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**SUBSTANCE ABUSE TREATMENT NEED
AND TREATMENT UTILIZATION AMONG
YOUTH ENTERING THE ILLINOIS JUVENILE
CORRECTIONS SYSTEM**

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SUBSTANCE ABUSE TREATMENT NEED AND TREATMENT UTILIZATION AMONG YOUTH ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM

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CSAT
Center for Substance
Abuse Treatment
SAMHSA

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FOREWORD

The mission of the Center for Substance Abuse Treatment (CSAT), Substance Abuse and Mental Health Services Administration (SAMHSA), is to improve the lives of individuals and families affected by alcohol and drug abuse by ensuring access to clinically sound, cost-effective addiction treatment that reduces the health and social costs to our communities and the nation. As part of its mission, CSAT supports the development of innovative treatment approaches, based on sound data and state-of-the-art analyses, and disseminates information on treatment approaches shown to be effective for curbing addiction and related behaviors.

In 1997, CSAT established the National Evaluation Data Services (NEDS) contract to support the CSAT mission. In 2000, through a new contract (Contract No. 270-00-7078), CSAT continued and expanded the scope of NEDS. NEDS activities help to foster collaboration and partnering among the public and private sectors along the Federal-state-local community-based treatment continuum. The three major activities of NEDS, under the current contract, are to assist in developing data infrastructure vehicles and tools, to perform treatment services secondary analyses on existing data, and to support the Government Performance Results Act (GPRA) activities. NEDS, through its Secondary Analysis Technical Reports, provides evidence-based information on substance abuse treatment issues relevant to treatment needs, access, utilization, efficacy, effectiveness, and efficiency. NEDS analyses focus on treatment needs, services received, and populations of interest to the substance abuse treatment field in order to provide new information about which services yield the best outcomes for what types of clients, at what cost. This information helps address treatment issues such as the treatment gap, culturally competent treatment services, and recovery.

This report describes a secondary analysis of existing data designed to assess the patterns and correlates of substance abuse treatment need and treatment utilization among 401 adolescents entering the Illinois juvenile corrections system. The findings, which include differences in treatment need and treatment utilization among African-American and white juvenile offenders, will be of interest to treatment providers who work with this population, to policymakers concerned with provision of services to high-risk and delinquent youth, and to researchers/evaluators.

Patrick J. Coleman
Project Director
National Evaluation Data Services (NEDS)

ACKNOWLEDGMENTS

ABSTRACT

Relatively little is known about the substance abuse treatment need patterns and experiences of youth incarcerated in the United States juvenile justice system. To address this issue, four closely related analytic questions concerned with understanding the predictors of treatment need and utilization patterns among adolescents entering the juvenile corrections system are examined. These analyses include assessments of racial/ethnic similarities and differences in the variables associated with treatment need and utilization. The data analyzed were collected as part of a face-to-face survey of 401 youth age 13 through 18 who entered the Illinois juvenile corrections system in mid-2000. Analyses were conducted using maximum likelihood methods for the assessment of path models with directly observed variables. For this population as a whole, need for substance abuse treatment and treatment utilization each were predicted by sets of social environmental and personal characteristics, in addition to several sociodemographic variables. Considerable variability in the effects of demographic and social environmental indicators on treatment need and utilization across race groups was observed. The findings of these analyses suggest the need for the continual development of the cultural competence of treatment providers and the expansion of on-site provision of substance abuse treatment services to all incarcerated juveniles who need them.

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This analysis investigates the correlates of treatment need and utilization in a representative sample of youth entering the juvenile corrections system in Illinois.

1.   INTRODUCTION

Evidence from a variety of sources suggests high levels of alcohol and other substance use among adolescents, and recent estimates suggest that approximately one-quarter of all Americans in need of but not receiving treatment for substance abuse problems are between age 12 and 17. Further, many youth involved in the justice system have substance abuse problems, and one might suspect that such problems would be prevalent particularly among incarcerated youth. With few exceptions, however, the treatment need and experiences of incarcerated youth remain largely unexplored.

This analysis aimed to address the following four questions:

- ■ What factors are associated with the need for substance abuse treatment among adolescents entering the juvenile corrections system?

- ■ What factors are associated with substance abuse treatment utilization among adolescents entering the juvenile corrections system?

- ■ Are there racial/ethnic differences in the factors associated with substance abuse treatment need among adolescents entering the juvenile corrections system?

- ■ Are there racial/ethnic differences in the factors associated with substance abuse treatment utilization among adolescents entering the juvenile corrections system?

These four analytic questions were addressed in comparisons of African-American and white youth entering the Illinois juvenile corrections system. Other population groups (e.g., Hispanics, Asians) were insufficiently represented to be included in the analysis.

2.   METHODS

The data used to conduct the analyses come from a survey of 401 youth who were interviewed as they entered the Juvenile Division of the Illinois Department of Corrections (IDOC) in mid-2000. The variables used in the analyses include (1) treatment need, (2) treatment utilization, (3) childhood neglect, (4) parental substance use, (5) peer substance use, (6) early onset of substance use, (7) depression, and (8) prior arrests. Treatment need was defined on the basis of the *Diagnostic and Statistical Manual of Mental Disorders*, or DSM-III diagnostic criteria. Treatment utilization was assessed using a composite indicator of lifetime

receipt of any type of treatment service. Additionally, gender, race, age, and educational status were used as control variables. The analytic questions were examined using path analysis.

3.   FINDINGS

More than two-thirds of the youth interviewed were found to have alcohol or other substance abuse treatment need, and over half of those met the treatment need criteria for *both* alcohol and other substance use. Less than half of the juveniles in need of treatment indicated they had ever received treatment. Some other important findings are highlighted below:

- ■ **Correlates of Treatment Need.** Variables related to treatment need included early onset of substance use, depression, and substance use by parents and peers. Childhood neglect was associated with treatment need indirectly, through its influence on depression and early age of substance abuse initiation.

- ■ **Correlates of Treatment Utilization**. As expected, treatment need was related to whether a youth had ever accessed treatment services. In addition, arrest history, age of substance abuse initiation, childhood neglect, and parental substance use were associated with treatment utilization.

- ■ **Treatment Need Among African-American and White Youth.** The results of this analysis suggest that the factors associated with treatment need differ somewhat for African-American and white youth.

- ■ **Treatment Utilization Among African-American and White Youth.** While arrest history, early substance abuse initiation, and parental substance use were associated with the likelihood of having ever accessed treatment services for both African-American and white juveniles, childhood neglect and peer substance use were related to prior treatment utilization for white youth only.

In general, the effects of social environmental variables on utilization patterns were considerably stronger among whites. A key finding was the stronger association between treatment need and utilization among white, compared to African-American, youth.

4.   SUMMARY AND IMPLICATIONS

This analysis revealed multiple correlates of treatment need and utilization among youth entering the juvenile corrections system, as well as important differences between African-American and white youth. The results of the analysis suggest several implications for substance abuse treatment providers, policymakers, and researchers/evaluators.

Implications for treatment providers include the following:

■ The social processes associated with substance abuse treatment need and utilization may vary across racial/ethnic groups. Thus, increasing the cultural competence of treatment providers and staff on an ongoing basis may improve utilization of services across racial/ethnic groups.

■ The findings underscore the role of parents and parent figures in a youth's experiences with substance use and treatment utilization.

Implications for policymakers include the following:

■ Given findings from this study, on-site provision of alcohol and other drug treatment services to all juveniles who enter the corrections system is critical.

■ The findings suggest that, in some cases, treatment utilization is a result of system intervention. Increased attention to the role of family service and juvenile justice agencies in youth treatment utilization—and possible differences in their role and/or involvement across cultural groups—may reduce some of the institutional and cultural barriers to access to treatment services.

Implications for researchers/evaluators include the following:

■ Use of longitudinal designs in future analyses will bring greater scientific rigor to the assessment of treatment need and utilization patterns of criminal justice-involved youth.

■ Wherever possible, future survey research efforts in this area can be strengthened by validating the quality of self-reported information regarding both substance use and treatment utilization behavior.

■ Future research/evaluation may explore other variables that are likely to be predictive of substance abuse behaviors and outcomes within this population.

Additional analyses on this topic that include youth representing a wider range of races/ethnicities than was possible in this study can provide the information needed to adapt treatment services to the needs of specific populations.

I. INTRODUCTION

I. INTRODUCTION

Adolescent delinquency historically has been closely associated with substance use and abuse (Elliott, Huizinga, & Menard, 1989; VanKammen, Loeber, & Stouthamer-Loeber, 1991; Wish & Johnson, 1986; Welte, Zhang, & Wieczorek, 2001). Although this linkage is well understood, comparatively little is known about the treatment need patterns and experiences of youth incarcerated in the juvenile justice system. The study documented in this report addressed these issues by investigating the correlates of both treatment need and treatment utilization in a representative sample of youth entering the juvenile corrections system in Illinois.

This chapter presents a brief overview of past research. It also provides an introduction to the purpose and goals of this analysis.

1.   OVERVIEW OF RELEVANT RESEARCH

The following sections provide an overview on adolescent substance abuse, treatment need, and treatment utilization patterns among incarcerated youth.

1.1   Adolescent Substance Abuse and Treatment Need

Evidence from national surveys such as Monitoring the Future (Johnston, O'Malley, & Bachman, 2000), the National Household Survey on Drug Abuse (Office of Applied Studies, 2000a), and the Youth Behavior Risk Survey (Kahn et al., 2000) consistently document high levels of alcohol and other drug use among adolescents. Other data sources, including the Drug Abuse Warning Network, further suggest the magnitude of the substance abuse problem among adolescents (Office of Applied Studies, 1999a).

Factors generally believed to be antecedents of adolescent substance use and abuse include early initiation of alcohol and other drug consumption (Bailey, Flewelling, & Rachal, 1992; Grant & Dawson, 1998; Greenfield, French, & Devine, 2002), parental substance use modeling and unstable family environments (Brook, Brook, Gordon, Whiteman, & Cohen, 1990; Epstein, Botvin, Diaz, & Schinke, 1995), and peer pressure (Dinges & Oetting, 1993; Kandel, Kessler, & Margulies, 1978). Adolescent substance use commonly is associated with delinquency and a variety of other problems, including poor physical health (MacKay, Fingerhut, & Duran, 2000), emotional and psychiatric problems (Office of Applied Studies, 1999b; Shedler & Block, 1990), and academic difficulties (Hawkins, Catalano, & Miller, 1992).

Recent estimates suggest that approximately one-quarter of all Americans in need of but not receiving treatment for illicit drug problems are between the ages of 12 and 17 (White

House, 2002). Other survey data suggest that many persons with substance abuse problems do not perceive themselves as being in need of treatment. Unfortunately, this denial of treatment need may be particularly strong among adolescent and young adult substance abusers (White House, 2002). Consequently, few youth who require substance abuse treatment, or their families, are believed to pursue treatment opportunities (Dembo, Schmeidler, Pacheco, Cooper, & Williams, 1997).

