects	Type of Subjects	Variables related to Length of Stay	Variance Explained
Blackburn	1972	4 state hospitals, five VA hospitals, three private psychiatric hospitals	Informal descriptive observations	N/A	General psychiatric units	Ward teams, management philosophy, admission and transfer policies, location, aftercare	N/A
Faden, V. B. & Taube, C. A.	1975	193 non-Federal pschiatric hospitals	Survey results	515,537	Psychiatric units in non-Federal general hospitals	Gender, ethnic group, age, diagnosis, substance abuse, source of payment	N/A
Clum	1975	University of Virginia Hospital	Multiple regression	119	Coed psychiatric patients	Patient's role in the family	Not given
Doherty	1976	Therapeutic community unit in private Midwestern psychiatric hospital	Stepwise linear regression	55	Male and female patients on a General psychiatric unit	Therapeutic community expectations; feminine/ masculine roles	Up to 76%
Hargreaves, Glick, Drues, Showstack, and Feigenbaum	1977	Langley Porter Institute, California	ANCOVA	119	Coed patients with diagnosis of schizophrenia	Pre-hospital functioning, gender	N/A

Table 16 – Chronological listing of LOS research studies (CONTINUED)

Authors	Year	Setting	Statistical Method	Number of Subjects	Type of Subjects	Variables related to Length of Stay	Variance Explained
Munley, Devone, Einhorn, Gash, Hyer, and Kuhn	1977	VA Hospital (five units)	Stepwise multiple regression	181	General psychiatric patients (gender not specified)	Age, History of commitment, Prior hospitalizations, Recent employment, History of suicidal behavior	20.3%
Miller and Willer	1979	Lakeshore Psychiatric Hospital, Toronto, Ontario, Canada	Multiple linear regression	72	General psychiatric patients	Self-Assessment Guide Score (social competence), Number of admissions, Gender	Not reported
Heiman and Shanfield	1980	Five hospitals in one city	Kolmogorov-Smirnov	903	Coed general psychiatric patients	Diagnosis, type of hospital	N/A
Gruber	1982	Psychiatric ward of general hospital in midwest	Not given (regression assumed)	200	General psychiatric patients	Age, Days of previous hospitalization, severity of illness	15.6%

Table 16 – Chronological listing of LOS research studies (CONTINUED)

Authors	Year	Setting	Statistical Method	Number of Subjects	Type of Subjects	Variables related to Length of Stay	Variance Explained
Boelhouwer and Rosenberg	1983	Hartford Hospital, Connecticut	Stepwise Multiple regression	765	Coed General psychiatric patients	Use of ECT, medications, physician, discharge setting, medical problems, marital status, gender, psychosis, age, psychosis, employment, place of admission	20%
Cyr and Haley	1983	Whitby Psychiatric Hospital, Whitby, Ontario, Canada	Multiple regression with maximum R-squared improvement method	877	General psychiatric patients	5 yr. Admission history, accompanied by nobody on admission, admitted for assessment, month of admission, gender, schizophrenia, previous admissions, age, marital status, address, employment status	30.72%

Table 16 – Chronological listing of LOS research studies (CONTINUED)

Authors	Year	Setting	Statistical Method	Number of Subjects	Type of Subjects	Variables related to Length of Stay	Variance Explained
Cuneo, Brelje, Randolph, and Taliana	1983	Chester Mental Health Center, Illinois	Spearman's Rank Correlation	816	IST patients	Seriousness of charges	N/A
Frank and Lave	1985	National survey database	Standard multiple regression	976	General psychiatric patients	Diagnosis, benefit structure, ethnic group, marital status, gender, education level, alcohol use	17%
Gordon, Jardiolin, and Gordon	1985	Shands Hospital psychiatric inpatient units, Florida	Chi-square	105	General psychiatric patients	Stress score, level of functioning	N/A
Mason, Louks, and Backus	1985	Seattle VA Medical Center	Chi-square	145	Male general psychiatric patients	Age, discharge type, previous hospitalizations, alcohol use, personality disorder	N/A
Fields, MacKenzie, Charlson, and Sax	1986	New York Hospital/ Cornell Medical Center	FUNCAT and LOGIS in SAS	116	Cognitively impaired medical patients	Cognitive impairment	N/A

Table 16 -- Chronological listing of LOS research studies (CONTINUED)

