PREDICTING DROPOUT FROM AN ALCOHOLISM TREATMENT PROGRAM USING A STATE DATABASE

by

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A Dissertation submitted to the
Graduate School – New Brunswick
Rutgers, The State University of New Jersey

In partial fulfillment of the requirements

For the degree of

Doctor of Philosophy

Graduate Program in Social Work

Written under the direction of

Dr. Raymond Sanchez Mayers

And approved by

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New Brunswick, New Jersey

October, 2011
This retrospective study attempts to identify variables predictive of treatment dropout, using the information collected in the New Jersey Substance Abuse Monitoring System, a data collection program based on the Addiction Severity Index, and used by the large majority of substance abuse treatment programs in the State. Client characteristics, client/clinician interaction, program characteristics/environment and practical barriers to treatment were examined as potential predictors of dropout. The dependent variable was completed treatment/quit or dropped out. The sample consisted of all clients (704), 184 women and 520 men whose primary drug of abuse was alcohol, who were treated in large drug free outpatient program between January 1, 2004 and May 31, 2007, at a medical center in Union County, New Jersey. The mean age of the subjects was 39.8 years. A series of bivariate analyses were performed using Chi-Square and t tests to select a group of potential predictor variables. These were then used as independent variables in logistic regressions in an attempt to find the variables with the best predictive validity for treatment dropout. Length of stay was found to be a good predictor of dropout, with
clients with shorter lengths of stay being more likely to leave treatment before completion. Level of treatment intensity, assessed by the program the client was referred to (Standard Outpatient, Intensive Outpatient, or Partial Hospital) was also found to predict dropout, with clients treated in the Standard Outpatient Program more than three times as likely to complete treatment as those treated in the other two programs. The predictive validity for dropout for some variables were different for men than for women –for men, but not for women, living with their children, and being mandated into treatment reduced the likelihood of dropout. Women who used alcohol and one other drug were 3.5 times as likely to drop out as women using alcohol only, but the number of drugs used was not predictive of dropout for men. The study tested whether subjects with more severe bio-psycho-social problems, as measured by the sum of the ASI composite scores, were more at risk of dropout, however this proved unfounded.
ACKNOWLEDGEMENTS

I express my heartfelt thanks to my committee chair, Dr. Raymond Sanchez Mayers, for his unfailing assistance, guidance and support. I also thank the other members of my committee, Dr. Ayse Akincigil, Dr. Paul Glasser, and Dr. Thomas Morgan. I am very grateful for the contributions made by the faculty and staff of the school. Lastly, I must thank my wife, Dennys, for her ongoing encouragement and patience.
Table of Contents

Abstract
Acknowledgements
Chapter One: Introduction
  Statement of the Problem
  Impaired Driving
  Negative Effects on Health
  Economic Costs
  Current Approaches to Alcoholism Treatment
  Practical Implications for Social Work Knowledge and Alcoholism Treatment
Purpose of the Study
Research Questions
Chapter Two: Literature Review and Conceptual Model
  Historical Background
  Conceptual Model
  Definition of Dropout
  Incidence and Outcomes of Dropout
  Predictors of Treatment Dropout
Client Characteristics
  Age
  Gender
  Race/Ethnicity
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>44</td>
</tr>
<tr>
<td>Living Situation/Social Isolation</td>
<td>46</td>
</tr>
<tr>
<td>Psychiatric Functioning</td>
<td>48</td>
</tr>
<tr>
<td>Employment</td>
<td>49</td>
</tr>
<tr>
<td>Coercion</td>
<td>49</td>
</tr>
<tr>
<td>Type and Severity of Alcohol and Drug Use</td>
<td>52</td>
</tr>
<tr>
<td>Client Motivation</td>
<td>54</td>
</tr>
<tr>
<td>Interaction Between Therapist Characteristics and Client Characteristics</td>
<td>55</td>
</tr>
<tr>
<td>Differences in Outcome by Therapist</td>
<td>56</td>
</tr>
<tr>
<td>Differences in Retention/Attrition Rates by Therapist</td>
<td>57</td>
</tr>
<tr>
<td>Practical Barriers to Treatment</td>
<td>57</td>
</tr>
<tr>
<td>Summary</td>
<td>59</td>
</tr>
<tr>
<td>Limitations of the Literature</td>
<td>60</td>
</tr>
<tr>
<td>Chapter Three - Methodology</td>
<td>63</td>
</tr>
<tr>
<td>Research Questions</td>
<td>63</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>63</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>67</td>
</tr>
<tr>
<td>Research Design</td>
<td>68</td>
</tr>
<tr>
<td>Data Collection</td>
<td>69</td>
</tr>
<tr>
<td>Description of the Sample</td>
<td>70</td>
</tr>
<tr>
<td>Comparison with State Sample</td>
<td>72</td>
</tr>
<tr>
<td>Instrument – NJ-SAMS Background and Description</td>
<td>72</td>
</tr>
<tr>
<td>Instrument – NJ-SAMS Reliability and Validity</td>
<td>75</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Addiction Severity Index</td>
<td>76</td>
</tr>
<tr>
<td>Procedures for Statistical Analysis</td>
<td>79</td>
</tr>
<tr>
<td>Chapter Four – Findings</td>
<td>85</td>
</tr>
<tr>
<td>Introduction</td>
<td>85</td>
</tr>
<tr>
<td>Bivariate Analysis of Hypotheses</td>
<td>85</td>
</tr>
<tr>
<td>Age</td>
<td>85</td>
</tr>
<tr>
<td>Gender</td>
<td>86</td>
</tr>
<tr>
<td>Marital Status</td>
<td>88</td>
</tr>
<tr>
<td>Living Situation/Social Isolation</td>
<td>89</td>
</tr>
<tr>
<td>Education</td>
<td>90</td>
</tr>
<tr>
<td>Employment</td>
<td>91</td>
</tr>
<tr>
<td>Psychiatric Variables</td>
<td>92</td>
</tr>
<tr>
<td>Motivation</td>
<td>95</td>
</tr>
<tr>
<td>Alcohol and Drug Use</td>
<td>96</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td>98</td>
</tr>
<tr>
<td>Client/Clinician Interaction</td>
<td>98</td>
</tr>
<tr>
<td>Program Characteristics /Environment</td>
<td>98</td>
</tr>
<tr>
<td>Treatment Intensity/Level of Treatment</td>
<td>99</td>
</tr>
<tr>
<td>Referral Source</td>
<td>94</td>
</tr>
<tr>
<td>Length of Stay</td>
<td>95</td>
</tr>
<tr>
<td>Practical Barriers for Clients</td>
<td>95</td>
</tr>
<tr>
<td>Cumulative Effects of Biopsychosocial Problems</td>
<td>96</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Multivariate Analysis</td>
<td>101</td>
</tr>
<tr>
<td>Logistic Regression Findings- ASI Scores, Length of Stay, Referral Source</td>
<td>102</td>
</tr>
<tr>
<td>Logistic Regression Findings – All Cases</td>
<td>104</td>
</tr>
<tr>
<td>Logistic Regression Findings for Male Subjects</td>
<td>106</td>
</tr>
<tr>
<td>Logistic Regression Findings for Female Subjects</td>
<td>107</td>
</tr>
<tr>
<td>Summary of Findings</td>
<td>107</td>
</tr>
<tr>
<td>Chapter Five  Discussion and Conclusions</td>
<td>109</td>
</tr>
<tr>
<td>Limitations of the Study</td>
<td>110</td>
</tr>
<tr>
<td>Dropout and Retention Rates</td>
<td>111</td>
</tr>
<tr>
<td>Length of Stay</td>
<td>112</td>
</tr>
<tr>
<td>Gender Specific Programs – Women’s Programs</td>
<td>113</td>
</tr>
<tr>
<td>Referral Source</td>
<td>114</td>
</tr>
<tr>
<td>Living Situation/Social Isolation</td>
<td>115</td>
</tr>
<tr>
<td>Education</td>
<td>117</td>
</tr>
<tr>
<td>Severity of Alcohol Use and Number of Drugs Used</td>
<td>117</td>
</tr>
<tr>
<td>Effects of Severity of Biopsychosocial Problems</td>
<td>117</td>
</tr>
<tr>
<td>Profile of the Typical Dropout</td>
<td>118</td>
</tr>
<tr>
<td>Implications for Treatment Programs and Treatment Policy</td>
<td>118</td>
</tr>
<tr>
<td>Suggestions for Future Research</td>
<td>121</td>
</tr>
<tr>
<td>References</td>
<td>123</td>
</tr>
<tr>
<td>Appendix A –Tables</td>
<td>134</td>
</tr>
<tr>
<td>Appendix B – Data Collection Instrument  (Supplemental File)</td>
<td>155</td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table A1 Client Characteristics Bivariate Analysis Results 135
Table A2 Differences in Completion of Treatment by whether or not Subjects were Treated in the Women’s Addiction Program 137
Table A3 Differences in Severity of ASI Composite Scores between Women Treated and not treated in the Specialized Women’s Addiction 138
Table A4 Alcohol Use by Treatment Completion or Dropped Out 139
Table A5 Client Psychiatric Difficulties by Completed Treatment/Dropped Out 140
Table A6 Program Characteristics by Treatment Completer Group and Treatment Dropout Group 141
Table A7 Completed Treatment/Dropped Out by Addiction Severity Index Mean Composite Scores 143
Table A8 Relationship between Perceived Importance of Treatment and Treatment Completion/Dropout 144
Table A9 ASI Scores Predictive of Quitting/Dropping Out of Treatment 145
Table A10 Logistic Regression Variables Predictive of Quitting/Dropping Out of Treatment Full Sample. 146
Table A11 Logistic Regression - Male Subjects - Variables Predictive of Quitting/Dropping Out of Treatment 147
Table A12 Logistic Regression - Female Subjects - Variables Predictive of Quitting/Dropping Out of Treatment 148
Table A13 Logistic Regression Predicting Dropping Out of Treatment- All Cases
Included

Table A14 Logistic Regression Predicting Dropping Out of Treatment

Female Subjects

Table A15 Logistic Regression Predicting Dropping Out of Treatment-

Male Subjects
CHAPTER ONE

INTRODUCTION

“It is simple but true, you cannot treat a patient who has dropped out”

(Froman, Dackis, & Rawson, 2002, p. 21).

Statement of the Problem

The use of alcohol in the United States is very extensive. In 2007, about 2% of Americans used alcohol on a daily or nearly daily basis, according to the National Survey on Drug Use and Health (NSDUH) (Substance Abuse and Mental Health Services Administration [SAMHSA], 2009). The survey also showed that these alcohol users were more likely than other Americans to be alcohol dependent in the past year. Slightly more than half of Americans aged 12 or older reported being current drinkers of alcohol in the 2007 survey (51.1%). Current drinkers were individuals who took at least one drink in the 30 days prior to completing the survey. This translates to an estimated 126.8 million people.

More than one fifth (23.3%) of persons aged 12 or older participated in binge drinking at least once in the 30 days prior to the 2007 survey. Binge drinking was defined as “taking five or more drinks on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the 30 days before completing the survey” (SAMHSA, 2008, p. 3). This translated to about 57.8 million people. Heavy drinking (five or more drinks on the same occasion on each of 5 or more days in the past
30 days), was reported by 6.9% of the population aged 12 or older, or 17.0 million people.

The frequency of admissions to treatment facilities for alcohol abuse or dependence can be found by examining the statistics of the 2006 Treatment Episode Data Set (TEDS), published by the Federal Substance Abuse and Mental Health Services Administration. TEDS is an annual compilation of data on the demographic characteristics and substance abuse problems of those admitted to substance abuse treatment, primarily at facilities that receive some public funding. About 40% of all admissions to substance abuse treatment facilities submitting data to TEDS reported alcohol as the primary drug of use, divided between 22% reporting alcohol use only, and 18 percent reporting alcohol and additional substances of abuse. Thirty-two percent reported daily use of alcohol at the time of admission, 26% reported past month abstinence, and 42% reported intermediate frequencies of use (SAMHSA, Treatment Episode Dataset (TEDS), 2009).

Alcohol Abuse/Dependence can have a number of serious negative consequences for an individual. These include:

**Impaired Driving**

Every day 32 people in the United States die in motor vehicle crashes that involve an alcohol-impaired driver. This amounts to one death every 45 minutes (U.S. Department of Transportation [USDOT], 2008). The annual cost of alcohol-related crashes totals more than 51 billion dollars (Blincoe et al., 2000). In 2008, 11,773 people were killed in alcohol-impaired driving crashes, accounting for nearly one-third (32%) of
all traffic-related deaths in the United States. Of the 1,347 traffic fatalities among children ages 0 to 14 years in 2008, about one out of every six (16%) involved an alcohol-impaired driver. Of the 216 child passengers ages 14 and younger who died in alcohol-impaired driving crashes in 2008, about half (99) were riding in the vehicle with the alcohol-impaired driver (USDOT, 2008). In 2008, over 1.4 million drivers were arrested for driving under the influence of alcohol or narcotics (U.S. Department of Justice, Federal Bureau of Investigation [FBI], 2009). That is less than 1% of the 159 million self-reported episodes of alcohol-impaired driving among U.S. adults each year (Quinlan, et al., 2005). Drugs other than alcohol (e.g., marijuana and cocaine) are involved in about 18% of motor vehicle driver deaths. These other drugs are often used in combination with alcohol (Jones, Shinar, & Walsh, 2003). Drivers with a Blood Alcohol Concentration (BAC) of 0.08% or higher involved in fatal crashes were eight times more likely to have a prior conviction for Driving While Under the Influence (DWI) than were drivers with no alcohol (8% and 1%, respectively), (Quinlan et al., 2005).

**Negative Effects on Health**

There are approximately 79,000 deaths attributable to excessive alcohol use each year in the United States (Centers for Disease Control and Prevention, 2009). This makes excessive alcohol use the third leading lifestyle-related cause of death for the nation (Mokdad, Marks, Stroup, & Gerberding, 2004). Additionally, excessive alcohol use is responsible for 2.3 million years of potential life lost (YPLL) annually, or an average of about 30 years of potential life lost for each death. In the single year 2005, there were
more than 1.6 million hospitalizations and more than 4 million emergency room visits for alcohol-related conditions (Centers for Disease Control and Prevention, 2009).

Causes of death due to alcohol use include: Alcohol-induced pseudo-Cushings syndrome (a condition which can lead to vascular disease and the persistence of hypertension and abnormalities of glucose metabolism); Mental and behavioral disorders due to alcohol use; Degeneration of nervous system due to alcohol; Alcoholic polyneuropathy (damage to the nerves that results from excessive drinking of alcohol); Alcoholic myopathy (a muscular disease that occurs in alcoholics in which the muscles wear down over time, and eventually shut down due to all that excess alcohol that is in the body, Alcoholic cardiomyopathy (a disorder in which drinking too much alcohol over a long period of time weakens the heart muscle so that it cannot pump blood efficiently); Alcoholic gastritis (a condition in which the walls of the stomach are irritated and may also become inflamed and bleed); Alcoholic liver disease; Alcohol-induced acute and chronic pancreatitis; Accidental poisoning by and exposure to alcohol; Intentional self-poisoning by exposure to alcohol (World Health Organization, 2004)

**Economic Costs of Alcohol Use**

Cost components can be classified into three main categories: direct costs, indirect costs, and intangible costs. Direct costs measure the value of resources used as a consequence of alcohol abuse. The direct cost can be further classified into: 1) health care cost, 2) research and prevention costs, (3) costs of crime and law enforcement, 4) costs of property damage or loss, 5) administration costs, 6) costs of welfare assistance or social work, 7) costs of alcoholic beverages, and 8) other costs.
In contrast, indirect costs are those for which resources are lost without a direct payment actually being made. Indirect costs can be classified into five categories as follows: 1) the cost of premature mortality, 2) the cost of reduced productivity, which includes both the cost of productivity loss due to absenteeism and that when the workforce comes to work (presenteeism), 3) the cost of incarceration, 4) the cost of loss of employment or early retirement, and 5) costs associated with crime, i.e., time loss for victims due to crime.

The last cost category is referred to as intangible costs, which represents pain, suffering, and the deterioration of quality of life. This type of cost, when reduced or eliminated, does not yield resources that can be made available for other uses, and is less likely to be included in cost estimations. On the average, the indirect costs due to the loss of productivity are more than the average direct costs attributable to alcohol use. In a recent study, efforts were made to estimate the social costs of heavy drinking and alcohol dependence in the United States. Total estimated annual health care costs were seventeen billion, five hundred million dollars. Direct costs for law enforcement were four billion, four hundred and ninety-seven million. Productivity losses were ninety-five billion, three hundred and sixty-eight million dollars. The total social cost of heavy drinking and alcohol dependence was one hundred and thirty-one billion, two hundred and six million dollars (Mohapatra, Patra, Popova, Duhig, & Rehm, 2010).

A World Health Organization study (2004) of the effects of alcohol use in the United States estimated that 25% of women had experienced some form of sexual assault, including rape. Approximately one half of those cases involved alcohol consumption by
the perpetrator, the victim, or both. The report also found that alcohol use played an important part in intimate partner violence. It noted that 30% to 40% of men and 27% to 34% of women who perpetrated violence against their partners were drinking at the time the violence occurred.

Divorce rates were also affected by alcohol use. The WHO report noted that a consumption increase of one liter of alcohol per capita results in an increase in divorce rates of about 20%. Rates of both gonorrhea and syphilis are also increased by alcohol consumption. Each one percent increase in alcohol consumption was associated with a 0.4% increase in reported gonorrhea incidence rates, and a 1.8% to 3.6% increase in reported syphilis rates.

**Current Approaches to Alcoholism Treatment**

The National Survey of Substance Abuse Treatment Services (N-SSATS) is maintained by the Office of Applied Studies, SAMHSA (SAMHSA, 2010). It is designed to collect data on the location, characteristics, services, and number of clients treated in all alcohol and drug abuse facilities, both public and private, throughout the United States. In 2009, N-SSATS reported that the majority of these facilities always or often used substance abuse counseling (96%), relapse prevention (87%), Cognitive-behavioral therapy (66%), 12-step facilitation (56%), and motivational interviewing (55%). More than a third of the facilities always or often used anger management (39%), contingency management/motivational incentives (27%), and more than a fifth always or often used trauma-related counseling (21%). Explanations of these various techniques are given below.
**Substance abuse counseling** is a short term treatment that is used for treating abuse/dependence for various substances, including alcohol. It includes supportive techniques, encouragement of the patient to discuss personal experiences, as well as expressive techniques, which help the patient to resolve interpersonal relationship issues, and gain greater insight and self-understanding.

**Relapse prevention** is a cognitive-behavioral therapy originally developed for the treatment of alcoholism, but later adapted for other substance disorders. This intervention focuses on the belief that learning processes play a central role in the development of dysfunctional behavior patterns. Individuals are helped to identify and correct problematic behaviors, and to develop new coping strategies that will facilitate abstinence and provide ways for getting immediate help should a relapse occur.

**Cognitive-behavioral therapy** (CBT) involves helping the client recognize and examine unhelpful patterns of thinking and reacting. These patterns are then modified or replaced with more functional and constructive ones. Clients are expected to play an active role in their own therapy.

The **12-step facilitation approach** consists of a brief, structured approach to facilitating early recovery from alcoholism as well as other drug abuse/dependence. It is intended to be implemented on an individual basis in twelve to fifteen sessions. It is based on the behavioral, spiritual, and cognitive principles that form the core of 12-step fellowships such as Alcoholics Anonymous.

**Motivational Interviewing** (MI) is a form of counseling which recognizes that many people experience ambivalence when deciding to make changes. MI assumes that
this ambivalent attitude or lack of resolve is the primary reason clients fail to succeed in treatment, so the key goal of the intervention is to help the client resolve this ambivalence so that the subject may successfully be involved in the treatment process. Thus the initial focus is not on changing behavior, but rather on enhancing the client’s motivation and determination to change. *Contingency management/motivational incentives* employ a positive-reinforcement method which rewards clients for constructive actions taken towards recovery.

*Anger management* is a set of interventions and strategies to work with alcoholics exhibiting anger problems. This treatment combines elements of the CBT approach, relaxation techniques, and communication skills building to assist the individuals in acquiring the ability to recognize the signs of anger and develop actions to deal with the anger in a constructive, positive way.

*Brief intervention* usually consists of one to five sessions. It is designed for alcohol and drug users who are not yet dependent. It helps the client to evaluate a potential substance abuse or alcohol problem, and then motivate them to begin to take action about their problem, either by natural, client directed means, or by entering additional substance abuse treatment.

*Trauma-related counseling* is a cognitive-behavioral intervention adapted for clients suffering from post-traumatic stress disorder (PTSD), as well as other effects of abuse and trauma. A psycho-educational and skills-building approach is used to help clients learn protective skills to promote healing from past experience. Clients also are taught behavioral strategies for reducing trauma symptoms and alcohol and drug relapse.
Settings in which treatment takes place vary. The N-SSATS 2009 State profile for New Jersey includes three hundred and forty alcohol and substance abuse treatment facilities, which reported that there were a total of 31,634 clients in treatment on March 31, 2009 (SAMSHA, 2009). Sixty-one percent of the facilities were private non-profit, 32% private for-profit, 4% were local government run, 2% State government run, and 1% run by the Federal government. Ninety-one percent treated clients with both alcohol and drug abuse problems, 76% clients with drug abuse problems only, and 80% clients with alcohol abuse only. Facilities could be included in more than one of the categories above.

The TEDS study describes the types of service offered for alcohol and substance abuse treatment as of 2006. These included Outpatient Treatment (also referred to as Standard Outpatient Treatment), which usually 2 hours of treatment two times a week, and generally consisted of individual and group counseling. Intensive Outpatient consists of a minimum of two or more hours per day for three or more days per week. Partial Hospital Treatment usually consists of six hours per day at least three days a week (The TEDS categories does not include a Partial Hospital category). Short Term Residential Treatment typically consists of thirty days or fewer on non-acute care in a setting with treatment services for substance abuse and dependency, including alcohol abuse/dependence. Long Term Residential is typically more than thirty days of non-acute care in a setting with treatment services for alcohol and substance abuse/dependency. Hospital Residential Treatment is twenty-four hour per day medical care in a hospital
facility in conjunction with treatment services for alcohol and/or substance abuse and dependency.

Detoxification services are of three types. The first is Free Standing Residential Detoxification, a twenty-four hour per day service in a non-hospital setting providing safe withdrawal and transition to ongoing treatment. The second is Ambulatory Detoxification, which are Outpatient services providing safe withdrawal in an ambulatory setting. The third is Hospital detoxification, twenty-four hour per day acute medical care services in a hospital setting for persons with severe medical complications associated with withdrawal (SAMHSA, TEDS, 2006).

A major difficulty in understanding the relative success rates of the various approaches to alcoholism treatment is the high rate of dropout of those clients who discontinue treatment prior to completion. We cannot know the extent to which any treatment programs are successful in treating the problem of alcoholism because of the high incidence of dropout. According to the TEDS 2005 report, only 39% of all subjects in the study completed treatment for alcohol and/or substance abuse dependence (SAMHSA, TEDS, 2006).

