

DISPARITIES IN ACCESS TO PUBLICLY FUNDED SUBSTANCE ABUSE
TREATMENT ACROSS RACE, GENDER, AND GEOGRAPHY

By

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DEDICATION

This thesis is dedicated in loving memory to:

Maurice “Wayne” Leland

March 21, 1952 – June 14, 2008

BELOVED SON, BROTHER, UNCLE AND FRIEND

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CHAPTER I

BACKGROUND AND SIGNIFICANCE

Adolescent substance abuse continues to be a public health concern in the United States. In fact, current social and peer pressures to use tobacco, alcohol, or other drugs and to engage in sexual intercourse present themselves to adolescents at much earlier ages. Many are engaging in risky behaviors that are harmful or dangerous to themselves and others, with deleterious consequences for their health and well-being that may be immediate or long term. Further, patterns of risky behaviors initiated during adolescence are associated with adult morbidity and mortality (CDC, 2000; Christie, & Viner, 2005). But the deleterious consequences are not randomly or evenly distributed. Certain vulnerable sub-populations of adolescents are the focus of the current study because, despite efforts to improve the overall adolescent health, disparities in health status, health outcomes, and access to health care exist. The subsequent section reviews the literature on substance use and substance use treatment for adolescents, focusing on disparities by racial/ethnic, gender, geography (i.e., rurality).

Adolescent Substance Use

Substance use among adolescents continues in epidemic proportions. Studies have shown that use of alcohol and other drugs often begins during adolescence

(Johnston, O'Malley, & Bachman, 2000). The Office of Applied Statistics (OAS) Report (2007) found that on an average day in 2006, youth (aged 12-17) initiated use of the following: a) 7,970 youth drank alcohol; b) 4,348 used an illicit drug; c) 4,082 smoked cigarettes; d) 3,577 used marijuana; e) 2,517 used pain relievers non-medically. Youth who used alcohol in the past month drank an average of 4.7 drinks per day on the days they drank (SAMSHA, 2007). These statistics are alarming as risky behaviors begun in adolescence can have detrimental effects on youth throughout their lifetime.

Race/Ethnicity

In 2005 and 2006, rates of substance dependence and use across racial/ethnic minority groups have not declined (SAMSHA, 2007). The common perception is that minority groups, particularly African Americans and Hispanics, use drugs more than whites. Yet, social and epidemiologic research has demonstrated that drug use prevalence rates for licit or illicit drugs including alcohol are lower for minorities than their white counterparts (Johnston, O'Malley, & Bachman, 2000; Bachman, Wallace, O'Malley, Johnston, Kurth, & Neighbors, 1991; CDC, 1998; Ellickson & Morton, 1999; McCabe, Teter, Boyd, & Gutherie, 2004; Weden & Zabin, 2006). Among persons aged 12 or older, the rates across these groups were similar, with African Americans having the lowest substance use rates: Hispanics (10.0 percent), whites (9.2 percent), and African Americans (9.0 percent) (SAMHSA, 2007). Minorities and especially African American males disproportionately experience negative and more severe consequences as a result

of their substance use despite this lower reporting of use than whites (Beavis & Oetting, 2002; Johnson et al, 2001; McClelland et al, 2004).

Gender

Although historically girls have been less to report substance dependence or abuse, the gender gap is closing. For example, the gap that used to exist between the rate of drug use between adolescent girls and boys no longer exists for youth 12-17 according to recent data (SAMHSA, 1998). Dakof (2000) also found similar levels of substance use in adolescent males and females. Although female adolescents have historically reported less use of alcohol and other drugs than their male counterparts (Brasseux, D'Angelo, Guagliardo, & Hicks, 1998; CDC, 1998), recent reports identify similar levels of dependence among those who do substances (U.S.D.H.H.S., 1999b). Rates of adolescent female and male use of alcohol and cigarettes were essentially equal in the 2000 National Household Survey of Drugs and Alcohol, with past lifetime use for both genders at 28% (SAMHSA, 2001). According to the Substance Abuse and Mental Health Services Administration (SAMHSA), the rate of youth substance dependence or abuse was approximately eight percent for both males and females in 2006 (SAMHSA, 2007). However, the type of substance used varies by gender. For example, adolescent females were less likely than males to report marijuana as their primary substance of abuse and more likely to report alcohol or stimulants as their primary substance of abuse (SAMHSA, 2007). In a study of demographics in public substance abuse treatment, Shillington and Clapp (2003) found that female adolescents were more like to report

injection drug use and methamphetamine as their primary drug of choice. Males, on average, reported beginning drug use almost a year before females (Shillington & Clapp, 2003). In a study of incarcerated juveniles in Mississippi, investigators using a semi-structured interview found a significant gender difference in reports of substance abuse disorder (Robertson, Dill, Husain, & Undesser, 2004).