1.2   Treatment Need and Treatment Utilization Patterns of Incarcerated Youth

Many adolescents entering the juvenile justice system are known to have substance abuse problems (Beck et al., 1988; DeFrancesco, 1996; Dembo, 1996; National Institute on Drug Abuse, 1995a; Sigda & Martin, 1996), and many have been victims of neglect, physical abuse, sexual abuse, and/or sexual exploitation (Dembo et al., 1992; Inciardi, Pottieger, Forney, Chitwood, & McBride, 1991; Johnson, Dunlap, & Maher, 1998; Kilpatrick et al., 2000; Mouzakitis, 1981). The impact of these traumatic experiences may pose a significant obstacle to the successful treatment of adolescents in juvenile corrections custody.

Recent research suggests that most facilities that house juveniles in the United States do not provide on-site substance abuse treatment services to residents (Office of Applied Studies, 2000b). Thus, perhaps it is not surprising that little is known about the substance abuse treatment experiences of adolescents entering the juvenile corrections system. Although large studies such as the DC*MADS project (National Institute on Drug Abuse, 1995a) provide rich information regarding the substance use behaviors of incarcerated juveniles, their treatment need and experiences remain largely unexplored.

One potentially useful framework for understanding the treatment need of juveniles entering the criminal justice system is Massaro and Pepper's (1994) conceptual model that places substance abuse within the larger psychosocial context of life experiences and personal dispositions that are conducive to this condition and that serve as potential barriers to effective treatment. In the web of conditions and problems known to be associated with substance abuse treatment failure in this regard are homelessness, violence, AIDS and other poor physical health conditions, psychological and/or psychiatric conditions, poor education, family problems, crime, lack of financial resources, unemployment, prostitution, poverty, neglect, and various forms of physical and sexual abuse (Harrison, 2001). This model emphasizes the importance of both cultural context and social environment in determining personal opportunities for substance abuse treatment (Blumer, Sutter, Ahmed, & Smith, 1967; Feldman, 1968). Exhibit I-1 presents a life cycle version of the model.

EXHIBIT I-1

LIFE CYCLE MODEL OF CONDITIONS AND EXPERIENCES CONTRIBUTING TO SUBSTANCE ABUSE

Begin Here

Child (Unparented)

Immature Young Adult

Early Alcohol/ Substance Abuse

Poor Social Vocational Skills Cognitive-Behavioral Problems

Next Generation

THE ADULT CYCLE

Community Return

Impulsivity Violent Psychosis

Doing Time, Little Treatment for Alcohol/Substance Abuse

In the Criminal Justice System

Source: Massaro & Pepper (1994)
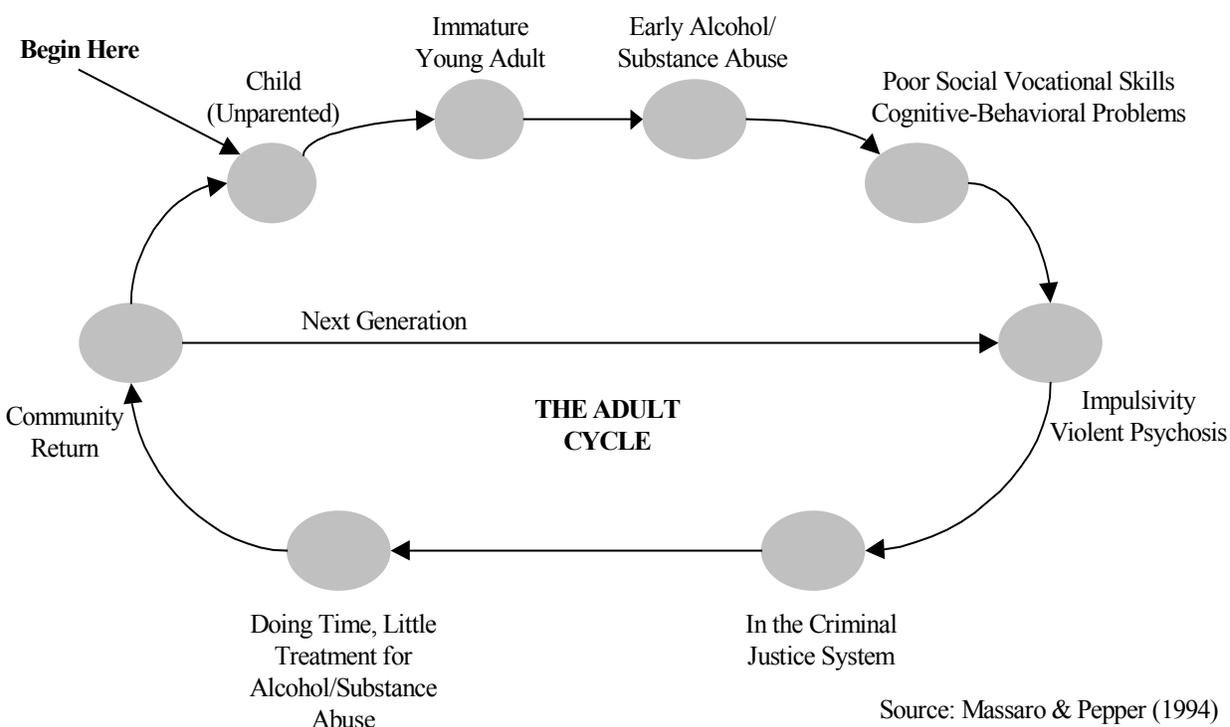
1.3   Effects of Race/Ethnicity on Treatment Need and Treatment Utilization

Racial and ethnic differences in patterns and perceptions of substance use are well documented (Bennett, Janca, Grant, & Sartorius, 1993; Caetano, Clark, & Tam, 1998; Cho & Faulkner, 1993; Kleinman & Lukoff, 1978; National Institute on Drug Abuse, 1995b; Wallace & Bachman, 1991). Numerous theoretical models have been proposed to account for these variations, but none have been found to be wholly consistent with the empirical evidence (Wallace, Bachman, O'Malley, & Johnston, 1995).

Research also suggests that youth from ethnic minority groups have fewer opportunities to access mental health services (Arcia, Keyes, Gallagher, & Herrick, 1993) and are less likely to complete treatment once started (Kazdin, Stolar, & Marciano, 1995). To date, however, sources of racial and ethnic variability in the processes associated with treatment need and utilization patterns among juvenile offenders have not been investigated.

2.   PURPOSE AND PARAMETERS OF THIS ANALYSIS

The broad goal of this analysis was to conduct a secondary analysis of existing data in order to assess the patterns and correlates of treatment need and treatment utilization among adolescents entering the Illinois juvenile corrections system. Data for this analysis come from a survey of 401 youth age 13 through 18 who were interviewed as they entered the Juvenile Division of the State of Illinois Department of Corrections (IDOC) during mid-2000.

This analysis examines the following four closely related questions concerned with understanding the predictors of substance abuse treatment need and experiences of this group of adolescents:

■   What factors are associated with the need for substance abuse treatment among adolescents entering the juvenile corrections system?

■   What factors are associated with substance abuse treatment utilization among adolescents entering the juvenile corrections system?

■   Are there racial/ethnic differences in the factors associated with substance abuse treatment need among adolescents entering the juvenile corrections system?

■   Are there racial/ethnic differences in the factors associated with substance abuse treatment utilization among adolescents entering the juvenile corrections system?

Pursuit of these analytic questions is vital, given the general lack of knowledge regarding the treatment need and utilization experiences of young offenders. In view of the near absence of empirical information on these topics, this analysis should provide useful guidance to criminal justice treatment providers, to policymakers, and to researchers/evaluators concerned with identifying and providing assistance to high-risk and delinquent youth.

3.   ORGANIZATION OF THE REPORT

This chapter has provided an overview of previous research, along with the specific analytic questions addressed by this analysis. Chapter II discusses the study's data collection, measurement, and analysis procedures. Chapter III presents the findings for each analytic question. Finally, Chapter IV summarizes the findings and presents a set of implications for substance abuse treatment practice, substance abuse treatment policy, and future research/evaluation. Appendix A describes the survey, and Appendix B presents the path models used for directly observed variables.

II. METHODS

II. METHODS

To address the analytic questions, a secondary analysis was conducted of survey data collected in 2000 through face-to-face interviews with juveniles entering the Juvenile Division of the Illinois Department of Corrections (IDOC). This chapter describes the data collection methodology followed in administering the 2000 survey. It also describes the measurement of all variables examined in the secondary analysis, as well as the statistical procedures employed and the specific sample subgroups examined.

1. DATA COLLECTION METHODOLOGY

The goal of the original survey was to characterize the nature and extent of substance use and its consequences among serious juvenile offenders in the State of Illinois. The survey focused specifically on youth entering the IDOC juvenile system for the first time. Face-to-face interviews were conducted with 401 youth age 13 through 18 between May 12, 2000, and August 11, 2000. The survey response rate was 98 percent. A complete description of survey procedures, including the questionnaire design process, interviewing procedures, study sites, and weighting procedures can be found in Appendix A.

2. VARIABLE MEASUREMENT

The variables used in the analyses included (1) treatment need, (2) treatment utilization, (3) childhood neglect, (4) parental substance use, (5) peer substance use, (6) early onset of substance use, (7) depression, and (8) prior arrests. Additionally, gender, ethnicity, age, and educational status were used as control variables. The effects of several other social environmental measures, including residing in a two-parent household, parental educational level, and receipt of governmental assistance, also were examined. Each of these variables is described below.

2.1 Treatment Need

Substance abuse treatment need was estimated on the basis of diagnostic criteria for substance abuse and dependence from the Mini International Neuropsychiatric Interview, or MINI (Sheehan & Lecrubier, 2002). The MINI, constructed on the basis of the *Diagnostic and Statistical Manual of Mental Disorders,* or DSM-III (American Psychiatric Association, 1987), is an abbreviated psychiatric interview schedule that includes a diagnostic inventory of alcohol abuse and dependence. For this study, the MINI criteria were applied to diagnose alcohol or drug abuse and dependence. During the interview, respondents were asked if they experienced

any problems or symptoms associated with the use of each substance during the 12 months before they entered corrections custody.

The MINI symptoms that detect substance dependence include:

- Increased tolerance to alcohol or other drugs

- Withdrawal symptoms

- Alcohol or other drugs taken in larger amounts or for a longer period than intended

- Unsuccessful efforts to control drinking or other drug use

- Spending a lot of time getting or using alcohol or other drugs or recovering from alcohol or other drug use

- Spending less time working, enjoying hobbies, or being with others because of drinking or other drug use

- Continuing use of alcohol or other drugs despite knowledge of psychological or physical problems caused by their use.

The symptoms indicative of substance abuse are:

- Alcohol or other drug use frequently interferes with fulfilling important obligations (e.g., missing work because of a hangover).

- Substance use places oneself in physically hazardous situations (e.g., driving a car or boat while under the influence).

- Substance use causes problems with police, family, and friends.

- Alcohol or other drugs continue to be used despite knowledge of these problems.

Respondents experiencing three or more dependence symptoms and one or more abuse symptom were classified as problem users and defined as being in need of treatment.

Other definitions of treatment need were also considered while developing the analyses described in this report. One alternative treatment need indicator was constructed based on a count of the numbers of types of illicit substances used, as well as binge drinking. A t-test comparison of this measure with the diagnostic treatment need indicator described above found a strong positive association between them (t = 10.47, df = 384, $p < .001$). The decision was made

to employ the diagnostic indicator of treatment need, however, because it is less ad hoc and is grounded in a generally recognized conceptual framework. Overall, 60 percent of youth entering the Illinois juvenile corrections system were found to need alcohol or other drug abuse treatment.