**Practical Implications for Social Work Knowledge and Alcoholism Treatment**

If we were able to accurately predict at least a percentage of the clients who currently drop out of treatment due to specific risk factors, it would be possible to engage in a series of intensive targeted interventions to prevent such dropout. If an association between subsets of this data and dropout can be identified, agencies would be able to more easily identify those clients at increased risk of dropout at the point of intake. This
would allow agencies to specifically target these clients for specialized programs/interventions aimed at reducing the likelihood of dropout.

Purpose of the Study

The major goal of this study was to investigate the feasibility of accurately predicting treatment dropout from alcoholism treatment at the individual program level using client data collected by the New Jersey Substance Abuse Monitoring System (NJ-SAMS). NJ-SAMS is a web based computer program that alcohol and substance abuse treatment agencies are required to use by the State of New Jersey to collect client data at the point in intake, and at the point of client discharge from their agency programs. In order to approach this, it was necessary to complete a comprehensive literature review of factors associated with treatment dropout. There was a very extensive literature examining factors associated with treatment dropout. Through a comprehensive review of this literature, it was possible to identify those variables which seem to have good predictive validity for dropout. This served as the basis for selecting those variables from the NJ-SAMS instrument to be tested for their ability to predict dropout.

The study focused on outpatient treatment and partial hospital programs, as the majority of clients in treatment in New Jersey are enrolled in these programs (SAMHSA, 2009).

For the purposes of the study dropout was defined as those clients who either fail to start treatment following having received an intake assessment, as well as those who did start, but subsequently voluntarily left or were discharged for non-compliance prior to the successful completion of treatment. Excluded from our sample were clients who
terminated treatment due to incarceration or death, or hospitalization for a medical or psychiatric illness, since these occurrences are clearly beyond the clients’ control. Since the treatment program we examined had numerous grants to provide treatment for clients not covered by any form of health insurance, very few clients terminate treatment prematurely due to an inability to pay for the treatment, and these were also excluded.

**Research Questions**

The following research questions guided this study:

1. Based on the literature review, what variables are consistently associated with, and have the best predictive validity for substance abuse treatment dropout?

2. Does data on these variables, as collected by the NJ-SAMS system at the agency treatment program level, have predictive validity for dropout of clients from substance abuse treatment?

3. More specifically, utilizing the data on these variables is it possible to accurately identify those clients, who are most likely to drop out of treatment, at a program site chosen for our study?

4. Is there a cumulative effect of these variables? Will clients with a greater problem severity in these variables associated in the literature with dropout show higher dropout rates than clients with a lesser problem severity in these variables?

5. Are there moderator variables which impact on the likelihood of client treatment dropout?

These questions and hypotheses that follow from them will be discussed in the following chapters. This chapter has been an introduction and overview of the problem
of alcoholism in the United States. Also discussed were treatment approaches to the problem of alcoholism and the problem of dropout. In addition, the relevance of this topic to substance abuse treatment and intervention was discussed.

Chapter Two focuses on a comprehensive review of the literature, including definitional issues and the scope of treatment dropout. It discusses the criteria for article and variable selection, categorizing the variables into client characteristics, client-clinician interaction, program characteristics/environment, and practical barriers to treatment.

The third chapter discusses the methodology used for the study. It proposes a series of hypotheses based on the potential effects of individual predictor variables on drop out, as suggested by the findings of the literature review. A more detailed description of the study design is discussed. The setting for the research and the sampling methods are noted, along with characteristics of the sample. The sample used in the study is compared with a State of New Jersey sample for the same time period. The New Jersey Substance Abuse Monitoring System is discussed at length, including its relationship to the Addiction Severity Index, as well as validity and reliability issues.

Chapter Four contains the bivariate and multivariate analyses used in testing the various hypotheses. The potential ability of a number of variables to predict dropout are examined in a series of Chi-Square and t tests, as well as logistic regressions. The potential effects on dropout for client characteristics, alcohol and drug use, psychological and psychiatric difficulties, The Addiction Severity Index composite scores, subject
motivation, length of stay in treatment, and the referral source through which the subject entered treatment are all examined in a series of bivariate and multivariate analyses.

Chapter Five contains a detailed discussion of the findings of analyses, including significant predictors of subject dropout, as well as discussions of why these variables may contribute to the client terminating treatment before completion. The limitations of the study are discussed. The chapter also includes a detailed discussion of the significance of the findings for alcoholism treatment, as well as a discussion of suggested ways in which clinical treatment and alcoholism policy might be enhanced to reduce treatment dropout.
CHAPTER TWO

LITERATURE REVIEW AND CONCEPTUAL MODEL

Historical Background

Alcohol is a substance that has provided many varied uses throughout history. Alcohol has played important roles in religion, and has been widely used for its medicinal, antiseptic, and analgesic properties. It has been used as a social lubricant, to facilitate relaxation, for its nutritional value, and funerary purposes.

From earliest times to the present, it has played an important role in various religions. In ancient times both beer and wine were deified and offered to the gods (Gastineau, Darby, & Turner, 1979). In ancient Egypt, alcoholic beverages were placed in the tombs of deceased kings for their use in the afterlife (Darby, Ghaliounqui, & Grivetti, 1977).

Examples such as the cults of Dionysus and Bacchus in ancient Greece and Rome, the use of wine in the Jewish Passover, as well as the important role of wine in the present day ritual of transubstantiation in Christian religions, show the central role alcohol has played in religions and religious festivals and beliefs. It appears that among the ancient Greeks habitual drunkenness was rare; however, intoxication at banquets and at certain religious festivals was not uncommon. By 425 B.C. warnings against intemperance, especially at symposia (a gathering of men for an evening of conversation), appear to become more frequent (Austin, 1985).

In the Christian era, late in the second century, several Christian sects rejected the use of alcohol and extolled abstinence. The Church rejected this view, and by the fifth
century had taken the position that wine was inherently a good gift from God, and should be used and enjoyed. The Church advocated moderate drinking, but rejected excessive or abusive use as sinful. Individuals were advised to refrain from drinking if they were unable to use alcohol in moderation (Austin, 1985). It is clear that both the Old and New Testaments condemn drunkenness, but not the moderate use of alcohol (Hewitt, 1980).

Up to the beginning of the eighteenth century, this attitude toward alcohol use continued. The moderate use of alcohol was condoned for pleasure, enjoyment and health, but drunkenness was seen as a sin. In early Colonial America alcoholic beverages continued to be viewed as a natural food, and as beneficial when used in moderation. The Puritans saw beer as a necessity, and indeed, alcoholic beverages were often safer to drink than the water available to them, since the water could be of questionable safety due to the presence of disease causing microbes.

The nineteenth century in America brought a change in attitudes toward alcohol, and it began to be seen in a much more negative light. Problems related to increasing industrialization, the growth of urban slums and increased crime, poverty and high infant mortality rates began to be attributed to alcohol use. Women became more involved in reform movements.

The American Society for the Promotion of Temperance, founded in 1826, engaged in widespread propaganda against intemperance. It was involved in both social and political activities, and by 1860 had a membership of over a million. The movement became more influential after the Civil War. The attention given to the problem of drunkenness during this period was the result of a growing concern about the relationship
of alcohol use to unemployment and poverty (Axinn & Stern, 2008).

The large number of saloons that encouraged drinking, especially by male laborers, increased societal perceptions of a chaotic environment, particularly among immigrants. The male heads of households often spent much of their pay on alcohol, causing severe hardships for their families. Women and children often experienced abuse and increased poverty due to the breadwinner squandering his salary on alcohol.

The temperance movement was successful in initiating some legislative reforms. In 1846, Maine enacted a law prohibiting liquor consumption, the first state to take such an action. Twelve other states followed suit, however, the laws proved to be very difficult to enforce, and public support for the laws waned. By 1868 Maine was the only state left with a liquor prohibition law. In the 1880s a second wave of statewide prohibition efforts was launched. Much of the support for this movement came from middle-class, rural, Protestant and evangelical concerns that societal values were being eroded by immigrant ethnic groups of a different religion (for instance Irish Catholics), seen as having a lower standard of living and morality.

Between 1907 and 1919, 34 states enacted laws enforcing statewide prohibition. In 1920 national prohibition came into effect. Although well-meaning, Prohibition proved to be extremely difficult to enforce, and resulted in a significant increase of criminal activity connected with supplying alcohol to those who wished it. In 1933 this “noble experiment” was ended with the passage of the Twenty-first Amendment to the U.S. Constitution. (Ray & Ksir, 2004)

Since 1933, the problematic effects of excessive alcohol use have become
increasingly more apparent, as discussed in the previous chapter. With the formation and
growth of Alcoholics Anonymous, there has been a strong resurgence of a demonization
of alcohol, along with an increased stress on abstinence as the only effective approach to
alcohol dependent individuals.

Conceptual Model

The conceptual framework for this study is a biopsychosocial model (Hoffman, American Society of Addiction Medicine, Adult Criteria Task Force, & American Society of Addiction Medicine, Adolescent Criteria Task Force, 1991; McKay, Cacciola, McLellan, Alterman, & Wirtz, 1997). While the theoretical framework for this study is biopsychosocial theory, the study is not aimed primarily at extending theoretical knowledge. Rather the study is of a more applied nature, adding to the social work knowledge base by attempting to increase our ability to practically identify clients at greatest risk of premature termination from alcoholism treatment at the level of the individual treatment agency. The practical use of such knowledge is that if we were able to more accurately predict treatment dropout, we would be able to develop specific interventions targeted at those clients at greatest risk, and perhaps reduce the overall rates of premature treatment termination.

Biopsychosocial theory, currently more commonly referred to simply as psychosocial theory, can trace its roots to the very beginnings of social work in the United States. Originally it was a generic term, used as a bridge between psychological and sociological thinking. Later it was used to describe a particular approach in social work practice. Currently, in addition to representing a particular social work thought
system, it has taken on a more general usage among helping professions, reflecting a commitment to a broad perspective of human functioning. This is a term that fully belongs to the domain of social work.

In social work practice, it represents a body of theory that underscores an integrated focus on both psychological and sociological functioning. It examines both the individual’s personality as well as the person’s interactions with the external environment. It attempts to mobilize the strengths in both systems to help the client develop more effective personal and interpersonal functioning, as well as more functional coping skills for dealing with the external environment (Lakhan, 2006). Psychosocial theory relates to the social work tradition of seeking knowledge from all relevant sources.

In therapeutic interventions, psychosocial theory seeks a thorough understanding of biopsychosocial development, interpersonal influence, the influence of significant others, environments and systems which contribute to the development and maintenance of healthy and functional patterns of living. The theory includes an understanding of the person in the context of the individual’s current reality and utilizes this understanding in a therapeutic manner in the treatment of psychological, personal, interpersonal, and social problems the person may experience (Turner, 1996).

The psychosocial model has been applied to the treatment of alcohol abuse/dependence, and this has been clearly demonstrated over the past thirty years in a shift in the field from a univariate model of alcoholism to a multivariate model. This multivariate model seems well suited to studying the problem of alcoholism, since it is better able to take into account the complex, interactional and contextual aspects of the
condition (Schwartz, 1982). The unit of analysis in biopsychosocial theory is an integration of elements in the environment of the person, which results in an individual’s behavior in a given situation. Schwartz (1982) outlined the major principles of the biopsychosocial model as follows:

1. Causation is seen as multi-directional, multi-causal, and probabilistic.
2. Change in one aspect of the person-environment system can cause further change throughout the system.
3. There is reciprocity of transactions between the person and the environment.
4. Actions of a person are purposive, intentional, and goal directed.
5. The person does not always move towards an ideal state, but can also be self-destructive.
6. To understand the person, we must pragmatically study the individual in relation to his or her unique context, including historical, current, and future factors.

Over the past thirty years, there has been an acceptance of the Multivariate Model as a basis for understanding substance abuse. This model, which is clearly biopsychosocial in nature, has largely displaced the previous Unitary or Disease model of addiction. The Multivariate Model sees addiction as having multiple causes, stemming from difficulties in the several biopsychosocial domains of a person’s life. As previously noted, this multivariate view is heavily reflected at present both in the assessment instruments used in alcohol and substance abuse treatment, as well as in the treatment approaches common in treatment agencies in the United States.

The multivariate model implies that alcohol and substance dependence subsumes
a variety of syndromes, and an individual’s use of alcohol or drugs can be considered on a continuum, from non-use, to non-problematic use, to various degrees of harmful use. It also states that an individual’s development of problem use follows a wide range of patterns over time, and that abstinence bears no necessary relationship to rehabilitation. Psychological and physiological dependence are separate issues, and not necessarily related.

A multivariate approach to assessment and treatment encourages a better balanced, holistic view, and results in a more truly biopsychosocial framework. The multivariate model suggests that the type and magnitude of difficulties experienced by different clients in each of the biopsychosocial domains will vary significantly from client to client, and the nature and severity of these problems can contribute not only to the development of alcohol and substance abuse problems, but can also impact on the likelihood of a client dropping out of treatment. Due to the variety of difficulties a specific client can experience in the various biopsychosocial domains, it is necessary to test specific variables from these domains to determine those variables that are most closely associated with dropout.

As mentioned, the acceptance of the biopsychosocial approach to alcohol and drug abuse treatment is strong (Mee-Lee, 2005). This is clearly demonstrated by the American Society of Addiction Medicine’s Patient Placement Criteria for the Treatment of Substance-Related Disorders (ASAM PPC) (Hoffman, 1991). These criteria moved addiction treatment away from a fixed program approach to an assessment-based, clinically driven and outcomes-oriented continuum of care. The criteria’s development
and refinement represents a shift from a unidirectional to a multidimensional assessment, from a strict focus on alcohol abuse to a focus on all biopsychosocial needs. The criteria also represented a shift to treatment based on a comprehensive biopsychosocial assessment, and a continuum of care reflecting the nature and severity of the client’s biopsychosocial problems.

ASAM published the first set of criteria in 1991; a second edition was published in 1996, and revised in 2001. The 2001 PPC contain six assessment dimensions. These include acute intoxication or withdrawal potential, biomedical conditions and complications, emotional, behavioral or cognitive conditions or complications, readiness to change, relapse, continued use or continued problem potential, and the recovery environment, which assesses the need for specific individualized, family, or significant-other, housing, financial, vocational, educational, legal, transportation or child-care services (Mee-Lee, 2001).

This widespread acceptance of this shift from a univariate to a multivariate, biopsychosocial model is also reflected in the NJ-SAMS data collection instrument, which is based on an earlier instrument, the Addiction Severity Index, originally developed in the late 1970s by Thomas McLellan and colleagues (McLellan, Cacciola, Alterman, Rikoon, & Carise, 2006). That instrument, like the NJ-SAMS, did not reflect a unitary theory of the etiology of alcoholism, but rather focused on several domains of a client’s life, such as medical, legal, and psychiatric, family/social, employment, as well as drug and alcohol use. Such an approach reflects the instrument’s underlying grounding in biopsychosocial theory. Information is collected to support a comprehensive, holistic
assessment and evaluation of the totality of an individual’s life situation. It serves as the basis for treatment planning and intervention which deals with the range of bio-psycho-social elements in the individual’s life situation.

**Definition of Dropout**

In the past the definition of treatment “retention/dropout” has not been consistent across studies, nor has the measurement approach to dropout. Variations in the way dropout has been defined (e.g., patients who fail or refuse to return or are discontinued; (Baekeland & Lundwall, 1975) and measured (e.g., duration vs. sessions, did the client complete the required number of treatment sessions, vs. therapist’s judgment, meaning in the opinion of the therapist did the client complete treatment have contributed to the variation in findings in past studies.

For the purposes of our study, we define the dropout as those clients who either fail to start treatment following having received an intake assessment, as well as those who do start, but subsequently voluntarily leave or are discharged for non-compliance prior to the successful completion of treatment, as determined by a consensus of the clinical treatment team, consisting of the psychiatrist, the drug treatment counselor, and the psychiatric nurse. The clinical team based their judgment as to whether or not a client had successfully completed treatment the client’s successful achievement of the goals specified in the client’s treatment plan.

**Incidence and Outcomes of Dropout**

A number of studies have found that the dropout rate is a major problem in alcohol and substance abuse treatment, especially during the first 3 months (Baekeland,
Lundwall, & Shanahan, 1973; Monras & Gual, 2000). Dropout rates of 50%–80% during this time are typical (Fonsi Elbreder, de Souza e Silva, Pillon, & Laranjeira, 2011; Stark, 1992). Significant attrition rates are also seen for clients in outpatient alcoholism treatment (Newham, Russell, & Davies, 2010). Data collected at a Federal level, the Treatment Episode Data Set for 2005, also reflects unacceptably high rates of dropout (SAMHSA, 2008). Yet longer stays in treatment are associated with better outcomes (e.g., (Gerstein & Johnson, 2000; Romelsjo, Palmstierna, Hansagi, & Leifman, 2005; Stark, 1992).

In a classic study, Baekeland and Lundwall (1975) critically reviewed the literature on alcoholism treatment dropout. This study examined eight articles on outpatient alcohol treatment dropout and was weak on reporting the exact criteria and methods of the review. In outpatient treatment, their analysis found that 52% to 75% of clients had dropped out by the fourth session. This paper is important as an early article which highlighted the extent of the dropout problem, as well as attempting to identify variables across studies which seemed to be related to dropout.

Stark (1992), in another classic article, conducted a very extensive clinically oriented review of the existent literature on treatment dropout. He noted that the consequences of dropout were severe, with early dropouts having about the same outcome as untreated clients. His review was confined to the use of alcohol and illicit drugs, and reported the findings for alcohol and drug use separately. Stark found that for clients in alcoholism treatment, the dropout rates ranged from between 45% to 82%. For alcoholics, both Baekeland & Lundwall (1975) and Stark (1992), as well as Cutler and
Fishbain (2005) found that length of stay in treatment is strongly related to outcome. The Treatment Episode Dataset (TEDS) (2005) (SAMHSA, 2008) also showed a significant relationship between length of stay and the likelihood of completing treatment, both for subjects whose primary drug of use was alcohol, as well as for users of other substances.

The outcomes for program completers is more positive compared to dropouts. A study of 133 clients treated in a Veterans Administration intensive outpatient program in Vermont investigated the role of program graduation by comparing social outcomes and inpatient utilization the years before and after treatment among graduates and dropouts. The primary drug of use for the large majority of these clients was alcohol. There were no significant differences found in completers and dropouts on the variables of race, age, marital status, psychiatric illness, or on the seven Addiction Severity Index domain composite scores. Clients attended a total of twenty sessions, each lasting four hours. Treatment was a combination of educational, 12-step, family, and behavioral group therapies. Subjects attended three to five sessions per week. Program graduates were more likely to be abstinent at 6 months (75% vs. 13% for dropouts, p < .001), less likely to have a full relapse at 6 months (9% vs. 62% for dropouts, p < .001), and less likely to be incarcerated at 6 months follow-up (1% vs. 10% for dropouts, p = .01) than dropouts (Wallace & Weeks, 2004).

The literature has consistently shown that positive treatment outcomes are related to length of time in treatment (McKay, Gutman, McLellan, Lynch, & Ketterlinus, 2003; Satre, Mertens, Arean & Weisner, 2004; SAMHSA, 2008; Weisner, Ray, Mertens, Satre,
Completers are three times more likely than non-completers to be substance-free 1 year later (Baekeland & Lundwall, 1975). The problem of client dropout is particularly vexing in the area of early attrition, with a range of clients failing to return to treatment after the first intake visit. Many studies report between 24% to 47% of clients attend only one or two intake sessions but do not return for any treatment sessions (Weisner, Mertens, Tam, & Moore, 2001).

Some statistics on dropout rates are available on a national level. The Treatment Episode Data Set (TEDS) is a compilation of data on demographic characteristics and substance abuse problems of those admitted to agencies for substance abuse treatment (SAMHSA, 2008). A treatment episode consists on a period of time between a client’s admission and discharge from a specific treatment program. The data comes primarily from agencies that receive some public funding. The TEDS system collects data on treatment episodes, thus the statistics are based on treatment episodes, not on individual clients. The data from the TEDS study continues to show troubling numbers of clients dropping out of treatment.

A comparison can be made between the TEDS year 2000 data, and the 2005 data, the most recent year for which the most complete data is available. For the year 2000, TEDS was able to collect discharge data from eighteen states, comprising some 326,000 discharges. About half (51%) of treatment episodes resulted in successful treatment outcomes. Forty-two percent involved individuals who had completed treatment and another 9% involved those who were transferred to another treatment program. Another 49% of treatment episodes ended in unsuccessful treatment outcomes. In 24% of these
episodes, clients left treatment against professional advice, and another 18% were terminated by the facility. This comprises 42% of the sample that would be considered dropouts for the purposes of our study. Seven percent were discharged for other reasons. The TEDS 2005 data clearly shows that longer lengths of stay in treatment were strongly related to better outcomes in treatment, both for all substances reported on, and for clients whose primary drug of use was alcohol.

It is obvious from the above discussion that many programs have significant dropout rates and are expending considerable resources on individuals who do not complete the treatment process. There is a growing need for treatment agencies to be able to accurately predict which clients are at the greatest risk for dropout. If this could be accurately done, it might be possible to design interventions to reduce dropout rates, thus increasing the effectiveness and efficiency of substance abuse treatment.

**Predictors of Treatment Dropout**

Over the past 35 years, many studies have attempted to identify predictors of client dropout from alcohol and substance abuse treatment. Studies have focused on client characteristics, such as demographic and socioeconomic variables (age, gender, race, marital status, living situation, social isolation, education, employment, socioeconomic status, legal history, and family history of alcohol and/or substance abuse). Other client specific variables, such as psychiatric co-morbidity, substance use severity, treatment factors, and level of motivation for treatment have also been examined. Program characteristics and the client-counselor relationship have also been examined as possible predictors of treatment dropout/retention (Palmer, Murphy, Piselli,
& Ball, 2009). More recently, studies have focused on the role of motivation in treatment retention (Adamson, Sellman, & Frampton, 2009; Bottlender, Kohler, & Soyka, 2006; Heffner et al., 2010). These studies have examined a wide range of potential predictors for attrition, along several dimensions.

The literature on client attrition from alcoholism treatment is very extensive, and some approach to limiting the scope this literature review to make it manageable was needed. A decision was made to limit the review specifically to outpatient treatment and partial hospital programs, and to exclude studies where medications such as Antabuse were used to directly treat alcohol/substance abuse dependence.

A difficulty was encountered with the manner in which many of the studies found in the literature review categorized subjects. In many of the studies reviewed, clients were defined as “substance abusers”, even though some of their sample used alcohol as their primary drug. A number of these studies contained inadequate information to allow one to determine the percentage of subjects whose primary substance of abuse was alcohol. This difficulty appeared more prevalent in more recent studies, making it somewhat difficult to locate a sufficient number of recent relevant articles for the review. It is possible that the reason for this is that many outpatient substance abuse treatment facilities tend to think of their clients in these terms, although there are definite differences among different client sub-populations based on primary drug of abuse. An exception to this was the TEDS study, which contained more detailed information about the composition of the sample than many other studies. TEDS had by far the largest, and what appeared to be the most representative, sample and contained the most accurate and
detailed data of all the studies reviewed. In the review we attempted to evaluate the quality of the article’s methodological rigor based on the following criteria:

1. Consistency of the research question(s) with the study design - was the study designed in a manner which could potentially answer the research question(s)?