Geography

Studies have also shown that rates of substance abuse are similar in both rural and urban areas. Using data from 2002-2004 National Surveys on Drug Use and Health (NSDUH), researchers found that prevalence rates of past-year illicit drug for rural adolescents are generally similar to those of both urban and suburban adolescents. However, there is some variation in the drugs of choice across rurality. Adolescents from rural counties had a prevalence rate of stimulant and methamphetamine use greater than that of urban youth and the highest prevalence rate for past month use of tobacco and alcohol across the three county types (Gfoerer, Larson, & Colliver, 2007). Rural adolescents admitted to treatment were more likely to report alcohol abuse as their primary drug diagnosis (OAS, 2006). In a longitudinal study of rural adolescents from Iowa, at T1, about 40% of adolescents consumed an alcohol beverage recently; at T4 (three years later), more than 80% had done so. At T1, 22% of adolescents reported excessively drinking at least once recently; when asked three years later, this had almost tripled (Ouellette, Gerrard, Gibbons, & Reis-Bergan, 1999). Using data from African American adolescents completing the Youth Risk Behavior Survey (YRBS), Kogan and

colleagues (2006) found that rural females had higher levels of cigarette, alcohol, cocaine, inhalant, heroin, and steroid use compared to their suburban and urban counterparts. Rural males had higher levels of use for all substances of interest except ecstasy, steroids and intravenous drugs compared to their suburban and urban counterparts.

Access to Substance Abuse Services for Adolescents

Compared to all other age groups, adolescents in general have been shown to have the worst health care access in the United States (Klein, 2004). Nationally and for instance, only about 9-16 percent of Americans with substance abuse or dependence utilize treatment services (Green-Hennessy, 2002; Woodward et al., 1997). National trends in substance abuse treatment access fluctuated between 2002-2007, among adolescents with an alcohol use diagnosis in the past year, the percentage who received treatment was from 5.9 and 8.1 percent; for illicit drug use it was between 8.5 and 11.3 percent (SAMSHA, 2008). Although annual utilization statistics are available, little research examines disparities by race, gender and geography in adolescent substance abuse treatment utilization. Neglect in the literature demonstrates a need for this and similar research to be conducted.

Race/Ethnicity

In its seminal 2002 report on racial and ethnic disparities in health care, the Institute of Medicine (IOM) identified myriad reasons, including access gaps and barriers to care, associated with the worse health outcomes of minorities (IOM, 2002). Health disparities research has documented several barriers to care frequently cited by racial and ethnic minorities. These barriers include, but are not limited to issues of discrimination and lower socioeconomic status. A history of racism and segregation in the United States has left many African Americans and Latinos with a sub-standard health care system. When surveying 3,884 individuals, Hispanics and African Americans were more likely to report that they had been treated unfairly in the health care system in the past based on their race and ethnicity, as compared to their white counterparts. Moreover, a majority of African Americans and Hispanics reported a fear of future discrimination based on their race/ethnicity (Kaiser Family Foundation, 1999).

Many racial/ethnic minorities have limited access to healthcare as a result of their lower socioeconomic status. In the United States, lower socioeconomic position is associated with lower overall health care use, even among those with health insurance (Smedley, 2002).

Concerning adolescent substance abuse treatment, racial and ethnic differences in the utilization of substance abuse treatment services may result from the aforementioned barriers to care. However, the literature is equivocal on the subject. After controlling for other factors (e.g., treatment need) some studies have found significant differences across racial/ethnic groups in substance abuse treatment access (SAMHSA, 2007), while other studies have found no differences (Weisner and Schmidt, 2001). Padgett and

colleagues (1994a; 1994b) found that African Americans and Hispanics were less likely to use outpatient substance abuse treatment services, but did not find any differences across race/ethnicity in use of inpatient services. Wu and colleagues (2002) found that white adolescents were more likely to receive alcohol treatment services than minority adolescents. Not only were white adolescents more likely to use services, but they were also more likely to access services at an earlier age (Wood et al., 2005). In analysis of the 2002 National Survey of Drug Use and Health, Mojtabei (2005) found no racial differences in substance abuse services use. In a 2006 article about differences in utilization of substance abuse services in a Medicaid population, Heflinger, Chatman, and Saunders (2006) found that African Americans and females were less likely than their respective white and male counterparts to access substance abuse treatment services. Moreover, on average, females and whites who had received services were accessing treatment earlier.

