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Community Determinants of Substance Abuse Treatment Referrals from Juvenile Courts: Do Rural Youth Have Equal Access?

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Abstract

Many youth in juvenile justice are in need of substance use services, yet referral to services is often inadequate. This study examines the ecological factors related to substance use service referrals made through Tennessee's juvenile courts. A series of hierarchical binomial logistic models indicated that individual-level factors accounted for 31% of the variance among courts in referral rates. Community and court factors accounted for an additional 16% of the variance. Youth were more likely to be referred if they had a higher need, were White, were male, were adjudicated in communities that had a higher service density, and appeared in courts that had good relationship and frequent contact with mental health providers. Controlling for individual need, youth in rural areas tended to have lower referral rates; however, this relationship was mediated by the frequency of contact and the quality of relations between the court and mental health providers and county average SES.

Keywords

Behavioral Health Care; Adolescence; Substance Use Services; Juvenile Justice; Rural; Disparities; Community; Racial and Ethnic Differences; Service Referral; Hierarchical Logistic Modeling

Introduction

It is widely known that many youth in the juvenile justice system have especially high need for substance abuse treatment. Studies have found roughly half of juvenile detainees had a current diagnosable substance use disorder (Robertson, Dill, Husain, & Undesser, 2004; Teplin, Abram, McClelland, Dulcan, & Mericle, 2002) and the lifetime prevalence of substance abuse disorders for one sample of youth in detention was more than 60% (Aarons, Brown, Hough, Garland, & Wood, 2001). A recent survey of 40 of the 44 juvenile justice facilities in Tennessee found that an estimated 42% of detained youth had a known substance use problem (Barnes et al., 2005). However, the rate at which youth are referred through the juvenile courts for substance abuse treatment is much lower than the rate of need. Breda (2003a) found that

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only 2% of female and 4.5% of male juvenile offenders were referred to substance abuse treatment through Tennessee's juvenile courts.

Factors Related to Behavioral Health Referral and Access for Juvenile Offenders

Several factors have been shown to influence referral or access to behavioral health services (i.e. mental health or substance abuse) among youth in the juvenile justice system. These factors include a lack of services in the community or the juvenile facilities, the attitudes of judges toward services, the attitudes of judges towards youth mental health and substance abuse, perceptions of the judges about the availability and quality of services, and established networks between service providers and the court (Breda, 2001).

In addition to community and court determinants of referral, there are several determinants at the youth level. Youth charged with drug or alcohol related offenses or youth with a history of drug and alcohol related offenses would be clear candidates for treatment referral. Nationwide, approximately 14% of youth charged with offenses were charged with a drug or liquor law violation (Snyder & Sickmund, 2006). Predictors of referrals to substance treatment through various service systems have included substance use, being male, prior involvement in social service agencies, and lack of involvement in prosocial groups (Aarons, Brown, Garland, & Hough, 2004; Downs & Robertson, 1990; Shillington, & Clapp, 2003).

Age is another youth-level factor likely affecting decisions about court referral to behavioral health services. Age and criminal history are "inextricably linked" in sentencing (Bushway & Piehl, 2007). A younger offender and an older offender with the same number and type of past offenses are not equal—the younger offender would be perceived as more severe, because older offenders have had more time to amass offences. Similarly, age and gender have been highly predictive of substance use onset, with older youth more likely to use drugs at all, and males more likely to try substances and having an earlier onset of substance use (Kandel & Logan, 1984), so older youth may be more likely to be referred to services.

Other studies have found race to be a factor; in a sample of publicly served youth, agencies more often referred minority youth to detention and more often referred Whites to less restrictive settings such as substance use treatment (Aarons, Brown, Garland, & Hough, 2004). Breda (2003a) found that there was not a significant direct relationship between ethnicity and referral to mental health treatment through juvenile courts in Tennessee. However, her study found a few moderating relationships between race and type of crime, and these relationships favored White referral to mental health services. Breda (2002) also found that White youth were more likely to be referred to alcohol and drug services. This was especially true when cases were handled informally rather than through formal petition. Breda's studies, however, did not control for county-level characteristics such as rurality and proportion of minorities. These may be particularly important aspects to control for in Tennessee, where the ethnic minority population is highly concentrated in urban areas.