2. Sampling factors, such as the study population, the likely degree of representativeness of the sample, sampling techniques, such as random sampling vs. convenience sampling, and sample size. The composition of the sample. Such as factors of age, marital status/living situation/degree of social isolation, (living alone or with others), race, gender, education, employment/socioeconomic status, legal history, family history of substance abuse, level of motivation for treatment, drug(s) used, severity of substance abuse/dependence, presence of co-morbid psychiatric and/or other medical illness, and psychosocial functioning was examined.

3. Adequacy of data collection instruments (examining such issues as the reliability and validity of the chosen instrument(s), as well as the actual collection techniques).

4. Appropriateness of statistical analytic procedures used.

5. Validity of the conclusions arrived at, in the light of the strengths and weaknesses of the particular study.

Studies which came closest to meeting these criteria were given more credence than studies which fell short in one or more of the criteria. I review the “best” studies (in terms of the above criteria) in the body of the literature review. The review is structured on the following dimensions: 1) client characteristics, 2) client-clinician interaction, 3)
program characteristics/environment, and 4) practical barriers for clients.

Client characteristics

Many client variables have been examined to assess their degree of association with treatment dropout. These have included demographic and socioeconomic variables (age, gender, race, marital status, living situation, social isolation, education, employment, and socioeconomic status). While a number of these variables shown have shown weak and inconsistent levels of association with drop out (Maglione, Polinsky, & Anglin, 1998; Stark, 1992), others have more consistently shown at least fair levels of predictive validity for premature termination from treatment. The TEDS data, for instance, showed that variables associated with higher dropout rates were age, (with higher age predictive of successful treatment completion), gender, (females more likely to complete treatment in standard outpatient programs, males more likely in intensive outpatient), race/ethnicity, (with Hispanics and Blacks least likely to have successful treatment episodes), and employment, (with those employed full time more likely to complete treatment than those employed part-time or unemployed) (SAMHSA, 2008)

These variables and others which showed significant association with dropout are reviewed below:

Age: Some studies have found a relationship between age and treatment dropout, suggesting that there is moderate evidence that age is related to dropping out (Baekeland & Lundwall, 1975; Mertens & Weisner, 2000). The 2005 TEDS data, as well as other studies, showed that younger clients appear to be more likely to drop out of treatment (Kravitz, Fawcett, McGuire, Kravitz, & Whitney, 1999; SAMHSA, 2008).
In the Kravitz study, the Tridimensional Personality Questionnaire (TPQ) was used to measure a trait-like quality, novelty seeking, which seemed related to client impulsiveness. The researchers tested the hypotheses that higher TPQ Novelty Seeking subscale scores would be associated with increased rates of treatment dropout and increased risk for dropping out earlier. A non-random sample of 170 alcohol-dependent men who participated in a double-blind, placebo-controlled pharmacotherapeutic trial for decreasing relapse drinking completed the TPQ and were monitored until treatment dropout. The mean Novelty Seeking score was significantly higher among study dropouts compared with non-dropouts (p<.003). Higher Novelty Seeking scores were associated with a higher adjusted odds ratio for dropping out (adjusted odds ratio = 1.07, 95% confidence interval [CI] = 1.00-1.15) and a higher adjusted hazard rate for dropping out earlier (adjusted hazard rate = 1.05, 95% CI = 1.00-1.09) (Kravitz, et al., 1999).

Studies examining attrition after intake found that clients younger than 30 years of age were more likely not to return to treatment. Weisner et al. (2001) examined correlates of dropout for individuals who were seen for one visit, accepted for treatment, but did not return to actually begin the program. This was a well designed study with a relatively large if non-random sample, which employed a sophisticated statistical analysis. The goal was to identify characteristics that predict treatment initiation. The design involved in-person structured interviews conducted with consecutive client admissions to a large chemical dependency treatment program, an HMO, in Sacramento, California.

The sample size was 1204 clients, and the health plan's automated registration
data were used to determine treatment attendance. Those who returned following an intake interview to begin treatment were compared with those who did not. Study subjects were individuals age 18 or over admitted to the program. Study variables included DSM-IV alcohol and drug dependence and abuse, Addiction Severity Index problem severity, motivation and treatment entry measures. Age (greater than 30 years) was found to be correlated with an increased likelihood of starting treatment. Measures of motivation, such as work-place pressures and the patient's perception of the importance of alcohol treatment, predicted starting treatment for individuals who were alcohol-dependent only or alcohol- and drug-dependent. The researchers concluded that screening at intake may identify those at risk of not returning after admission to start treatment. The researchers suggested that clinicians might consider making additional efforts during the intake process to engage individuals who are unemployed and have drug (as opposed to alcohol) disorders and less motivation.

Jackson et al. (2006) conducted a study at an urban outpatient treatment in England to identify factors that predict attendance for the start of treatment following assessment, and factors that predict retention in treatment. Participants consisted of 419 consecutive clients (272 male and 147 female) who had been assessed over a two-year period and had chosen out-patient care. These included 141 who did not attend treatment (non-starters), 106 who attended only once (starters), and 172 who attended more than one session (retainers). Independent variables included factors that previous research or clinical experience suggested might influence attendance, such as demographic factors, clients' support and mental state, substance use and aspects of clinical practice.
Independent variables included age, sex, gender, employment, marital status, support network and whether clients live alone or not. Other variables examined were whether clients were receiving treatment for mental health problems and, as a further indicator of mental state, whether clients had attempted suicide. In addition, the study considered the range and intensity of use of alcohol and other substances, specifically: level of dependence on alcohol; typical number of units consumed per day; and whether a client was concurrently using non-prescribed illicit drugs. Two factors relating to the service were also considered: waiting time before treatment and distance from home to the clinic, both of which had been found to affect attendance. Additional factors included the type of treatment that the client chose, the referral agent, and as an indicator of motivation, whether the client contacted the clinic after assessment to confirm that their treatment option had been agreed. Univariate analyses and multiple logistic regression analyses were conducted to identify factors predicting whether clients attended the first treatment session and whether they continued to remain in treatment. The study found that those clients who were most likely to be retained in treatment were older.

Results of the TEDS 2005 study multivariate analysis found that for outpatient treatment, subjects over 40 years of age were 9% more likely to complete treatment than subjects younger than forty, and for the intensive outpatient population subjects over 40 years of age were 10% more likely to complete treatment (SAMHSA, 2008).

Mason and Luckey (2003) compared a sample of ninety-eight young adults (18 to 25 years of age) drawn from an alcohol treatment sample from two large urban settings in the United States with 922 older adults. The findings indicated that the young adult
sample differed significantly from older subjects in the study on five domains. These were education and employment, relationships, mental health, alcohol and drug use, and Alcoholics Anonymous involvement. Regarding the first domain, appeared that the young adults were likely to be at greater risk for not successfully transitioning out of treatment and into gainful activity such as employment. Research has demonstrated that being less educated and unemployed are risk factors for not completing treatment; therefore, this domain could signify a need for an intervention targeting educational and employment issues with the young adults.

The relationship domain underscored the dependency of young adult group with high-risk living environments. Young adults may have less choices or options in deciding where and with whom to live. They reported experiencing more familial conflicts (more than half of the days for the last 12 months) than the remainder of the sample. It is possible that they were more likely to experience a problematic influence of a home environment where others were engaged in substance abuse. Differing living situations may produce different outcomes.

The mental health domain also differentiated the younger from the older group of subjects. The younger group had a higher percentages of clients that reported experiencing hallucinations in the twelve months prior to intake (18% vs. 6%), suicide attempts (39% vs. 25%), overnight stay in a hospital for mental treatment ( 39% vs. 27%), and difficulties understanding, concentrating, or remembering (61% vs. 40%).

Regarding drug and alcohol use, the younger group was more likely to have used drugs or alcohol more than weekly in the twelve months prior to intake (84% vs. 44%).
Greater frequency of alcohol and/or drug use has been associated with increased risk of dropout (SAMHSA, 2008). Finally, the young adults attended less AA meetings in the past 30 days than did the remainder of the sample (Mason & Luckey, 2003). Based on the review of these studies, it does appear that age is correlated with treatment dropout, with younger clients being more likely to drop out of treatment.

**Gender:** Comparatively little research specifically related to the effects of substance abuse treatment on women was available prior to 1988. In that year Congress passed the Anti-Drug Abuse Act, which mandated that 10% of the monies for grants to public, private, and not for profit agencies be set aside for the funding of demonstration treatment programs for substance abusing pregnant and postpartum women and their infants. The availability of these funds served as an impetus for increased research on women’s treatment services (Kandall, 1996).

Research shows that a number of differences exist between women and men substance abusers (Grella & Hser, 1997; Nelson-Zlupko, Kauffman, & Dore, 1995). Women show unique biopsychosocial characteristics associated with alcohol and substance abuse. Differences have been found to exist in levels of self-esteem, rates and types of mental health problems, and level of stigma associated with substance abuse (SAMHSA, 1997).

Women are likely to experience more difficulty entering and remaining in treatment due to gender specific barriers such as child care, finances, stigma, lack of family support for treatment, and difficulty with confrontational types of treatment (Vannicelli & Nash, 1984). Vannicelli (1984), in a classic article identified three sets of
barriers to effective treatment for alcoholic women: 1) the impact of negative myths and expectancies (in particular, the myth that women do worse in treatment); 2) the impact of stereotyped sex-role expectancies which may limit and constrict women's potential for growth; and 3) the impact of the knowledge gap (i.e., the treatment needs of women).

This was a well done study which included a meta-analysis of a decade of research studies, as well as clinical experience. The major limitation of the study is its age, although Vannicelli’s findings are similar to those of other, more recent studies reviewed. Weisner et al. (2001) found that gender was correlated with an increased likelihood of starting treatment, but only for women who were dependent on alcohol. Control variables included primary drug of use, employment, drug severity scores, and motivation.

The TEDS (2005) data found that female subjects treated in standard outpatient programs were 10% more likely to complete treatment, while for the intensive outpatient programs males were 9% more likely to complete treatment. Some research suggests that women are more likely to complete treatment if it occurs in the context of specialized women’s addiction treatment programs (Ashley, Marsden, & Brady, 2003; Niv & Hser, 2007; Orwin, Francisco, & Bemichon, 2001; Zilberman, Tavares, Andrade, & El-Guebaly, 2003). There are a number of possible explanations for this. Some authors have suggested that traditional substance abuse treatment, based on a twelve step/disease model approach, emphasizes the importance of clients admitting their “powerlessness” over the substance to which they are addicted. They suggest that this approach is ill suited to the reality of many female addicts, who experience strong feelings of
powerlessness in their lives, and that an approach stressing an empowerment model is more appropriate. Women’s living situations and needs are often quite different from those of men. Programs that incorporate elements of parenting skill training, medical issues relevant to women and that provide child care and transportation are more likely to attract and hold women (Vannicelli & Nash, 1984).

Green, Polen, Dickinson, Lynch, & Bennett (2002) studied gender differences in treatment process indicators among 293 HMO members recommended for substance abuse treatment. The participants in this study were 102 women and 191 men assessed and recommended for outpatient substance abuse treatment. The mean age for men was 40 years, for women 36 years. Over 80% of the sample was Caucasian, 12% was Black, and the remainder “other”. Twenty-two percent of the men and 12% of the women had less than a high school education. Forty-seven percent of the men and 53% of the women used alcohol only, while 23% of the men used alcohol and another drug, compared to 33% of the women. Dependent variables were initiation of treatment, treatment completion, and number of hours spent in treatment. Predictor variables included demographic, social, and health related data, diagnosis and severity of alcohol and/or drugs, motivation to change, and Addiction Severity Index composite scores. A series of logistic regressions were performed to test the predictive validity of the independent variables for treatment initiation, completion, and number of hours spent in treatment. Initiation, completion, and time spent in treatment did not differ by gender, but factors predicting these outcomes differed markedly. Treatment completion was predicted in women by higher income and legal/agency referral; in men, by older age. Failure to
complete was predicted in women by more dependence diagnoses and higher Addiction Severity Index employment scores; in men, by worse psychiatric status, receiving Medicaid, and low motivation for entering treatment. More time spent in treatment was predicted, in women, by alcohol or opiate diagnoses and legal/agency referral; in men, by fewer mental health diagnoses, and higher education.

A 2001 study examined predictors of participation and retention for patients treated at an urban, hospital-based outpatient substance abuse treatment clinic. Subjects (N=268) were consecutive admissions to an abstinence-oriented, urban, hospital based, publically funded outpatient treatment program. All patients were interviewed using the Addiction Severity Index (ASI) at the time of admission. Clients were categorized into one of three mutually exclusive groups based on lifetime substance use problems. These were alcohol only – (N=72), drug only (N=51), and alcohol plus drug (N=145). Alcohol-only patients were significantly older, more likely to be Caucasian, married, have less than a high school education, and be employed than drug-only or alcohol and drug patients. Using multiple regression analysis, substance use status did not predict treatment participation and retention, whereas race, gender and employment composite score were significant predictors.

Regarding gender, men were found to be more likely to complete treatment than women, when controlling for race/ethnicity, marital status, type and severity of drug use, and employment situation (McCaul, Svikis, & Moore, 2001). The increased likelihood of women dropping out rather than males may be related to the fact that treatment was given in a mixed-gender group setting. The treatment content may not have been perceived as
relevant to many of the female clients. There is some evidence that women do better in single-gender treatment, when the content is tailored more to women’s issues, such as female reproductive health, parenting, and problem areas such as domestic violence.

What is the availability of such women specific programming? Based on information from the 1998 Uniform Facility Data Set (UFDS), a national survey of substance abuse treatment facilities in the United States, 19% offered special programs for pregnant or postpartum women, and 28% offered special programs for other groups of women. Only 9% of all facilities offered child care, 7% offered prenatal care, and 5% offered perinatal care. Over a third of the facilities offered some form of transportation to treatment (SAMHSA, 1998).

What program organizational characteristics seem to be correlated with attracting and retaining women in treatment? Tinney, Oser, Johnson, & Roman (2004) conducted a series of bivariate and multivariate analyses to identify organizational characteristics associated with higher percentages of women in treatment. The design of the study was correlational and exploratory. The sample of agencies (n=365) for the study was drawn from the 2002 National Treatment Center Study, a representative national study of private sector alcohol and drug abuse treatment centers. The study sought to provide a perspective on the ways in which organizational context factors contribute to the availability of women’s specialized programs and how this is in turn related to treating a higher percentage of female clients. The dependent variable was the percentage of predominantly female caseloads. The following program services/characteristics appeared correlated with an agency having a predominantly female caseload:
1. The provision of child care services for the client.


4. Having a higher percentage of counselors with advanced degrees – Masters level and above.

5. Receiving a higher percentage of referrals from mental health clinics and a lower proportion from work based sources such as employee assistance programs.

6. Acceptance of a higher proportion of Medicare/Medicaid clients.

Other studies suggest that a key element in attracting and retaining female clients is the tailoring of the program to female alcoholic and substance abusers’ unique needs. Previous studies had found significantly lower rates of treatment entry, treatment retention, and successful treatment outcome for women than men (Blume, 1990; Reed, 1985; Stevens, Arbiter, & Gilder, 1989). It appears that simply providing the same treatment while segregating the clients by gender seems to have no positive effect on retention or outcome.

Blumenthal (1988) has suggested that, if higher numbers of women were to be retained in treatment, programs would have to address the gender differences in the etiology of addictive disorders in women, and modify program approaches and content to target the unique needs of women. There are few studies in the literature, however, that have empirically investigated this. Copeland found that the provision of gender-specific
treatment without altering program content and treatment approach had no effect on the outcomes for female clients (Copeland & Hall, 1992).

Other researchers have found evidence that specialized services for women can increase both retention and outcomes of women in treatment, but the number of controlled studies is quite limited. Of these, Dahlgren and Willander (1989) randomly assigned 200 women to either a regular ward/alcoholism treatment center or a women only outpatient or residential center. Results were compared after two years. Clients treated in the specialized women’s unit showed more positive results both in terms of rates of alcohol consumption and social adjustment, including employment status.

A second controlled study, however found no difference in either retention rates or outcomes. Dodge & Potocky-Tripodi, (2001) compared retention rates and changes in levels of self-esteem, social support, depression, and severity of addiction among 89 women in three treatment programs: gender-specific, mixed-gender, and a combination of gender-specific and non-gender-specific treatment. None of the three groups demonstrated differential improvement on any of the outcomes, nor did they show any significant differences in retention rates.

Bride (2001) attempted to control for a number of potentially confounding variables found in the above studies, by comparing the retention and completion rates between single and mixed gender treatment in one agency, which had changed over time from single to mixed gender programming. The agency did not change its philosophy or treatment approach, nor add any new programming specific to unique woman’s issues. This at least partially controlled for these variables, which had been uncontrolled in
previous studies. Because this study was longitudinal, however, it may have been somewhat vulnerable to history effects. The study design was a quasi-experimental, retrospective cohort design. The sample included 305 men and 102 women. No significant differences were found in either retention rates or outcomes among the groups. This lent support to the position that gender-specific groups must go beyond just providing a women-only environment to impact on retention rates and clinical outcomes for women.

**Race/Ethnicity:** Understanding racial disparities in alcoholism treatment completion is especially important because racial/ethnic minorities experience a disproportionate burden of alcohol-related health consequences. Results on the relationship between client race and treatment attrition have resulted in somewhat equivocal findings. Some studies have shown that clients completing treatment were more likely to be Caucasian or Hispanic (Carroll, Libby, Sheehan, & Hyland, 2001; SAMHSA, 2008). Weisner et al. (2001) found that dropouts were more likely to be Black or Hispanic. Completers were more likely to be White. TEDS (2005) found that for standard outpatient programs, being non-Hispanic White increased the likelihood of completing treatment by 26%, and for intensive outpatient programs by 28%.

As had been suggested earlier, race may be a “proxy” for other variables which more directly influence the likelihood of dropout. A 2006 study assessed the racial and ethnic differences in completion rates from publicly funded alcohol treatment programs, and attempted to estimate the extent to which any identified racial differences in completion rates are related to differences in patient characteristics. The researchers used
administrative intake and discharge records from all publically funded outpatient and residential alcohol treatment programs in Los Angeles County during 1998-2000. Subjects were African American, Hispanic and Caucasian clients discharged from those programs who were 18 years and older, and who reported alcohol as their primary substance of use (N=10,591).

Bivariate analysis identified differences in rates of treatment completion by patient characteristics. Logistic regression models assessed the contribution of differences in patient characteristics to differences in treatment completion. Lower completion rates for African American (17.5%) relative to Caucasians (26.7%) were partially explained by differences in patient characteristics in outpatient care. Most of these differences were related to indicators of economic resources (employment, homelessness, and receiving Medicaid benefits). Differences in completion rates between Hispanics and Caucasians were not found. The study concluded that significant differences in the rates of outpatient treatment completion between African American and White clients are partially due to economic differences among patients, however other factors related to these differences are unexplained (Jacobson, Robinson, & Bluthenthal, 2007b).

In a follow up study to further investigate the potential causes for the large racial disparities in completion rates from alcoholism treatment programs in urban environments, Jacobson, et al. (2007a) suggested that the neighborhood conditions in the areas where treatment programs are located may influence client outcomes. Patient records for all non-homeless African American (N=1,677), Hispanic (N=1,635), and
White (N=1,216) alcohol outpatients, ages 18 or older, discharged during 1998–2000 from publicly funded treatment programs in Los Angeles County, the second largest system of publicly funded substance abuse treatment in the United States, were combined with census data. Their study tested the hypothesis that racial differences in treatment completion are related to differences in neighborhood context, particularly neighborhood-level disadvantage.

The researchers found, based on estimates from multilevel statistical models, that neighborhood disadvantage was significantly associated with treatment competition after controlling for patient characteristics and facility and zip code level random effects. Results from regression model estimates indicate that racial differences in treatment neighborhood disadvantage account for 32.3% of African American–White differences in treatment completion. Hispanic–White differences in completion, and the effect of home neighborhood disadvantage on completion, were non-significant. The study concluded that the location of publicly funded alcohol treatment programs is related to racial disparities in treatment completion, but additional research is necessary to understand the mechanism behind this association.

**Education:** A number of studies have found an association between a subject having more years of education and a reduced likelihood of dropping out of treatment. It appears that education is a significant predictor of treatment completion, with clients with 12 years or more of education more likely to complete.

The 2005 TEDS survey found that clients with 12 or more years of education (vs. those with fewer than 12 years) were 28% more likely to complete treatment or to
transfer to further treatment. Subjects having 12 or more years of education were 5% more likely to finish standard outpatient treatment and were 14% more likely to complete intensive outpatient treatment than those with less than 12 years of education.

Tam, Weisner, & Mertens (2000) compared the epidemiological characteristics of alcohol-only and alcohol-and-drug dependent clients in a treatment sample, to assess the existence of different treatment needs. Subjects were patients admitted to treatment at a health maintenance organization’s chemical dependency program. Data was collected by interviewing using a structured questionnaire. The sample included 491 alcohol-only and 217 alcohol-and-drug dependent clients. Demographic characteristics, lifetime and current substance use, Addiction Severity Index composite scores, and DSM-IV criteria for alcohol and drug dependence were assessed at admission. The odds of alcohol-and-drug dependence were higher among males, African Americans (when compared with Whites), those who were younger, and those with less than college education. Since other studies (SAMHSA, 2008) have found that the combined use of alcohol and other drugs, as opposed to use of alcohol only, increases the likelihood of dropout, the fact is that those clients with less than a college education were likely to be at increased risk of not completing treatment. This study suggests that the lack of education may also be associated with an increased likelihood of multiple drug use, leading to increased risk of dropout.

Wickizer et al. (1994) conducted a study to analyze completion rates of clients in drug and alcohol abuse treatment programs in Washington State and to assess the factors associated with treatment completion. Subjects whose primary drug of use was alcohol
were analyzed separately from those whose primary substance was various illicit drugs. Data was obtained on 5,827 client records contained in the Washington State Substance Abuse Monitoring System. The dependent variable was treatment completion or failure to complete treatment. Independent variables included gender, race/ethnicity, age, education, monthly income, living situation, marital status, primary, secondary, and tertiary drugs used, and referral source. Logistic regression was performed to determine the independent predictors of treatment completion. For intensive outpatient alcohol treatment programs, education was found to be a significant predictor of treatment completion, with subjects with more education being more likely to complete treatment. Education was not a significant predictor for completion for subjects in the standard outpatient programs.

Living Situation/Social Isolation: Based on the literature review this area seems to have received considerably less attention than other characteristics. No articles directly relating living situation and degree of social support to the likelihood of treatment completion in outpatient alcoholism treatment could be located, so related literature to treatment dropout was utilized. O’Brien et al. (2009) conducted a literature review on disengagement from mental health services, and the variables associated with dropout. The study found that dual diagnosed clients (psychiatric illness and alcohol/substance abuse disorders) were particularly difficult to engage and hold in treatment. Other factors found to be relevant are being single or divorced and either living alone, without family in a hostel or being homeless. Some of these may reflect a more general alienation from society as well as from treatment services.
Sinha (2001) conducted a meta-analysis on the general effect of social support on the outcome of therapeutic interventions. The author conducted an exhaustive review of studies published up to 2007. Twenty-seven studies were located. The results demonstrated a small correlation ($r=.13$) between degrees of social support and successful psychotherapy outcome, suggesting that social support played a modest but significant role in successful completion of treatment.