2.2   Treatment Utilization

Juveniles were asked if they had ever been in treatment to stop drinking or using drugs. Those who reported having done so were classified as having lifetime treatment utilization experience.

Consideration also was given to using multiple measures of treatment utilization to reflect fundamental differences between formal treatment services and self-help programs. The decision not to employ separate measures was based on empirical analyses of the data set indicating that very few juveniles who had participated in self-help programs had not also received formal treatment services (only two juveniles reported participation in a self-help group but had never received formal treatment). Only 48 percent of youth needing treatment reported lifetime contact with any form of substance abuse treatment services.

2.3   Childhood Neglect

The determination of childhood neglect was based on five questions. Respondents were asked how often they had experienced the following as they were growing up: (1) no place to live, (2) not adequate clothes to wear, (3) not enough food to eat, (4) feeling unloved, and (5) feeling unsafe or in danger. Each question had four options from which to choose: (1) frequently (ten or more times), (2) sometimes (three through nine times), (3) a few times (one or time times), and (4) never. Youth who answered "frequently" or "sometimes" to any of these questions (33% of those in the study) were regarded as having experienced childhood neglect.

2.4   Parental Drug Use

Respondents who reported that any male or female adult he/she most often lived with (e.g., father, stepfather, mother's boyfriend, mother, stepmother, father's girlfriend) ever used drugs were classified as being exposed to parental drug use. About 21 percent of the respondents were exposed to parental drug use.

2.5   Peer Substance Use

Interviewed juveniles were asked if "none," "some," or "most or all" of their friends use each of three substances: cigarettes, alcohol, and marijuana. Peer substance use reflects the use of these drugs by "most or all" of a respondent's friends.

2.6   Early Onset of Substance Use

Early onset of substance use reflects whether the respondent began using any of three substances—cigarettes, alcohol, or marijuana—before age 10. About 40 percent of the youth reported having used one or more of these substances before age 10.

2.7   Depression

Depression was measured by the seven-item Center for Epidemiological Studies Depression Scale (Radloff, 1977):

- I did not feel like eating; my appetite was poor.
- I had trouble keeping my mind on what I was doing.
- I felt depressed.
- I felt everything I did was an effort.
- My sleep was restless.
- I felt sad.
- I could not get going.

Each of these items was coded as 1="never," 2="rarely," 3="sometimes," 4="frequently." Reliability coefficient (Chronbach's Alpha) for these items was 0.752, indicative of a high level of reliability as a scale. These responses were summed to produce depression index scores, which ranged from 7 to 28, with the median being 15. Respondents with a score higher than 90 percent of the sample (i.e., scores of 22 or greater) were defined as being depressed.

2.8   Prior Arrests

Number of prior arrests serves as a proxy indicator of formal contact with the criminal justice system. Respondents were asked how many times they had been arrested by the police in their lifetimes. The total number of arrests was scaled into three levels of contact with the criminal justice system: low (arrested less than five times), medium (arrested five through nine times), and high (arrested ten or more times). On average, juveniles newly admitted to the Illinois juvenile corrections system had been arrested 12 times.

2.9   Control Variables

Several background and environmental characteristics were included as control variables, including subjects' gender, race/ethnicity (African-American, white, Hispanic, and other), age

(13 or 14, 15 or 16, 17 or older), and educational status (attending school at time of admittance to IDOC, dropped out or not attending at the time of admittance). Other social environmental variables measured but not included in the final analytical models were two-parent household (lived with both parents, biological or otherwise), parental educational level (highest level of education completed by any parent), and governmental aid (subject's family's receipt of public aid, such as support from welfare, social security disability, or food stamps).

3.   STATISTICAL ANALYSIS METHODS

Each analytic question was examined using path models for directly observed variables (Jöreskog & Sorbom, 2001; Raykov & Marcoulides, 2000). Using maximum likelihood to estimate all parameters, this analytic strategy simultaneously specifies a system of regression equations, making it possible to assess both the direct and the indirect effects of predictor variables on outcome measures. An additional advantage of this approach is its ability to perform multi-group analyses in which some coefficients can be constrained to be equal across groups while others are permitted to vary (Hayduk, 1987). Difference of Chi-square tests then can be employed to determine whether the coefficients vary significantly between groups. Because the variables examined in these models each had nominal or ordinal measurement properties, we estimated polychoric correlation matrices and used them in addressing each analytic question (Jöreskog & Sorbom, 1996). Appendix B provides additional information on this analytic method.

4.   SUBSAMPLES ANALYZED

To address the analytic questions about racial/ethnic differences in the predictors of treatment need and utilization, separate analyses of African-American (n=181) and white (n=177) youth were conducted. The small numbers of Hispanic youth (n=27) and youth from other racial/ethnic groups (n=16) admitted to the Illinois Youth Center in St. Charles (IYC-St. Charles) and the Illinois Youth Center in Warrenville (IYC-Warrenville) during the time of the interviews precluded separate analyses for these groups. Using the analytic procedures described above, the path model initially fitted to the entire sample independently for African-American and white youth was re-assessed to explore similarities and differences in treatment need and utilization processes across these groups. Although sample sizes were not sufficient to analyze females (n=52) separately, the final path model was respecified to evaluate its fit among males only (n=349).

III. FINDINGS

III. FINDINGS

This chapter presents the empirical findings of this secondary analysis. Separate sections report on:

- Characteristics of youth entering the Illinois juvenile corrections system
- Patterns of treatment need and utilization
- Personal and environmental correlates of treatment need and utilization
- Correlates of early onset of substance abuse, depression, and prior arrests
- Path analytic models designed to address the four analytic questions, including:

   − Correlates of substance abuse treatment need
   − Correlates of substance abuse treatment utilization
   − Racial/ethnic differences in the correlates of substance abuse treatment need
   − Racial/ethnic differences in the correlates of substance abuse treatment utilization.

A final set of analyses was conducted to explore potential gender differences in the correlates of treatment need and utilization.

1. CHARACTERISTICS OF YOUTH ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM

Exhibit III-1 summarizes the weighted demographic characteristics of the sample of 401 youth entering the Illinois juvenile corrections system. Because females were oversampled, the sample was adjusted for differential probabilities of selection by gender. Exhibit III-1 presents weighted demographic characteristics and other background characteristics. In the weighted sample, males represented 87 percent of all juveniles entering juvenile corrections. Nearly two-thirds (65%) of all respondents were 15 or 16 years old. In terms of education, about 68 percent of youth reported not attending school or having dropped out of school at the time of facility admittance. Forty-two percent grew up in two-parent households, and just under half (49%) reported family receipt of governmental assistance. Finally, 39 percent reported that at least one parent completed high school. Thirty-five percent indicated that one or both parents attended college, and 13 percent reported that neither parent completed high school.

These youth also can be described in terms of several environmental and other personal characteristics. In terms of environmental characteristics, one-third (33%) of the sample reported symptoms of childhood neglect, and 21 percent reported parental drug use. Just over one-third (34%) reported peer substance use. In terms of the personal characteristics examined, 40 percent of respondents reported they had begun using cigarettes, alcohol, and/or marijuana before age 10.

Approximately 12 percent were classified as "depressed." Thirty-one percent of the youth indicated they had never been arrested or had been arrested one to four times; 27 percent had been arrested five to nine times; and 42 percent had been arrested ten or more times.

Forty-five percent of the sample identified themselves as African-American, and 44 percent as white. Exhibit III-1 presents breakdowns of each respondent characteristic by racial/ethnic group.

		Race/Ethnicity			
	Total (n=401) %	**African-American (n=181) %**	**White (n=177) %**	**Hispanic (n=27) %**	**Other (n=16) %**
Gender					
Male	87.1	84.2	91.7	96.3	52.9
Female	12.9	15.8	8.3	3.7	47.1
Age					
13–14	17.7	18.1	20.5	0.0	12.5
15–16	64.8	67.6	63.1	70.4	43.8
17 or older	17.5	14.3	16.5	29.6	43.8
Educational Status					
Attending school	67.8	74.0	61.9	60.5	73.9
Dropped out/not attending	32.2	26.0	38.1	39.5	26.1
Two-Parent Household					
Yes	42.0	56.3	30.4	33.3	31.3
No	58.0	43.8	69.6	66.7	68.8
Parental Educational Level					
Less than high school	12.5	10.7	9.4	44.4	12.5
High school graduate	52.4	46.9	57.5	51.9	56.3
More than high school	35.2	42.4	33.1	3.7	31.3
Governmental Aid					
Yes	48.6	38.6	59.9	37.0	50.0
No	51.4	61.4	40.1	63.0	50.0
Early Onset of Substance Use					
Yes	39.7	21.0	62.0	22.3	35.0
No	60.3	79.0	38.0	77.7	65.0
Depression					
Yes	11.4	11.9	11.0	3.7	23.5
No	88.6	88.1	89.0	96.3	76.5

EXHIBIT III-1
CHARACTERISTICS OF YOUTH ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM

EXHIBIT III-1 (CONT.) CHARACTERISTICS OF YOUTH ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM					
		Race/Ethnicity			
	Total (n=401) %	**African- American (n=181) %**	**White (n=177) %**	**Hispanic (n=27) %**	**Other (n=16) %**
Prior Arrests					
Arrested less than 5 times	31.0	30.6	33.4	15.8	34.6
Arrested 5–9 times	27.3	31.2	25.2	15.8	26.1
Arrested 10 or more times	41.7	38.2	41.5	68.4	39.3
Childhood Neglect					
Yes	32.7	34.4	29.9	38.1	35.0
No	67.3	65.6	70.1	61.9	65.0
Parental Drug Use					
Yes	20.9	18.0	23.2	11.9	43.6
No	79.1	82.0	76.8	88.1	56.4
Peer Substance Use					
Yes	33.5	74.9	40.8	42.1	32.7
No	66.5	25.1	59.2	57.9	67.3

2. PATTERNS OF TREATMENT NEED AND TREATMENT UTILIZATION

Overall, approximately two-thirds (68%) of youth interviewed were found to be in need of treatment for either alcohol or other drug abuse. Among these, 36 percent met the criteria for both alcohol and other drug abuse; 27 percent met the criteria for drug abuse only; and 5 percent met the criteria for alcohol abuse only. Exhibit III-2 shows the patterns of treatment need and utilization among youth in the analysis sample. The first column of Exhibit III-2 presents treatment need patterns by demographic and other characteristics. There were neither gender nor age differences in treatment need. Racial/ethnic differences were observed, however: African-Americans were less likely to need alcohol or other drug treatment relative to respondents from other racial/ethnic groups. Also, youth who had dropped out of school or were not attending school at the time of their admittance were more likely to need both alcohol and other drug treatment than were those who had been attending school.

Of the 273 adolescents in need of treatment, 48 percent reported having received some form of substance abuse treatment. Receipt of formal treatment, including residential or inpatient treatment, weekly outpatient treatment, intensive outpatient or day treatment, and detoxification, was most common (35%). In addition, 18 percent of the adolescents in need of treatment indicated having participated in self-help groups, such as Alcoholics Anonymous or Narcotics Anonymous. Demographic breakouts of treatment utilization patterns are presented in the second column of Exhibit III-2. No gender, racial/ethnic, or educational status differences

were found in treatment utilization rates. Older youth, however, were more likely to have participated in both formal treatment and self-help groups.