Authors	Year	Setting	Statistical Method	Number of Subjects	Type of Subjects	Variables related to Length of Stay	Variance Explained
Essock-Vitale	1987	Neuropsych-iatric Institute and Hospital, UCLA	Correlations	1,122	General psychiatric patients	Medical comorbidities, ECT, discharge to home, expensive DRG categories	N/A
Fulop, Strain, Vita, Lyons, and Hammer	1987	Mount Sinai Hospital, New York; Northwestern Memorial Hospital, Chicago	T tests	59,259	Medical/Surgical patients	Psychiatric comorbidity	N/A
Goodban, Lieberman, Levine, Astrachan, and Cocilovo	1987	State hospital and mental health center in Connecticut	Multiple linear regression	320	General psychiatric patients	On Medicare, previous hospitalization within 6 months, age	9%
Choca, Peterson, Shanley, Richards, and Mangoubi	1988	Veterans Administra-tion Lakeside Medical Center, Illinois	Stepwise multiple regression with cross validation	556	General psychiatric patients	Psychotic affective disorders, passive/aggres-sive personality disorder Substance abuse	24-27%
Rodenhauser and Khamis	1988	Maximum security forensic hospital	Chi square, log linear model, Kruskal Wallis	380	Forensic Hospital patients	Charges, admission legal status	N/A

Table 16 – Chronological listing of LOS research studies (CONTINUED)

Authors	Year	Setting	Statistical Method	Number of Subjects	Type of Subjects	Variables related to Length of Stay	Variance Explained
Rodenhauser and Khamis	1988	Maximum security forensic hospital	Logit model analysis, logistic regression, ANOVA	376	Maximum security forensic patients	Schizophrenia, no personality disorder, felony charge, drug treatment refusal, restraint	N/A
Lyons and McGovern	1989	Large Midwestern state hospital	ANCOVA	127	Dually diagnosed patients (substance abuse and mentally ill)	Substance abuse	N/A
Kiesler, Simpkins, and Morton	1990	400 nonFederal short-stay hospitals	Weighted least squares regression model	10,123	Mentally ill and Substance Abusers	Type of hospital, substance abuse	29-99%
Casper and Pastva	1990	Harlem Valley Psychiatric Center, New York	Chi-squared	63	"Heavy Use" cohorts; general psychiatric patients	Pre- and Post-index variables	N/A
McFarland, Faulkner, and Bloom	1990	Community mental health center and state hospital in Oregon	Multivariate regression	50	Involuntary noncriminal psychiatric patients	Facility type, Diagnosis, legal status	7-22%
Michalon and Richman	1990	Camp Hill Hospital, Halifax, Nova Scotia	ANOVA	423	General psychiatric patients, coed	Year of admission, Diagnosis, Legal status, Transfer	N/A

Table 16 – Chronological listing of LOS research studies (CONTINUED)

Authors	Year	Setting	Statistical Method	Number of Subjects	Type of Subjects	Variables related to Length of Stay	Variance Explained
Herr, Abraham, and Anderson	1991	St. Elizabeth's Hospital, Boston, Mass.	t-test, chi-squared, multiple linear regression	100	General psychiatric patients, coed	ECT, medical consults, employment, age, dementia, placement, diagnosis	N/A
Chang, Brenner, and Bryant	1991	Community Mental Health Center in the Northeast	Correlation, multiple regression	200	General psychiatric patients, coed	Past hospitalizations, employment, living situation, substance abuse, diagnosis of schizophrenia	20%
Boerstler and de Figueiredo	1991	Outpatient psychiatric clinic	Classification and regression trees (CART)	382	General psychiatric patients, coed	Recent inpatient treatment	N/A
Lyons, O'Mahoney, and Larson	1991	800-bed private teaching hospital	Regression analyses	2000	General psychiatric patients, adolescents, Eating disordered patients, older adults	Attending psychiatrist	N/A
Nicholson and McNulty	1992	Eastern State Hospital, Oklahoma	Multiple regression	493	Incompetent to stand trial patients	Demographics, resources, admission status	10%

Table 16 – Chronological listing of LOS research studies (CONTINUED)

Authors	Year	Setting	Statistical Method	Number of Subjects	Type of Subjects	Variables related to Length of Stay	Variance Explained
Brock and Brown	1993	Air Force tertiary care hospital	ANOVA and stepwise multivariate regression	1019	General psychiatric patients, military and civilian	Active military, race, severity of illness, personality disorder, suicidality on admission, diagnosis	21-31%
Tucker and Brems	1993	Large midwestern medical school	ANOVA and chi-squared	291	General psychiatric patients	Ethnicity, Axis I diagnosis, Axis II diagnosis	N/A
McCrone and Phelan	1994	Bethlem Royal and Maudsley Joint Hospitals, London	Coefficients of Variation, multivariate regression	5482	General psychiatric patients, coed	Diagnosis	3%
Nieminen, Isohanni, and Winblad	1994	Closed, mixed ward, Department of Psychiatry, University of Oulu, Finland	Linear regression	1330	General psychiatric patients, coed	Young age, psychosis, participation in treatment	10.9-16.5%

Table 16 – Chronological listing of LOS research studies (CONTINUED)