Walter et al. (2006) studied the risk of relapse faced by alcohol dependent patients after detoxification. Patients had completed a comprehensive baseline assessment, including a stress coping questionnaire (SVF120). Socio-demographic information was also collected. A logistic regression analysis was used to evaluate the impact of stress coping styles, as well as the effect of pretreatment drinking and social characteristics on relapse. Approximately half the patients (49%) relapsed within 1 year after treatment. Significant predictors of relapse were social factors related to living situation (living alone), marital status (being separated from the spouse) and pretreatment frequency of alcohol intake. These findings suggest that partnership with significant others (family or spouse) is more relevant for the risk of relapse than stress coping styles. Although this study was not directly related to our research question, it seems likely that the effects of a subject’s living situation may also be relevant to our sample.

A 2002 study examined the environmental contexts surrounding resolution of drinking problems among problem drinkers with different help-seeking experiences. The study highlighted the positive impact of social support, including family encouragement to continue treatment, and the social support subjects received from Alcoholics
Anonymous participation as contributing to the likelihood of treatment completion (Rudolf & Priebe, 2002). Based on the literature it appears that there is a relationship between social isolation, as reflected in the person’s living situation, and the likelihood of dropout. A possible reason for this is that more isolated individuals may lack the ongoing encouragement and support of significant others to continue in treatment.

**Psychiatric Functioning:** Psychiatric functioning has been studied by examining a number of different variables. These have included client depression, anxiety, and aggressivity. These symptoms have been measured using the SCL-90, the Addiction Severity Index psychiatric composite score, and the Minnesota Multiphasic Personality Inventory. Other studies have examined client personality factors as being related to attrition such as sensation seeking and antisocial personality traits. Ross reported that approximately 65% of studies she reviewed (n=25) showed either a positive relationship between higher psychiatric impairment and increased attrition or no association, thus concluding there was little evidence for a direct relationship between psychological distress at admission and later attrition (Ross, Cutler, & Sklar, 1997).

In two studies, the differential effects of depression and anxiety appeared related to attrition. Low levels of anxiety and high levels of depression were related to treatment retention (Kirby, Marlowe, Lamb, Platt, & 1997; Lamb, Marlowe, Festinger, & Kirby, 1994). However, other studies have not found significant relationships between psychiatric functioning and attrition. Kleinman (1992) found no significant associations between SCL-90 scores and retention in an outpatient treatment for cocaine and crack abusers. Stark and Campbell (1988) found high rates of early attrition, but the attrition
did not appear to be directly related to the severity of psychiatric symptomatology. Antisocial personality disorder has been associated with higher dropout rates in some substance abuse studies, (Stark, 1992). Other studies (Carroll et al., 1994; Haller, Knisely, Elswick, Dawson, & Schnoll, 1997) were not able to replicate this finding. Kravitz et al., (1999) found higher novelty seeking scores were related to attrition and Helmus et al., (2001) replicated this finding, although only in long-term retention.

**Employment:** Studies have shown clients without skilled occupations, and with fewer months of employment in the past year from treatment initiation, or who are unemployed were more likely to drop out of treatment (Mammo & Weinbaum, 1993; Gottheil, Sterling, & Weinstein, 1997). Finally, Weisner et al., (2001) found clients with family incomes over $20,000 were more likely to attend treatment after an intake session than clients with family incomes of less than $20,000.

**Coercion:** Many clients entering alcoholism treatment are “involuntary clients” in that they have been pressured to seek treatment from a variety of sources such as family members, spouses or significant others, employers, or legal or public agencies such as the courts or child welfare agencies. Agencies such as the New Jersey’s Division of Youth and Family Services can exert pressure on individuals to enter and complete treatment. In the past, such clients were thought to be less likely to successfully complete treatment; however, studies have found that such clients are at least as likely to complete treatment as “voluntary” clients, if not more likely.

The TEDS study (SAMHSA, 2008) found that for all treatment services combined, clients mandated to treatment by the criminal justice system (vs. those referred
by other sources) were 9% more likely to complete treatment or to transfer to further treatment. For outpatient treatment, the effect of a criminal justice referral was much greater, with 58% of such individuals completing treatment or being transferred to further treatment, due to their special needs. For intensive outpatient treatment, the percentage of completion or transfer for further treatment was 34%. These findings strongly suggest that clients coerced into treatment are not handicapped by such a referral, and indeed have a fairly good chance of treatment completion.

Although the importance of coercion in entry to treatment for alcohol problems is currently recognized, few studies have focused on different types and levels of coercion among heterogeneous groups of clients entering treatment agencies. A study by Polcin and Weisner (1999) focused on the demographic characteristics and ASI problem severity associated with various sources and levels of coercion. The study was conducted in Northern California, with private and HMO treatment programs \((n=927)\) and included consecutive admissions of individuals entering public \((n=298)\), HMO \((n=334)\), and private \((n=295)\) alcohol treatment programs. Therapeutic approaches in these settings varied and included social, medical, and psychological models of treatment. The gender distribution in the sample was 65% male \((n=608)\) and 35% female \((n=320)\). Thirty percent were married or living together as married. Most clients were between the ages of 25 and 44, with 30% between 25–34 and 36% between 35–44. Thirty two percent of the sample reported an income over $35,000; 27% $10,000–35,000; and 41% less than $10,000.
Over one-half of the sample was educated at the high school level or above (51%), 27% had at least some college or technical training, and 22% had less than a high school education. The distribution by ethnicity included 54% who identified themselves as White, 33% as African-American, and 5% as Hispanic.

Level of coercion was a count of respondent responses to a question asking whether any of the following had given an ultimatum to enter treatment: mothers, fathers, sisters, brothers, sons, daughters, friends, welfare, police or courts, workplace colleagues, supervisors, physicians or other healthcare workers, or clergy. The largest proportion of respondents reported an ultimatum from family members, although more of those married received an ultimatum than those unmarried.

Logistic regression analysis was used to assess the importance of demographic characteristics and ASI problem severity in predicting whether respondents had received an ultimatum to enter treatment or not. Individuals over age 60 were only about one fourth as likely as those aged 40–49 to report receiving an ultimatum ($p<0.05$), and African-Americans were about two thirds as likely ($p<0.05$) as Whites. Respondents who were not married or living with a partner were about two-thirds as likely as others to report an ultimatum ($p<0.01$). In regard to problem severity, clients above the mean on legal severity were over twice as likely to report an ultimatum ($p<0.001$), and those above the mean on family severity were one and one half times as likely to report an ultimatum ($p<0.05$).

These findings suggest that treatment professionals in alcohol programs need to assess a variety of problem areas in addition to alcohol dependence when treating patients
who are referred from other institutional sources. Pressure to enter treatment, even when measured in the extreme form of ultimatums, cannot be assumed to indicate higher levels of alcohol severity, but rather, may indicate the existence of family, social, drug, legal or psychiatric problems needing to be addressed in treatment. It may also indicate the potential of the use of family members to repair or rebuild social supports.

**Type and Severity of Alcohol and Drug Use:** TEDS (2005) found that for all discharges combined (from all treatment programs), the strongest predictor of treatment completion or transfer to further treatment was the use of alcohol rather than other drugs. Clients discharged from all types of service combined were 82% more likely to complete treatment or to transfer to further treatment if their primary substance was alcohol, after taking into account all other characteristics associated with that outcome.

The use of alcohol as a predictor was followed by all seven of the other variables, used in a multivariate analysis, although their influence was much weaker. These included daily use of alcohol (21%), being over 40 years of age at admission (19%), having 12 or more years of education (14%), being White (13%), referral to treatment by the criminal justice system (9%), being employed (7%), and being male (5%). The strongest predictors of outpatient treatment completion or transfer to further treatment were referral to treatment by the criminal justice system (58%) and the use of alcohol as the primary substance (48%). The strongest predictors of intensive outpatient treatment completion or transfer to further treatment were the use of alcohol as the primary substance (36%), and/or referral to treatment by the criminal justice system (34%).

Mertens and Weisner (2000) studied an insured population in outpatient treatment
in California. They recruited all eligible intakes to a health maintenance organization's outpatient alcohol and drug treatment program during a 2-year period and obtained a sample of 317 women and 599 men. The programs, day hospital and traditional outpatient modalities, were abstinence based. Logistic regression analysis was used to identify independent predictors of length of stay and program completion. One general pattern of prediction of greater retention for both men and women was found, that of fewer and less severe alcohol and drug problems.

Veach, Remley, Kippers, & Sorg (2000) studied whether the variables gender, age, employment status, number of problems on the treatment plan, referral for driving while intoxicated (DWI), marital status, race, and primary substance (including alcohol) used were predictive of retention in treatment in an intensive outpatient program. This study examined computerized records, ex post facto, from client admissions. The dependent variable in this study was retention. This was a dichotomous variable in that clients were either retained or dropped out of the treatment program. The sample included 509 adult men and women clients who were admitted to an outpatient substance abuse treatment program during an 18-month period. There were about three times as many men in the sample as there were women, which is not unusual for an alcohol and substance abuse treatment program. Three-quarters of the sample (75%) were between the ages of 26 and 47. Most of the sample (83.5%) was employed. About half of the subjects (47.3%) were married, and 59% were Euro-American, 40% were African-American, and 1% were classified as other. Alcohol dependence was the primary diagnosis for almost half of the sample (49.9%). Cocaine dependence (22.7%) and
cannabis dependence (13.6%) were the other leading primary diagnoses. Rates of retention for employed clients (74.1%) and those diagnosed with alcohol dependency (79.6%) exceeded the overall rate of retention. Clients whose primary drug of use was alcohol were more likely to be retained in treatment than clients whose primary drug of use was other than alcohol.

**Client Motivation:** It would seem obvious that treatment retention would be related to client motivation. Ryan, Plant, & O’Malley (1995) found motivation at treatment entry was predictive of client involvement and retention in alcoholism treatment. Also Weisner et al. (2001) found that clients who rated their need for alcohol treatment as extremely important were more likely to start treatment. However, other studies have not shown motivation to be related to treatment (Donovan, Rosengren, Downey, Cox, & Sloan, 2001; Morgan et al., 1998). As Hser (1998) points out, the results of client motivation and readiness for treatment and attrition are limited but promising. Inexact and poorly defined measures of motivation (indirect measures, global clinical impressions, etc.), as well as evolving conceptual distinctions regarding motivation (readiness to change versus readiness for treatment) are likely to contribute to these equivocal results.

Shen, McLellan, & Merrill (2000) studied the relationship between patients’ motivation for treatment and their post treatment improvements in the areas measured by the Addiction Severity Index (ASI; alcohol, drug, medical, psychiatric). They examined how the effects of clients’ perceived needs for treatment contributed to their use of treatment and their reported change. Clinical interview data (N= 696) collected using the
ASI from the Target Cities Project in the city of Philadelphia in 1993 and 1995 were used. It was found that clients’ motivation made a substantial difference in their improvement following treatment in all problem areas.

Clients who said treatment was even slightly important on the ASI at admission made more changes than clients who reported that treatment was “not at all” important. Even when the motivation groups were approximately equated for lifetime problem severity there was still a significant effect of recent motivation as expressed on the ASI. These data are consistent with other findings from the “stage of change” literature suggesting that treatment is only important for patients who are ready or at least somewhat motivated to receive it. These findings underscore the importance of efforts to increase patients’ readiness for treatment in order to achieve better treatment effects.

Interaction Between Therapist Characteristics and Client Characteristics

Differences in retention rates by clinician have been noted. Najavits and Weiss (1994) conducted an empirical review of differential therapist effectiveness in treating clients with substance abuse disorders. They addressed four major questions: 1) How much variation is there in therapist effectiveness? 2) What are the therapist characteristics (e.g. personality variables, socio-demographic characteristics, in session behavior) that are related to therapist effectiveness? 3) What are the best designs for research studies examining therapist effectiveness? 4) What are the therapist characteristics that maximize a therapist’s effectiveness with substance abuse clients?

The emphasis was on comprehensively reviewing the literature on the differential effectiveness of therapists who were similar on such variables as training, experience,
theoretical orientation, and clinical setting. Therapist effectiveness was defined as the amount of client improvement that could be attributed “solely to the therapist, rather than to patient characteristics type of treatment, or other influences” (Najavits and Weiss, 1994, p. 680). The authors noted the inherent difficulty in their task, of separating out all the other factors contributing to client outcome, and attempted to address this difficulty in their choice of articles for their review. They examined two aspects of therapist effectiveness: client symptomatic improvement from pretreatment to post treatment, and patient premature termination from treatment. The researchers identified in-session “Interpersonal Functioning” (referred to as empathy, genuineness, respect, and concreteness) as the only variable consistent across the studies they reviewed as related both to positive treatment outcome and treatment retention.

**Differences in outcome by therapist:** One study specific to alcohol treatment was found. Miller, Taylor, & West (1980) studied nine paraprofessional therapists conducting short-term behavioral treatment with alcoholics. The sample of clients being treated consisted of a non-random sample of 41 clients recruited through local news media. Of the 41 subjects, 21 were male, 20 female, with a mean age of 41 years, and a median income of $21,900. The majority of the subjects were Caucasian. The outcome measure was patients’ drinking at 7 months. When outcome results for all patients within each therapist’s caseloads were averaged, the least effective therapist showed only a 25% rate of successful patient outcomes while the most effective therapist had a rate of 100%.

The degree to which the 9 counselors in the study displayed “Accurate Empathy” was found to be related to the differential success of the therapists. Guidelines for rating
the degree of empathy displayed by each therapist were based on the Traux Accurate Empathy Scale (Truaz & Cakhuff, 1967). The degree of empathy shown by each therapist was independently rated by the three authors of the study, who participated in the clinical supervision of the counselors. The amount of empathy shown by the therapists accounted for 67% of the therapists’ outcome results. Therapists’ experience level was not related to either empathy or outcome.

Differences in retention/attrition rates by therapist: Only one study was found indicating that there were differences in clinical outcomes from therapist to therapist treating alcohol abusing/dependent clients in similar or the same settings. Rosenberg, Gerrein & Manohar (1976) evaluated 16 alcohol counselors at Boston City Hospital during a one-year period. They found that counselors’ average patient attendance rates ranged from 27% to 67% during 18 weeks of treatment. As early as 9 weeks into treatment, a significant difference in dropout rate could be found among counselors. Neither patient variables nor completion of a one-year training program by the counselor affected retention rate. This area needs further research, since it may help to at least partially explain some of the striking variance in findings we see in many studies of client retention and outcome in treatment.

Practical Barriers to Treatment

Barriers to treatment include factors in the client’s environment as well as barriers that exist within the treatment program structure. Transportation difficulties are a major problem for some (Friedmann, Lemon, & Stein, 2001; Hser et al., 1998; Palmer, Murphy, Piselli, & Ball, 2009). These transportation difficulties become more problematic as the
distance from the client’s home to the treatment facility increases.

Hser and colleagues studied factors related to drug treatment program entry among 276 clients in a substance abuse treatment program. One group of clients had been seen for intakes at a community resource center and a second group at a drug abuse research center connected with the University of California in Los Angeles. The study examined a number of background and demographic characteristics to attempt to determine predictors of entering treatment. The sample of 276 was 46% female, 35% African American, 26% Hispanic, and 36% White. The mean age was 35 years. Average years of education was 11.7. Marital status was 19% married, 28% widowed, divorced or separated and 53% never married. Twenty-five percent were employed, 41% unemployed, and 34% not in the labor force (neither employed nor seeking employment). Thirty-seven percent of the sample reported using alcohol only or alcohol in combination with other drugs. In examining reasons for failure to follow through with treatment, 12% of the sample reported transportation problems related to their inability to attend treatment. Other reasons given as preventing treatment attendance were program admission eligibility problems (16%), not wanting to be on a waiting list or bring on a waiting list too long (14%), and scheduling difficulties (1%).

Friedmann et al. (2001) studied the possible effects of providing certain types of transportation assistance would improve outpatient treatment retention. The sample consisted of 1,144 clients in 22 outpatient methadone maintenance programs, and 2,031 clients in 22 outpatient drug-free (ODF) programs in the Drug Abuse Treatment Outcomes Study (DATOS), a national, 12 month longitudinal study of drug abuse
programs. Thirty-one percent of the ODF clients reported heavy alcohol use in addition to other drug use. Program directors surveyed provided information on what, if any, types of transportation were provided by their agencies to clients in their programs. Multivariate hierarchial linear models were used to control for a number of variables other than transportation, such as demographics, degree of psychiatric difficulties, and severity of drug and alcohol use. It was found that provision of a car, van, or contractual transportation services improved treatment retention, but giving the clients individual vouchers or payment for public transportation did not.

Palmer et al. (2009) examined the reasons for premature termination of outpatient alcohol and drug treatment using both qualitative (focus groups) and quantitative (survey) methods in a pilot study involving 44 clients and 22 clinicians. The clients were predominantly male, and African American. Transportation difficulties were found to predict an increased likelihood of dropout.

Another barrier related to the clients’ environment may be lack of affordable housing. Haller et al. (1997) investigated the effects of providing supportive housing on retention of drug and alcohol abusing women in treatment. It was found that subjects living in the community and attending a day treatment program were 6.1 times more likely to drop out of treatment than those clients who were provided with supportive housing.

**Summary:**

The literature review suggests that the potential risk factors for treatment dropout could logically be grouped into four major categories. These are (a) client
characteristics, (b) client-clinician interaction, (c) program characteristics/environment, and (d) practical barriers to treatment. Data on all four of these categories is collected by the NJ-SAMS system, however the amount of data collected on each of the categories differs. Client characteristics are collected in detail. Since we are testing data collected at intake, and at the point of termination of treatment, an examination of client/clinician interaction in ongoing treatment is beyond the scope of our study.

Program characteristics were examined in terms of type of treatment, including traditional outpatient (less than nine hours a week), intensive outpatient (nine hours or more a week), and a partial hospital program, targeted towards MICA (Mentally Ill Chemically Addicted) diagnosed clients. It was possible to examine differential dropout rates based on the client’s referral to these programs.

The NJ-SAMS program allowed the examination of several potential practical barriers to treatment attendance. These included geographic distance from the treatment agency, availability of a drivers license, and whether or not a car was available for transportation to the agency.

Limitations of the Literature

This extensive review of the literature highlights the complexity of the large number of variables, (client characteristics, program characteristics, therapist characteristics, etc.) which can interact to produce varying effects found in different studies of dropout. This very complexity underscores the need for collecting comprehensive information on each client’s life situation at intake. The reasons for dropout must also be taken into account. If this is not done, both voluntary dropouts
(e.g., those who choose to stop coming or who are discontinued because of poor compliance) and involuntary dropouts (e.g., those who are discontinued for clinical reasons, die, or who move out of the area) comprise the dropout sample, and this mixing of subclasses of dropouts can compromise results. There may also be significant differences between predictors of earlier versus later dropout (Stark & Campbell, 1988).

The situation is further complicated because many studies examine treatment retention/dropout only after a client has started treatment, while in reality much client attrition occurs before clients actually start formal treatment. For example, a client may make an appointment by phone for an initial intake interview and then not follow through with the intake. Some studies have specifically examined dropout that occurs from the time an individual first applies for treatment to rather than the time of actually entering ongoing treatment (Jackson, Booth, McGuire, & Salmon, 2006; Weisner, Mertens, Tam, & Moore, 2001).

Finally, almost all studies have focused on the main effects of one or more predictor variables, ignoring the possibility of interactions among predictors. Such interactions may attenuate main effects of risk factors and lead to premature dismissal of the importance of such variables if interactions are not examined (Adamson, Sellman, & Frampton, 2009; Baekeland, Lundwall, 1975). For example, many studies failed to report the proportions of specific primary substance of abuse/dependence, and would report on the relationship of a variable such as gender to dropout, without examining potential differences in the relationship as a function of the primary substance of
abuse/dependence. Studies may also fail to report the number of substances abused, which may increase the likelihood of dropout of subjects of gender.

Despite the difficulties encountered in researching factors contributing to treatment attrition, it does appear that research in this area is growing, and that some progress, if slow, is being made in identifying relevant variables associated with dropout.
CHAPTER THREE  
METHODOLOGY  

Research Questions  

The major research question is: Is it possible to accurately predict dropout from substance abuse treatment of clients whose primary drug of choice is alcohol, using the data collected in the NJ-SAMS dataset? 

To answer this, the study addressed the following questions:  

1. Based on the literature review, what variables are consistently associated with alcohol abuse/dependence treatment dropout?  
2. Does data on these variables, as collected by the NJ-SAMS system at the agency treatment program level, have predictive validity for dropout of clients from substance abuse treatment?  
3. More specifically, utilizing the data on these variables is it possible to accurately identify those clients, who are most likely to drop out of treatment, at a program site chosen for our study?  
4. Is there a cumulative effect of these variables? Will clients with a greater number of risk factors associated with these variables in the literature as predictive of dropout show higher dropout rates as clients with a lesser number of these risk factors? 
5. Are there moderator variables which impact on the likelihood of client treatment dropout?  

Hypotheses  

The following hypotheses are proposed as likely to have predictive validity for dropout:
Client Characteristics: (At intake)

1. Younger clients are more likely to drop out of treatment than older clients.

2. Females are more likely to drop out of treatment than males, unless they are treated in a specialized women’s addiction program.

3. Single/separated/divorced subjects are more likely to drop out than married clients.

4. Clients living alone are more likely to drop out than clients living with others.

5. Clients with fewer years of education are more likely to drop out than those with greater years of education.

6a. Unemployed clients are more likely to drop out than employed clients.

6b. Clients with a profession, trade or skill will be less likely to drop out than clients without a profession, trade, or skill.

7. Clients with more severe psychiatric co-morbidity more likely to drop out than clients with less severe co-morbidity, or no co-morbidity.

8. The lower the level of motivation, the more likely the client will be to drop out.

9. Clients with more severity of alcohol use as measured by days of alcohol use and days of use to intoxication in the past 30 days will be more likely to drop out than clients with less severity of use.

10. The greater number of drugs a subject used, the less likely the subject will be to complete treatment.

11. African American and Latino clients will be more likely to drop out than Caucasian clients.

Client-Clinician Interaction:
1. There will be no relationship between matching the gender of the intake worker to the client, and the likelihood of dropout.

**Program Characteristics/Environment:**

1. Clients at lower levels of intensity of treatment will be less likely to drop out than clients at higher levels of intensity of treatment.
2. Clients who were mandated into treatment will be less likely to drop out of treatment than clients who are non-mandated.
3. The longer the client remains in treatment, the more likely the client is to complete treatment.

**Practical Barriers for Clients:**

1. The greater the geographic distance between the client’s residence and the treatment agency, the higher will be the dropout rate.
2. Clients who have a valid driver’s license and a car available for their use will be less likely to drop out of treatment than clients who do not have a valid driver’s license and a car available for their use.

**Cumulative Effects of Biopsychosocial Problems:**

1. The greater the severity of problems a client has in the seven ASI domains (medical, employment, legal, alcohol/drug, family/social, and, psychiatric status) the more likely the client is to drop out of treatment.