Public substance abuse treatment for youth involved in Tennessee's juvenile justice system are generally funded through the Substance Abuse Prevention and Treatment Block Grant (a federal program that provides service funds to states out of the Department of Health and Human Services), and a Medicaid set-aside for residential services to children in state custody (Northrup & Heflinger, 2000). There is evidence that Tennessee's primary public funding source for substance abuse treatment, TennCare (Tennessee's Medicaid managed behavioral health care program), has been very difficult to access for youth in juvenile justice (Thomas, Gourley, & Mele, 2004b). Interviews with local, state, and federal officials concerning the state of substance abuse treatment for juvenile offenders in Tennessee found that 1) Tennessee lacks systematic, formal, consistent mental health and substance use screening in its juvenile detention centers, and there are inconsistent attitudes among officials at all levels about the

necessity of screening; 2) there is some official resistance to substance use screening in juvenile justice without the availability of appropriate services for youth who are identified as having substance use problems; and, 3) some officials believed that substance abuse treatment for youth in some counties were completely unavailable (Thomas, Gourley, & Mele, 2004b). The considerable autonomy among juvenile courts in Tennessee may also contribute to a lack of a systematic screening and consistent statewide procedures.

Based on these studies, access to public substance abuse treatment in Tennessee may be dependent on characteristics of juvenile courts such as availability of screening, established networks between the juvenile court and service providers, and beliefs by the juvenile court staff about the availability and effectiveness of behavioral health treatment.

Rural Factors Associated with Behavioral Health Need and Service Access

Youth living in rural areas have comparable rates of behavioral health problems to youth in suburban and urban areas (Costello, Gordon, Keeler, & Angold, 2001; Fox, Merwin, & Blank, 1995) and higher levels of abuse of methamphetamine and OxyContin (D. Hartley, J. Gale, & D. Lambert, cited in NACRHHS, 2007) and other drugs (NCASA, 2000; OAS, 2006) and alcohol (OAS, 2006). Moreover, rates of child poverty are somewhat higher in rural areas (Clark, Savitz, & Randolph, 1999), and poverty is significantly related to child and adolescent behavioral health problems (Costello, Compton, Keeler, & Angold, 2003).

Rural areas also have unique geographic, spatial, and cultural factors that impact service access and use. Rural Americans have disproportionately higher rates of poverty, less education, less access to primary care providers, and are less likely to have health insurance (Ricketts, 1999). A scant 9% of the nation's physicians work in rural areas, though rural Americans comprise 20% of the population. Rural areas are characterized by isolation, and distance to health providers is strongly associated with frequency of access (Arcury et al., 2005). Rural children are less likely to have insurance, are at a higher risk for unmet medical need, and rural families are more likely to delay medical care for their children because of cost (Clark, Savitz, & Randolph, 1999). Other well-documented disparities exist specifically in behavioral health service provision (Ricketts, 2000). For instance, rural areas have fewer behavioral health inpatient and outpatient providers and specialists per resident (Hartley, Bird, & Dempsey, 1999).

Several significant barriers to behavioral health care have been identified through interviews with residents in rural areas (Sawyer, Gale, & Lambert, 2006). These include stigma, a mistrust of health professionals, a lack of cultural competence in professionals working with the rural poor, insufficient communication among agencies, lack of specialists, distances in care, public transportation infrastructure, and lack of integration across service sectors. All of these barriers may act as determinants of whether or not youth are referred to services (Sawyer, Gale, & Lambert, 2006).

Rural areas, and the behavioral health and criminal justice systems within them, are part of a unique ecological context not often studied in social science, which has been historically urban-centric (Heflinger & Christens, 2006). We found no studies specifically examining the relationship of rurality with possible disparities in substance abuse service referral through the juvenile court. The field needs more evidence on service referral as a result of the complex interaction between a youth's characteristics and the ecological system in which the youth is contained, including court and community factors. Any analysis of service referral disparity needs to consider and incorporate these complex ecological factors.

The ecological model emphasizes that relationships cannot be studied in isolation, and that phenomena are often a result of interactions among hierarchical levels of variables

(Bronfenbrenner, 1979). One cannot simply examine the relationship between rurality (or any other variable discussed here) and service referral without controlling for the ecological context, because individuals and regions vary greatly. However, the ecological context often implies interrelationships among the many variables within a context. This can create analytical issues associated with multicollinearity, when variables are so interrelated that it is difficult to separate their effects. For instance, rurality may be related to the socioeconomic status of community and to the availability of service providers. All three may be related to referral to substance use treatment. In an ecological context, an appropriate analysis should incorporate the level of analysis, in this case, individual, court, and community levels. With multicollinear relationships, it may be that the overall influence of the ecological level is of more interest than the individual variables within a level.

Study Purpose and Hypotheses

The purpose of this study was to examine the relationship of individual, court, and community factors to the referral of youth from the juvenile courts to substance abuse treatment. We were particularly interested in the role rurality may play in referral and whether there were disparities in referral between urban and rural areas. In Tennessee, the juvenile courts and the public behavioral health service system network are organized primarily at the county level, so county is the level of community focus for this analysis.