EXHIBIT III-2 TREATMENT NEED AND UTILIZATION AMONG YOUTH ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM, BY DEMOGRAPHIC CHARACTERISTICS		
Youth Characteristic/ Demographic Variable	Treatment Need (n=401)	Treatment Utilization (n=273)
Total	68.1%	48.0%
Gender		
Male	68.2	48.3
Female	67.3	45.7
Age		**
13–14	59.2	33.3
15–16	69.9	47.0
17 or older	71.4	64.0
Race/Ethnicity	***	
White	78.5	54.0
African-American	55.8	39.6
Hispanic	81.5	50.0
Other	68.8	45.5
Educational Status	**	
Attending school	64.0	47.1
Dropped out/not attending	76.7	49.0
Two-Parent Household		
Yes	65.5	46.4
No	71.6	49.2
Parental Educational Level		
Less than high school	70.0	28.6
High school graduate	64.8	48.6
More than high school	72.3	51.9
Governmental Aid		
Yes	70.4	49.3
No	65.6	45.7

** $p < .01$.
*** $p < .001$.

3.   PERSONAL AND ENVIRONMENTAL CORRELATES OF TREATMENT NEED AND TREATMENT UTILIZATION

Exhibit III-3 illustrates treatment need and utilization of the respondents, by personal and environmental characteristics. The first column presents the associations between treatment need and each personal and environmental characteristic. These analyses suggest that both sets of variables are strongly predictive of treatment need. Specifically, youth classified as being depressed and as having early onset of substance use and higher numbers of prior arrests had

greater probabilities of needing substance abuse treatment services. In addition, youth reporting parental drug use, peer substance use, and childhood neglect were more likely to be in need of substance abuse treatment. Among those in need of treatment, none of these personal and environmental measures were found to be related to likelihood of prior treatment utilization (Exhibit III-3, column 2).

EXHIBIT III-3 **TREATMENT NEED AND UTILIZATION AMONG YOUTH ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM,** **BY PERSONAL AND ENVIRONMENTAL CHARACTERISTICS**		
Characteristic	**Treatment Need (n=401)** **%**	**Treatment Utilization (n=273)** **%**
Personal Characteristics		
Early Onset of Substance Use	***	
Yes	82.4	48.1
No	58.7	47.6
Depression		
Yes	73.9	42.9
No	67.3	52.9
Prior Arrests	**	
Less than 5 arrests	60.0	39.2
5–9 arrests	66.1	48.6
10 or more arrests	75.4	52.8
Environmental Characteristics		
Childhood Neglect	*	
Yes	74.8	55.1
No	64.8	44.0
Parental Drug Use	***	
Yes	83.3	47.1
No	64.0	48.3
Peer Substance Use	***	
Yes	82.1	51.8
No	61.0	45.1

* $p < .05$.
** $p < .01$.
*** $p < .001$.

4. CORRELATES OF EARLY ONSET OF SUBSTANCE USE, DEPRESSION, AND PRIOR ARRESTS

Associations between three variables important to the life cycle model depicted in Exhibit I-1 and demographic and other background characteristics are presented in Exhibit III-4. Several of the relationships shown in this exhibit are notable. First, early onset of substance use was associated with childhood neglect, parental drug use, and peer substance use. Also, racial/ethnic differences existed in early onset of substance use. In particular, whites were considerably more likely to report early age of substance use onset than were African-Americans, Hispanics, and respondents of other races/ethnicities. Further, gender was related strongly to depression, with females being at greater risk for this affliction. Depression also was more likely among those reporting childhood neglect, parental drug use, and peer substance use. Number of prior arrests was found to be associated only with parental drug use: among those reporting parental drug use, a majority (54%) reported they had been arrested ten or more times.

5. PATH ANALYTIC MODELING OF ANALYTIC QUESTIONS

This section presents the empirical findings relevant to each analytic question.

5.1 Correlates of Treatment Need

The path analytic model presented in Exhibit III-5 examines the multivariate correlates of treatment need and treatment utilization among youth entering Illinois juvenile corrections facilities in mid-2000. Exhibit III-5 presents maximum likelihood (ML) estimates for each pathway estimated. The final model presented here was trimmed to eliminate nonsignificant regression paths in preliminary models specified for the full sample, African-Americans, and whites. We included several demographic items that have significant bivariate associations with treatment need and/or utilization in these models. In the interest of clarity, however, these pathways are not depicted. ML coefficients and standard errors for all coefficients in this model, including demographic items, are provided in Exhibit III-6, along with R^2 coefficients for each dependent measure. Overall, this model provided a close fit to the observed data.[1]

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[1] In particular, the X^2 Goodness of Fit coefficient was small and insignificant ($X^2 = 2.69$, df = 3, ns). Other goodness of fit measures for this model also indicated a good fit, including the Root Mean Square Error of Approximation (RMSEA = 0.00), the Normed Fit Index (NFI = 1), and the Critical N (CN = 978.4).

				Prior Arrests	
Youth Characteristic/ Demographic Variable	**Early Onset of Substance Use**	**Depression**	**<5 Arrests**	**5–9 Arrests**	**10+ Arrests**
EXHIBIT III-4 **EARLY ONSET OF SUBSTANCE USE, DEPRESSION,** **AND PRIOR ARRESTS AMONG YOUTH ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM,** **BY PERSONAL AND BACKGROUND CHARACTERISTICS**					
Total	39.7	11.5	31.0	27.3	41.8
Gender		***			
Male	38.7	7.7	29.5	27.5	43.0
Female	46.2	36.5	41.2	25.5	33.3
Age					
13–14	46.5	9.9	35.2	26.8	38.0
15–16	40.8	10.8	29.3	30.5	40.2
17 or older	29.6	15.7	32.9	15.7	51.4
Race/Ethnicity	***				
White	61.9	11.9	33.5	25.0	41.5
African-American	21.0	11.0	30.4	31.5	38.1
Hispanic	22.2	3.7	14.8	14.8	70.4
Other	35.3	23.5	37.5	25.0	37.5
Educational Status					
Attending school	38.4	9.9	31.3	29.8	39.0
Dropped out/not attending	42.3	14.0	31.0	21.7	47.3
Two-Parent Household					
Yes	43.5	10.3	33.9	26.8	39.3
No	36.9	12.5	28.9	27.6	43.5
Parental Educational Level					
Less than high school	42.0	9.8	27.5	23.5	49.0
High school graduates	34.3	8.6	29.4	29.4	41.2
More than high school	47.1	16.4	35.0	25.7	39.3
Governmental Aid					
Yes	40.0	14.3	31.8	29.2	39.0
No	39.3	8.7	30.1	25.7	44.2
Childhood Neglect	*	**			
Yes	48.1	17.6	28.0	25.8	46.2
No	35.6	8.5	32.6	28.1	39.3
Parental Drug Use	**	*		*	
Yes	56.0	18.1	21.4	25.0	53.6
No	35.3	9.5	33.4	28.1	38.5
Peer Substance Use	*	*			
Yes	47.0	16.4	23.7	28.9	47.4
No	36.1	8.6	34.5	26.6	39.0

*   *p* <.05.
**   *p* <.01.
***p <.001.

EXHIBIT III-5
PREDICTING TREATMENT NEED AND UTILIZATION AMONG YOUTH ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM: A PATH MODEL WITH STRUCTURAL PARAMETER ESTIMATES*
(N=401)

Model Fit Chi-Square = 2.69 (p = 0.44)

RMSEA = 0.0 (p = 0.76)

Adjusted Goodness of Fit Index = 0.97
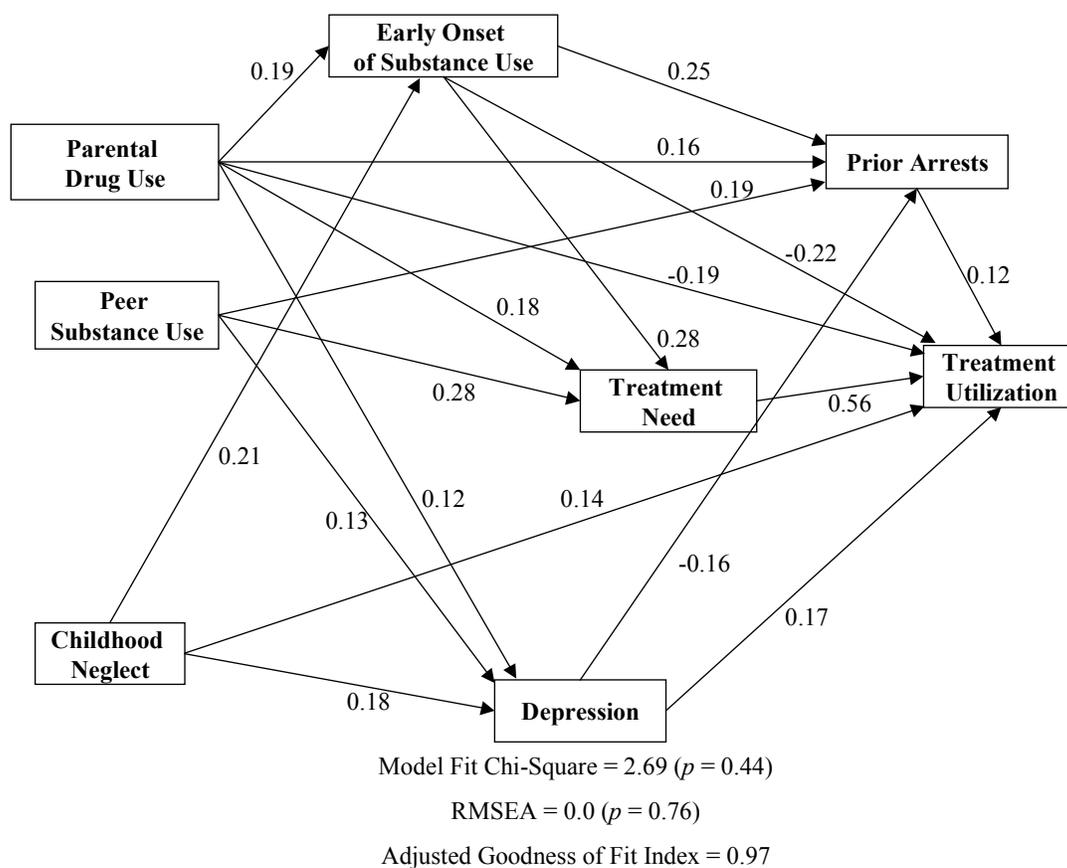
*All paths shown are significant at the 0.05 level; paths from ethnicity, gender, age, and education are not shown.