   The idea is that there is a cumulative or threshold effect, in that the client may be able to handle moderate problems in one or two domains (e.g. medical and family/social), but becomes overwhelmed if problems develop in additional domains, and increase in
severity. The client reaches limits of ability to cope and gives up, relapsing and returning to alcohol and/or drug use, possibly to relieve stress. This will be measured by the number of composite scores in each of the seven domains with a value of greater than zero. The composite scores are created by including several questions from each of the ASI domains in a specific algorithm, which is run in SPSS, and which varies for each domain.

Please see the NJ-SAMS instrument in Appendix B for a list of the variables which will be used in the statistical analysis and hypothesis testing. Some further computation was needed on some of the variables. For instance, Age was computed by using date arithmetic, subtracting the client’s birth date from the date at which s/he was seen at intake. Race/Ethnicity also required some initial computation, in order to form a single categorical variable which incorporates a category for Latino clients. For some variables several questions are used to measure each variable. One has the option of using the composite score for that domain as the measure, or actually using the measurement for the individual question, if it appears that the composite score is masking the true predictive validity of a specific question. These computations are easily accomplished in SPSS.

Practical barriers for clients includes questions regarding geographic distance from treatment site, whether client has a valid driver’s license, and whether client has a car. For cumulative effects of biopsychosocial problems, ASI composite scores were used. The composite scores are created by including several questions from each of the
ASI domains in a specific algorithm, which is run in SPSS, and which varies for each domain.

**Definition of Terms**

By *substance abuse* we mean substance and/or alcohol abuse/dependence diagnoses as described in the American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders, (American Psychiatric Association [*DSM-IV-TR*], 2000).

*Successful completion of treatment* was determined by the clinical treatment team of the Trinitas Hospital’s Substance Abuse Program, and was based on several factors:

1. Regular attendance at treatment sessions, as measured by a program sign-in sheet, and notes by the clinicians in the case record.

2. At least partial achievement of the treatment goals which were set based on the initial NJ-SAMS assessment, as measured by client self-report, random urine screens, information from collateral contacts, and counselor observer interactions during group and individual counseling sessions.

Based on consideration of these factors, the treatment team made a (dichotomous) decision as to whether or not the client had successfully completed treatment.

We define the *dropout* as those clients, who either fail to start treatment following having received an intake assessment, as well as those who do start, but subsequently voluntarily leave or are discharged for non-compliance prior to the successful completion of treatment. We will exclude from our sample clients who terminate treatment due to
incarceration or death, or hospitalization for a medical or psychiatric illness, since these occurrences are clearly beyond the clients’ control.

**Research Design**

The purpose of our study was to test the feasibility of utilizing data collected at the treatment program level to predict the likelihood of client dropout by examining possible valid indicators of dropout, using the data available in the NJ-SAMS System. The study examined if the data collected through the NJSAMS system can be used to predict the likelihood of specific clients dropping out of treatment. This is an ex-post-facto study. It is an associational/descriptive analysis utilizing data collected at Trinitas Hospital, Substance Abuse Services Department, in Elizabeth, NJ. Of the subjects included in the study, two groups were formed:

1. Those who dropped out of treatment

It is a cross-sectional design, as the data was collected from all clients entering treatment from January 1, 2004 to June 30, 2007. The dataset consisted of data on clients whose primary drug of use was alcohol, and consisted of information which was collected at the time of intake, and later at discharge, by the staff of the substance abuse treatment service, using the NJ-SAMS admission, assessment, and discharge modules. The study relied on the system of standardized data collection created by the New Jersey Division of Addiction as the main data source. This system, New Jersey Substance Abuse Monitoring System, was implemented as a pilot program in November 2002, with fifteen substance abuse treatment agencies across the state on New Jersey taking part.
Currently 243 substance abuse treatment agencies throughout the state are utilizing the NJ-SAMS system for collecting data at the point of intake assessment and evaluation, as well as discharge information.

Data Collection

The data used in this study was collected by the Trinitas Hospital Outpatient Substance Abuse Treatment program. Trinitas does not use self-administration, the data are collected in a semi-structured clinical interview, and this is the format in the great majority of other agencies in the State. Trinitas Hospital is located in Elizabeth, New Jersey. The Substance Abuse Treatment Program comprises several components, including a traditional outpatient program, a specialized program for MICA (Mentally Ill Chemically Addicted) as well a single gender program for women. The staff included a half-time American Society of Addiction Medicine (ASAM) certified psychiatrist, four fulltime nurses, and sixteen counselors, with the counselors equally divided between Certified Drug and Alcoholism Counselors, and Licensed Clinical Social Workers. The counselors were further divided between “in-recovery” individuals, and those who were never addicted to either drugs or alcohol. The basic treatment philosophy was a drug free twelve step disease model; however this approach was supplemented with Cognitive Behavioral and Motivational Interviewing interventions. The program did not utilize methadone maintenance, however many of the clients were prescribed anti-psychotic medication, especially in the MICA program.

Generally the program is in many ways similar to outpatient drug free substance abuse outpatient treatment programs in New Jersey. This is partially because procedures
for intake and treatment planning, qualifications of staff, reporting requirements, staffing patterns, placement of clients at a specific level of care criteria, etc. are set for these programs by the State Division of Addiction Services Regulations and Standards.

The National Survey of Substance Abuse Treatment Services is an annual survey conducted by the U.S. SAMHSA (SAMHSA). In 2004, for New Jersey, 331 substance abuse treatment agencies responded to this survey, a response rate of 98%. These agencies reported on 29,687 clients who were in treatment on March 31, 2004. Sixty-four percent of the substance abuse treatment facilities in the State were private non-profit, as is the program at Trinitas. Ninety five percent of the facilities treated clients with both alcohol and/or substance abuse problem, as does Trinitas. Ninety percent of the client sample was receiving outpatient treatment.

Description of the Sample

The target population was the population of clients who receive treatment for alcohol abuse treatment in the State of New Jersey. The sample consisted of all the adult (18 years and older) clients receiving intake assessments and evaluations and enrolled for treatment at Trinitas Hospital’s Substance Abuse Services from January 1 2004 through May 31, 2007. These clients were followed until they either completed treatment, or terminated treatment. Those who remained in treatment after May 31, 2007 were not included in the sample, since their treatment outcome was unknown at that date. A person is eligible for admission to the Substance Abuse Services (SAS) department if he/she, based on this intake assessment, is diagnosed with an alcohol and/or substance abuse or dependence disorder using the DSM-IV TR criteria (DSM-IV-TR, 2000). The
sample consisted of those clients whose primary drug of choice was alcohol, however many of the clients were also using other substances, as described below.

The initial sample consisted of 768 consecutive admissions to the Outpatient Substance Abuse Treatment Service of Trinitas Hospital between January 1, 2004 and May 31, 2007. Only those clients whose primary drug of use was alcohol, and who were subsequently discharged from the treatment facility were included in this sample. Clients who continued in treatment beyond May 31, 2007 were not included since their treatment outcome was at that point unknown. The sample was further limited to those subjects who had either completed treatment or quit or dropped out.

Subjects excluded were those who needed a different level of care (inpatient) (N=19), those whose non-substance abuse needs could not be met by the agency (N=4), those discharged for non-compliance with agency rules (N=17), those who lost insurance coverage or the ability to pay (N=7), those incarcerated for charges that occurred prior to entering treatment (N=2), those incarcerated for charges that occurred following entering treatment (N=2), subjects hospitalized for medical reasons (N=3), subjected deceased (N=3), and those in an “other” category (N=7). The final sample consisted of 704 subjects.

Three hundred sixty-three subjects were using alcohol only, 200 used alcohol plus one other drug, and 142 used three or more drugs. The mean age for the sample intake was 39.8 years, median age 40.8 years, standard deviation 10.5 years. There was little difference in the mean ages of men and women: the mean age for men was 39.68 years, (SD= 10.7) and for women 40.2 years (SD= 10.1). One hundred and eighty-four (184) of
the sample was female; five hundred and twenty (520) were male. Two hundred and twenty-eight subjects (32.4%) were either employed full time (35 or more hours per week) or in military service. Thirty five subjects (5%) were employed part-time regular hours, and fifteen (2.1%) were employed part-time with irregular hours, and two (.3%) were doing unpaid volunteer work. Sixty (8.5%) were retired or disabled. One hundred and seventy-three (24.6%) were unemployed; actively looking for work, and 151 (21.4%) were unemployed, not actively looking for work. Twenty-six clients (3.7%) were living in half-way house settings and thus not employed, Eleven (1.6%) were students, three (.4%) were homemakers.

During the same time frame, there were a total of 29,198 clients placed in either Traditional Outpatient, Intensive Outpatient, or Partial Hospital treatment and whose primary drug of use was alcohol entered into the NJ – SAMS system Statewide. The State-wide figures included subjects from both urban and rural settings, so there were differences between this study’s sample and the State-wide numbers.

Research Instrument

The study used a system of standardized data collection created by the New Jersey Division of Addictions as the main data source. NJ-SAMS is a web-based data reporting and tracking system designed to track outcomes in substance abuse treatment. Compared to the former ADADS system used, NJ-SAMS contains greatly expanded information collection in the areas of client history and treatment needs (using an assessment instrument based on the Addiction Severity Index). The system can also track treatment services provided, client referral patterns, and client outcomes.
The increased focus on outcomes is the response by the State of New Jersey’s Division of Addictions Services to the 1993 Government Performance and Results Act (GPRA) (Government Performance and Results Act, 1993). This act mandated greater accountability for all entities (agencies, states, etc.) receiving federal funding. This act mandates new treatment outcome reporting requirements in block grants to the states. Outcome reporting became mandatory in 2004, and the number and types of outcome data collected was greatly expanded.

The NJ-SAMS program is the New Jersey Division of Addictions effort to meet these increased requirements for reporting. The Division hoped to develop a data driven quality improvement process for substance abuse treatment throughout the State, aimed at enhancing treatment effectiveness. They also wished to use the data collected to demonstrate to New Jersey legislators and other funding sources that substance abuse treatment overall is effective, and worth funding.

The NJ-SAMS program grew out of a federal government sponsored study which was begun in 1999, the Treatment Outcome and Performance Pilot Study II (TOPPS II) (SAMHSA, 1999). This study provided funding to states to collect information about outcomes of addiction treatment, as well as to develop ways to meet the new federal block grant requirements by developing ongoing outcomes monitoring data systems. New Jersey was one of 19 states to receive a TOPPS II grant. The New Jersey study collected outcome data on over 1000 clients in 20 block grant funded treatment agencies. It also developed an advisory process to elicit stakeholder involvement in the development of a state wide process of continuous outcome monitoring, through
stakeholder involvement in ongoing committees which provided input into the
development of the NJ-SAMS system. The final NJ-SAMS system incorporated all the
input from the stakeholder committees, and additional data elements and modules in
response to changing federal mandates and individual treatment provider’s suggestions
and requests.

Currently the NJ-SAMS system consists of six completed modules. These are
Pre-Admission, Admission, Assessment, Additional Biopsychosocial Information, an
American Society of Addiction Medicine based Placement Level of Care, and
Discharge/Continuing Care. Additional modules may be added at a later date, if the need
is seen.

The need to protect client confidentiality was given very serious attention in this
project. The client data collected at the individual treatment agency is transferred to the
State server utilizing a process of secure transactions. Secure transactions are a
mechanism for transferring sensitive information via the web. To further secure the
system, read only access may be provided to other persons for research, analysis and
reporting. This capability potentially gives the Division of Addictions the ability to make
available to legitimate researchers subsets of data from the NJ-SAMS data base with all
client identifying information stripped off, so that the aggregated data is truly
“anonymous”. Researchers have access to aggregated State-wide data on a number of
variables such as age, gender, race/ethnicity, etc.

The assessment module of the NJ-SAMS instrument includes the Addiction
Severity Index (ASI). While the NJ-SAMS instrument has been tested by the State for
validity and reliability, and has reportedly performed well in these areas, the results have not yet been published (personal communication Division of Addictions staff November, 2002). The ASI section of the NJ-SAMS is the same as the original ASI, fifth edition (the current version of the Addiction Severity in wide use).

The NJ-SAMS has a number of demographic and other questions preceding the ASI portion. An obvious question is the degree to which these questions might bias the respondents’ answers, thus possibly biasing the results of the ASI. The ASI Composite scores consist of summary computations for each of the seven ASI domains. They are created by using specific questions from each domain in a formula, which indicates the level of problem severity in that domain. The range of all composite scores is 0.000 to 1.000. The higher the composite score, the greater is the severity of the problem. In the creation of the composite scores, McLellan and his colleagues developed an empirical method of combining those items from each problem domain which were capable of showing change and which were well related to each other. The method involved the intercorrelation of items within each problem domain to remove those, which were not well related, and then testing their internal consistency or reliability using Cronbach’s Alpha. Those questions having an alpha score of .70 or higher on each composite, indicating significant internal consistency were used in the formula for computing the composite score.

Comparisons with other well-validated measures of each ASI problem area were also conducted, and the results indicated significant convergent validity in all composite scores. Thus this selective combination of items from each of the ASI problem areas
resulted in general measures of patient status in each area. These measures are arrived at mathematically and have shown reliability and validity in several settings (McLellan et al., 1985).

The NJ-SAMS program uses exactly the same questions and formulae as the ASI in the computation of the composite scores, however since the NJ-SAMS is a computer program, the calculations are expressed using the computer programming language in which the NJ-SAMS was written.

We realize that due to additions the State has made to the ASI format, findings from previous studies based on the ASI may only partially apply to the new instrument. We are presenting information available on the ASI, and will obtain more specific data on the reliability and validity results on the NJ-SAMS instrument as soon as they are made available. In verbal communications with staff from Division of Addictions, we have been informed that the instrument’s performance compares favorably to the fifth edition of the ASI.

The ASI is a semi-structured interview format that inquires into seven potential problem areas in substance abusing patient’s lives: medical status, employment and financial support, drug use, alcohol use, legal status, family/social status, and psychiatric status. A skilled interviewer can gather information on recent (past 30 days), and lifetime problems in all of the problem areas in about an hour. The ASI is multivariate in focus, providing an overview of problems related to substance abuse, rather than focusing on only one area. The target population is adults (18 years and over), and it has been normed on the following treatment groups: alcohol, opiate, cocaine, public, private,
inpatient, outpatient, as well as the following subject groups: males, females, psychiatrically ill substance abusers, pregnant substance abusers, gamblers, homeless, probationers, and employee assistance clients (Hodgins & El, 1992; Stoffelmayr, Mavis, & Kasim, 1994).

The ASI consists of approximately 200 items, divided into seven subscales. The instrument can be pencil and paper or computer based, and is usually administered in an interview format, although a self-administered version exists. Scoring takes about five minutes for severity ratings scored by a technician. Computerized scoring is available. The ASI provides two scores: severity ratings, which are subjective ratings of the client’s need for treatment, derived by the interviewer, and composite scores for each of the seven domains. Composite scores are measures of problem severity during the prior thirty days, and are calculated by a computerized scoring program. It has been used extensively for treatment planning and outcome evaluation, and researchers have used it for a wide variety of clinical outcome and other studies. The instrument is in the public domain (McLellan, et al., 1992; Hodgins et al. 1992; Stoffelmayr, et al., 1994). The instrument has been tested for reliability for test-retest, split half, and internal consistency reliability. It has also received extensive testing for content, criterion (predictive and concurrent), and construct validity, and has performed well in all of this testing.

Stoffelmayr et al. (1994) examined the stability of ASI scores, as well as inter-rater reliability in the context of a longitudinal study spanning two years. The study reported high correlations among raters on the ASI composite scores. The study examined inter-rater agreement based on correlations of paired assessments. Pearson
product-movement correlations were used to estimate the consistency between pairs of ratings. Correlations ranged from a high of 0.99 for the medical to 0.97 for the legal composite scores, indicating a high level of inter-rater reliability. McLellan et al. (1985) examined the reliability and validity of the ASI in a sample of 181 male alcohol and/or drug dependent clients in three treatment facilities. Results of concurrent reliability studies indicate that trained technicians can estimate the severity of patients' treatment problems with an average concordance of .89. Test-retest studies show that the information obtained from the ASI is consistent over a 3-day interval, even with different interviewers.

Comparisons of the ASI severity ratings and composite measures with a battery of previously validated tests indicate evidence of concurrent and discriminant validity. The reliability and validity results were consistent across subgroups of patients categorized by age, race, sex, primary drug problem, and treatment center. Appleby, Dyson, Altman, & Luchins. (1997) noted that the Addiction Severity Index is the most widely used measure of substance use in the field, with its reputation supported by numerous reliability and validity studies. Despite this, the psychometric properties of the ASI had not been examined in mental hospital populations. To address this shortcoming, Appleby and colleagues replicated prior studies and expanded upon the validity of the ASI in a sample of 100 public psychiatric patients selected for a larger study. It was found that reliability was acceptable, but there was only moderate agreement on the psychiatric scale severity score.
ASI drug and alcohol scales correlated well with other substance use instruments and with DSM-III-R diagnoses, and the ASI can identify meaningful types of patient problems through cluster analysis. These findings, on the whole, supported the use of the ASI drug and alcohol scales in public psychiatric hospitals. Leonhard, Mulvey, Gastfried, & Shwartz (2000) investigated whether the use of the Addiction Severity Index (ASI) in a network of inner-city alcohol and drug abuse clinics under non-ideal conditions would yield internally consistent and valid data. A sample of 8,984 ASI scores was collected over a 34-month period. Construct validity was examined by computing the internal consistency of all subscales. Convergent and divergent validity of composite scores and of severity ratings were evaluated using correlation matrices. Findings demonstrated that ASI scores were internally consistent and valid, even though the recommended administration protocol may not always have been followed as faithfully as might be desirable. It was felt that this robustness favored the use of the ASI in clinical environments.

**Procedures for Statistical Analysis**

Each variable was screened for missing data and data entry error by direct examination of the data set, and by using the frequencies command in SPSS. The amount of missing data varied from variable to variable, however in most cases it did not exceed three percent of the data, and in the majority of analyses less than one percent. An exception to this was the variable Dunits (the number of sessions attended by the client). This variable was missing eighty-eight records. The case records for these clients were unavailable, and thus the data could not be recovered by examining the case records. A
dummy variable was created, *Dunits12*, with two categories, 1 = data available and 2 = data missing. This variable was run in chi-square and t tests against the other variables used in our analysis, and no significant differences were found in the analyses between those cases with data available in *Dunits12*, and those cases missing data for that variable. Based on those series of preliminary analyses, it was decided that the *Dunits* variable would be used in the analyses with the cases missing data replaced with the serial means of the cases in each of the three levels of treatment, standard outpatient, intensive outpatient, and partial hospital. Thus the mean for the length of stay in treatment days for clients treated in the standard outpatient program was computed, using only the cases assigned to standard outpatient, and this mean value was used to fill in the missing data for that variable for cases treated in that program which were missing data. A similar procedure was followed for cases missing data in both the intensive outpatient program and the partial hospital program.

For all of the other variables, a series of trial analyses were performed both with missing data excluded, and with the missing data replaced with serial means, and no significant differences in the results were seen. A decision was made to exclude those cases with missing data from the individual analyses, rather than to replace such data with serial means.

For the t tests, and logistic regressions, data was screened for outliers by converting the data in those variables into Z scores. Since both t tests and logistic regression are sensitive to outliers, cases that exceeded three standard deviations were excluded. Generally this did not exceed more than three percent of the data, and in most
instances was less than one percent. It appeared that the missing data was generally due to a failure of the intake worker to enter the data. The potential effects of missing data was further tested by creating a new variable which divided the data for each of the variables used in the analysis into a dichotomous variable the categories being “contained data” or “missing data.” The potential effect of missing data was tested by performing either chi-square tests for categorical data, or t tests for continuous data using Dreason (completed treatment/quit or dropped out) as the dependent variable. None of these analyses were found to produce significant differences in the results due to missing data.

The analysis was approached by first conducting a series of chi-square analyses for categorical data, and by t-tests for data measured at the interval or ratio levels. Variables were tested against the dependent variable Dreason, coded 1 = completed treatment, or 2 = quit or dropped out. Variables found to be significant were considered for their own ability to contribute to the likelihood of dropout, and for possible inclusion into a series of logistic regression analyses, in an effort to identify the best possible model for predicting dropout.

The data was also examined for possible multicollinearity. Tolerance statistics were obtained for each independent variable. This measure of collinearity among independent variables has a range of 0 to 1, with a value close to 0.1 indicating collinearity. The values for the variance inflation factor for each predictor were also examined. The VIF for a variable indicates whether there is a strong linear association between the variable and all the other predictor variables which might be used in the logistic regression equation. The researcher used a straightforward way of dealing with
collinearity among variables, deleting the problematic variable from the analysis. If the information contained in one variable is also contained in another variable, no real information is lost. Another possible approach is to combine the variables with high intercorrelations into a single variable, creating a single measure representing a single construct, thus eliminating repetition (Mertler & Vannatta, 2002).

Another potential problem with logistic regression involved the ratio of cases to variables included in the analysis. This situation arises when combinations of discrete (categorical) variables result in too many cells with no cases. This did not prove to be a problem with the data in this study, due to the relatively large sample size. This issue can often be corrected by collapsing offending variables, and also by insuring a sufficiently large sample size so that his problem does not occur. A final potential problem involved the fact that logistic regression relies on a goodness-of-fit test as a way of assessing the fit of the model to the data. This test includes values for the expected frequencies for each cell in the data matrix formed by combinations of discrete variables. If any of the cells have expected frequencies of 5 or less, the analysis loses much of its statistical power. To prevent this difficulty, pairs of discrete variables were evaluated to ensure that all cells have at least an expected value of 1, and that no more than 20% have frequencies of less than 5. This also was not found in the data analysis, again because of the sample size. If this problem is found to exist in the data, one can either collapse variables with more than two categories, or delete less important discrete variables so as to reduce the number of cells. The relatively large sample size in our study served to avoid this problem.
The findings of our logistic regression analyses are presented in tables found in Appendix B. These tables include the B (the regression coefficients or weights for each variable used in the equation), the Wald statistic (a measure of the significance of each predictor variable), the associated Significance Value for each predictor variable, and the Exp (B) (the odds ratio or likelihood of a client falling into a category of the dependent variable). Narratives explaining the meaning of the values presented in the tables are found in Chapter Four.

The seven composite scores were also run in a logistic regression, to determine the degree to which each score, and the scores taken as a whole might have predictive validity for dropout. All variables used in the logistic regression equations were tested against each other for collinearity by including them in a multiple regression equation with the dependent variable Casenum, which is a unique case number assigned by the program to each case when the case data is initially entered into the NJ-SAMS program by the intake worker. Cases with a tolerance score of 0.1 or less are likely to have a high degree of collinearity, and thus should be excluded from the logistic regression analysis. None of the variables were at or less than a tolerance of less than 0.1. For categorical variables, the preliminary chi-square tests were used to identify variables which might have less than the minimum expected values in the individual cells for the logistic regression analysis( twenty percent of the cells or greater with values of 5 or less), when run against Dreason. This was not found to be a problem due to the large sample size, the limited number of variables included in the logistic regression equations, and the distribution of values in cells of the various variables tested.
Analyses were done in the order listed in the hypotheses section of this paper. The cumulative effects of problems noted in each of the seven ASI domains was tested by summing the composite score in each of these domains to create a new variable, Totalcom, which represented the total level of biopsychosocial distress experienced by each client.