Gender

Despite converging rates of substance use and dependence, adolescent males have been shown to be more likely admitted to substance abuse treatment than girls. Only one-third of all adolescent substance abuse treatment admissions were female in 2005 (OAS, 2007). Larson and colleagues (2004) examined adolescent's use of mental health/substance abuse services in FFS Medicaid across four states and found that services users were more likely to be older, male, and white.

However, the girls that do enter treatment are demonstrating higher levels of behavioral problems. Dakof (2000) reported that “drug-abusing girls referred for treatment not only use drugs and engage in externalizing behaviors as extensively as do their male counterparts, but also are distinguished by their higher levels of internalizing symptoms and family dysfunction (p. 28).” In a sample of adolescents examined at an urban detention center intake, females were significantly more likely to report illicit drug use than males, except for marijuana use (McClelland, Elkington, Teplin, & Abram, 2004). Another study of adolescents entering substance abuse treatment found that girls showed significantly greater severity in substance use, problems associated with use, and mental health related variables at intake (Stevens, Estrada, Murphy, McKnight, & Tims, 2004).

Geography

Health resources in rural areas are relatively scarce and difficulty in accessing these limited resources continues to affect health negatively. Rural communities have fewer hospital beds, physicians, nurses and specialists per capita as compared to urban residents, as well as increased transportation barriers to access health care (e.g. distance to care; Blumenthal and Kagen, 2006). Similarly, concern has been raised about whether effective treatments for adolescents are available in rural settings (Anderson, 2003). There were approximately 115,000 substance abuse treatment admissions, including both adults and adolescent, to facilities in rural areas in 2003 (SAMHSA, 2004). In a study of rural differences in treatment population characteristics, rural youth demonstrated greater

substance abuse problem severity than their urban counterparts at intake (Hall et al., 2008). However, a search of the published literature in PubMed and PsychInfo revealed not one published study that examined rural versus urban access to adolescent substance abuse treatment (see Appendix).

Purpose of the Study

The purpose of this study was to examine disparities in utilization of substance abuse treatment among minority, female, and rural adolescents enrolled in Medicaid in one southern state's Medicaid program. McAuliffe and Dunn (2004) recommended examining substance abuse treatment needs and access in a state-level manner due to the variability of these issues nationally. Moreover, they found that one of the regions with the largest treatment gaps could be found in the south (McAuliffe & Dunn, 2004). This study is in part a replication in Mississippi of previous work done in Tennessee by Heflinger, Chatman, and Saunders (2006). The goal of this study is to address the following research questions:

- 1) Are gender, race/ethnicity, or geography associated with differential access to substance abuse treatment?
- 2) Are there differences in the age at which adolescents first access substance abuse treatment, and does this differ by gender, race/ethnicity, or geography?

CHAPTER II

METHODS

Data Source

This secondary analysis used data from eligibility and claims from adolescents enrolled in Mississippi Medicaid in 2005. The data include information on the statewide population of adolescents enrolled in MS Medicaid including demographics, diagnoses, service claims and encounters. These data have been used in previously published research (e.g. Saunders & Heflinger, 2005).

Study Context

The Role of Medicaid in Adolescent Substance Abuse Treatment

Medicaid, Title XIX of the Social Security Act, is the U.S. insurance program for poor and disabled children and adults. The states and the federal government both fund Medicaid, it is administered by the states; however, each state must adhere to federal guidelines in order to receive matching federal monies. Thus, there is some variability among the states in Medicaid programs and services. Medicaid, a mean-testing program,

provides coverage for children who are poor (family income of less than 100 percent of the federal poverty level) and “near poor” (family income of 100 to 199 percent of the federal poverty level; Centers for Medicare and Medicaid Services (CMS), 2008).

Medicaid serves various groups of people including: eligible low-income parents, children, seniors, and people with disabilities. The largest funding source for medical and health-related services for low-income people is Medicaid (CMS, 2008; Weil, 2003).

The Early and Periodic Screening, Diagnosis and Treatment (EPSDT) program, a mandatory service under Medicaid, provides preventive and comprehensive health services for children and youth up to age twenty-one (21). The EPSDT program includes provisions that make substance abuse services available to children and adolescents who are diagnosed with alcohol or drug problems (Mississippi Division of Medicaid, 2002, Annual Report).