Of the three personal characteristics examined (early onset of substance use, depression, and prior arrests), one was found to have direct effects on respondents' likelihood of having treatment need: youth reporting early substance use initiation were more likely to be in need of treatment. Two social environmental characteristics were also found to have direct effects on each juvenile's likelihood of needing treatment: those reporting parental drug use and peer substance use were more likely to be in need of treatment. The third environmental indicator—childhood neglect—was found to have multiple indirect effects on treatment need through its

influence on depression and age of substance use onset. Additionally, parental drug use was found to influence treatment need indirectly through the same mechanisms of increasing depression and the chances of being an early substance user. In this regard, early age of substance use initiation also was associated indirectly with treatment need through its effects on depression. Finally, being male, being older, and not being in school at the time of admittance to the juvenile corrections system were found to be independently associated with youth treatment need. The direct effects of these variables explained 37 percent of the variance in treatment need in this sample.

5.2   Correlates of Treatment Utilization

The model depicted in Exhibit III-5 also examines the effects of personal, social environmental, and demographic characteristics on the likelihood that incarcerated juveniles had previously accessed substance abuse treatment services. The ML coefficients for this model also are presented in Exhibit III-6. Both Exhibit III-5 and Exhibit III-6 indicate that by far the strongest correlate of treatment utilization is treatment need, as might be expected. Of primary interest are the independent direct effects of other variables on utilization once the strong effects of treatment need are taken into account. The first column of Exhibit III-6 indicates that all three personal characteristics have independent direct effects on treatment utilization. Specifically, youth who initiated substance use before age 10 were *less* likely to have accessed treatment services. Also, youth classified as depressed were more likely to have received substance abuse treatment services, as were those with a higher number of prior arrests. Two social environmental characteristics were also associated with utilization. Those reporting childhood neglect were more likely to have received treatment, while youth reporting parental drug use were *less* likely to have accessed such services. In addition, youth who were male, white, and older were more likely to report previous experience with substance abuse treatment. These variables collectively accounted for 45 percent of the variance in treatment utilization.

EXHIBIT III-6
PREDICTING TREATMENT NEED AND UTILIZATION AMONG YOUTH ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM: STRUCTURAL PARAMETER ESTIMATES (STANDARD ERRORS) FOR PATH MODEL (N=401)

Predictors	Treatment Utilization	Treatment Need	Prior Arrests	Depression	Early Onset of Substance Use
Treatment need	0.56*** (0.05)				
Prior arrests	0.12** (0.04)	0.05 (0.04)			
Depression	0.17*** (0.05)	-0.01 (0.05)	-0.16** (0.06)		
Early onset of substance use	-0.22*** (0.05)	0.28*** (0.05)	0.25*** (0.06)	---	
Parental drug use	-0.19*** (0.04)	0.18*** (0.04)	0.16** (0.05)	0.12** (0.04)	0.19*** (0.04)
Childhood neglect	0.14*** (0.04)	---	---	0.18*** (0.04)	0.21*** (0.04)
Peer substance use	-0.03 (0.04)	0.28*** (0.04)	0.19*** (0.05)	0.13** (0.04)	-0.02 (0.04)
Race/Ethnicity (white)	0.22*** (0.05)	0.09 (0.05)	-0.23*** (0.06)	-0.15* (0.06)	0.61*** (0.04)
Gender (male)	0.14** (0.05)	0.13* (0.05)	0.12* (0.06)	-0.51*** (0.04)	-0.01 (0.04)
Age	0.17*** (0.04)	0.18*** (0.04)	0.12* (0.05)	0.05 (0.04)	-0.13*** (0.04)
Education	0.00 (0.04)	0.15*** (0.04)	0.09 (0.05)	0.06 (0.04)	-0.06 (0.04)
R^2	0.45	0.37	0.16	0.40	0.47

* $p < .05$
** $p < .01$
*** $p < .001$

5.3   Correlates of Treatment Need, by Race

To determine whether treatment need was influenced by a similar set of predictors among both African-American and white juveniles, separate path models were estimated. These models were estimated simultaneously, and an overall model fit was produced. Exhibits III-7 and III-8 present path diagrams for the African-American and white models, respectively; Exhibits III-9 and III-10 provide regression coefficients and standard errors for the models. Overall, this multi-group model provided a close fit to the observed data.[2]

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[2] The overall X^2 Goodness of Fit for this model was 5.99 (df = 6, ns). This and other goodness of fit indices indicated a good approximation between this model and the observed data for each cultural group (RMSEA = 0.00; NFI = 1.00; CN = 996.86).

EXHIBIT III-7

PREDICTING TREATMENT NEED AND UTILIZATION AMONG AFRICAN-AMERICAN YOUTH ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM: A MULTI-GROUP PATH MODEL WITH STRUCTURAL PARAMETER ESTIMATES (N=181)*
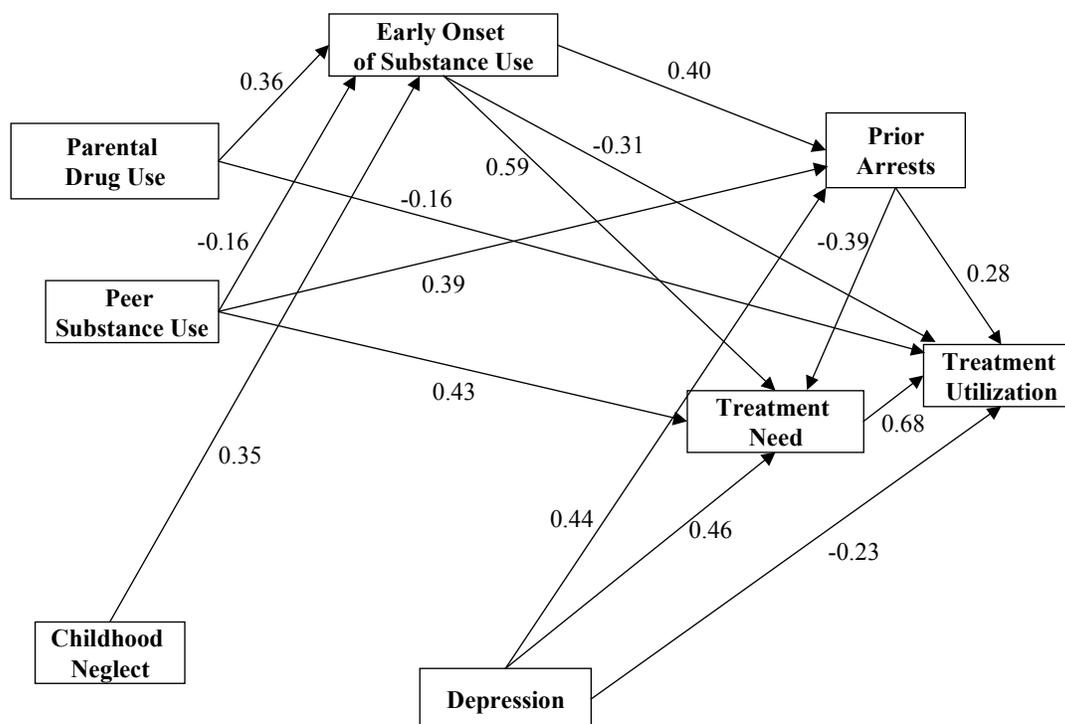
Overall Model Fit Chi-square = 1.46 (*p* = 0.69)

RMSEA = 0.0 (*p* = 0.81)

Adjusted Goodness of Fit Index = 0.97

*All paths shown are significant at 0.05 level; paths from gender, age, and education are not shown.

EXHIBIT III-8
PREDICTING TREATMENT NEED AND UTILIZATION AMONG WHITE YOUTH
ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM: A MULTI-GROUP
PATH MODEL WITH STRUCTURAL PARAMETER ESTIMATES (N=176)*
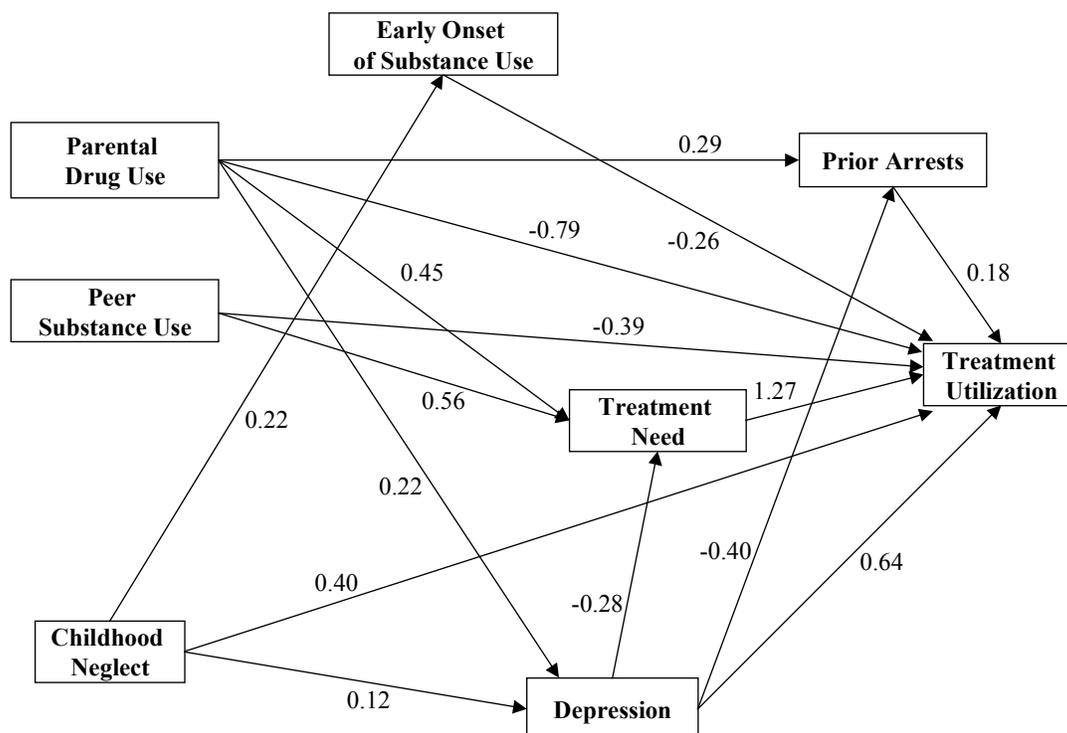

Overall Model Fit Chi-square = 4.53 (*p* = 0.23)

RMSEA = 0.06 (*p* = 0.81)

Adjusted Goodness of Fit Index = 0.37

*All paths shown are significant at 0.05 level; paths from gender, age, and education are not shown.

	EXHIBIT III-9 PREDICTING TREATMENT NEED AND UTILIZATION AMONG AFRICAN-AMERICAN YOUTH ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM: STRUCTURAL PARAMETER ESTIMATES (STANDARD ERRORS) FOR PATH MODEL (N=181)				
Predictors	**Treatment Utilization**	**Treatment Need**	**Prior Arrests**	**Depression**	**Early Onset of Substance Use**
Treatment need	0.68*** (0.05)				
Prior arrests	0.28** (0.09)	-0.39*** (0.08)			
Depression	-0.23* (0.10)	0.46*** (0.08)	0.44*** (0.07)		
Early onset of substance use	-0.31*** (0.10)	0.59*** (0.08)	0.40*** (0.07)	---	
Parental drug use	-0.16* (0.07)	0.07 (0.07)	0.01 (0.06)	0.10 (0.06)	0.36*** (0.06)
Childhood neglect	-0.01 (0.07)	---	---	0.09 (0.06)	0.35*** (0.06)
Peer substance use	-0.13 (0.08)	0.43*** (0.07)	0.39*** (0.06)	-0.08 (0.06)	-0.16** (0.06)
Gender (male)	-0.26* (0.12)	0.63*** (0.10)	0.76*** (0.07)	-0.52*** (0.06)	-0.31*** (0.06)
Age	-0.07 (0.09)	0.43*** (0.07)	0.38*** (0.06)	-0.29*** (0.06)	-0.26*** (0.06)
Education	0.10 (0.07)	-0.08 (0.07)	-0.19** (0.06)	0.20** (0.06)	-0.03 (0.06)
R^2	0.35	0.41	0.50	0.43	0.46

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Comparison of the African-American and white models reveals several similarities and differences. In both samples, age and peer substance use were directly predictive of substance abuse treatment need.