The effects of the client level of motivation for treatment was tested by a series of chi-squares with each of the seven variables asking how great the need for treatment of problems in each of the ASI domains, run against the variable Dreason. Additionally, a cumulative variable Totalmot, was created by summing the values of responses to that question in each of the seven domains. This variable was included in a logistic regression, as an indication of the total level of motivation for treatment the client reported at intake.
CHAPTER FOUR

FINDINGS

Based on the literature review, a group of variables were selected which had been identified in past studies to be related to the likelihood of subjects dropping out of or completing treatment. These variables were tested in bivariate analyses in the hypotheses below, to determine which might be significantly related to treatment completion or quitting/dropping out. They were examined in a series on Chi-Square or t tests, depending upon the level of measurement of the specific variable. Those variables which were found to be significant were further tested in a series of logistic regressions, initially including the entire dataset, and then performing further logistic regressions after first dividing the dataset into males or females.

Bivariate Analysis of Hypotheses

The following hypotheses were proposed as likely to have predictive validity for dropout:

Client Characteristics: (At intake)

Please refer to Appendix A, Table A1 and Table A2, for a summary presentation of client characteristics findings.

Age:

Hypothesis 1: Younger clients are more likely to drop out of treatment than older clients.

An independent groups t-test was conducted to compare the mean ages of those subjects who completed treatment with those who quit or dropped out. The results showed that there was no significant difference in the mean ages between treatment
completers and those who quit or dropped out. The mean age of completers was 39.41 years (SD=11.05); of those who quit/dropped out 40.1 years (SD= 10.19). The test showed N = 704, t = .807, p = .42. Thus this hypothesis was unfounded.

This finding differed from the majority of studies found in the literature review, which suggested that younger clients are more likely to drop out of treatment. A possible explanation is that the sample is skewed towards older clients, with only 22.6% of the subjects 30 years of age or younger. Perhaps the differences in the mean ages of completers (39.41 years) vs., dropouts (40.1 years) was insufficient to adequately test potential differences in the likelihood of completing treatment as opposed to dropping out. Thus, there may have been insufficient numbers of younger clients in the sample to have a sufficient range of ages to adequately test the effect of age on dropout. It is possible that the mean age of alcoholic clients is likely to be greater than that of clients using some other drugs, such as cocaine or heroin, given the greater time period needed to develop alcohol dependence.

**Gender:**

Hypothesis 2: Females are more likely to drop out of treatment than males, unless they are treated in a specialized women’s addiction program.

Chi-Square analysis compared the completion/dropout numbers between men and women, Chi-square (1, N=704) = 1.13, p = .33. There were no significant differences in completion/dropout based on the subjects’ gender. The relationship between completers/dropouts and whether or not the subject women were or were not in the Specialized Women’s Addiction Treatment Program was then tested utilizing a Chi-
Square test. An examination of the SPSS crosstabs table (Appendix a, Table A3) showed that while there was a significant relationship between being treated in the Women’s Addiction Program and the likelihood of completing treatment, the relationship was in the opposite direction to what had been hypothesized. Thus women who were not treated in the Women’s Addiction program, but instead in the mixed gender treatment program had a greater chance of completing treatment (Please refer to Appendix A, Table A4).

A discussion with the intake workers who decided whether or not to refer a client to the Specialized Women’s Addiction Program suggested a possible explanation for this. It appeared that the women referred to the Specialized Women’s Program tended to have more severe problems in many of the seven ASI domains than the women referred to mixed gender treatment. This possibility was tested by running a crosstabs table with a chi-square comparing the frequency of alcohol use between the women in the Specialized Women’s program and those clients not in the program. The results showed that indeed the women in the Specialized Women’s program had a significantly higher frequency of alcohol use than those women in the mixed gender program, Chi-Square (4, N = 184) = 33, p <.001.

In a later analysis we found that there was a moderate relationship between the frequency of alcohol use, and likelihood of treatment dropout. We also ran a series of t tests to determine if in fact the mean scores in each of the seven ASI domains were higher for the women in the Specialized Women’s Addiction program, indicating more severe difficulties in these biopsychosocial domains. For the alcohol composite score, the results were  t (182) = -5.8, p <.001. On the average, women in the specialized
women’s program scored higher (M = .42, SD = .25), compared to subjects in the mixed treatment group (M = .17, SD = .14). For the ASI drug score, the respective scores for subjects in the women’s addiction program were t (182) = -2.3, p < .02; (M = .09, SD = .08, M = .05, SD = .04). The employment scores were also significantly higher for subjects in the women’s addiction program, t (182) = -2.4, p < .02; (M = .78, SD = .29; M = .65, SD = .31). No significant differences were found in the legal and family/social ASI scores. The medical score did show significant differences, with a t test score of t (182) = -2.1, p < .04; (M = .37, SD = .21; M = .27, SD = .28). The psychiatric scores also suggested that subjects in the specialized women’s program experienced more severe mental health difficulties than those in the mixed treatment group, t(182) = -4.38, p < .001; (M = .34, SD = .24, M = .16, SD = .16).

In summary, the women in the Specialized Women’s Addiction Program had significantly higher mean ASI composite scores in the areas of Alcohol, Drug, Employment, Medical, and Psychiatric. This would suggest that the women who were treated in the Specialized Women’s Addiction program did indeed have greater severity of problems in these life areas, and this fact may at least partially explain our finding that they more likely to drop out of treatment than women not in the mixed gender treatment group. It seemed that the greater degree of problem severity experienced by these women overwhelmed the potential benefits of treatment in the Specialized Women’s Program, resulting in many of them dropping out treatment.

**Marital Status** (Please refer to Appendix A, Table A1).
Hypothesis 3: Single/separated/divorced subjects are more likely to drop out than married clients.

A Chi Square test was performed to test the relationship between marital status and completion of treatment and quitting/dropping out. The results showed that the relationship was not significant at the .05 level; Chi-square (9, N = 704) = 8.0, p .09. Thus, there is no statistically significant difference in dropout rates of single/separated/divorced subjects.

Living Situation/Social Isolation:

Hypothesis 4: Clients living alone are more likely to drop out than clients living with others.

The subjects living situation was explored to determine its possible effects on treatment completion/dropout. A series of Chi-Square tests were performed to test the relationship between living arrangements and treatment completion/dropout. Please refer to Appendix A, Table A1.

The only variable that was significantly related to treatment completion/dropout was “Lived with Children”, Chi-square (1, N = 704) = 14.1, p <.001. A further analysis was done looking at the “Lived with Children” variable by gender. A surprising finding was that for males, living with their children was significantly related to treatment completion and a reduction in dropout, but this effect did not hold true for females. For men, the results were Chi-square (1, N = 520) = 17.8, p <.001. One hundred and sixty-six men (32%) lived with their children, while three hundred and fifty-four (68%) did not. Of that number, eighty-six (52%) who lived with their children completed treatment,
while eighty (48%) did not complete. Of those who did not live with their children, one hundred and fifteen (32%) completed treatment, while two hundred and thirty-nine (68%) did not complete.

For women, the Chi-square was (1, N = 184) = .753, p .38. Of the women living with their children, thirty-six (37%) completed treatment, while sixty-one (63%) did not. The reasons for these differences are unclear. Perhaps a father’s sense of responsibility for supporting his children increases motivation for treatment. This could also be related to a reduced sense of social isolation. The reasons why living with their children has no significant effect on women completing treatment, but increases the likelihood of men completing is puzzling. One possible explanation is that children may increase the woman’s stress levels, especially since many of the women were single heads of households, whereas men living with their children were much more likely to be in a two parent household, where responsibilities are shared, thus reducing stress levels. This is an interesting finding and bears further investigation in a future study.

**Education (Please refer to Appendix A, Table A2):**

Hypothesis 5: Clients with fewer years of education are more likely to drop out those with greater years of education.

A t test was performed to compare the mean years of education completed between the treatment completers with the subjects who dropped out. Prior to running the test, scores were standardized, and no scores were found to exceed three standard deviations from the mean. The results revealed that the treatment completer group (N = 264, M = 11.38, SD = 2.12) differed from the quit/dropped out group (N= 440, M =
11.73, SD = 1.95). Thus the group with less education was more likely to complete treatment \( t (702) = -2.27, p .024 \). The hypothesis was not founded, since the subjects with a higher level of education were found to be more likely to drop out.

A review of difference in the mean years of education for the treatment completers and dropouts was small, a difference of .35 years, suggesting that the range of education between treatment completers and clients who quit or dropped out may have limited the findings. Perhaps had there been more of a spread in the years of education it might have shown more influence on treatment outcome.

**Employment (Please refer to Appendix A, Table A1):**

Hypothesis 6a: Unemployed clients are more likely to drop out than employed clients.

In the NJ-SAMS dataset the employment variable was coded into ten separate categories. This was recoded as follows: full time employed\( (N = 228) \), part-time employed regular hours\( (N = 35) \) and part-time employed irregular hours \( (N = 15) \) were combined into one category “employed” and coded 1; unemployed actively looking for work \( (N = 173) \) and unemployed not actively looking for work \( (N = 151) \) were collapsed into “unemployed” and coded as 2; retired or disabled \( (N = 60) \) was recoded as 3, and homemaker \( (N = 3) \), student \( (N = 11) \), and living in a halfway house \( (26) \) was coded as 4, “other”.

A crosstabs with a Chi-Square analysis showed that of the employed subjects, 47.5% completed treatment, while 52.5% quit or dropped out. Of the unemployed group, only 33.4% completed treatment, while 66.6% dropped out. For the retired or disabled
group, 25% completed, while 75% dropped out, and for the “other” group, 20% completed, while 80% did not. The Chi-Square test showed that unemployed subjects were considerably more likely to drop out of treatment than those who were employed, Chi-Square (3, N = 704) = 23.34, p < .001.

Hypothesis 6b. Clients with a profession, trade or skill will be less likely to drop out than clients without a profession, trade, or skill.

This was tested with a Chi-Square analysis, comparing completed treatment or quit/dropped out with “Do you have a profession, trade or skill?” N = 700, with 4 cases having missing data. The Chi-Square result was (1, N = 700) = .27, p .62. There was no significant relationship found between whether or not a subject has a trade, skill, or profession and treatment completion or dropout.

**Psychiatric Variables** (Please refer to Appendix A, Table A5 and Table A6):

Hypothesis 7: Clients with more severe psychiatric co-morbidity are more likely to drop out than clients with less severe co-morbidity, or no co-morbidity.

The following variables were tested against completed treatment or quit/dropped out as a way of measuring the degree of psychiatric difficulties:

7a Variable Pa “In your lifetime how many times have you been treated for any psychological or emotional problems (do not include treatment for alcohol or drug problems) in a hospital or inpatient setting?” An independent samples t test was done to compare the completer and dropout groups on the lifetime mean number of times subjects were treated for any psychological or emotional problems in a hospital or inpatient setting. Sixteen cases were outliers, and were excluded from the analysis. N = 688 after
outliers excluded. The t test revealed that there were significant differences in the two groups, with the group with the lower mean times treated in a hospital or inpatient setting more likely to complete treatment than the group with the higher mean times treated, t(685) = -2.98, p = .003, N = 264, (M = .33, SD = .93; N = 424, (M =.60, SD = 1.4).

7b Variable P1b “In your lifetime, how many times have you been treated for any psychological or emotional problems (do not include treatment for alcohol or other drug problems) in an outpatient/private patient setting (where you did not spend the night)?”

Five cases were outliers and were excluded from the analysis; N = 699 after excluding the outliers. There were significant differences between the completers and dropouts on this variable t (671) = -.2.8, p = .005, (N = 263, M = .33, SD = .72; N = 436, M = .51, SD = .98). The subjects with a lower mean episodes of treatment on this variable were more likely to complete treatment than those with higher mean episodes.

7c. Variable P14 “In the past 30 days, how many nights have you spent in the hospital because of psychological or emotional problems?”

Fifteen cases were outliers. N = 689 in analysis. There were no significant differences between the completers and dropouts on this variable t (601) = -.1.6, p = .12, (N = 260, M = .33, SD = 1.63; N = 429, M = .54, SD = 1.9).

7d. P16 “In the past 30 days, how many times were you treated for outpatient for psychological or emotional problems?”
Two cases were outliers. N = 702 in analysis. There were no significant differences between the completers and dropouts on this variable (t (601) = -.40, p .68 (N = 263, M = .05, SD = .227; N = 439, M =.04, SD = 1.9).

The following set of dichotomous psychiatric variables were also tested, utilizing a chi-square analysis:

7e. Variable P2 “Do you receive a pension for a psychiatric disability?”

Chi-Square analysis compared the completion/dropout groups, between those that received or did not receive a pension due to a psychiatric disability. The results were Chi-Square (1,N=704) = 4.7, p .03. There was a significant difference in completion/dropout based on the subjects’ status on this variable, with those receiving a pension more likely to drop out.

7f. Variable P3a “Have you experienced serious depression for two weeks or more at a time (feeling badly depressed, sad, hopeless, uninterested in things) that was not from alcohol or drugs, in the past 30 days?”

This variable was significant, Chi-Square (1,N=704) = 11.85, p <.001. Subjects who had experienced serious depression were more likely to drop out than those that had not.

7g. Variable P3b “Have you experienced serious depression (that was not from alcohol or drug use), feeling badly depressed, sad, hopeless, uninterested in things) for two weeks or more at a time: in your lifetime?”
This variable was also significant, \( \chi^2 (1, N=704) = 12.00, p < .001 \). Subjects who had experienced serious depression at some time in their lives were more likely to drop out than those that had not.

7h. Variable P4a “Have you experienced serious tension or anxiety for two weeks or more at a time (feeling uptight, unreasonably worried, inability to feel relaxed) in the past 30 days while you were not under the influence of alcohol or another drug?” Chi-Square analysis showed that the group who answered yes to this were more likely to drop out, \( \chi^2 (1, N=704) = 8.50, p < .004 \).

7i. Variable P10a “In the past 30 days, have you been prescribed medication for any psychological or emotional problems for at least 2 weeks or more (even if you did not actually take it)?” This variable was significant, \( \chi^2 (1, N=704) = 8.83, p < .003 \). Subjects who had been prescribed medication were more likely to drop out than those that had not.

Since so many of the variables used to compute the ASI psychiatric composite score proved to be significant predictors of dropout, it was decided to use the ASI psychiatric composite score to represent the degree of psychiatric difficulties experienced by subjects in the later logistic regressions.

**Motivation:**

Hypothesis 8: The lower the level of motivation, the more likely the client will be to drop out.

This hypothesis was tested by a series of t tests, using questions in each of the seven ASI domains, which ask the subject how important the client feels it is necessary to
obtain treatment or counseling for problems in each domain. The results showed that the completers group had a significantly lower score on this variable than did the dropout group. For completers the mean score was 11.92, SD 4.20. For dropouts, the mean was 13.42, SD 4.13, N = 704, t(702) = 4.65, p <.001. Thus the results were the opposite of what had been hypnotized, with the dropout group having a higher level of initial motivation than the completers.

Alcohol and Drug Use (Please refer to Appendix A, Table A7 and Table A8):

Hypothesis 9a: Clients with more severity of alcohol use will be more likely to drop out than clients with less severity of use.

Independent groups t tests was done to compare the mean age of first use of alcohol, as well as the age of first use to intoxication of those subjects who completed treatment with those who quit or dropped out. The results showed that there was no significant difference in the mean ages between treatment completers and those who quit or dropped out. The mean age of first use to intoxication for completers was 16.33 years, SD 6.2; of those who quit/dropped out 16.4, SD 5.9. The test showed N = 704, t (702) =.235, p .42. For the age at first use, the mean age for completers was 16.97, N = 704, df 702, SD 5.02; for subjects who quit or dropped out it as 16.3 years, N = 704, SD 5.4, t (702) = .65, p.113.

Hypothesis 9b: Clients with more severity of alcohol use as measured by days of alcohol use and days of use to intoxication in the past 30 days will be more likely to drop out than clients with less severity of use.
The variables days of alcohol use and days of use to intoxication in the past 30 days both significantly predicted the likelihood of dropout. For number of days used, an independent samples t test showed that the mean number of days for completers was 5.25, SD 6.59. For dropouts, the mean was 8.9, SD 9.3, N = 704, t (638) =5.7, p <.001. The mean for days of use to intoxication for completers was 2.8, SD 6.2; for dropouts 5.7 days, SD 8.3, N = 704, t (669) =5.36, df 669, p <.001.

Thus the greater the number of days of alcohol use in the 30 days prior to intake, the more likely the subject was to drop out. Similarly, the greater number of days in the 30 days prior to intake the client used alcohol to intoxication, the more likely was dropout. Based on a bivariate correlation analysis it was found that these two variables were highly correlated (Pearson Correlation .754), so it was decided that only the number of days of alcohol use would be used in the logistic regression analysis, to avoid multicollinearity problems.

The frequency of alcohol use coded as a categorical variable was also a significant predictor of dropout, Chi-Square (1,N=704) = 32.9, p <.001. Generally, with the exception of “less than weekly” use, the more frequent the alcohol use, the less likely the subject was to complete treatment.

Hypothesis 10: The greater number of drugs a subject used, the less likely the subject was to complete treatment.

The number of drugs used was coded 1 = alcohol only, 2 = alcohol plus one other drug, and 3 = alcohol plus two other drugs. The number of drugs used was
significant in predicting dropout, Chi-Square (1, N=704) = 12.7, p = .003. The greater number of drugs a subject used, the less likely the subject was to complete treatment.

**Race/Ethnicity** (Please see Appendix B, Table A1):

Hypothesis 11: African American and Latino clients will be more likely to drop out than Caucasian clients.

The results of a Chi-Square analysis found that while a higher percentage of African American subjects did drop out than did Caucasian subjects (69.8% to 65.7%) a considerably lower percentage of Hispanic subjects were dropouts (51.1%). Chi-square (2, N = 704) = 18.9, p < .001. The dropout rate was highest for Blacks, closely followed by Caucasians. Hispanics were the least likely to drop out of treatment, a finding not consistent with a number of previous studies.

**Client-Clinician Interaction:**

Hypothesis 1: There will be no relationship between matching the gender of the intake worker to the client, and the likelihood of dropout.

A Chi-Square test comparing the match between the gender of the intake worker with the gender of the subject and its relation to dropout was performed. The results showed that the hypothesis was unfounded, Chi Square (1, N = 704 = .73, p .37).

**Program Characteristics/Environment** (Please refer to Appendix A, Table A9):

**Treatment Intensity/Level of Treatment:**

Hypothesis 1: Clients at lower levels of intensity of treatment will be less likely to drop out than clients at higher levels of intensity of treatment (Please refer to Appendix B, Table 6).
This was tested initially by a Chi-Square test, comparing the three levels of treatment (Standard Outpatient, Intensive Outpatient, and Partial Hospital) with completed treatment or quit/dropped out. The results showed the hypothesis was supported, Chi Square (2, N = 704)=50.94, p <0.01.

**Referral Source (Please refer to Appendix A, Table A10):**

Hypothesis 2: Clients who were mandated into treatment will be less likely to drop out of treatment than clients who are non-mandated.

Based on the literature, there was some indication that dropout rates may be related to whether or not the client was a mandated (ordered into treatment by an agency such as a court), or a non-mandated client (such as self-referred, entering treatment at the suggestion of a significant other, mental health clinic, etc.). The 24 referral categories in the NJ-SAMS were collapsed into four categories to facilitate Chi-Square analysis. These were mandated (n = 299), and non-mandated (n= 234). For two of the categories, “other” (n = 68) and “county other” (n = 103), it was not possible based on the dataset to determine whether or not cases in these categories were mandated or non-mandated, so they were included as separate categories in the analysis. A Chi-Square analysis was conducted, comparing type of referral with the likelihood of completing treatment or quitting/dropping out. Fifty percent of the mandated clients completed treatment, and 50% quit/dropped out. Of the non-mandated clients, only 21.4% completed, while 78.6% did not. The results of the Chi-Square were (3, N=704) =49.5, p <.001. Thus the hypothesis was supported, with mandated clients much more likely to complete treatment than non-mandated clients.
Length of Stay:

Hypothesis 3: The longer the client remains in treatment, the more likely the client is to complete treatment.

Length of stay in treatment was categorized as follows: 1 = stayed 1 day; 2 = stayed 2 to 20 days; 3 = stayed 21 plus days. A Chi-Square analysis (2, N = 704) = 102.6, p < .001, found a significant relationship between length of stay and completing treatment. Thus the hypothesis was founded, with longer length of stay in treatment associated with greater likelihood of completion.

Practical Barriers for Clients:

Hypothesis 1: The greater the geographic distance between the client’s residence and the treatment agency, the higher will be the dropout rate.

The zip codes of the subjects were used to create two groups, the first group consisted of residents of the town in which the treatment program was located, and the second group those living outside of that town and thus further away from the program. A Chi-Square analysis revealed that there was no significant relationship between geographic distance from the treatment agency and the likelihood of completing treatment. Chi-Square (1, N = 704) = < .001, p .98.

Hypothesis 2: Clients who have a valid driver’s license and a car available for their use will be less likely to drop out of treatment than clients who do not have a valid driver’s license and a car available for their use.
Based on a Chi-square analysis ($1, N=704) = 1.3, p .257, it was found that there was no significant relationship between the availability of a valid driver’s license and a car, and the likelihood of treatment completion.

**Cumulative Effects of Biopsychosocial Problems:**

Hypothesis 1: The greater the severity of problems a client has in the seven ASI domains (medical, employment, legal, alcohol/drug, family/social, and, psychiatric status) the more likely the client is to drop out of treatment.

Please refer to Appendix B, Table A11 for a presentation of the results of a series of t tests comparing the mean composite ASI score in each biopsychosocial domain for those subjects who completed treatment with those who quit/dropped out. The completers had significantly lower composite scores in the Alcohol, Drug, Employment, Family/Social, Medical, and Psychiatric domains than the quit/dropped out group, suggesting that greater severity of biopsychosocial difficulties predispose clients to dropping out of treatment.

To determine the total effect of the combined seriousness of difficulties in each of the seven ASI domains, the scores in each domain were summed, creating a new variable, Totalcom. This variable was then tested with an independent samples t test against the completers vs. the dropout groups. The results showed that the completers group had a significantly lower score on this variable than did the dropout group. For completers the mean score was 2.04, SD .68. For dropouts, the mean was 2.44, SD .76, $N = 704, t(603) = 7.17, p <.001.$

**Multivariate Analysis**
Initially the seven ASI Composite Scores were included as possible predictor variables, along with Level of Treatment and Length of stay were tested as possible significant predictors of dropout (Please refer to Appendix B, Table A12). The dependent variable was Completed Treatment/Quit or Dropped Out. Logistic regression, method enter, was conducted to determine which independent variables (ASI composite scores for alcohol, drug, legal, family/social, medical, employment and legal) as well as length of stay in treatment and treatment intensity) were predictors of the outcome of treatment (completed treatment or quit/dropped out). The reference category for the dependent variable was “Quit or Dropped Out”; for Level of Treatment it was “Standard Outpatient”, and for Length of Stay the reference category was “stayed one day”.