The State of Mississippi and Adolescent Substance Abuse Treatment

In 2007, the United States Census Bureau (USCB) published a report indicating that Mississippi was the poorest state in the country. The state had a median household income of \$34,473 and a per capita income of \$9,432. Mississippi ranks as one of the poorest states partly because of its dependence on agriculture, its discouragement of industry, and its legacy for slow progress over the years. There have been little federal subsidies apportioned for rural development. As of 2007, Mississippi has an estimated population of 2,918,785. Mississippi's population has the largest proportion of African Americans of any U.S. state, currently nearly 37% (USCB, 2007).

In Mississippi, Medicaid services are reimbursed through a fee-for-service (FFS) funding mechanism. There has been little research on FFS Medicaid systems, because a majority of states use a managed care approach to Medicaid reimbursements (Centers for Medicare and Medicaid Services (CMS), 2008). The Governor's Office Division of Medicaid (DOM) is the single state agency to administer the Medicaid program (Northrup and Heflinger, 2000). The Mississippi Department of Mental Health (DMH) is responsible for developing and maintaining a comprehensive, statewide system of prevention and service options for children and adults with emotional disturbance or mental illness, alcohol/drug abuse/dependence problems, mental retardation/developmental disabilities, and Alzheimer's disease and other dementia (Northrup & Heflinger, 2000). Covered services under Mississippi's Medicaid (MS Medicaid) program for substance abuse include case management, community mental health centers, outpatient therapy, intensive outpatient treatment, residential treatment, and inpatient services (Northrup & Heflinger, 2000).

Sample

For research question 1, the annual substance treatment service access analyses, the sample was the statewide population of adolescents aged 12 to 17 years who were enrolled in Medicaid in this state during the study period ($n = 37,047$). For research question 2, the "first use" analyses, the sample consisted of adolescents who had their first substance abuse service paid for by Medicaid during fiscal year (FY) 2005, as determined in this study ($n = 267$).

Measures

Predictor Variables

Demographic characteristics such as age, race, gender and county of residence were available from the eligibility data. Age is the age of the adolescent in years. Race was coded for this study as minority = 1 (referent, white). Eighty percent (80%) of Medicaid enrollees were African Americans, 3.8% of enrollees were some other minority group. Gender was coded female = 1 (referent, male).

Eligibility for Medicaid has been shown to be an important predictor of health service utilization in other studies (Deck & Key, 2000) and was assigned on the basis of each enrolled youth's Medicaid eligibility category at the time of service, as identified on the claim form or from the enrollment file when the claims information was missing. Youth were assigned to one of five categories: Supplemental Security Income (SSI) for youths with a disability; Temporary Assistance for Needy Families (TANF); foster care; some other poverty program; or as other state-funded program. SSI was chosen as the referent for the eligibility categories because it has less state-to-state variability than TANF and other poverty-related Medicaid categories.

To examine rural versus urban differences, the youth's county of residence was used. To determine the level of urbanization a dichotomized Rural-Urban Continuum Code (RUCC) was used. The RUCC forms a classification scheme that distinguishes metropolitan (i.e., metro) counties by the population size of their metro area, and nonmetropolitan (i.e., nonmetro) counties by degree of urbanization and adjacency to a

metro area or areas (Hauerstein et al., 2007; Butler & Beale, 2003). This 9-point typology was dichotomized along the metro and nonmetro status. Metro counties were considered urban counties ($n = 17$) and nonmetro counties were considered rural counties ($n = 65$) for this analysis.

Youth service use was determined from the claims data. The claims data base provided information about treatment claims filed on behalf of these adolescents during the study period. Since diagnostic information is available in the claims dataset, a substance abuse service was any treatment for which a claim documented a primary or secondary diagnosis of a substance use disorder. Similarly, a mental health service was any treatment for which a claim documented a primary or secondary diagnosis of a mental health disorder. Any use of mental health services within the prior year was used as a predictor variable.

Dependent Variables

Utilization of substance abuse services for the population of adolescents enrolled in MS Medicaid was examined in two ways in this study. The first question considered the probability of any substance abuse treatment within FY 2005. This is a measure of access (Ettner et al., 2003, Deck et al., 2000). The second utilization measure examined the age at which the first substance abuse service was received (Wood et al., 2005; Mandell et al., 2002).

Analysis

First, bivariate analysis of treatment and age of first use with chi-squares and *t*-tests were conducted using SPSS statistical software for Windows (version 16; SPSS, Inc., Chicago, IL). Second, for multivariate analysis of treatment and age of first use hierarchical binomial logistic model and hierarchical linear model were conducted using HLM software for Windows (version 6; SSI, Inc., Lincolnwood, IL).