We hypothesized that a youth would be more likely to be referred to substance abuse treatment if: a) the presenting offense was substance-use related, b) the youth had substance-use related offenses in the past, and c) the youth was older, male, and White. Additionally, we hypothesized that youth would be more likely to be referred if they lived in counties that: d) were urban, e) had more substance abuse treatment service providers, f) had higher average SES, and g) contained a higher proportion of Whites. Finally, we hypothesized that youth would be more likely to be referred if they were processed by courts with officers that: h) believed substance abuse treatment in their county was adequate, i) rated the relations between the court and behavioral health providers as higher quality, and j) reported more frequent contact between the court and behavioral health providers.

Many of these variables are expected to be at least moderately multicollinear, which can result in difficulty in separating the effects of individual variables. However, in the context of the primary research question, which is examining the relationship between rurality and service referral while controlling for ecological context, we deemed it to be more beneficial to include the variables in conceptually cohesive “blocks” (individual, county, and court).

Methods

This study applied hierarchical binomial logistic modeling (Raudenbush & Bryk, 2002) to merged data from three existing datasets to examine the relationships among county, court, and individual characteristics in predicting substance use service access.

Datasets

Three databases were used that corresponded with the different levels of interest: youth, court, and county. These three databases, their respective samples, and the measures used are described below.

Youth-level—Individual-level variables included the dependent variable, which was a dichotomous measure of referral to substance abuse treatment (1 = referred). Predictor variables included the dichotomous indicators of gender (1 = Male) and race (1=White); age;

the number of prior drug or alcohol offenses; and an indicator if the presenting offense was drug or alcohol (D/A) related (1 = D/A related).

The first database was an existing dataset of all youth, unduplicated, who were processed by the Tennessee juvenile court for offenses in 1997 (Breda, 2001). This individual-level database did not include any youth who appeared before the court solely for custody issues such as neglect and abuse. It contained information about the demographics, legal disposition (i.e. how a case was settled by the court), and referrals to services for all of the youth that came before the juvenile court in 1997. Since this dataset is used by the courts to process youth and track their disposition, it is thought to be of high quality. This is reflected in the relatively small amount of missing data for such a large dataset, as discussed below. Youth younger than 11 years old were removed from this study because virtually none had been referred to substance abuse treatment. An additional 921 cases (2.3%) were removed from analysis due to missing data on race (919 cases), age (232 cases), and gender (32 cases). Finally, court data (described below) was missing for two of the smaller counties in the state, so the youth from those counties ($n = 132$) were removed from the analysis. These deletions represented a total of 2.7% of the sample, leaving a total individual-level sample size of 39,054.

Using a series of t-tests and χ^2 tests, we explored if there were differences between those included and those excluded from analysis due to missing data. Almost all of the fifteen analyses were non-significant, indicating that for most variables data was likely missing completely at random and its absence had a minimal impact on the analyses due to removal. None of the analyses were statistically significant at $p < .05$ for those missing gender or race. Some minor differences were found for those missing data on age. However, due to the large sample size of 39,054 and the fact that there were very few differences found for those included and excluded from the analysis, we believe the final data set to be extremely representative of the youth court population. Deletion of the missing cases is believed to have minimally impacted the generalizability of our findings.

County-level—A county sociodemographic database was compiled by the researchers and consisted of data from the U.S. Census Bureau, Economic Research Service (United States Department of Agriculture Economic Research Service, 2004), and other public data sources. Variables used from this database pertained to a timeframe as close to 1997 as possible, which is the same timeframe as the other datasets in the study. Specific county-level variables used in the analyses included the ratio of behavioral service providers to youth (number of behavioral health service providers in the county per 1000 youth aged 5-17), the percentage of residents in the county that lived in areas designated as “rural” by the U.S. Census Bureau, the proportion of racial and ethnic minorities in the county, and county average socioeconomic status (SES). SES was computed as a mean of the standard scores of three indicators from the Census: the proportion of high school graduates, the log of median family income (to correct for positive skew), and the cube of the employment rate (to correct for a severe negative skew; Tukey, 1977). Hence, county SES was a constructed score with roughly equal weighting by education, income, and employment, with an average score of zero and positive scores indicating higher SES.

One of the counties had a score on SES that was an extreme outlier, a full standard deviation above all of the other counties. This was Winsorized (Lipsey & Wilson, 2001) to two standard deviations above the mean, still higher than the other counties, but reducing the impact of this county as an outlier. The ratio of service providers to youth had four outliers that scored more than two standard deviations above the mean; these were also Winsorized to two standard deviations above the mean.