As noted, data screening led to the elimination of several outliers, with a total of 692 cases included in the analysis. Regression results suggested that the overall model fit of the predictor variables was questionable, (-2Log Likelihood=696.569), but was statistically reliable in distinguishing between treatment completion and quit/dropped out; Chi Square (11)=213.229, p<.001. The model correctly classified 76.9 of the cases overall, correctly predicting 70.5% of the completers and 80.6% of the quit/dropped out group. Regression coefficients are presented in Appendix B, Table A13. Wald statistics indicated that the ASI composite scores for alcohol, employment, and medical domains significantly predicted the likelihood of quitting or dropping out of treatment. The level of intensity of treatment in which a subject was placed also significantly predicted quitting or dropping out, as did the length of stay in treatment.
Examining the previous bivariate analyses it appeared that certain variables which were used to compute the ASI composite scores made a much greater contribution to the particular ASI score than did other variables also used to compute the score.

Based on the findings of the series of bivariate analyses, and the preceding logistic regression analysis, variables which had been found to be significant predictors of dropout were chosen for inclusion in a series of logistic regressions (Please see Appendix A, Table A13, Table A14 and Table A15). These included the number of days used alcohol in the 30 days prior to intake; years of education, length of stay in treatment, (reference category stayed 1 day); lived with children (reference category no); level of treatment, (reference category standard outpatient); employment status, (reference category employed); ASI composite medical score, number of drugs used, (reference category alcohol only); race/ethnicity, (reference category Caucasian); referral source, (reference category mandated); ASI psychiatric scores; all 7 ASI scores summed; and level of motivation for treatment.

The variables found to be significantly related to dropout were tested for collinearity by running them in a correlation analysis and checking for any variables which exceeded a correlation of .7. No collinearity problems were found. The variables which had been found significantly related to dropout were then run in a logistic regression. Once outliers were excluded, 692 of the 704 cases could be included in the analysis. For the purposes of the analysis the dependent variable was coded 0 = completed treatment and 1 = quit or dropped out. The categorical variables were coded in the following manner:
Referral source (Refsurrcond) 1 = mandated to treatment, 2 = not mandated, 3 = other and 4 = other county source (reference category mandated).

As noted earlier, because of the coding scheme used in the NJ-SAMS program for this variable, it was not possible to determine whether cases that were coded other or other county were mandated or non-manded clients, so these cases were kept in their own categories for the analysis.

> The variable employment (E4fourcat) was coded as 1 = employed, 2 = unemployed, 3 = retired or disabled, and 4 = other (reference category employed).

> Race/ethnicity (Racerecd) was coded as 1 = White, 2 = Black, 3 = Hispanic (reference category White).

> Program intensity (aloc) was coded as 1 = Standard Outpatient, 2 = Intensive Outpatient, 3 = Partial Hospital.

> The number of drugs used by a subject (Numdrugs) was coded 1 = alcohol only, 2 = alcohol and one other drug, 3 = alcohol and 2 or more other drugs (reference category alcohol only).

All of these variables were compared to the likelihood of quitting/dropping out of treatment, thus the odds ratio scores reflect the likelihood of NOT completing treatment. Twelve cases were found to be outliers based on their length of stay values, and were excluded from the logistic regressions. Appendix B, Table A13 reflects a logistic regression of the entire data set, excluding the outliers as mentioned above. Variables predictive of dropout were as follows: education, length of stay, level of treatment, and referral source.
It was decided to use these variables in a further logistic regression equation to see if the predictive ability of the model could be improved. A logistic regression was conducted with the following independent variables (number of days used alcohol in past 30 prior to intake, years of education, whether or not the subject lived with his/her children, level of treatment intensity, employed or unemployed, number of drugs used, race/ethnicity, referral source, whether or not the subject had been mandated into treatment, the ASI scores for medical and psychiatric difficulties, a variable Totalcom, which was the sum of all seven ASI scores for each subject, and a variable Totalmot, the level of motivation of the subject, referral source, length of stay in treatment and level of intensity of treatment. The reference categories for the categorical variables were as follows:

- lived with children – yes,
- employed or unemployed or unemployed – employed,
- number of drugs used – alcohol only,
- race/ethnicity – White,
- referral source – mandated.

For level of treatment intensity, standard outpatient, and for length of stay in treatment – stayed one day.

For the dependent variable the reference category was quit or dropped out.

A logistic regression method enter was performed. The model fit remained questionable, (-2 Log Likelihood=670.083) but was statistically reliable in distinguishing between treatment completion and quit or dropped out; (Chi-Square (21)= 239.714,
The model correctly classified 76.2% of the cases overall, 64.2% of the completers and 83.1% of the quit or dropped out group. Wald statistics indicated that Years of Education predicted the likelihood of dropout, although the effect was minimal. The effects of Length of Stay in Treatment were strong; however the strength of the predictive validity of this variable is partially due to the reference category, Stayed One Day. Level of Treatment also showed strong predictive validity for dropout, with subjects in the Intensive Outpatient 3.7 times as likely to drop out as those in the Standard Outpatient program, and those subjects in the Partial Hospital program 3.38 times as likely to drop out. Clients who were NOT mandated to treatment were 2.26 times as likely to drop out as mandated clients. None of the other variables tested proved to be significant predictors of dropout.

Two additional logistic regression analyses were performed, to determine if there were differences by gender for the predictive validity of the variables identified in the bivariate analyses performed earlier. The dataset was first divided by gender, and then the above logistic regression analyses were repeated, first for males, and then for females. A logistic regression method enter was performed using only the male subjects. The model fit improved, (-2 Log Likelihood=478.855) and was statistically reliable in distinguishing between treatment completion and quit or dropped out ;( Chi-Square (21) = 209.27, p=<.001. The model correctly classified 76.8 of the cases overall, 69.2% of the completers and 81.5% of the quit or dropped out group. Wald statistics showed Years of Education, Length of Stay in Treatment, Living with One’s Children, Level of Treatment
and Referral Source to be significant predictors of dropout. Regression coefficients are presented in Appendix A, Table A14.

A third logistic regression method enter was performed using only the female subjects. Please refer to Appendix A, Table A15. The model fit improved, (-2 Log Likelihood=170.826) and was statistically reliable in distinguishing between treatment completion and quit or dropped out; (Chi-Square (21)= 48.578 p=.001. The model correctly classified 81.1% of the cases overall, 60.7% of the completers and 90.8% of the quit or dropped out group. Wald statistics showed that Length of Stay, Level of Treatment, and Number of Drugs Used were significant predictors of dropout.

In summary, several client characteristic variables which had been identified in past studies as predictive of dropout were not found to be significant predictors in this study. These included age, gender, client motivation for treatment, and marital status. The bivariate analyses did identify a number of variables which were significantly predictive of dropping out of treatment. These included one aspect of the clients’ living situation (living with one’s children – significant only for males), years of education, employment status, severity of biopsychosocial problems as measured by the Addiction Severity Index composite scores for the alcohol, drug, employment, medical, and psychiatric domains, severity of alcohol and drug use, and race/ethnicity.

A number of these predictors found significant in the bivariate analyses lost their predictive ability when examined in the multivariate analyses. Those variables which retained their ability to predict dropout differed in this by the gender of the subjects. For males, years of education (with a greater number of years increasing the likelihood of
dropout), length of stay in treatment (with longer stays prediction greater likelihood of treatment retention), living with their children, level of intensity of treatment (higher levels of intensity associated with dropout), and referral source (non-mandated subjects at higher risk of not completing treatment). For females, predictors of dropping out included length of stay (but only for stays 21 days or more), level of treatment (but only intensive outpatient treatment), and the number of drugs used, with the use of alcohol and one other drug predictive of dropout.
CHAPTER FIVE

DISCUSSION AND CONCLUSIONS

The study was a retrospective one, using NJ-SAMS data collected over a two and a half year period at a large alcohol and substance abuse treatment program which was affiliated with a medical center in Union County, New Jersey. An extensive literature review was done, aimed at identifying variables which had been identified as having good predictive validity for dropout.

These variables were then run in a series of bivariate analyses to test their effect on the study’s dependent variable, a dichotomous variable with the categories completed treatment or quit/dropped out. Those variables found to have significant impact on the dependent variable were then used in a series of logistic regression analyses, to determine their effect on the likelihood of dropout controlling for the effects of the other significant variables in the analysis.

Overall, the study found that the data collected by the NJ-SAMS program can be used to identify clients who are more likely to be at risk of treatment dropout. It also tended to underscore the possible different risk and protective factors for dropout based on gender. An encouraging finding was that mandated clients are no more likely to drop out than voluntary clients – indeed they are more likely to complete treatment.

The study also confirmed that the clients with a longer length of stay are more likely to complete treatment than those with shorter stays. A more troubling finding was that despite being placed in higher levels of care, clients at these levels of care (Intensive
Outpatient and Partial Hospital) were much more likely to dropout than clients in the Standard Outpatient Program.

In this chapter will be a discussion of the significance of these findings for social work and alcohol treatment, including a discussion of potential treatment and policy modifications which might decrease the rates of client drop out.

Limitations of the Study

A retrospective study of this nature can suffer from several possible sources of bias. This study was based on a secondary analysis of pre-existing data which had been collected at the points of intake and discharge by treatment program staff. The staff had received extensive training given by the State of New Jersey focusing on the collection of data using the NJ-SAMS program, and their collection of data was monitored on an ongoing basis by the program supervisor. This was a sample defined by referral to the treatment program of one particular alcohol and substance abuse program affiliated with a department of psychiatry at a large urban medical center. While the sample was large, and consisted of all clients accepted for treatment during the study period whose primary drug of use was alcohol, it was limited to an urban population, so there was no way of knowing the extent to which these findings can be generalized to clients drawn from more rural settings.

It was possible to compare the study sample to the State treatment population data entered into the NJ-SAMS database during the same period of the study on some of the variables of interest. The proportion of men to women was similar in both the State data and the study sample. The percentages of Caucasian (33%), Black (35%) and Hispanic
(32%) differed from the proportions in the State data of Caucasian (71%), Black (17%), and Hispanic (12%). These differences were likely at least partially caused by the State data including clients from both urban and rural areas of the State. This further limits the generalizability of the study findings to the larger State population.

Since the purpose of the study was to test the ability of the data collected in the NJ-SAMS dataset to predict dropout, the researcher was limited to that data. In some instances the dataset prevented more intensive analysis of some of the findings, such as the question of the differences in predictive validity of some of the variables based on the gender of the subjects. The data also prevented a more in-depth examination of the effects of program variables other than level of intensity of the treatment provided (standard outpatient, intensive outpatient, and partial hospital) on dropout rates.

Other variables which may well have contributed to dropout included the size and composition of treatment groups, types of interventions utilized, staff turnover, and subjects with co-occurring disorders compliance with prescribed psychotropic medications. None of this data was collected by the NJ-SAMS program, and thus was not available for analysis. Despite these shortcomings, the agreement of a number of the findings with previous studies, especially with the TEDS data, suggest that many of the study’s findings are relevant to a larger population of alcohol abusing/dependent clients in treatment.

**Dropout and Retention Rates**

Of the 704 subjects in the study, two hundred and sixty-four completed treatment, while four hundred and forty dropped out. The proportion of clients who completed
treatment was only 40%. Clients were placed in one of the three programs based on the seriousness and multiplicity of problems they exhibited at intake, including the severity of addiction as well as of problems in the other ASI biopsychosocial domains. The high proportion of clients treated in the intensive outpatient and partial hospital programs indicates that the majority of clients treated during the period of the study exhibited moderate to severe problems at intake. Bivariate analysis found that the ASI composite score indicative of psychiatric difficulties was higher for dropouts than for completers (dropouts = .26, completers = .18). The multiplicity and severity of these mental health and biopsychosocial problems may have required both a different and more intensive set of treatment interventions than was available in the treatment programs.

**Length of Stay**

For both male and female subjects, length of stay was strongly associated with treatment completion. This finding is similar to that found in previous studies. The TEDS 2005 data clearly shows that longer lengths of stay in treatment were strongly related to better outcomes in treatment, both for all substances reported on, and for clients whose primary drug of use was alcohol.

In the study sample there were differences in the effect of length of stay by gender. For males, lengths of stay between two to twenty days and for periods longer than twenty days significantly reduced the likelihood of dropout. For females, length of stay predicted treatment completion, but only for stays of twenty-one days or longer. There are many potential explanations for the association of greater lengths of stay with
increased likelihood of treatment completion. Based on this it is self-evident that every effort should be made by treatment programs to hold clients in treatment.

Several methods may increase lengths of stay and reduce dropout. The first is a more aggressive outreach to clients who fail to appear for treatment. Rapid follow up by telephone, if available to the client, and/or by letter encouraging the client to contact the treatment program and discuss reasons for non-attendance should be tried. For some clients a change in scheduled treatment appointment times, (for instance if the client’s work hours change), may assist the client in returning to treatment. For clients experiencing transportation difficulties, perhaps public transportation vouchers or even van service might be provided. Van service is particularly appropriate for women with young children. Another important component of programming for women is the provision of on-site child care services, since many female clients do not have access to reliable child care. Another approach might be to provide single gender treatment programs.

**Gender Specific Programs – Women’s Programs:**

Women’s issues are different than men’s. They are likely to need a different array of services and resources targeted towards specific issues, such as child care, transportation services, and mental and physical health. Given these differences, it seems logical that women could benefit from programs designed to reduce barriers to treatment and designed specifically to meet their unique needs. There seems to be no generally accepted definition of substance abuse treatment programming for women, but is possible
to identify elements which need to be included in such programs. Important elements would include:

1. Medical, social, and other ancillary services, such as transportation and childcare, aimed at reducing barriers to women’s access to and participation in treatment.

2. Program modules and services focused on women’s specialized needs, prenatal services, parenting effectiveness classes, mental health services, women’s reproductive health, etc.

3. Program modules which address sensitive women-specific issues in a more comfortable and supportive environment than is likely to be found in a mixed gender program. Such issues as past and current physical, sexual, or emotional abuse, domestic violence, issues of shame and self-esteem are more likely to be discussed in a single gender group (Kandall, 1996).

At present it appears that there is sufficient evidence in the literature to suggest strongly that women’s specific treatment programs do increase both the recruitment and retention rates and positive clinical outcomes for alcohol and substance abusing women.

While length of stay and program level were significant predictors of treatment for both men and women, some other variables were quite different in their ability to predict dropout for women as opposed to men.

Referral Source

Referral source was a strong predictor for treatment completion for men, but not for women. Male clients who were “voluntary clients” (were not ordered into treatment by a court, an Employee Assistance Program, or other agency such as the New Jersey
Division of Youth and Family Services- DYFS), were three times more likely to drop out than men mandated into treatment (“coerced clients”). This is encouraging finding, since it suggests that male mandated clients have a good chance benefiting from, and completing, treatment.

For female clients, there was no significant relationship between being either a voluntary or mandated client and treatment completion. For male clients, programs should not be reluctant to accept mandated clients for treatment, but rather should encourage referrals from such sources as the drug and criminal courts, probation and parole, and public child welfare agencies such as Division for Youth and Family Services.

A possible explanation for the differential effect of this variable based on gender may have to do with the potential severity of consequences of not completing treatment for mandated vs. voluntary clients. Those referred by the criminal justice system may be facing incarceration if they drop out, a consequence not usually faced by male voluntary clients. It is likely that more female clients are referred for treatment by such sources as DYFS and Work First New Jersey, and while there are negative consequences associated with not completing treatment when referred to it by these agencies; they do not usually include a threat of incarceration. It appears that there may be a relationship between the severity of the negative consequence for treatment dropout, and the likelihood of treatment completion.

**Living Situation/Social Isolation**

Living Situation was another area that differed significantly by gender in its
predictive validity for dropout. Male clients who were living with their children were 1.7 times less likely to drop out than clients who were not. There are several possible explanations for this. One has to do with social isolation and social support. Males living with their children may be more likely to also be living with the children’s mother, and thus be less isolated socially. They may also be more responsible and stable, having chosen to remain with their offspring rather than living apart from them. Perhaps the children provide additional motivation for client to complete treatment. Since men remaining with their children are more likely to living in a two parent household, there may less stress on the client, such as financial stress, and the rigors of child rearing, since both parents may be income producing and can share child care duties. The client would also have someone with whom to share other responsibilities and who might provide emotional support and encouragement to complete treatment.

The effect of living with one’s children was found not to be a protective factor against dropout for female clients. It may be that males living with their children may also be living with the children’s mother, and thus in a two parent household. For women it is more likely that they are single heads of households, and thus the children may be sources of additional stress, as the single parent struggles to provide financially for the children, and has to deal alone with the responsibilities of child care. The children may become additional sources of stress for the client, and child care responsibilities and factors such as the illness of a child may interfere with the woman’s ability to attend treatment sessions. It is possible that in two parent families, the lion’s share of the child
care duties are born by the woman, making it easier for the man to attend treatment without having to worry about who will watch the children while he is away.

**Education**

Years of education was another area which was predictive of dropout for men, but not for women. For men, those with more education were more likely to drop out than men with less education. This variable had no predictive validity for women.

**Severity of Alcohol Use and Number of Drugs Used**

The severity of alcohol use was not a significant predictor of treatment outcome for men or women; however the number of drugs used was predictive of dropout for women, but not for men. Women who used alcohol plus one other drug were 3.5 times more likely to drop out than women who used alcohol only.

**Effects of Severity of Biopsychosocial Problems**

Higher values on some of the ASI composite scores were significantly predictive of dropout based on the bivariate analysis. These included the alcohol, medical, legal, and psychiatric scores. The drug and family/social scores were not significant at the p<.05 level, but approached significance. When all seven ASI composite scores were combined to produce a summary measure of the total amount of biopsychosocial problems of a subject, and included in the multivariate analyses, this summary measure failed to significantly predict dropout, although for male clients it approached significance at the p=.065 level, while not significant for female clients. The results of multivariate analysis found that other variables discussed previously were better predictors of dropout.
Profile of the Typical Dropout

In summary, the typical male dropout was an African American who was a voluntary client, and who was placed in either the intensive outpatient or the partial hospital program, rather than the standard outpatient program. He is likely to be unemployed. If he had children, he was not living with them. He had more years of education than completers. He had remained in treatment less than 21 days. He is likely to have higher ASI composite scores, reflecting a greater severity of biopsychosocial problems than male clients who completed treatment.

For women, the typical dropout is an African American likely to have been treated in either the intensive outpatient program or the partial hospital program. She was using alcohol plus one other drug. She is likely to be unemployed. She has higher ASI composite scores in the domains of alcohol and drug use, medical issues, employment difficulties, and psychiatric difficulties.

Implications for Treatment Programs and Treatment Policy

Why do clients drop out more from intensive outpatient (IOP) and partial hospital (PH)? One possible answer is that clients in these programs are likely to have more biopsychosocial problems. For these clients it would be important to use ASI composite scores to create priorities in the client’s treatment plan.

Since clients who qualify for standard outpatient are much less likely to drop out, treatment organizations should utilize more of their resources on clients in IOP and PH. These resources include staff and time in smaller groups and more individualized attention.
The literature and the data from the current study shows that the highest ASI composite scores were in employment domain. Organizations should place more emphasis on helping clients secure employment, through appropriate community referrals as well as vocational rehabilitation referrals. They should consider incorporating some psychoeducational groups related to finding employment and enhancing skills needed to maintain employment.

Since voluntary clients are likely to experience less extrinsic motivation than clients referred as mandated, more efforts should be made to help clients develop more intrinsic motivation. This might include the use of Motivational Interviewing techniques and other approaches needed to develop increased motivation.

If a client has children but is not living with them, the client should perhaps be encouraged to reestablish and/or increase contact with his/her children, if this is not contraindicated by the client’s situation. Staff should be prepared to aggressively outreach to the client if he stops attending, through phone calls and/or correspondence, encouraging the client to discuss the reasons for his non-attendance. The program would need to be structured to accommodate changes in the client’s life situation. For instance, if the client has been attending treatment during the day and then finds employment which requires him to work daytime hours, evening treatment should be available, and staff should be ready to exercise flexibility in scheduling the client’s treatment hours.

For women, if not a single gender program, at least some single gender groups focused specifically on women’ issues, such as child rearing practices and groups focused on helping women deal with possible past trauma connected with sexual abuse and/or
domestic violence, should be considered. The ASI composite scores should also be given consideration in formulating the client’s treatment plan, with special attention given to the domains of alcohol and drug use, medical issues, employment, and psychiatric difficulties. More efforts should be focused on increasing the women’s’ intrinsic motivation for treatment, since being mandated into treatment is less likely to prevent dropout than it is for men. Motivational Interviewing approaches could be helpful for these clients, with greater focus on those clients who are using alcohol plus another drug, as they are at greater risk of dropout. The program ideally would also need to provide child care services for the younger children of the clients attending the program, and transportation services as well. Assistance in finding and maintaining employment would also be helpful.

In the future alcohol and substance abuse treatment programs are likely to come under increasing pressure to adopt evidenced based treatment approaches. The Mental Health Parity Act (PL 110-343) enacted in 2008 has increased coverage for alcohol and substance abuse disorders in health plans and through Medicaid coverage. Additionally, the Patient Protection and Affordable Care Act (ACA) will increase access to treatment due to the requirement for health insurance coverage. These changes are likely to change financing for addiction services, with a reduction of reliance on grants and contracts, to increased reliance on Medicaid and insurance coverage. In the past, and currently, both Medicaid and insurance plans have required providers to utilize treatment staff with licensure and/or certification. If programs are to successfully adapt to these
changes, they will have to both further professionalize their staff and train them to make a much greater use of evidence based treatment.

There is likely to be increased pressure on agencies to hire staff educated at the Masters level, and also for state certification and licensing boards to implement major modifications of the curriculum required for alcohol and drug treatment certification. If more master’s level social workers could be encouraged to enter the alcohol and substance abuse counseling field, this would help with both the increased professionalization of the field, and also increase the likelihood of greater acceptance of Evidence Based Practice models.

**Suggestions for Further Research**

Since current treatment approaches appear to be largely ineffective in holding these populations in treatment, this situation definitely requires further research, both examining current practices for treating these populations, and testing the effectiveness of newer, evidence based treatments in preventing dropout in this group of clients. There appears to be a strong need for further study, using experimental designs, of the effects of levels of counselor education and training on client retention, with special attention to counselors’ philosophy of treatment and willingness to learn and apply evidenced based practices, even if some of them appear contrary to the traditional disease model 12- step approach to treatment. The current curriculum mandated by the State as a requirement for alcohol and drug counselor certification also needs to be studied, to determine how
much of its content is evidence based, and what modifications might be needed to better prepare counselors for work with clients with more serious psychiatric disorders.

While alcoholism treatment has proven successful for a large number of individuals, there are many others who have not benefited from treatment. This is especially the case for clients with more severe biopsychosocial and psychiatric disorders. This group, despite receiving greater dosages of treatment in both intensive outpatient and partial hospital programs, still drop out at an alarming rate. Future research will need to focus more heavily on this population, to better understand the reasons for these high dropout rates. Studies are also needed to determine if newer, more innovative evidence based practices will be more effective in holding these individuals in treatment.