Hierarchical Linear Modeling

People exist within organizational structures or other shared contexts. Therefore, individuals are considered “nested” within these contexts. Nested individuals tend to share similar environments and experiences and to be more similar to each other than people randomly sampled from the entire population. Therefore, observations based on these individuals are not fully independent. Standard regression techniques require independence of observations as a primary assumption for the analysis (Raudenbush & Bryk, 2002).

This analysis used hierarchical linear modeling (HLM) because of the hierarchically nested structure of the data—adolescents were nested within counties. The use of HLM leads to: 1) improved estimation of effects within individual units (e.g., developing an improved estimate of a regression model for an individual school by borrowing strength from the fact that similar estimates exist for other schools; 2) formulation and testing of hypotheses about cross-level effects; and 3) the partitioning of variance components among levels (Raudenbush & Bryk, 2002).

First, a “null or unconditional” model was run that only included the dependent variable in order to establish the variance in utilization rates among counties, providing an initial basis for determining the amount of variance accounted for by more complex models. After running “Model 1”, more complex models were run to understand the role of race, gender, and geography in access to substance abuse treatment services and age of first substance abuse service.

In Model 2, I included the individual-level variables only and allowed their coefficients to vary randomly across counties. The individual-level data in both HLM and HBLM are called “level-1 variables” and those at the county level, “level-2 variables.” The level-1 variables were gender and race/ethnicity.

. Model 3 was run with the county-level variable on the intercept in order to determine whether it accounted for variance after controlling for the level-1 predictors. The level-2 variable was level of rurality. Model 4 was run with the level-2 variable allowed to affect both the slope and the intercepts. Model 5 consisted of the level-1 variables of interest (e.g., race and gender) with the level-1 covariates of age, previous mental health service use, and eligibility category. Model 6 included the previous variables in the model with the level-2 variable of rurality on the slope. Model 7 consisted of the level-1 variables, the level-1 covariates, and the rurality variable on the slope and the intercepts of the variables of interest: race and gender. These interaction effects were included because the literature suggests that there are some rural minority and rural female adolescents have statistically significant different rates of substance use treatment (e.g. SAMHSA, 2007). The final model, Model 7, is presented here because the inclusion of these variables increased the overall variance explained in the model

predicting both probability of substance abuse service use and age of first substance abuse service. The final multivariate model is presented in Table 2. It included all variables of interest with level-1 predictors, covariates and the level-2 variable. The final model was of the form:

$$\text{Level 1 model: } \eta_{ij} = \beta_{0j} + \beta_{1j}(\text{NONWHITE}) + \beta_{2j}(\text{FEMALE}) + \beta_{3j}(\text{AGE}) + \beta_{4j}(\text{PREVSAUS}) + \beta_{5j}(\text{TANF}) + \beta_{6j}(\text{FOSCARE}) + \beta_{7j}(\text{OTHPOV}) + \beta_{8j}(\text{OTHSTATE}) + r$$

$$\text{Level 2 model: } \beta_{0j} = \gamma_{01} (\text{RURAL}) + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11} (\text{RURAL})$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21} (\text{RURAL})$$

$$\beta_{3j} = \gamma_{30}$$

$$\beta_{4j} = \gamma_{40}$$

$$\beta_{5j} = \gamma_{50}$$

$$\beta_{6j} = \gamma_{60}$$

$$\beta_{7j} = \gamma_{70}$$

$$\beta_{8j} = \gamma_{80}$$

Question 1: Differences in Substance Abuse Treatment Access

For question 1, the annual substance abuse treatment access analysis, a hierarchical binomial logistic regression (HBLM) was estimated for the annual probability of enrollees' use of a substance abuse service in the Medicaid program. This method of analysis was used due to the dummy coding of the outcome variable (any substance abuse service use = 1). The procedure also applied the data to a Bernoulli

distribution instead of a normal distribution. Again, race, gender, and rurality were the variables of interest used to examine disparities.

Question 2: Differences at Age of First Use of Substance Abuse Treatment

For question 2, the age of first substance use treatment analysis, a traditional HLM model was produced. In the first-use analysis, age at first substance abuse service was calculated on the basis of the difference between the date of that service and the youth's date of birth, reported in years. Race, gender, and rurality were the primary independent variables used to examine disparities. In the first-use model, a linear regression was estimated on the basis of age (in years) at first substance abuse service use. Similar models were run, with the exception that age was excluded as a covariate since it was the dependent variable in order to avoid collinearity issues. As aforementioned, for the first-use analysis, only those adolescents with a substance abuse treatment service paid for by Medicaid in 2005 were included.

CHAPTER III

RESULTS

Sample Characteristics

Table 1 reports the descriptive statistics for the population of Mississippi Medicaid enrollees aged 12-17 during state fiscal year 2005, by gender, race, and rurality.