Court-level—The third database was an existing court-reported database from a 1997 survey of Tennessee juvenile court judges and youth service officers (YSO's; Breda, 2001). Seventy-three judges and 87 YSO's responded to the court survey, providing court data on 96 of the 98 courts in Tennessee, and 93 of the 95 counties. One county had two courts, one county had three courts, and court data for two counties was missing due to nonresponse. For this analysis, the most senior ranking court officer's data, the judge-report, was used first. If no judge report was available for a particular county then the YSO-report data was used. The appropriateness of this was tested by running the final model using only judge-report data; the results were nearly equivalent to those described below. This data is believed to be of high quality due to the extremely high response rate and the relative lack of missing data, described below.

Court data included an average of two items measuring the court officer's belief that outpatient and inpatient substance abuse treatment in the county were adequate (1 = adequate, 2 = somewhat adequate, 3 = somewhat inadequate, 4 = inadequate). In addition, we used a measure of the frequency of contact between the court and behavioral health service providers (1 = daily, 2 = weekly, 3 = monthly, 4 = less often than monthly) and a rating of the quality of relations between the court and behavioral health service providers (1 = very poor, 2 = poor, 3 = fair, 4 = good, 5 = excellent). The last two questions were worded regarding mental health providers. In Tennessee, all of the community mental health centers are contracted to provide TennCare-funded substance abuse treatment. In the absence of specific questions about substance abuse service providers, this study assumes that attitudes toward mental health reflect those towards the behavioral service system.

The variable measuring the court officer's belief in service adequacy was missing on one case, so this was replaced by the mean of all court officers for that item. The other two behavioral health variables were each missing on seven cases, so these were replaced by their respective means. Replacement with the mean was chosen as an imperfect conservative compromise that avoids problems associated with deletion of missing cases or estimation of scores through regression.

Analyses

Table 1 depicts the means, standard deviations, and frequencies/percentages for all of the data. Note that most of the youth (98%) had no prior drug or alcohol related offenses, and 13% were presenting with a drug or alcohol related offense. Only 4.4% were referred to drug or alcohol treatment by the court.

This analysis used hierarchical binomial logistic modeling (HBLM) because of the hierarchically nested structure of the data, as youth service referrals were nested within courts/counties. Because individual youth who are served by the same court and live in the same county share those court/county characteristics with each other, their data is not fully "independent," which is a requirement of traditional regression modeling. In this case, HBLM is more appropriate than traditional logistic regression because hierarchically structured data violates the assumption of independence of observations, resulting in misestimated standard errors when not treated as hierarchical (Raudenbush & Bryk, 2002). The individual-level data in HBLM are called "level-1 variables" and those at the court/county level, "level-2 variables." This analysis treated courts and counties as one level, even though two counties had multiple courts. We deemed the simplicity of this two level approach as far preferable to the small gain in statistical appropriateness that would have resulted from a three level model. This analysis had a level-2 court/county sample size of 96 with a level-1 individual sample size of 39,054.

First, we ran a "null" model in order to estimate the typical rate of referral. This "Model 1" (see Table 2) also established the variance in referral rates among counties, providing an initial basis for determining the amount of variance accounted for by more complex models. Since a

central research question in this study was whether rurality is related to referral rates, percent rural was added in Model 2 to explain between-county variance. Model 3 included only the individual-level variables into the model and allowed their coefficients to vary randomly across counties/courts. These level-1 variables included youth age, gender, ethnicity, number of prior substance use offenses, and whether the presenting offense was substance use related. Model 3 was run to provide a baseline for determining additional variance accounted for by court and county after accounting for individual variables.

Model 4 added percent rural to the third model in order to determine whether rurality accounted for variance after controlling for the level-1 predictors. Model 5 added the additional county variables to the fourth model. These variables included county SES, the percentage of minorities in the county, and the ratio of substance abuse treatment providers to 1000 youth in the county. Finally, in order to determine if court attitudes and beliefs moderated the relationship between the other variables and service referrals, the sixth and final model added the court level factors to Model 5. These included the court officers' ratings of contact with behavioral health providers, the court officers' belief that substance abuse treatment are inadequate in the county, and the court officers' ratings of the quality of relations with behavioral health providers in the county.

Results

Analyses revealed widely divergent rates of court referrals to substance abuse treatment. The average referral rate in Tennessee courts was 4.4%, with actual values ranging widely from 0% to 28%. Before controlling for youth and county characteristics, a bivariate linear correlation between percent rural and referral rate was not significant ($r = -.14, p = .19$), and a quadratic, curvilinear correlation was also not significant ($r = -.13, p = .22$). In all models below, the results of the unit-specific model with robust standard errors are described. The unit-specific model allows one to interpret the parameters for a "typical" court, or a court that scores at the median. Due to the dichotomous nature of the outcome variable, the odds ratios and probabilities for all results were obtained through a logit link function (Raudenbush & Bryk, 2002).