Personal characteristics, including early age of substance use initiation and prior arrests, were found to have a direct effect on treatment need of African-American youth only. Within this group, environmental factors, including peer substance use, parental drug use, and childhood neglect, had indirect effects on treatment need through their influences on early age of substance use initiation.

Among white youth only, parental drug use was associated with need for treatment. Notably, depression was significantly associated with treatment need in opposite directions for

the two racial groups. Among African-Americans, depressed youth were *more* likely to be in need of treatment, while white youth who were depressed were *less* likely to need treatment.

Examined collectively, the set of variables was found to explain a smaller proportion of the variance in treatment need among African-American youth ($R^2 = 0.41$) than among white youth ($R^2 = 0.64$).

	EXHIBIT III-10				
	PREDICTING TREATMENT NEED AND UTILIZATION AMONG WHITE YOUTH ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM: STRUCTURAL PARAMETER ESTIMATES (STANDARD ERRORS) FOR PATH MODEL (N=176)				
Predictors	**Treatment Utilization**	**Treatment Need**	**Prior Arrests**	**Depression**	**Early Onset of Substance Use**
Treatment need	1.27*** (0.03)				
Prior arrests	0.18*** (0.02)	0.00 (0.05)			
Depression	0.64* (0.04)	-0.28*** (0.08)	-0.40*** (0.11)		
Early onset of substance use	-0.26*** (0.02)	0.08 (0.05)	0.14 (0.08)	---	
Parental drug use	-0.79*** (0.03)	0.45*** (0.05)	0.29*** (0.08)	0.22*** (0.05)	0.07 (0.08)
Childhood neglect	0.40*** (0.02)	---	---	0.12* (0.05)	0.22** (0.08)
Peer substance use	-0.39*** (0.03)	0.56*** (0.05)	0.14 (0.08)	0.09 (0.05)	0.27*** (0.07)
Gender (male)	0.46*** (0.03)	-0.05 (0.07)	-0.20* (0.10)	-0.58*** (0.05)	0.20** (0.08)
Age	-0.18*** (0.03)	0.31*** (0.05)	0.13 (0.08)	0.31*** (0.05)	-0.12 (0.07)
Education	-0.17*** (0.02)	0.27*** (0.05)	0.15* (0.07)	0.02 (0.05)	0.01 (0.07)
R^2	0.93	0.64	0.17	0.60	0.17

* $p < .05$.
** $p < .01$.
*** $p < .001$.

The original multi-group model, in which all structural regression parameters were free to vary across the African-American and white groups, was next re-specified with a series of nested submodels, each constraining a single model parameter to be equal across the two racial groups. Difference of Chi-square tests between the original, unconstrained model and each nested submodel that included a single constrained parameter permits a test of whether the coefficient in question varies significantly between the two racial groups. This procedure is equivalent to testing for statistical interactions in an ordinary least squares (OLS) regression analysis. The

effects of these parameter constraints on overall model fit are summarized in Exhibit III-11. In this exhibit, each of the nested submodels 1 through 5 is compared to the original multi-group model (model 0) to test the effects of equating the direct effects of individual variables on treatment need.

Submodel 1 in Exhibit III-11 reveals no significant change in the goodness of model fit when the effects of peer substance use on treatment need are constrained to be equal across racial groups. Thus, submodel 1 is accepted over the original multi-group model (model 0), and it is concluded that the effects of peer substance use on treatment need are equal between these two groups of youth. A second social environmental measure, parental drug use, was found to be significantly associated with treatment need only among white youth. Not surprisingly, when this coefficient was constrained to be equal across groups in a nested model (submodel 2), overall model fit was found to be significantly worse. Submodel 3 indicates that constraining the effects of early onset of substance use to be equal across groups significantly worsens the overall model fit. Consequently, the findings from the original model 0 are accepted, and it is concluded that early age of onset of substance use is associated with treatment need among African-American youth but not among white youth. Submodel 4 confirmed that depression did not influence treatment need in a similar manner across racial groups. Finally, submodel 5 confirmed that a model equating the effects of prior arrests across racial groups led to a worse-fitting model.

Model/Submodel	Model X^2	Degrees of Freedom	X^2 Difference
EXHIBIT III-11 **DIFFERENCE OF X^2 TESTS ASSOCIATED WITH VARIOUS MODEL CONSTRAINTS ACROSS MODELS FOR AFRICAN-AMERICAN AND WHITE YOUTH ENTERING THE ILLINOIS CORRECTIONS SYSTEM**			
0. Original multi-group model—no constraints	5.99	6	--
Treatment Need			
1. Peer substance use effects on treatment need equated	8.32	7	2.33
2. Parental drug use effects on treatment need equated	24.22	7	18.23***
3. Early onset of substance use effects on treatment need equated	35.10	7	29.11***
4. Depression effects on treatment need equated	47.69	7	41.70***
5. Prior arrest effects on treatment need equated	22.11	7	16.12***
Treatment Utilization			
6. Peer substance use effects on treatment utilization equated	14.91	7	8.92*
7. Childhood neglect effects on treatment utilization equated	35.43	7	29.44***
8. Parental drug use effects on treatment utilization equated	63.26	7	57.27***
9. Early onset of substance use effects on treatment utilization equated	6.27	7	0.28
10. Depression effects on treatment utilization equated	69.01	7	63.02***
11. Prior arrest effects on treatment utilization equated	7.15	7	1.16
12. Treatment need effects on treatment utilization equated	49.66	7	43.67***

* $p < .05$.
*** $p < .001$.

Overall, these results suggest that:

- Among African-Americans, but not whites, early age of onset of substance use and prior arrests were associated with treatment need.

- Among white youth, parental drug use was associated with treatment need. This was not the case for African-Americans.

- Depression had opposite effects on treatment need among African-American and white youth. Depression was associated with greater treatment need among African-Americans and with less treatment need among whites.

- With the exception of peer substance use, there is little similarity in the direct predictors of treatment need among African-American and white youth.

5.4   Correlates of Treatment Utilization, by Race

Examination of Exhibits III-6 through III-9 also reveals information regarding factors associated with treatment utilization among African-American and white youth. Overall, the proportion of variance in treatment utilization accounted for in these models was far less for African-American youth ($R^2 = 0.35$) than for white youth ($R^2 = 0.93$).

Submodels 6 through 12 in Exhibit III-11 summarize the effects of imposing parameter constraints across racial groups on overall model fit. The direct effects of early age of substance use initiation and prior arrests were very similar across the two groups. Imposing constraints on each of these coefficients (submodels 9 and 11) did not significantly reduce the goodness of fit of the overall model, suggesting that these constructs influence substance abuse treatment utilization in a similar manner regardless of racial/ethnic background. Two of the social environmental measures influenced utilization among white but not African-American youth: childhood neglect and peer substance use. White youth who reported childhood neglect were more likely to have utilized treatment services (submodel 7); this was not the case for African-Americans. Peer substance use, on the other hand, was associated with a lesser likelihood that white youth would have utilized treatment services previously (submodel 6). Parental drug use also was associated with a smaller likelihood that both African-American and white youth would have received treatment in the past. As submodel 8 in Exhibit III-11 suggests, though, the effects of parental drug use were stronger for whites than for African-Americans. Submodel 10 confirmed a worse model fit when the effects of depression on treatment utilization were constrained to be equal across groups. Evaluation of the coefficients in Exhibits III-8 and III-9 indicates opposite effects of depression by race group. Among African-American youth, depression was associated with less likelihood of having ever received treatment. Among white

youth, in contrast, depression was positively related to treatment utilization. Finally, submodel 12, which constrained the effects of treatment need on treatment utilization to be equal across groups, also produced a worse model fit. Inspection of the path coefficients in Exhibits III-8 and III-9 indicates that the effect of treatment need on receipt of treatment services was stronger for white youth than for African-American youth.

These results can be summarized as follows. In general, the independent variables included in these models are better able to predict patterns of treatment utilization among white youth. Only two of the personal characteristics—early onset of substance use and prior arrests— appear to influence treatment utilization in a similar manner across groups. Depression had opposite effects on the use of treatment services, increasing their utilization among white youth and decreasing their use among African-American youth. Treatment need was more strongly associated with utilization patterns among white youth. The effects of each of the social environmental variables examined, including peer substance use, childhood neglect, and parental drug use, also were greater for white youth than for African-American youth.

5.5 Model Fit Among Males

Gender is another variable that is likely to have implications for treatment need and utilization. The relatively small number of females included in these data, however, preclude multi-group comparisons. Instead, the path model was re-estimated for males only. The results, presented in Exhibit III-12, generally are consistent with the model for the full sample (Exhibit III-5), with a few notable exceptions. Perhaps most important is the difference in the effects of depression on treatment utilization patterns. Although depression was associated with increased service utilization for incarcerated youth in general, depression was *not* predictive of treatment utilization among males. This suggests that the effects of depression on treatment utilization are likely to be considerably stronger among females. Although this relationship cannot be examined directly because of the small number of females in the sample, it should be noted that females were at a much higher risk of being depressed (see Exhibit III-4). Similarly, Exhibit III-12 indicates that childhood neglect and peer substance use were not predictive of depression among males, although each was significantly associated with depression in the larger sample.

EXHIBIT III-12 **PREDICTING TREATMENT NEED AND UTILIZATION AMONG MALE YOUTH ENTERING THE ILLINOIS JUVENILE CORRECTIONS SYSTEM: STRUCTURAL PARAMETER ESTIMATES (STANDARD ERRORS) FOR PATH MODEL (N=348)**					
Predictors	**Treatment Utilization**	**Treatment Need**	**Prior Arrests**	**Depression**	**Early Onset of Substance Use**
Treatment need	0.61*** (0.05)				
Prior arrests	0.14** (0.04)	0.05 (0.04)			
Depression	0.06 (0.05)	-0.08 (0.05)	-0.20*** (0.05)		
Early onset of substance use	-0.20*** (0.06)	0.26*** (0.06)	0.27*** (0.07)	---	
Parental drug use	-0.31*** (0.05)	0.26*** (0.05)	0.18** (0.05)	0.16** (0.05)	0.13*** (0.04)
Childhood neglect	0.13** (0.05)	---	---	0.09 (0.05)	0.27*** (0.04)
Peer substance use	-0.02 (0.05)	0.29*** (0.04)	0.11* (0.05)	0.10 (0.05)	0.05 (0.04)
Race/ethnicity (white)	0.21*** (0.06)	0.07 (0.06)	-0.32*** (0.07)	-0.13* (0.05)	0.65*** (0.04)
Age	0.14*** (0.04)	0.23*** (0.04)	0.11* (0.05)	0.11* (0.05)	-0.09* (0.04)
Education	0.02 (0.04)	0.06 (0.04)	0.14** (0.05)	0.11* (0.04)	-0.08* (0.04)
R^2	0.44	0.41	0.15	0.10	0.52

* $p < .05$.
** $p < .01$.
*** $p < .001$.