In FY 2005, there were 37,047 youth aged 12-17 enrolled in Mississippi Medicaid.. Almost 85% of enrollees were identified as minority. There was an approximate even split across gender. In 2005, using the RUCC urban-rural classification scheme, 69.1% of adolescents resided in rural counties and the remaining 30.9% of adolescents were from urban counties. By eligibility category, the largest eligibility mechanism was TANF (83.4%), followed by SSI – 13.2%, other poverty program – 1.9%, other state program – 1.2%, foster care – 0.3%, respectively.

Only a small number of adolescents ($n = 267$, 0.7%) utilized a substance abuse treatment service provided by MS Medicaid. Twelve percent (12.5%) had used a mental health service in the past 12 months. On the average, there were about 20 mental health days with a standard deviation of 45.

Table 1 *Characteristics of youths aged 12 to 17 years enrolled in MS Medicaid in state fiscal year 2005, by race, gender and geography*

	Female (n = 18,646)	Male (n = 18,401)	Minority (n = 31,028)	White (n = 6,019)	Rural (n = 25,614)	Urban (n = 11,433)	Total (n = 37,047)
Variable							
% Female	100.0%	--	50.4%	50.3%	50.4%	50.1%	50.3%
% Male	--	100.0%	49.6%	49.7%	49.6%	49.9%	49.7%
% Nonwhite	83.7%	83.8%	100.0%	--	83.0%**	85.4%	83.8%
% White	16.3%	16.2%	--	100.0%	17.0%**	14.6%	16.2%
% Rural	69.3%**	69.0%	68.5%**	72.2%	100.0%	--	69.1%
% Urban	30.7%**	31.0%	31.5%**	27.8%	--	100.0%	30.9%
% with any MH days in past 12 months	10.1%**	15.0%	11.6%**	17.4%	12.8%	12.0%	12.5%
Avg. MH days among youths with any MH days (mean±SD)	19.5±43.0	21.4±47.1	20.9±43.9	19.8±50.4	20.2±41.1	21.5±54.4	19.8±45.0
Medicaid Elg. Category							
- SSI	8.6%**	17.8%	14.1%**	8.7%	12.7%**	14.2%	13.2%
- Foster care	0.4%	0.2%	0.2%	0.7%	0.2%	0.5%	0.3%
- TANF	85.0%	81.8%	82.9%	86.0%	83.9%	82.2%	83.4%
- Other poverty	3.8%	0.0%	1.7%	3.0%	1.9%	2.1%	1.9%
- Other state	2.2%	0.2%	1.1%	1.6%	1.3%	1.0%	1.2%
SA Tx use in FY 2005	0.4%**	1.1%	0.6%**	1.2%	0.7%	0.8%	0.7%

* $p < 0.05$, ** $p < 0.01$

Substance Abuse Treatment Users vs. Non-Substance Abuse Treatment Users

Table B (see Appendix) provides information comparing substance abuse service system users to non-users on the variables of interest, including the predictor variables and the dependent variables in the hierarchical model analysis. As aforementioned, in FY 2005, there were 267 (0.7% of enrolled) adolescents that used some type of substance abuse service. In 2005, whether one was a substance abuse service user significantly differed at the bivariate level on the basis of race $\chi^2_{(1)} = -21.151, p < 0.001$, gender $\chi^2_{(1)} = 66.500, p < 0.001$, but not level of rurality $\chi^2_{(1)} = 2.808, p = 0.094$, n.s.

Probability of Substance Abuse Treatment Access

Using HBLM, the odds of accessing substance abuse treatment services are significantly reduced if one is minority or female (Table 2). Rurality was not a statistically significant predictor. In the results reported below, the model with robust standard errors is described. Due to the dichotomous nature of the outcome variable, the odds ratios and probabilities for all results were obtained through a logit link function.

Compared to their white counterparts, minority adolescents were half as likely to use a substance abuse service. Females were almost two-thirds less likely as males to use a substance abuse service. Rural residence; however, did not significantly alter the odds of engaging in substance abuse service after controlling for other variables. For each year of additional age, enrollee's were about 25% more likely to use SA services. Having a previous mental health treatment service significantly increased an enrollee's odds of using a SA service.