A challenge for researchers is how to best disseminate evidence based practice interventions to “real world” community treatment settings. Attempts to accomplish this must consider the fit between the proposed interventions and the characteristics, readiness, and attitudes of the staff as well as the client.
References


US Department of Health and Human Services Substance Abuse and Mental Health Services Administration, (2008). Treatment Episode Data Set (TEDS) : 2005
Discharges from Substance Abuse Treatment Services. *DASIS Series: S-41, DHHS Publication No. (SMA) 08-4314,*


Appendix A

Tables
Table A1

Client Characteristics at Intake by Completed Treatment or Quit/Dropped Out
Categorical Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Completed Treatment (N = 264)</th>
<th>Quit/Dropped Out (N = 440)</th>
<th>χ²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>63 34.2</td>
<td>121 65.8</td>
<td>1.13</td>
<td>.33</td>
</tr>
<tr>
<td>Male</td>
<td>201 38.7</td>
<td>319 61.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never married</td>
<td>127 34.1</td>
<td>245 65.9</td>
<td>8.0</td>
<td>.09</td>
</tr>
<tr>
<td>Married</td>
<td>60 44.1</td>
<td>76 55.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Separated</td>
<td>31 47.0</td>
<td>35 53.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>40 34.2</td>
<td>77 65.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>6 46.2</td>
<td>7 53.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
<td>18.9</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>White</td>
<td>80 34.3</td>
<td>153 65.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>75 30.2</td>
<td>173 69.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>109 48.9</td>
<td>114 51.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living Situation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lived with spouse/sex partner</td>
<td></td>
<td></td>
<td>1.3</td>
<td>.25</td>
</tr>
<tr>
<td>Yes</td>
<td>140 39.5</td>
<td>214 60.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>124 35.4</td>
<td>226 64.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lived with children</td>
<td></td>
<td></td>
<td>14.2</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Yes</td>
<td>122 46.4</td>
<td>141 53.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>142 32.2</td>
<td>299 67.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lived with parents</td>
<td></td>
<td></td>
<td>.9</td>
<td>.37</td>
</tr>
<tr>
<td>Yes</td>
<td>64 34.6</td>
<td>121 65.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>200 38.5</td>
<td>319 61.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lived with other family</td>
<td></td>
<td></td>
<td>.002</td>
<td>.96</td>
</tr>
<tr>
<td>Yes</td>
<td>67 37.6</td>
<td>111 62.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>197 37.5</td>
<td>329 62.5</td>
<td></td>
<td></td>
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### Table A1 (continued)

*Client Characteristics at Intake by Completed Treatment or Quit/Dropped Out Categorical Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Completed Treatment (N = 264)</th>
<th>Quit/Dropped Out (N = 440)</th>
<th>( \chi^2 )</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lived with friends</td>
<td></td>
<td></td>
<td>.10</td>
<td>.81</td>
</tr>
<tr>
<td>Yes</td>
<td>32</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>232</td>
<td>383</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lived alone</td>
<td></td>
<td></td>
<td>1.07</td>
<td>.34</td>
</tr>
<tr>
<td>Yes</td>
<td>69</td>
<td>131</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>195</td>
<td>309</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td>23.3</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Employed</td>
<td>132</td>
<td>146</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>109</td>
<td>217</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retired or disabled</td>
<td>15</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>32</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table A2

Client Characteristics at Intake by Completed Treatment or Quit/Dropped Out
Continuous Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Completed Treatment</th>
<th>Quit/Dropped Out</th>
<th>t (702)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td><strong>Age at intake</strong></td>
<td>39.4</td>
<td>11</td>
<td>40.7</td>
<td>10.19</td>
</tr>
<tr>
<td><strong>Education completed in years</strong></td>
<td>11.38</td>
<td>2.12</td>
<td>11.73</td>
<td>1.94</td>
</tr>
</tbody>
</table>
Table A3

*Differences in Completion of Treatment by whether or not Subjects were in the Women’s Addiction Program*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Completed Treatment (N = 64)</th>
<th>Quit/Dropped Out (N = 140)</th>
<th>χ²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>In women’s program</td>
<td>44</td>
<td>101</td>
<td>10.1</td>
<td>.005</td>
</tr>
<tr>
<td>Not in women’s program</td>
<td>20</td>
<td>19</td>
<td>48.7</td>
<td></td>
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</table>


### Table A4

**Differences in Severity of ASI Composite Scores by whether or not Subjects were Treated in the Women’s Addiction Program**

<table>
<thead>
<tr>
<th>Variable</th>
<th>In Women’s Program</th>
<th>Not in Women’s Program</th>
<th>t (182)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N = 145)</td>
<td>(N = 39)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td>.41 .25</td>
<td>.17 .14</td>
<td>-5.8</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Drug</td>
<td>.09 .08</td>
<td>.05 .04</td>
<td>-2.3</td>
<td>.02</td>
</tr>
<tr>
<td>Employment</td>
<td>.78 .29</td>
<td>.65 .31</td>
<td>-2.4</td>
<td>.02</td>
</tr>
<tr>
<td>Legal</td>
<td>.21 .16</td>
<td>.16 .13</td>
<td>1.7</td>
<td>.09</td>
</tr>
<tr>
<td>Family/Social</td>
<td>.46 .36</td>
<td>.43 .31</td>
<td>-.27</td>
<td>.79</td>
</tr>
<tr>
<td>Medical</td>
<td>.37 .21</td>
<td>.27 .28</td>
<td>-2.1</td>
<td>.04</td>
</tr>
<tr>
<td>Psychiatric</td>
<td>.34 .24</td>
<td>.16 .16</td>
<td>-4.38</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Table A5

*Differences in Severity of Psychiatric Difficulties by Completed Treatment or Dropped Out

*Continuous Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Completed Treatment</th>
<th>Quit/Dropped Out</th>
<th>n*</th>
<th>M</th>
<th>SD</th>
<th>n*</th>
<th>M</th>
<th>SD</th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>In your lifetime how many times treated (do not include alcohol or drug treatment):</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For psychological or emotional Problems</td>
<td>264</td>
<td>.33</td>
<td>.93</td>
<td>424</td>
<td>.60</td>
<td>1.4 671</td>
<td>-2.98</td>
<td>.003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For psychological or emotional problems outpatient</td>
<td>263</td>
<td>.33</td>
<td>.72</td>
<td>436</td>
<td>.51</td>
<td>.98 436</td>
<td>-2.8</td>
<td>.005</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the past 30 days, how many times treated (do not include alcohol or drug treatment)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How many nights spent inpatient for treatment of psychological or emotional problems</td>
<td>260</td>
<td>.33</td>
<td>1.6</td>
<td>429</td>
<td>.54</td>
<td>1.9 601</td>
<td>-1.6</td>
<td>.12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How many times treated outpatient for psychological or emotional problems</td>
<td>263</td>
<td>.05</td>
<td>.23</td>
<td>439</td>
<td>.04</td>
<td>1.9 601</td>
<td>-0.40</td>
<td>.68</td>
<td></td>
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</tr>
</tbody>
</table>

* n after outliers excluded
### Table A6

**Differences in Psychiatric Difficulties by Completed Quit Dropped Out Categorical Variables**

<table>
<thead>
<tr>
<th></th>
<th>Completed Treatment (N = 264)</th>
<th>Quit/Dropped Out (N = 440)</th>
<th>( \chi^2 )</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Have you in your lifetime (not related to alcohol or drug use)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experienced Serious depression for 2 weeks or more</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>96</td>
<td>30.5</td>
<td>219</td>
<td>69.5</td>
</tr>
<tr>
<td>No</td>
<td>168</td>
<td>43.2</td>
<td>221</td>
<td>56.8</td>
</tr>
<tr>
<td>Experienced serious tension or anxiety for 2 weeks or more</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>83</td>
<td>30.9</td>
<td>186</td>
<td>69.1</td>
</tr>
<tr>
<td>No</td>
<td>181</td>
<td>41.6</td>
<td>254</td>
<td>58.4</td>
</tr>
<tr>
<td>Been prescribed medication for psychological or emotional problems for 2 weeks or more</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>75</td>
<td>28.4</td>
<td>187</td>
<td>71.6</td>
</tr>
<tr>
<td>No</td>
<td>189</td>
<td>42.5</td>
<td>258</td>
<td>57.5</td>
</tr>
<tr>
<td>Received a pension for a psychiatric disability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11</td>
<td>22.9</td>
<td>37</td>
<td>77.1</td>
</tr>
<tr>
<td>No</td>
<td>253</td>
<td>38.6</td>
<td>403</td>
<td>61.4</td>
</tr>
</tbody>
</table>
Table A6 (continued)

*Differences in Psychiatric Difficulties by Completed Quit Dropped Out Categorical Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Completed Treatment (N = 264)</th>
<th>Quit/Dropped Out (N = 440)</th>
<th>χ²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the past 30 days have you experienced</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(not due to alcohol or drugs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experienced serious depression for 2 weeks or more</td>
<td></td>
<td></td>
<td>11.8</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Yes</td>
<td>62</td>
<td>28.2</td>
<td>158</td>
<td>71.8</td>
</tr>
<tr>
<td>No</td>
<td>202</td>
<td>42.7</td>
<td>282</td>
<td>58.3</td>
</tr>
<tr>
<td>Experienced serious tension for 2 weeks or more</td>
<td></td>
<td></td>
<td>8.5</td>
<td>.004</td>
</tr>
<tr>
<td>Yes</td>
<td>62</td>
<td>29.4</td>
<td>149</td>
<td>70.6</td>
</tr>
<tr>
<td>No</td>
<td>202</td>
<td>40.9</td>
<td>291</td>
<td>59.1</td>
</tr>
<tr>
<td>Been prescribed medication for 2 weeks or more</td>
<td></td>
<td></td>
<td>8.8</td>
<td>.003</td>
</tr>
<tr>
<td>Yes</td>
<td>44</td>
<td>27.5</td>
<td>116</td>
<td>72.5</td>
</tr>
<tr>
<td>No</td>
<td>220</td>
<td>40.4</td>
<td>324</td>
<td>59.6</td>
</tr>
</tbody>
</table>
Table A7

*Differences in Severity of Alcohol and Drug Use by Completed Treatment or Quit/Dropped Out Categorical Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Completed Treatment (N = 264)</th>
<th>Quit/Dropped Out (N = 440)</th>
<th>χ²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of alcohol use 30 days prior to intake</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No use</td>
<td>87</td>
<td>104</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than weekly</td>
<td>49</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 to 2 times weekly</td>
<td>46</td>
<td>77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 to 6 times weekly</td>
<td>44</td>
<td>89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily</td>
<td>38</td>
<td>129</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used alcohol only or alcohol plus other drugs 30 days prior to intake</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol only</td>
<td>159</td>
<td>202</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol plus 1 other drug</td>
<td>63</td>
<td>137</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol plus 2 other drugs</td>
<td>42</td>
<td>101</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

32.9   <.001

12.7.   .003
Table A8

*Differences in Severity of Alcohol and Drug Use by Completed Treatment or Quit/Dropped Out*

*Continuous Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Completed Treatment</th>
<th>Quit/Dropped Out</th>
<th>t(702)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N = 264)</td>
<td>(N = 440)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age first used alcohol</td>
<td>16.84 5.23</td>
<td>16.17 5.63</td>
<td>1.58</td>
<td>.114</td>
</tr>
<tr>
<td>Age first used alcohol to intoxication</td>
<td>16.15 6.41</td>
<td>16.30 6.10</td>
<td>-.130</td>
<td>.48</td>
</tr>
<tr>
<td>How many days used alcohol 30 days prior to intake</td>
<td>5.25 6.59</td>
<td>8.90 9.26</td>
<td>-5.67</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Table A9

*Differences in Completed/Dropped Out Of Treatment by Program Intensity Categorical Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Completed Treatment (N = 264)</th>
<th>Quit/Dropped Out (N = 440)</th>
<th>χ²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard outpatient</td>
<td>102</td>
<td>60</td>
<td>68</td>
<td>40</td>
</tr>
<tr>
<td>Intensive outpatient</td>
<td>135</td>
<td>32.1</td>
<td>286</td>
<td>67.9</td>
</tr>
<tr>
<td>Partial hospital</td>
<td>27</td>
<td>23.9</td>
<td>86</td>
<td>76.1</td>
</tr>
</tbody>
</table>
Table A10

*Differences in Referral Source by Completed Quit Dropped Out Categorical Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Completed Treatment (N = 264)</th>
<th>Quit/Dropped Out (N = 440)</th>
<th>$\chi^2$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referral Source</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mandated</td>
<td>150 50.2</td>
<td>149 49.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-mandated</td>
<td>50 21.4</td>
<td>149 78.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>20 29.4</td>
<td>48 70.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other county</td>
<td>44 42.7</td>
<td>59 57.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$\chi^2 = 49.5$, $p < .001$
Table A11

*Differences in Addiction Severity Index Composite Scores by Completed Treatment or Quit/Dropped Out*

<table>
<thead>
<tr>
<th>Scores</th>
<th>Completed Treatment (N = 264)</th>
<th>Quit/Dropped Out (N = 440)</th>
<th>t(702)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>M = .26, SD = .30</td>
<td>M = .36, SD = .25</td>
<td>-5.79</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Drug</td>
<td>M = .06, SD = .05</td>
<td>M = .08, SD = .07</td>
<td>-4.14</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Employment</td>
<td>M = .68, SD = .30</td>
<td>M = .75, SD = .29</td>
<td>-2.96</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Family/Social</td>
<td>M = .40, SD = .29</td>
<td>M = .45, SD = .32</td>
<td>-2.45</td>
<td>.015</td>
</tr>
<tr>
<td>Legal</td>
<td>M = .19, SD = .13</td>
<td>M = .18, SD = .14</td>
<td>1.14</td>
<td>.25</td>
</tr>
<tr>
<td>Medical</td>
<td>M = .26, SD = .19</td>
<td>M = .34, SD = .27</td>
<td>-4.47</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Psychiatric</td>
<td>M = .18, SD = .21</td>
<td>M = .26, SD = .24</td>
<td>-4.86</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Table A12

*Logistic Regression Predicting Dropping Out of Treatment, Addiction Severity Index (ASI) Composite Scores, Level of Treatment, and Length of Stay*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>OR</th>
<th>95% CI</th>
<th>Wald statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASI Scores</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td>1.18</td>
<td>.496</td>
<td>3.26</td>
<td>[1.23, 8.61]</td>
<td>5.67</td>
<td>.017</td>
</tr>
<tr>
<td>Drug</td>
<td>.88</td>
<td>.72</td>
<td>2.43</td>
<td>[.084, 70.3]</td>
<td>.267</td>
<td>.60</td>
</tr>
<tr>
<td>Employment</td>
<td>.75</td>
<td>.32</td>
<td>2.12</td>
<td>[1.13, 3.98]</td>
<td>5.45</td>
<td>.02</td>
</tr>
<tr>
<td>Family/Social</td>
<td>.308</td>
<td>.31</td>
<td>1.36</td>
<td>[.78, 2.51]</td>
<td>.97</td>
<td>.32</td>
</tr>
<tr>
<td>Legal</td>
<td>.013</td>
<td>.70</td>
<td>.99</td>
<td>[.25, 3.89]</td>
<td>&lt;.001</td>
<td>.96</td>
</tr>
<tr>
<td>Medical</td>
<td>.941</td>
<td>.48</td>
<td>.99</td>
<td>[.25, 3.89]</td>
<td>4.18</td>
<td>.04</td>
</tr>
<tr>
<td>Psychiatric</td>
<td>.457</td>
<td>.47</td>
<td>1.58</td>
<td>[.63, 4.0]</td>
<td>.94</td>
<td>.33</td>
</tr>
<tr>
<td><strong>Level of treatment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>35.84</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Intensive outpatient</td>
<td>1.47</td>
<td>.246</td>
<td>4.35</td>
<td>[2.68, 7.05]</td>
<td>35.63</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Length of stay</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>95.69</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2 to 20 days</td>
<td>1.43</td>
<td>.308</td>
<td>.238</td>
<td>[.130, .435]</td>
<td>21.0</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>21 or more days</td>
<td>2.99</td>
<td>.326</td>
<td>.050</td>
<td>[.026, .095]</td>
<td>84.31</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*Note.* CI = confidence interval for odds ratio (OR).
Table A13

*Logistic Regression Predicting Dropping Out of Treatment - All Cases Included*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>OR</th>
<th>95% CI</th>
<th>Wald statistic</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of days past 30 used alcohol prior to intake</td>
<td>.015</td>
<td>.013</td>
<td>1.01</td>
<td>[.99, 1.0]</td>
<td>1.28</td>
<td>.26</td>
</tr>
<tr>
<td>Years of education</td>
<td>.102</td>
<td>.013</td>
<td>1.11</td>
<td>[1.0, 1.2]</td>
<td>3.99</td>
<td>.046</td>
</tr>
<tr>
<td>Length of stay in treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>87.62</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Stayed 2 to 20 days</td>
<td>-1.35</td>
<td>.318</td>
<td>.259</td>
<td>[.14, .48]</td>
<td>17.98</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Stayed 21 or more days</td>
<td>-2.91</td>
<td>.333</td>
<td>.055</td>
<td>[.03, .10]</td>
<td>76.22</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Lived with children – no</td>
<td>.302</td>
<td>.201</td>
<td>1.35</td>
<td>[.91, 2.0]</td>
<td>2.21</td>
<td>.13</td>
</tr>
<tr>
<td>Level of treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24.45</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Intensive outpatient</td>
<td>1.31</td>
<td>.266</td>
<td>3.71</td>
<td>[2.21, 6.25]</td>
<td>24.39</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Partial hospital</td>
<td>1.22</td>
<td>.417</td>
<td>3.38</td>
<td>[1.49, 7.68]</td>
<td>8.55</td>
<td>.003</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>.315</td>
<td>.223</td>
<td>1.37</td>
<td>[.88, 2.12]</td>
<td>2.00</td>
<td>.157</td>
</tr>
<tr>
<td>Disabled or retired</td>
<td>.287</td>
<td>.418</td>
<td>1.33</td>
<td>[.58, 3.02]</td>
<td>.470</td>
<td>.493</td>
</tr>
<tr>
<td>Other employment status</td>
<td>.986</td>
<td>.531</td>
<td>2.22</td>
<td>[.94, 7.58]</td>
<td>3.45</td>
<td>.063</td>
</tr>
<tr>
<td>ASI medical score</td>
<td>.622</td>
<td>.523</td>
<td>1.82</td>
<td>[.66, 5.14]</td>
<td>1.41</td>
<td>.235</td>
</tr>
<tr>
<td>Number of drugs used</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.18</td>
<td>.246</td>
</tr>
<tr>
<td>Alcohol and 1 other</td>
<td>.382</td>
<td>.235</td>
<td>1.46</td>
<td>[.92, 2.32]</td>
<td>.925</td>
<td>.104</td>
</tr>
<tr>
<td>Alcohol and 2 other</td>
<td>.031</td>
<td>.266</td>
<td>1.03</td>
<td>[.61, 1.73]</td>
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Table A13 (continued)

*Logistic Regression Predicting Dropping Out of Treatment- All Cases Included*

<table>
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<th>Variable</th>
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<th>OR</th>
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<th>Wald statistic</th>
<th>p</th>
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<td>Black</td>
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<td>[.80, 2.09]</td>
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<td>1.01</td>
<td>[.60, 1.67]</td>
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<td>2.26</td>
<td>[1.29, 3.96]</td>
<td>8.22</td>
<td>.004</td>
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<tr>
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<td>1.45</td>
<td>[.734, 2.90]</td>
<td>1.45</td>
<td>.281</td>
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<tr>
<td>Referral source other county</td>
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<td>.278</td>
<td>1.28</td>
<td>[.734, 2.90]</td>
<td>.785</td>
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<td>.424</td>
<td>[.126, 1.46]</td>
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<td>[.973, 2.46]</td>
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<td>.065</td>
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<td>.997</td>
<td>[.993, 1.06]</td>
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<td>.940</td>
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*Note.* CI = confidence interval for odds ratio (OR).
Table A14

*Logistic Regression Predicting Dropping Out of Treatment- Male Subjects*

<table>
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<tr>
<th>Variable</th>
<th>$B$</th>
<th>$SE$</th>
<th>$OR$</th>
<th>95% CI</th>
<th>Wald statistic</th>
<th>$p$</th>
</tr>
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<tbody>
<tr>
<td>Number of days past 30 used alcohol prior to intake</td>
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<td>1.01</td>
<td>[.98, 1.04]</td>
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<td>1.14</td>
<td>[1.01, 1.28]</td>
<td>4.73</td>
<td>.030</td>
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<td>.199</td>
<td>[.08, .45]</td>
<td>14.91</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Stayed 21 or more days</td>
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<td>.035</td>
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<td>.246</td>
<td>1.72</td>
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<td>.312</td>
<td>3.54</td>
<td>[1.92, 6.53]</td>
<td>16.45</td>
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<tr>
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<td>[.71, 2.04]</td>
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<td>.484</td>
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<tr>
<td>Disabled or retired</td>
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<td>.534</td>
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<td>[.53, 4.36]</td>
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<td>[.736, 8.16]</td>
<td>2.13</td>
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<td>[.451, 5.84]</td>
<td>.522</td>
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<tr>
<td>Number of drugs used</td>
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<td>Alcohol and 1 other</td>
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<td>1.46</td>
<td>[.92, 2.32]</td>
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<td>1.15</td>
<td>[.626, 2.14]</td>
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</table>
### Table A14 (continued)

*Logistic Regression Predicting Dropping Out of Treatment- Male Subjects*

<table>
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<th>Wald statistic</th>
<th>p</th>
</tr>
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<tr>
<td>Black</td>
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<td>[.71, 2.33]</td>
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<td>.915</td>
<td>[.501, 1.67]</td>
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<td>.773</td>
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<td>1.65</td>
<td>[.896, 3.06]</td>
<td>2.59</td>
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<td>1.68</td>
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<td>.282</td>
<td>1.54</td>
<td>[.967, 2.93]</td>
<td>3.41</td>
<td>.065</td>
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<tr>
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<td>.041</td>
<td>.102</td>
<td>[.947, 1.11]</td>
<td>.396</td>
<td>.529</td>
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*Note.* CI = confidence interval for odds ratio (OR).
<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
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<th>OR</th>
<th>95% CI</th>
<th>Wald statistic</th>
<th>p</th>
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<tr>
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<td>.028</td>
<td>1.00</td>
<td>[.952, 1.06]</td>
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<tr>
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<td>.122</td>
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<td>Intensive outpatient</td>
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<tr>
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<td>.791</td>
<td>1.80</td>
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<td>1.80</td>
<td>[.141, 23.13]</td>
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<td>3.54</td>
<td>[.1.29, 9.69]</td>
<td>6.10</td>
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<td>[.309, 2.79]</td>
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Table A15 (continued)

*Logistic Regression Predicting Dropping Out of Treatment- Female Subjects*

<table>
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<th>Wald statistic</th>
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<td>[.111, 2.19]</td>
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*Note.* CI = confidence interval for odds ratio (*OR*).
Appendix B

New Jersey Substance Abuse Monitoring System Instrument

And

Assessment Module (ASI)

Please refer to the supplemental file.