IV. SUMMARY AND IMPLICATIONS

IV. SUMMARY AND IMPLICATIONS

This chapter summarizes the main findings of the analysis and discusses their implications for treatment providers, policymakers, and researchers/evaluators.

1. SUMMARY

More than two-thirds of all youth entering the juvenile corrections system in the State of Illinois (68%) were found to need either alcohol or other drug abuse treatment. Of those youth in need of treatment, more than half met the need criteria for both alcohol *and* other drug abuse. However, less than half of all youth needing treatment (48%) reported lifetime contact with any form of substance abuse treatment services.

The analysis examined four analytic questions. The first two addressed the personal and social environmental factors that might be predictive of treatment need and utilization, while the other two explored racial group similarities and differences in those factors. Each question was examined using path models for directly observed variables. The remainder of this section summarizes the findings for each analytic question.

1.1 Correlates of Treatment Need

Youth reporting an early onset of substance use were more likely to be in need of alcohol or other drug treatment. Further, juveniles who reported parental drug use and peer substance use were more likely to need treatment. Treatment need was also greater among youth who were male, older, and not in school at the time of their entry into corrections custody. Childhood neglect was associated with treatment need indirectly through its influence on depression and early onset of substance use.

1.2 Correlates of Treatment Utilization

In addition to treatment need, personal characteristics that were associated with the likelihood that youth had previously used treatment services included early onset of substance use, depression, and prior arrests. In particular, juveniles whose first experience with substance use came before age 10 were less likely to have accessed treatment services, while youth who were depressed and those with more arrests were more likely to have done so. With regard to social environmental factors, juveniles reporting childhood neglect were more likely to have used treatment services. Treatment utilization was less common among youth reporting parental

drug use, however. White, male, and older juveniles were more likely to have treatment utilization experience.

1.3   Correlates of Treatment Need, by Race

A multi-group path model revealed that there is little consistency in the direct predictors of treatment need among African-American and white juveniles, with the exception of peer substance use. Prior arrests and early onset of substance use were predictive of treatment need among African-Americans but not among whites. In contrast, parental drug use was predictive of treatment need for white, but not African-American, youth. Most importantly, depression had opposite effects on treatment need across racial groups. For African-Americans, depression was associated with greater treatment need, but for whites, depression was related to decreased treatment need.

1.4   Correlates of Treatment Utilization, by Race

As with treatment need, there were considerable differences in the correlates of treatment utilization across the African-American and white groups. Two personal characteristics did influence utilization patterns in a similar manner across groups: early onset of substance use and prior arrests. Both African-Americans and whites who initiated substance use before age 10 were less likely to have ever accessed treatment services, while for both racial groups, a higher number of prior arrests was associated with an increased likelihood that youth had ever received substance abuse treatment. Depression had opposite effects on the use of treatment services, increasing their utilization among white juveniles and decreasing their use among African-American juveniles. The effects of social environmental variables on utilization patterns were considerably stronger among whites. A key finding was the stronger association between treatment need and service utilization among white, as compared to African-American, youth. Overall, the multi-group path model was much more successful in explaining variation in the treatment utilization patterns of white juvenile offenders than of their African-American counterparts.

1.5   Gender Differences

Although gender differences in treatment need and utilization patterns were not a main focus of this analysis, the final path model for the sample as a whole was refit for males only to explore potential gender effects. The model for males was largely consistent with the model for the full sample. The few exceptions related mostly to depression, the prevalence of which was found to be far greater among females. Higher rates of depressive symptoms among females in

the general population is a well-documented finding (e.g., Avison & McAlpine, 1992; Lennon, 1987; Nolen-Hoeksema, 1997; Rosenfield, 1989). The data from the present analysis are consistent with the conclusion that depression is strongly associated with receipt of substance abuse treatment services among female, but not male, youth in the juvenile corrections system. Further analysis on this topic is needed, but if these findings are correct, they suggest that gender differences in the prevalence of depression are likely to have implications for the delivery of treatment services to incarcerated male and female youth.

2. IMPLICATIONS

This section considers the implications of the findings described in the previous section for treatment providers, policymakers, and researchers/evaluators.

2.1 Implications for Treatment Providers

Generally, the issue of substance abuse treatment utilization for youth has received little attention in the literature. In light of recent findings from the DATOS-A project that underscore the general success of substance abuse treatment among adolescents (Hser et al., 2001), issues related to treatment utilization among this population become more important. The literature pertaining to treatment among adults has focused on the role of the courts in mandating or coercing treatment, but developmental and legal perspectives suggest that other variables may be more salient in the study of adolescent treatment involvement and subsequent engagement. One relevant set of environmental variables relates to family and parenting processes. Although, in many cases, parental permission may be required for treatment to proceed, parental motivation may be a necessary prerequisite for initiating adolescent substance abuse treatment. Accordingly, the findings support the notion that when parents are impaired by substance abuse problems, they fail to enlist the necessary treatment support for their children, even though their children are at considerable risk for needing substance abuse treatment to begin with. The present analysis is preliminary, and the mechanisms through which substance-abusing parents neglect to find or identify appropriate treatment placements for their children need to be explored in greater detail.

These findings also highlight the potentially valuable role that can be played by adult treatment providers in screening for and treating family substance abuse problems. The finding that youth with a history of neglect were more likely to access treatment services raises additional concerns about the role of parents in the treatment process. This association may reflect intervention processes that occurred as a result of the neglect. When neglect comes to the attention of authorities and prompts intervention (such as case management or foster care

placement), neglected children may gain increased access to adults who are willing or able to take responsibility and enlist appropriate treatment services. The fact that this effect was significant among whites but not among African-Americans may indicate that these potential forms of intervention and access were less likely to occur for children in the latter group. Unfortunately, the data do not permit the direct examination of the link between neglect reports and social service intervention. Further examination is needed to explore this and other potential pathways to treatment utilization among these youth.

A final implication of this analysis for substance abuse treatment practice is that the cultural competence of treatment providers and staff be emphasized and developed on an ongoing basis, for two reasons.

First, providers are likely to continue to encounter a diversifying patient population, and many currently are not prepared for this challenge. As this analysis suggests, the social processes associated with substance abuse treatment need and service utilization may vary across racial/ethnic groups. Thus, continued emphasis on developing staff and program competencies to recognize and appreciate these differences will be vital, as will the development of appropriate communication strategies.

Second, this analysis documented a stronger association between treatment need and the utilization of treatment services among white youth than among African-American youth. Cultural disparities in access to health care services are a well-documented problem (Kales et al., 2000; Schappert, 1999; Snowden, 1999). Increased emphasis on cultural competence among service providers will be necessary to overcome barriers to substance abuse treatment access among minority populations.

2.2 Implications for Policymakers

Research cited earlier (Office of Applied Studies, 2000b) indicates that most juvenile corrections facilities in the United States do not provide on-site substance abuse treatment services. Given findings from this analysis that two of every three youth entering the corrections program in Illinois are in need of treatment and that less than half have *ever* had access to treatment services, a critical policy recommendation would be a commitment to ensure on-site provision of alcohol and other drug treatment to all juveniles who enter the corrections system. Such a policy takes on added significance given other findings from this analysis suggesting that contact with the criminal justice system, as measured by number of prior arrests, may be a key pathway by which many of these youth gain access to treatment.

2.3   Implications for Researchers/Evaluators

This analysis has four implications for research/evaluation, including greater reliance on longitudinal research designs, continued refinement of survey measures, assessment of alternative models and pathways, and increased emphasis on understanding how culture influences patterns of treatment need and utilization. The following paragraphs briefly discuss these implications.

Longitudinal Research Designs

Although the constructs examined in this analysis clearly imply a life-course progression, the data analyzed are nonetheless cross-sectional. Accordingly, they suffer from numerous methodological constraints that prevent these analyses from making causal inferences (Shadish, Cook, & Campbell, 2002). Longitudinal study designs would be better able to establish unequivocally the temporal ordering of the variables of interest to this research. Use of such designs, although expensive and difficult to implement in practice, remains a priority for future analysis of treatment need and utilization patterns of youth involved with the justice system.

Improved Measurement of Substance Use and Treatment Utilization

It commonly is acknowledged that survey reports underestimate substance use behaviors (Fendrich, Johnson, Sudman, Wislar, & Spieler, 1999; Harrison & Hughes, 1997). For youth entering secure juvenile corrections custody, there are likely to be powerful disincentives to candid reporting of illicit activities. Consequently, the prevalence of treatment need reported in this analysis may be a lower-bound approximation. Although researchers and evaluators have exerted considerable effort in recent years to improve the methodologies employed to collect survey data concerned with substance use and other sensitive behaviors (Fendrich & Miller, 2000; Harrison & Hughes, 1997; Turner, Lessler, & Gfroerer, 1992), little information is currently available on the quality of respondent reporting of treatment utilization experiences. Whenever possible, future survey research efforts can be strengthened by incorporating procedures to validate the quality of self-reported information regarding both substance use and treatment utilization behavior.

Assessment of Alternative Models

This analysis examined the effects of three important variable domains: personal characteristics and experiences, social environmental factors, and sociodemographics. The variables examined in each domain were found to be associated with both treatment need and

treatment utilization in this sample. Numerous other variables in each domain, however, merit future investigation. Additional personal characteristics that are likely to be predictive of substance abuse behaviors and outcomes in this population include sexual orientation and associated discrimination; educational values, experiences, and expectations; religious convictions; discretionary income; self-esteem; self-efficacy; positive and negative sources of social support; specific forms of delinquent and risk-taking behavior; and physical disabilities. Other social environmental factors that warrant consideration include household structure and transitions, childhood supervision, and neighborhood structure, organization, and cohesion. In addition, future analysis might also include structural variables that are associated with economic opportunities and that have profound influences on adolescent behavior (Sampson, Raudenbush, & Earls, 1997). Finally, the correlates of comorbid (i.e., substance abuse and other psychiatric) treatment need and utilization in this population may also be considered.

Racial/Ethnic Variability in Treatment Need and Utilization

In general, there is limited information regarding the antecedents and correlates of substance use among youth from diverse cultural backgrounds in the United States (Wallace et al., 1995). The availability of evidence-based initiatives concerned with racial and ethnic variability in treatment need and/or utilization is even more restricted. As this country continues its demographic transition toward a multicultural society, understanding how cultural processes influence patterns of treatment need and utilization will continue to grow in importance. The limited analyses presented in this report suggest similarities and important differences between African-American and white youth. An important limitation of this analysis, however, was its inability to examine more than two racial groups. Future analysis could include youth representing other cultural backgrounds. Of critical importance will be reorganizing conceptual models to begin to evaluate potential pathways by which culture may influence the development of treatment need and the utilization of treatment services. Culturally driven differences in self-reliance vs. collectivist action, uncertainty avoidance, communication norms, acceptance of vertical vs. horizontal social structures, and willingness to disclose personal information all might be examined. Culture-specific variables, such as personal experience of racial and ethnic discrimination, historical patterns of group oppression, acculturation, and language skills, also must be explored.

