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Explaining Racial/Ethnic Differences in Adolescent Substance Abuse Treatment Completion in the United States: A Decomposition Analysis

Brendan Saloner, PhD,

Robert Wood Johnson Health and Society Scholars Program, University of Pennsylvania, 3641 Locust Walk, Room 308, Philadelphia, PA 19104

Nicholas Carson, MD, and

Center for Multicultural Mental Health Research, Cambridge Health Alliance and Harvard, Department of Psychiatry, Harvard Medical School

Benjamin Lê Cook, PhD

Center for Multicultural Mental Health Research, Cambridge Health Alliance and Harvard, Department of Psychiatry, Harvard Medical School

Abstract

Purpose—To identify contributors to racial/ethnic differences in completion of alcohol and marijuana treatment among adolescents at publicly-funded providers.

Methods—The 2007 Treatment Episode Data Set (TEDS) provided substance use history, treatment setting, and treatment outcomes for youth aged 12–17 from five racial/ethnic groups (N=67,060). Individual-level records were linked to variables measuring the social context and service system characteristics of the metropolitan area. We implemented non-linear regression decomposition to identify variables that explained minority-white differences.

Results—Black and Hispanic youth were significantly less likely than whites to complete treatment for both alcohol and marijuana. Completion rates were similar for whites, Native Americans, and Asian Americans, however. Differences in predictor variables explained 12.7% of the black-white alcohol treatment gap and 7.6% of the marijuana treatment gap. By contrast, predictors explained 57.4% of the Hispanic-white alcohol treatment gap and 19.8% of the marijuana treatment gap. While differences in the distribution of individual-level variables explained little of the completion gaps, metropolitan-level variables substantially contributed to

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corresponding author: Tel: 215-746-2772 Fax: 215-746-0397, saloner@wharton.upenn.edu.

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IMPLICATIONS AND CONTRIBUTION

Black and Hispanic youth are substantially less likely than non-Hispanic whites to complete both alcohol and marijuana treatment. Factors related to the metropolitan environment, including racial/ethnic concentration, are among the most important in explaining differences between white and minority youth. Medicaid financing is also an important contributor to Hispanic-white differences.

Hispanic-white gaps. For example, racial/ethnic composition of the metropolitan area explained 41.0% of the Hispanic-white alcohol completion gap and 23.2% of the marijuana completion gap. Regional differences in addiction treatment financing (particularly use of Medicaid funding) explained 13.7% of the Hispanic-white alcohol completion gap and 9.8% of the Hispanic-white marijuana treatment completion gap.

Conclusions—Factors related to social context are likely to be important contributors to white-minority differences in addiction treatment completion, particularly for Hispanic youth. Increased Medicaid funding, coupled with culturally tailored services, could be particularly beneficial.

Keywords

race/ethnicity; substance abuse treatment; decomposition; disparities

INTRODUCTION

Heavy alcohol and drug use beginning in adolescence substantially increases risk of poor health, criminal activity, and incarceration in adulthood.[1,2] Although black and Hispanic adolescents abuse substances at rates comparable to (or lower than) non-Hispanic whites (hereafter “whites”),[3,4] they are disproportionately likely to experience arrests and future health problems because of substance abuse.[5,6] Greater risk for negative consequences among black and Hispanic youth partially stems from greater exposure to social stressors such as poverty and greater contact with law enforcement.[7,8] Less is known about other minority groups (Asian Americans and Native Americans), but some research suggests that Native American youth are at elevated risk for problem drinking.[9]

Poor access to the substance abuse treatment system may be another important contributor to worse outcomes for minority youth with addiction disorders. One recent study finds that, compared to whites, black and Hispanic adolescents with substance use disorders are significantly less likely to utilize treatment in both clinical and self-help settings.[10] Generally, when minorities achieve access to the system, they are less likely to receive services with a substance abuse treatment professional or in a residential setting.[11] Little research, however, has examined how treatment outcomes differ between white and minority youth once they are in the system. Moreover, little is known about whether minority youth fare better in certain settings or programs.[12] Studies with small, selective samples, suggests minority youth have lower retention and are less likely to complete treatment overall.[13,14]

Our study makes two new contributions to the study of racial/ethnic addiction treatment differences among adolescents. First, we quantify treatment completion gaps between white and minority youth using a large national dataset. Completion is a key outcome to consider because it significantly predicts future abstinence and recovery.[15,16] Second, we establish the contribution of factors measured at the individual and metropolitan level to racial/ethnic differences in completion using regression-based decomposition.