Model 1 through Model 5

Results for the preliminary models are shown in Table 2 and summarized below. The probability of being referred to substance abuse treatment in a "typical" or median court was 2.63%, with a 95% plausible value range of 0.16% to 30.8% among courts. This is smaller than the population-wide referral rate of 4.4% described in Table 1 because of the nonlinear relationship between the logit, the log-odds, and the probability of referral. In Model 2, the percentage of rural residents in the county was not significantly related to referral to substance abuse treatment ($OR = 0.9939; 95\% CI = 0.981, 1.007$); only 1% of the between-court variance in court referral rates was accounted for by rurality alone. Model 3 indicated that youth factors were highly related to referral with the exception of age, which also had a low reliability. Random effects varied significantly for all variables with the exception of gender and age. Due to these considerations, gender was fixed and age was dropped from Model 3 and all future models. The level 1 individual variables accounted for 31.3% of the variance across courts.

Model 4 added percent rural to Model 3. The addition of percent rural accounted for 7.2% more variance than Model 3 and the rural variable had a borderline significant relationship with referrals ($\chi^2_{(3)} = 3.71, p = .051$). Model 5 added the rest of the county factors. This model accounted for 47.3% of the variance in referral across courts, an increase of 8.2% from the previous model. With the addition of the three new county variables in this model, rural percentage was no longer significant as a single variable.

Model 6

The final model added court-level factors to Model 5. The final model was of the form: Level 1 model: $\eta_{ij} = \beta_{0j} + \beta_{1j}(\#PRIORDRUGARRESTS_{ij} - \#PRIORDRUGARRESTS..) + \beta_{2j}(\text{PRESENTDRUGOFF}) + \beta_{3j}(\text{RACEWHITE}) + \beta_{4j}(\text{MALE})$ Level 2 model: $\beta_{0j} = \gamma_{01}(\text{SES}_{.j} - \text{SES..}) + \gamma_{02}(\text{PCTMINORITY}_{.j} - \text{PCTMINORITY..}) + \gamma_{03}(\text{RURALPCT}) + \gamma_{04}(\text{PROYOUTH RATIO}) + \gamma_{05}(\text{INADEQUATESERV} - \text{INADEQUATESERV..}) + \gamma_{06}(\text{CONTACTPROVIDERS} - \text{CONTACTPROVIDERS..}) + \gamma_{07}(\text{PROVIDERRELATIONS} - \text{PROVIDERRELATIONS..}) + u_{0j}$

$$\begin{aligned} \text{Level 1 model: } \eta_{ij} = & \beta_{0j} + \beta_{1j} (\#PRIORDRUGARRESTS_{ij} - \#PRIORDRUGARRESTS..) \\ & + \beta_{2j} (\text{PRESENTDRUGOFF}) \\ & + \beta_{3j} (\text{RACEWHITE}) + \beta_{4j} (\text{MALE}) \end{aligned}$$

$$\begin{aligned} \text{Level 2 model: } \beta_{0j} = & \gamma_{01} (\text{SES}_{.j} - \text{SES..}) \\ & + \gamma_{02} (\text{PCTMINORITY}_{.j} - \text{PCTMINORITY..}) \\ & + \gamma_{03} (\text{RURALPCT}) \\ & + \gamma_{04} (\text{PROYOUTH RATIO}) \\ & + \gamma_{05} (\text{INADEQUATESERV} - \text{INADEQUATESERV..}) \\ & + \gamma_{06} (\text{CONTACTPROVIDERS} - \text{CONTACTPROVIDERS..}) \\ & + \gamma_{07} (\text{PROVIDERRELATIONS} - \text{PROVIDERRELATIONS..}) + u_{0j} \end{aligned}$$

$$\begin{aligned} \beta_{1j} &= \gamma_{10} + u_{1j} \\ \beta_{2j} &= \gamma_{20} + u_{2j} \\ \beta_{3j} &= \gamma_{30} + u_{3j} \\ \beta_{4j} &= \gamma_{40} \end{aligned}$$

where #PRIORDRUGARRESTS was the number of prior substance offenses, PRESENTDRUGOFF was whether the youth presented with a substance offense, RACEWHITE was youth race (White/non-White), MALE was youth gender, SES was average SES for the county, PCTMINORITY was the percentage minority, RURALPCT was the percentage rural, PROYOUTH RATIO was the provider to 1000 youth ratio, INADEQUATESERV was the court's rating of the inadequacy of behavioral health services in the county, CONTACTPROVIDERS was the court staff's rating of their frequency of contact with behavioral health services, and PROVIDERRELATIONS was the rating of the quality of relations between the court and county behavioral health services.