Authors	Year	Setting	Statistical Method	Number of Subjects	Type of Subjects	Variables related to Length of Stay	Variance Explained
Pfeiffer, O'Malley, and Shott	1996	Summary of 54 articles related to psychiatric outcome	Summary table	N/A	General psychiatric patients	Associated with outcome: type of illness, previous hospitalization, age at onset, medication use, marital status	N/A
Barnow, Linden, and Schaub	1997	Dept. of Psychiatry, Free University of Berlin	ANOVA	736	Patients with diagnosis of depression	Age, marital status, gender, severity of depression	N/A
Creed, Tomenson, and Tramner	1997	Manchester Royal Infirmary, Manchester, England	ANOVA, multiple regression	115	General psychiatric patients, coed	Diagnosis, social behavior scale, living situation, ECT, drug use	14.6-49%
Hendryx and DeRyan	1998	91 acute care hospitals in Washington	MANCOVA, logistic regression	46,998	Acute, short-stay general psychiatric patients	Insurance type	Not given
Huntley, Cho, Christman, and Csernansky	1998	Metropoli-Tan St. Louis Psychiatric Center, St. Louis, Missouri	Stepwise multiple regression	760	General psychiatric patients	Diagnosis, age, previous admissions, substance abuse	16%

Table 16 – Chronological listing of LOS research studies (CONTINUED)

Authors	Year	Setting	Statistical Method	Number of Subjects	Type of Subjects	Variables related to Length of Stay	Variance Explained
Moran, Fragala, Wise, and Novak	1999	Maximum security forensic hospital in Maryland	ANOVA, hierarchical multiple regression	101	Forensic mental health patients	Prior employment, gender, age, education level, ethnic group	Not given
Oiesvold, Saarento, Sytema, Christiansen, Gostas, Lonnerberg, Muus, Sandlund, and Hansson	1999	Seven psychiatric hospitals in four Nordic countries	Cox proportional hazard model, Cox regression	837	General psychiatric patients, coed	Age, Gender, Children at home, Employment, Diagnosis, Planned admission, Previous outpatient care or aftercare	N/A
Sloan, Yokley, Gottesman, and Schubert	1999	Metro-Health Medical Center, Cleveland, Ohio	ANOVA, t-tests	2323	General psychiatric patients, coed	Comorbid physical illness	N/A
Federman, Drebing, Boisvert, Penk, Binus, and Rosenheck	2000	99 Veterans Health Administration Hospitals	Pearson product correlations	Not given	General psychiatric patients, coed	Cold, wet climates	14%
Galynker, Cohen, Salvit, Miner, Phillips, Focseneanu, and Rosenthal	2000	Beth Israel Medical Center, New York	regression	44	Medical/ surgical rehab patients	Gender, PANSS subscale, SANS attention subscale	42.4%

Table 16 – Chronological listing of LOS research studies (CONTINUED)

Authors	Year	Setting	Statistical Method	Number of Subjects	Type of Subjects	Variables related to Length of Stay	Variance Explained
Sajatovic, Donenwirth, Sultana, and Buckley	2000	Large urban state mental health facility	t-tests, chi square	1358	General psychiatric patients, coed	Age, Gender	N/A
Hopko, Lachar, Bailley, and Varner	2001	Harris County Psychiatric Center, Houston	Chi square, stepwise discriminant function analysis	2430	General psychiatric patients, coed	BPRS-A resistance score, Number of previous referrals for extended care. BPRS-A postive symptoms score, BPRS-A pschological discomfort score	78% (classification accuracy)
Fisher, Barreira, Geller, White, Lincoln, and Sudders	2001	8 inpatient facilities maintained by the Massachu-setts Department of Mental Health	Descriptive	330	Long-stay general psychiatric patients	Medical problems, Significant behavioral problems	N/A
Stevens, Hammer, and Buchkremer	2001	General psychiatric hospital in Tubngen, Germany	Cox regression	4706	General psychiatric patients	Diagnosis, medication, ethnicity, education, open ward	Not reported

Table 16 – Chronological listing of LOS research studies (CONTINUED)

Authors	Year	Setting	Statistical Method	Number of Subjects	Type of Subjects	Variables related to Length of Stay	Variance Explained
Boronow	2001	Sheppard Pratt health System, Maryland	Descriptive	561	General psychiatric patients, and substance abuse patients	Type of insurance	N/A

APPENDIX C

DATA COLLECTION FORM

CASE #:_____ Data collector: _____

Variables to be collected	Coding	For Ted's use only
Gender:	1 = male, 0 = female	
Referring County:		
Date of Admission: Date of Discharge:	LOS =	
Ethnic Group:		
Age at admission:		
Axis I diagnoses at discharge:	Psyhotic level? 1 = yes 0 = no Substance abuse? 1 = yes 0 = no	
Axis II diagnoses at discharge:	Personality disorder? 1 = yes, 0 = no	
Number of S&R events:		
Pending Criminal Charges at admission:	# of felonies: _____ # of misdemeanors: _____	
Evidence of Involuntary Medication:	1 = yes, 0 = no	
Psychiatric Medications at Discharge:	Atypical? 1 = yes, 0 = no	
# of transfers:		