Table 2 *Probability of utilization of substance abuse services among adolescents aged 12 to 17 years enrolled in MS Medicaid, state fiscal year 2005 in the final model*

	<i>Odds Ratio</i>		<i>P</i>
	<i>OR Coefficient</i>	<i>95% CI</i>	
Intercept	0.0002	0.000, 0.001	<0.001
<i>County data/level 2</i>			
Rural	0.960	0.523, 1.763	0.895
<i>Individual data/level 1</i>			
Minority	0.507	0.375, 0.687	<0.001
Minority x Rural	1.070	0.608, 1.914	0.760
Female	0.367	0.234, 0.574	<0.001
Female x Rural	1.079	0.608, 1.914	0.796
Age	1.261	1.164, 1.365	<0.001
Previous MH service in the year	11.349	7.815, 16.481	<0.001
Eligibility category (reference: SSI)			
- TANF	1.043	0.737, 1.477	0.812
- Foster care	1.082	0.421, 2.780	0.871
- Other poverty	0.786	0.189, 3.264	0.740
- Other state	0.469	0.066, 3.323	0.448

Age at First Substance Abuse Service

See Table C in Appendix for table showing average age of first use by race, gender, and rurality. The same pattern observed in the bivariate analysis above for probability of service use does not hold for age of first substance abuse service. In FY 2005, there were no significant differences on age of first substance abuse service among the demographic variables of interest: race $t(265) = -0.266, p = 0.821$, n.s., gender, $t(265) = -1.474, p = 0.142$, n.s. and rurality $t(265) = -0.789, p = 0.431$, n.s.

Table 3 displays the age at first substance abuse service regression model. After controlling for all other variables, neither race, gender, nor rurality were statistically significant predictor variables at the $p < .05$ level. Adolescents who had mental health

visits in the past year received a service about four months earlier than those not having any previous mental health visit. Coefficients for this full model are depicted in Table 3.

Table 3 *Hierarchical Linear Regression Model Predicting Age of First Substance Abuse Service (n = 267)*

	<i>Final Model</i>		
	<i>Coefficient</i>	<i>SE</i>	<i>P</i>
Intercept	16.558*	0.357	<0.001
<i>County data/level 2</i>			
Rural	-0.118	0.387	0.762
<i>Individual data/level 1</i>			
Minority	0.048	0.317	0.880
Minority x Rural	0.096	0.390	0.805
Female	0.261	0.302	0.388
Female x Rural	-0.016	0.378	0.967
Previous MH service in the year	-0.398*	0.159	0.013
Eligibility category (reference: SSI)			
- TANF	-0.150	0.184	0.416
- Foster care	0.255	0.640	0.690
- Other poverty	0.615	0.923	0.505
- Other state	1.570	1.274	0.219
<hr/>			
Variance components			
Intercept u_0	0.00002		
Level-1	0.078*		
% var accounted for	13.3		
<hr/>			
* $p < 0.05$			

Limitations

While it is clear that groups of youth enrolled in Mississippi Medicaid differentially experienced substance abuse treatment utilization rates, the models only serve as a catalyst for further research, analysis, and discussion. This study also has

limited generalizability, because the sample included only adolescents in the Medicaid service system of one southern state. In addition, only Medicaid claims and encounter data were included, which could have potentially underestimated the amount of adolescents who received substance abuse treatment; due to the fact that some treatment users may have sought services paid by other funding streams (Northrup & Heflinger, 2000). An additional limitation is that the encounter data do not include a measure of the severity of the youth's substance use problem—for example, abuse compared with dependence. Thus, there is not ability to control for treatment need and/or severity with this dataset.

Further, there is limited statistical power for Question 2 that may have resulted in null findings when there actually may have been some significant findings. The lack of power with only 267 focal cases spread across 82 counties, could potentially mask the main and interaction effects. For instance, interactions are much harder to specify than main effects and the confidence bounds for the results pertaining to Question 2 are much broader.

CHAPTER IV

DISCUSSION

This study examined rates of utilization of substance abuse treatment services by adolescents enrolled in Mississippi Medicaid in 2005, and incorporated youth- and county-level characteristics in explaining the variance in rates of service use. Rates of substance abuse treatment were shown to be low. Annual access to Medicaid paid substance abuse treatment services was less than 1% of the enrolled population in Mississippi in 2005. Using HBLM, minority and female adolescents were shown to be less likely to use substance abuse treatment than white and male adolescents. Level of rurality was not found to be a significant predictor of substance abuse service use. Having previously had mental health services greatly increased the odds of using a substance abuse service, which may indicate the role of the mental health system in identifying and referring adolescents in need of substance abuse treatment. Minority, female, and rural adolescents did not significantly differ with their respective counterparts on age of first substance abuse service. Although the literature is equivocal on this issue, this has been noted in the literature previously.