Several variables were centered on their grand mean in order to aid interpretation (Raudenbush & Bryk, 2002). Level 2 estimates represent the court/county mean value for a person with a score of 0 on every non-centered predictor and from an average group for every grand mean centered predictor. We centered certain variables when 0 was not a meaningful or realistic score. These variables included county SES, the rating of the inadequacy of services, the amount of contact with providers, the quality of relations between providers and the court, and the percentage of minorities (no county was zero percent minority). At level 1, the number of prior drug arrests was grand centered in order to interpret the intercept as true for the "average" youth.

Table 2 indicates all of the coefficients for each model. The final model (6) accounted for 47.4% of the variance between courts in referrals. Although this percentage accounted for differs only slightly from the 47.3% accounted for in Model 5, a multiparameter test indicated that the court-level variables fit the data better ($\chi^2_{(1)} = 7.4, p = 0.006$). These variables shared considerable variance with the county-level variables, hence the significant multiparameter test yet the small gain in overall explanatory variance. Even after controlling for all of these variables, there remained a significant amount of between-court variance in referral rates ($u_{00} = 1.04, p < .001$). Odds ratios for this full model are depicted in Table 3, indicating that youth-related variables were most strongly associated with referral to substance abuse treatment. Significant predictors included presenting offense, history of D/A offenses, race, and gender.

The individual-level coefficients all had significant random error variance (with the exception of gender, which had been fixed), indicating that the influence of number of prior drug offenses, being referred for a drug offense, and race were related differentially to the likelihood of referral across courts. This seems of particular concern for youth race, as it indicated that youth of color may be receiving unequal treatment under the law depending on which court processed the youth's case. However, race is not uniformly or randomly distributed in the state of Tennessee; minority youth are more concentrated in Shelby County (Memphis), western Tennessee, and urban Davidson County (Nashville), and very few live in rural or eastern Tennessee. Further interest in this finding spurred a post hoc exploratory analysis, described later.

The collection of community-level variables accounted for significant variance in referral rates; however, none were individually significant in the final model due to multicollinearity. The fact that none of them were significant at the .05 level indicates that there is considerable multicollinearity occurring among these variables and that this analysis did not have the power to separate the individual impact of these variables with precision, since there were only 93 counties at level 2, and power for each level is largely determined by the number of cases at that level (Snijders, 2005). The moderate multicollinearity and the inclusion of a relatively large assortment of variables resulted in somewhat decreased power, resulting in lower precision for the court/county coefficients. The usual response to this problem is to increase the sample size; however, this study was a nearly complete census of courts in the state of Tennessee, so an increase in sample size is not possible.

Among the community-level variables there were a moderate number of intercorrelations, and a high negative correlation between rurality and SES. Rural areas had significantly lower SES ($r = -.652, p < .001$) as well as a significantly smaller minority population ($r = -.353, p < .001$). Courts in rural areas reported that they had less contact with behavioral health services ($r = .399, p < .001$) and that behavioral health services were more inadequate ($r = .285, p = .005$). Hence, controlling for individual need, youth in rural areas tended to have lower referral rates; however, this relationship was mediated by the frequency of contact and the quality of the relationship between the court and mental health providers and county average SES. This is supported by the fact that the relationship between rurality and referral was no longer significant upon the introduction of the community and court-related variables correlated with rurality.

Additional Analyses

Two post-hoc analyses were run in order to explore the finding that the relationship between race and referral probability significantly varied among courts. Two variables were thought to account for these discrepancies, the proportion of minorities in the county and the percentage rural. We felt that counties with a higher proportion of minority individuals might have more racial equality in regards to referrals. We also hypothesized that rural counties would have less racial equality in referral rate, in part due to the smaller proportion of minorities in rural areas,

and in part due to the historical context of racial prejudice and discrimination in communities in the rural south (Bridges, 1994; Hill, 2005; King, 1963).

The first post-hoc analysis was the same as the final individual-level model from Model 3, with the addition of a cross level interaction between the proportion of minorities in the county by race. This interaction was not statistically significant, $\gamma = -.013$, $SE = .008$, $p = .09$, although it neared significance. As the proportion of minority individuals in the county increased, the ethnic disparity in referrals decreased, consistent with the post hoc hypothesis. This lends some support to the idea that the racial makeup of a county mediates racial disparities in service referral. The second post-hoc analysis added a cross level interaction between percent rural by race. This interaction was not statistically significant, $\gamma = .001$, $SE = .004$, $p = .82$. The percentage of rural residents in the county was not related to the relationship between the race of the youth and referral to substance abuse treatment.