Finally, it is notable that the explanatory variables examined in these analyses were able collectively to account for much more of the variability in treatment need and utilization patterns among white youth than among African-American youth. This finding provides further evidence that other factors must be considered before a more thorough understanding of need and use patterns within the African-American population can be achieved.

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APPENDIX A
SURVEY DESCRIPTION

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The goal of the Illinois Survey of Juvenile Corrections Facilities was to characterize the nature and extent of substance use and its consequences among serious juvenile offenders in the State of Illinois. The survey focused specifically on youth entering the Illinois Department of Corrections (IDOC) juvenile system for the first time. Face-to-face interviews were conducted with 401 youth age 13 through 18 between May 12, 2000, and August 11, 2000.

Survey Questionnaire

The survey instrument used in this study included modules on substance abuse, family background, educational background, history of illegal activity, and history of physical and sexual abuse. The questionnaire was based on an instrument previously administered to youth incarcerated in Texas (Fredlund, Farabee, Blair, & Wallisch, 1995). The University of Illinois at Chicago Survey Research Laboratory's (SRL) Questionnaire Review Committee reviewed pretest and final versions of the questionnaire to be used. The committee is composed of SRL staff members appointed by the director to ensure that all questionnaires administered by SRL follow ethical practices and basic principles of questionnaire construction. The questionnaire and procedures were reviewed and approved by the University of Illinois at Chicago Institutional Review Board (H-99-390).

Since this study encompassed interviews with minors, ethical practices were given special consideration. Permission to conduct interviews with individual youth at IDOC facilities was granted in October 1999. The survey interview began by requesting the juvenile's assent to participate in the study. This included providing the youth with information regarding the purpose and sponsor of the study, the voluntary nature of participation, the confidential nature of all responses, and persons and organizations to contact with any questions or concerns. Each respondent was offered a $10.00 incentive in appreciation for participating in the study. One of the two facilities where interviews were completed requested that the funds be provided in bulk to fund recreational activities rather than be given to the respondents directly. The other facility arranged to have the amount transferred into the individual respondent's commissary account.

Interviewing Procedures

Before interviewing began, all interviewers received training on general interviewing techniques. This training covered interviewer roles and responsibilities, the importance of maintaining strict confidentiality, and general principles of survey administration. Interviews

were conducted using computer-assisted personal interviewing (CAPI) techniques. Each interviewer also received detailed study-specific training regarding the goals of the survey and the procedures to be followed. These training sessions included a general project overview, interviewing procedures specific to this study, a detailed introduction to and discussion of the questionnaire contents, and practice sessions administering the questionnaire. At one of the two corrections facilities, the facility's reception social work supervisor conducted a training session on facility policy and procedures, personal safety issues, and procedures for interviewers to follow if youth became emotionally distressed or physically agitated. Interviewers administered the survey in private in offices that had been reserved for the conduct of this study. IDOC regulations required that staff remain in close proximity, however, for security reasons. Since discussions with IDOC staff suggested that a very small percentage of youth incarcerated in Illinois speak only Spanish or another language, interviews were conducted in English only. Interviews averaged 90 minutes in length.

Interviewing Sites

All interviews were completed at the two State of Illinois facilities that provide intake services for minors entering the juvenile corrections system. These facilities differed considerably, and the survey procedures employed at each required some tailoring. The Illinois Youth Center in St. Charles (IYC-St. Charles) securely houses a long-term male population and is also the central intake unit for every adjudicated male youth in the State of Illinois. The Illinois Youth Center in Warrenville (IYC-Warrenville) serves as the central intake unit for female minors in the state as well as being the only medium-security corrections facility for female minors in Illinois.

Because of space and schedule limitations, interviewing at IYC-St. Charles was conducted only on weekday evenings. Youth entering reception at St. Charles typically remain there between three days and two weeks, and they are housed in one of three "cottages," depending on the type of offense committed, age, and security risk. During the reception period, the physical and psychosocial needs of each youth are assessed. Juveniles then are sent to one of the long-term juvenile corrections facilities around the state, remain at IYC-St. Charles to participate in its long-term program, or are returned to their home county for treatment or other services. IDOC makes the placement determination according to the level of severity of the offense committed, as well as the individual needs of the youth as determined by the social work staff at the facility. Six interviewers conducted interviews at IYC-St. Charles. Generally, youth were invited to be interviewed at least 24 hours after they had arrived at the facility from their county of origin. Each interviewer conducted one to two interviews an evening.

The total population of incarcerated minor females is markedly small in comparison to the population of incarcerated males. Every adjudicated female in the State of Illinois is sent to IYC-Warrenville, where she is assessed and either housed at the facility or returned to her own county for treatment or special services. Two interviewers conducted interviews at the Warrenville facility. At this facility, interviewing was conducted during the day in private rooms. Because the number of new intakes was much smaller at IYC-Warrenville, females who arrived at IYC-Warrenville before interviewing began were included in the study, as well as those entering the facility for the first time during the data collection period.

Response Rates and Weights

A total of 412 juveniles were approached to participate in the survey. Five refused to participate, two were not available for interviewing, and four were duplicates. Thus, the number of completed interviews was 401. The response rate is the ratio of completed interviews to eligible sample (eligible 408 = 412 – 4 duplicates). In this study, the response rate was 98 percent (401/408). Although the study goal was to interview youth for whom this was the first entry into the juvenile corrections system, it is important to note that some of the respondents may have been incarcerated previously in local or out-of state-facilities.

Because males and females were sampled separately, the number of completed interviews with each was not proportionate to their percentage of the total population of youth entering IDOC facilities. In addition, the interviewing periods for males and females differed, so each individual's probability of selection differed by gender. We applied post-stratification weights to adjust for these two factors.

Interviews were conducted between May 12, 2000, and August 11, 2000. As indicated above, so few females entered the system during that period that interviews were also attempted with females who had entered the system before the interviewing period began. Interviews were attempted on the basis of each female's date of entry into the system, beginning with those who entered just prior to the interviewing period and working backward. The date of entry for the female who had been at IYC-Warrenville longest was July 1999.

For purposes of weighting, the total population of males and females was defined as those who entered the system between July 22, 1999, and August 11, 2000. The weight is simply the ratio of the population percent to the sample percent. Because females accounted for a higher percent of the sample than of the total population, their weight was less than 1.0; the opposite holds true for males.

APPENDIX B
PATH MODELS FOR DIRECTLY OBSERVED VARIABLES

APPENDIX B
## PATH MODELS FOR DIRECTLY OBSERVED VARIABLES

Path models were used for our analyses with LISREL 8 (Jöreskog & Sorbom, 2001) to test a set of relationships between directly observed independent (exogenous) and multiple dependent (endogenous) variables simultaneously. The general equation of the model is

$$\mathbf{y} = \beta\,\mathbf{y} + \gamma\,\mathbf{x} + \zeta \tag{1}$$

where $\mathbf{y}$ is a $p \times 1$ vector of observed dependent variables ($y_1, y_2,...y_p$) and $\mathbf{x}$ is a $q \times 1$ vector of independent variables ($x_1, x_2,...x_q$) where p = number of dependent variables and q = number of independent variables. β is a $p \times p$ coefficient matrix ($\beta_{11}, \beta_{21}, \beta_{31},...\beta_{pp}$ with $\beta_{11}, \beta_{22}, \beta_{33},...\beta_{pp}$ set to zero) that relates dependent variables to each other, and γ is a $p \times q$ coefficient matrix that relates independent variables to dependent variables ($\gamma_{11}, \gamma_{12}...\gamma_{pq}$). ζ is a vector of equation errors ($\zeta_1, \zeta_2 ...\zeta_p$).

An example of a path model equation (1) described above can be depicted as following:

EXHIBIT B-1
A PROTOTYPE PATH MODEL
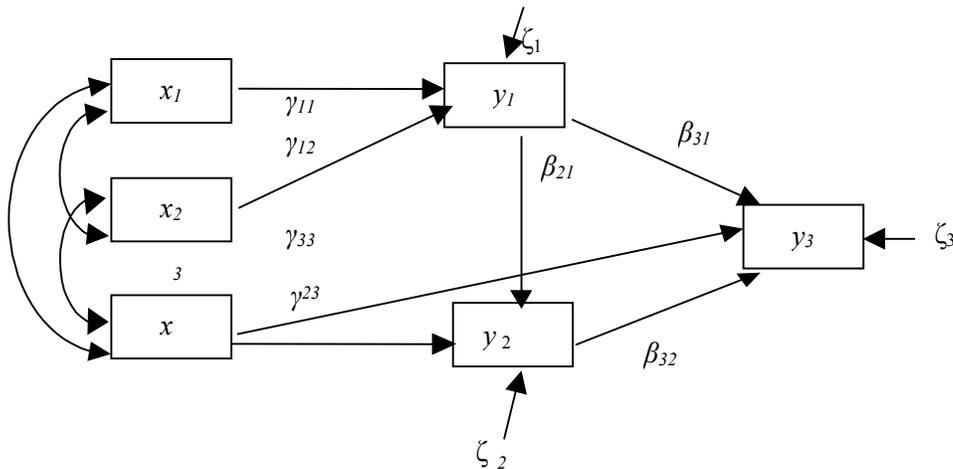
As presented in the above diagram, path coefficients or parameters that are predicted to be insignificant or theoretically irrelevant are held constant or *fixed* to zero to represent the absence of a relationship. Paths that are to be estimated, often referred to as *free* parameters, are estimated by Maximum Likelihood (ML) method (Jöreskog, 1973), a default method in LISREL that simultaneously calculates all model parameters at once. The ML estimates are known to be consistent, unbiased, and efficient.

For each free parameter, statistical significance is tested by t-statistics. If a *t-value* is between −1.96 and 1.96, it is not significantly different from zero, so fixing it to zero would not affect overall model fit that determines the degree to which a proposed path model fits the sample data. LISREL calculates model fit statistics, including Model Fit χ^2, Adjusted Goodness of Fit Index (AGFI), Root Mean Square Error of Approximation (RMSEA), Normed Fit Index (NFI), and Critical N.

Since we were dealing with observed variables measured in different modes (mostly nominal and ordinal), we used PRELIS (Jöreskog & Sörbom, 1996) to generate polychoric correlation matrices that are corrected for non-continuous variables and for non-normally distributed variables. The reason for this was that the use of uncorrected correlation matrices violates the distributional assumptions of ML estimation and could have resulted in the rejection of correct models.

We also performed multi-group analyses with two separate correlation matrices for each of the subgroups (i.e., African-Americans and whites). After imposing the equal estimates of path coefficients across subgroups, the difference of χ^2 test is done between (1) the model with its path coefficients constrained to equality and (2) the unconstrained model, in which all parameters were free to vary across the groups. This procedure allowed us to explore differences in the estimated model parameters across racial groups.[3]

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[3] The testing hypotheses are that the parameters of β and γ vary across two groups: $\beta^{(\text{African-Americans})} \neq \beta^{(\text{Whites})}$; $\gamma^{(\text{African-Americans})} \neq \gamma^{(\text{Whites})}$.