Implications and Contributions

The findings in this study suggest that white adolescents are gaining access to substance abuse treatment at significantly higher rates may be explained by previous research findings that the use of alcohol and drugs is higher among whites than African Americans.

The study replicates – in a new sample in a new state with a different health care system – what Heflinger and colleagues (2006) found previously about access to substance abuse treatment through the Medicaid system. In that study, whites were nearly two times as likely as African Americans to access substance abuse services, while males accessed services at a 75% greater rate than females. In addition, statewide, less than one percent of the enrolled adolescent Medicaid population received a substance use service, although prevalence rates were much higher. However, the age differences noted in that study were not demonstrated here.

As aforementioned, studies have shown that racial and ethnic minorities often times suffer from more negative social consequences of substance abuse compare to whites (Herd, 1994; Jones-Webb et al, 1995; Boyd et al., 2003). The nature of the relationships is still unclear. For example, the role of the legal system: are African American adolescents entering the juvenile justice system instead of substance abuse treatment facilities? Concern that has been raised by some researchers that African American youth may be more likely to end up in the juvenile justice system than the specialty treatment system when they get in trouble in community settings (Aarons et al, 2004). This study did not have access to the data needed to examine whether the differential rates of service use were related to differential use of the juvenile justice

system for African American and female youth in this state, but this issue could benefit from further study.

A powerful indicator as to whether an adolescent would receive services was having previously had a mental health service. This indicates that once youth are in the mental health system, their chances of having substance abuse problems identified and referred for treatment are greater than for other youth. This finding implores service providers to coordinate and work cooperatively on various aspects of care to ensure optimal benefits are obtained by these adolescents.

The data for this study also lacked a “need” variable to be able to examine if differences in actual substance abuse differed and, thus, the need for treatment was less among the African American, female, and rural adolescents in this state. The disparities found herein could reflect the lower need for substance abuse treatment among these groups. However, Heflinger, Chatman, & Saunders (2006) showed that even after correcting for need, African American female youth had the greatest disparities in treatment access. This is another area in need of future study: What youth, family, community, or service system factors could be influencing these disparities?

This study also demonstrates a need for policy and provider attention to disparities in substance abuse treatment settings. Medicaid data can be used for performance indicators to routinely track difference in access by race, gender, geography, and/or disease. The use of existing data sets such as Medicaid can provide much-needed information in a cost-effective way. Using these data sets can provide methodologically rigorous information about substance abuse treatment including trend analysis, survival analysis, and more complex hierarchical regression models.

This study contributes to the sparse body of research concerning adolescent behavioral health issues. This research introduces a more robust and more rigorous statistical procedure to the data analysis of substance treatment issues. Further investigation is still needed. For instance, more studies could specifically address the interaction of race and gender in the rural context or determine the causal pathways of racial, gender, and rural disparities documented in this study. Longitudinal study of these issues may further elucidate important information concerning initiation, utilization, and retention of substance abuse treatment. Disparities are still present and should continue to be examined in this context.

APPENDIX

Table A *Literature Search Results*

The search engines consisted of two databases: a) PsycINFO, a database of psychology-related articles and b) PubMed, a database with articles from the medicine discipline. The inclusion criteria for the articles reviewed in this paper are the following:

1. Located in the Psychology or Medicine database.
2. Satisfied the final search term: *(rural and urban) AND (mental health treatment or services) AND (adolescent)*
3. Published in peer-reviewed journal
4. Could include a juvenile justice focus, even though not a keyword

The exclusion criteria for the articles reviewed in this paper are the following:

1. Did not describe a health care or services issue
2. Focused only on international or immigrant population
3. Focused only on an adult population

	PsycINFO	PubMed
Adolescent	835	14,330
substance abuse	259	545
treatment or services	53	147
rural and urban	6	7
Total*	0	0

* after applying inclusion and exclusion criteria and removing unduplicated cases

Table B *Substance abuse service use by race, gender, and geography*

	SA Service User (<i>n</i> = 267)	SA Service Non-User (<i>n</i> = 36,780)
% Female	25.5%**	50.5%
% Male	74.5%**	49.5%
% Nonwhite	77.4%**	84.7%
% White	22.6%**	15.3%
% Rural	64.4%	69.2%
% Urban	35.6%	30.8%

**p* < 0.05, ** *p* < 0.01

Table C *Age of first substance abuse service by race, gender, and geography among substance abuse service users (n = 267)*

	<i>M</i>	<i>Sd</i>
Female	16.45	1.31
Male	16.19	1.24
Nonwhite	16.27	1.22
White	16.23	1.37
Rural	16.30	1.24
Urban	16.17	1.30

*p < 0.05, **p < 0.01

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