Discussion

This study examined rates of referral to substance abuse treatment by juvenile courts in Tennessee in 1997, and incorporated youth-, county-, and court-level characteristics in explaining the variance in rates of referral. Rates of referral to substance abuse treatment were shown to vary widely among the juvenile courts across the state, ranging from 0 to 28% with an average of 4.4%. This rate is much lower than the estimated 42% of detained youth in Tennessee with a known substance use problem (Barnes et al., 2005). This is likely reflective of the fact that Tennessee lacks systematic, formal, consistent mental health and substance use screening in juvenile facilities, and that some officials believe that substance abuse services are completely unavailable in some counties (Thomas, Gourley, & Mele, 2004b).

After controlling for the other individual and community level variables in the model, including drug offense history and presenting charge, white youth were 44% more likely to be referred to substance abuse treatment than minority youth; however, this varied among counties. Counties with higher percentages of minorities were less likely to have disparities in referral rates, although this finding was borderline ($p = .09$). The considerable flexibility and freedom that youth courts have in Tennessee should be tempered by careful consideration of racial justice. The state is currently working to address disproportionate minority contact and confinement in a number of ways, including developing standardized risk assessment tools and alternatives to detention.

The principal research question in this study examined the relationship of rurality to substance use referral. These findings indicate that, controlling for the characteristics of individual youth such as drug offense history, youth in rural counties were referred to substance use treatment at lower rates than youth in urban counties. However, this relationship was completely mediated by the collection of court and county factors, specifically the court's belief in the adequacy of service providers and the court's report of the amount of contact with service providers. In other words, staff in rural courts felt they had less contact with services and that services were more inadequate than urban courts. Courts that reported less contact with behavioral health services were less likely to refer. Additionally, courts in counties with a lower provider-to-1000-youth ratio and courts that reported lower quality relations with service providers were less likely to refer. The data suggest that it may be the density of the service network, in terms of availability of services and strength of interactions among agencies, which is the major influence on referrals. This is indicated by the fact that the three county/court variables with the strongest relationship to referral rate were the provider-per-1000-youth ratio, the frequency of contact between the court and providers, and the quality of relations between the court and providers.

Implications

This study highlights that juvenile courts and treatment personnel, as well as policy makers concerned with publicly funded substance abuse services, should monitor referral and access patterns for these vulnerable groups and launch coordinated efforts to improve access to substance abuse treatment for female and minority adolescents. This study has at least two extremely important implications for anyone working in this field. First, possible “service disparities” in any state or region is a complex issue that requires a complex examination. For instance, in this study, examining the simple association between rurality and service referral rates through the courts indicated no relationship. A researcher or policy maker might have incorrectly ended the inquiry at this point, satisfied that there were no rural-urban disparities. Digging deeper, however, revealed that after statistically controlling for the distinctive needs, characteristics, and offense history of adjudicated youth in each county, youth in rural areas were less likely to be referred to behavioral health services through the courts. This illustrates the necessity of including complex, hierarchical, cross-level relationships when examining disparity.

Second, this study supports the idea that building relationships between the court and service providers through increased contact may increase service referrals, even in rural areas. This lends some support to the presence of treatment providers in the court to facilitate appropriate referrals. In counties where there are few or no service providers, juvenile court personnel should reach out to adjacent areas and contact the system-level managers who are responsible for public treatment, and those managers should be proactive and assess coverage and access by geographic area. Likewise, service providers would do well to maintain regular, positive, high quality relations with juvenile courts.

A caveat needs to be considered when interpreting this analysis. It may appear that this study assumes that substance abuse treatment is beneficial. The effectiveness of substance abuse treatment is not the focus of this study, and this study makes no argument as to whether these services are beneficial. It may be that the type of service provided to youth with complex needs is of less importance than a program’s philosophy, goals, or method of service delivery (Pullmann, et al. 2006). Current behavioral health policy and practice for children and adolescents encourages community-based, least restrictive, integrated care for youth with complex emotional and behavioral problems (Kutash, Duchnowski, & Friedman, 2005; New Freedom Commission on Mental Health, 2003). Substance use service agencies, per se, may or may not be familiar with or embrace these values and principles. Specific types of services are somewhat independent of service values and mode of delivery. For example, a juvenile detention program that is strengths-based, youth centered, comprehensive, and integrated with the professional and natural supports of the community may be much more effective and appropriate for youth with substance use problems than a traditional inpatient detox center.

In conclusion, this study lends support to the hypothesis that some factors associated with rurality—namely, density of service networks, average county SES, and contact between the courts and mental health providers—are related to a decreased probability of referral to substance abuse treatment. Thus, when controlling for individual need, rural youth in this juvenile justice system have less access to substance abuse treatment than their urban and suburban counterparts, possibly due to decreased contact between the court and behavioral service providers in rural areas. It may be that establishing a mechanism to increase the amount of contact between service providers and courts, particularly in rural areas, would effectively increase the probability of substance use service referrals. This study suggests future directions for researchers to explore the complex forces behind referrals to specialized services in juvenile courts.

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Table 1
 Descriptives and Frequencies for Variables in the Hierarchical Binomial Logistic Regression Model

Variable	M	SD	n	Valid %	Missing n
<i>Court reported data, N = 96</i>					
Judge respondents			73	76	--
YSO respondents			23	24	
Years respondent worked in court			10.6	6.6	
Court's belief that inpatient and outpatient substance abuse treatment are inadequate	3.07	0.83			1
How often does the court contact MH providers (Higher scores = less contact)	2.71	0.93			7
A rating of the quality of relations between the court and MH providers	3.49	1.01			7
<i>County sociodemographic data, N = 93</i>					
Average SES as a composite of z-scores on proportion of HS graduates, median income, and employment rate	0	0.88			--
Percentage of minorities	9.7	11.08			--
Percent rural from the 2000 Census	37.9%	29.2%			--
Number of public providers per 1000 youth 5-17	0.38	0.29	10	11	--
0			32	34	
.01 - .30			37	40	
.31 - .60			10	11	
.61 - .90			4	4	
.91 +					
<i>Individual data, N = 39,054</i>					
Gender: Male			26,167	67	--
Age	16	1.6			--
Number of prior drug and/or alcohol related offenses	0.03	0.26	38,281	98	--
0			490	1.3	
1			166	0.4	
2			41	0.1	
3			76	0.2	
4+					

Presenting offense included drug or alcohol related charge	5,126	13.1	--
Race: White	25,575	66	--
Referred to drug or alcohol treatment	1,727	4.4	--

Table 2
Hierarchical Binomial Logistic Regression Models Predicting Referral to Substance Abuse Treatment

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Fixed effects (slopes)												
Intercept	-3.612*	0.160	-3.630	0.159	-5.307*	0.175	-5.373*	0.175	-5.821	0.347	-5.383	
<i>County data/level 2</i>												
% Minority									-0.016	0.016	-0.017	0.017
% Rural									-0.009	0.007	-0.006	0.007
SES									0.366	0.275	0.300	0.264
Provider-youth ratio									1.430*	0.636	1.087**	0.640
<i>Court data/level 2</i>												
Perceived inadequacy of services											-0.273	0.175
Freq. contact MH /											-0.237**	0.147
Qual. of relations with MH											-0.217**	0.117
<i>Individual data/level 1</i>												
# prior drug offenses					0.435*	0.167	0.415*	0.109	0.396*	0.112	0.371*	0.115
Presenting with drug offense					2.615*	0.167	2.670*	0.174	2.678*	0.173	2.708*	0.173
White					0.405*	0.131	0.394*	0.129	0.362*	0.130	0.366*	0.131
Male					0.388*	0.141	0.389*	0.141	0.389*	0.141	0.389*	0.140
Variance components												
Intercept $\mu 0$	2.046*		2.025*		1.406		1.258*		1.077*		1.075*	
# prior drug offenses					0.432		0.454*		0.686*		0.492*	
Presenting with drug offense					1.461		1.466*		1.202*		1.340*	
White					0.221		0.228*		0.482*		0.229*	

	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>		<i>Model 4</i>		<i>Model 5</i>		<i>Model 6</i>	
	<i>Coeff.</i>	<i>SE</i>	<i>Coeff.</i>	<i>SE</i>	<i>Coeff.</i>	<i>SE</i>	<i>Coeff.</i>	<i>SE</i>	<i>Coeff.</i>	<i>SE</i>	<i>Coeff.</i>	<i>SE</i>
% var accounted for		1%			31.3%		38.5%		47.3%		47.4%	

* $p < .05$

** $p < .10$

I Variable is reverse scored; higher scores = less contact

Table 3

Odds Ratios for the Final Model

	<i>Odds Ratio</i>	
	<i>OR Coefficient</i>	<i>95% CI</i>
Intercept	0.0045	0.003, 0.006
<i>County data/level 2</i>		
% Minority	0.983	0.951, 1.016
% Rural	0.994	0.979, 1.008
SES	1.351	0.801, 2.279
Provider-youth ratio	2.964	0.833, 10.545
<i>Court data/level 2</i>		
Services are inadequate	0.761	0.538, 1.076
Freq. contact MH ¹	0.789	0.590, 1.055
Qual. of relations with MH	0.805	0.638, 1.015
<i>Individual data/level 1</i>		
# prior drug offenses	1.449	1.153, 1.820
Presenting with drug offense	15.007	10.658, 21.128
White	1.442	1.112, 1.870
Male	1.475	1.120, 1.944

¹ Variable is reverse scored; higher scores = less contact