Our conceptual approach is guided by a review article by Alegría and colleagues, which suggests racial/ethnic disparities in addiction treatment among adolescents are partially

influenced by state and federal policies and larger-scale socioeconomic inequality, but are transmitted through several domains, particularly, individual-level factors (including engagement in school, living situation, and substance use history), service systems (including availability of different kinds of treatments), and social context (including demographic and economic characteristics of areas where treatment is delivered).[17]

We formed specific hypotheses related to how each domain might influence completion differences. First, we hypothesized individual-level factors would not substantially influence completion differences. Among adult populations, minorities and whites receiving publicly-funded treatment are similar in terms of prior substance use and other individual-level risk factors.[18] Additionally, minority adolescents in treatment in the 1990s DATOS study were similar to their white counterparts in many facets, and actually used substances less frequently [19]. Second, we hypothesized system-level factors would substantially contribute to minority-white completion differences. Minorities might disproportionately receive care in lower intensity settings or live in regions where fewer services are offered through the publicly-funded system.[20] Both factors could contribute to lower completion rates because such environments likely limit individual choice and access to individualized services. Third, we hypothesized social context could contribute to lower minority completion since minorities disproportionately live in metropolitan statistical areas (MSAs) with concentrated poverty and fewer positive opportunities for youth.[21]

Overall, we hypothesized treatment completion differences would exist between whites and all groups except Asian Americans. Although pathways into treatment differ by substances and racial/ethnic group, we did not have adequate information to form hypotheses about whether certain variables would be more important for specific substances or groups.

METHODS

We analyzed the 2007 Treatment Episode Data Set (TEDS), a database tracking admissions and discharges from substance abuse providers that receive public funding. TEDS covers the majority of substance abuse treatment episodes in the public sector in the United States. We focused on youth 12-17 years old who received treatment primarily for either alcohol or marijuana, resided in an MSA, and were discharged from any residential or outpatient alcohol and drug treatment settings other than detoxification (N=67,060). Racial/ethnic categories are based on U.S. Census definitions: non-Hispanic white (49.0%), black (22.9%), Hispanic (24.0%), Native American (2.8%), and Asian American (1.4%). Analysis of publicly available survey data is considered exempt by the University of Pennsylvania Institutional Review Board.

Study Variables

Our dependent variable was a binary measure of treatment completion. Complete treatment included either planned discharge or transfer to another facility after a successful episode of treatment. Reasons for not completing treatment included leaving against professional advice, having treatment terminated by facilities because of non-compliance, incarceration, or death. We considered treatment completion rates separately for youth admitted to treatment primarily for alcohol or marijuana, the two most commonly treated substances.

We examined these substances separately because, although their use is highly overlapping, timing of initiation and risk factors for use differ across racial/ethnic groups.[6]

Individual-level Measures—We considered variables related to need for treatment: age, sex,[22,23] and substance use history (age of first use, number of previous treatment episodes, frequency of use at time of admission, and types of substances used). We included other individual-level factors that likely influence treatment outcomes: attendance in school, living arrangement (homeless, living independently, or living with family), and employment status. We also included referral source to treatment (criminal justice, health provider, self, etc.) and service setting (residential, “intensive” or “non-intensive” outpatient). Intensive outpatient treatment was two or more hours of treatment for three or more days per week, anything less was non-intensive.[24]

Service-System Measures—Using the National Survey of Substance Abuse Treatment Services (N-SSATS), a national census of substance abuse providers, we calculated the number of publicly-funded, adolescent-serving providers in the MSA, and divided by the MSA population to obtain a provider-to-population ratio. For providers offering services to adolescents, we calculated variables related to financing and organization of services: the fraction that had contracts with managed care; and accepted payment from private insurance, Medicaid, or reduced price care. Related to service delivery, we calculated the number of different therapies offered at each facility and number of different “wraparound services” (housing, transportation, onsite mental health treatment, social services). To calculate an MSA average, we weighted each provider’s value by the number of adolescents receiving treatment at that facility.

Social Context Measures—We selected measures of social context theorized to impact behavioral health treatment for minorities. To avoid potential multicollinearity we restricted our focus to three variables: racial/ethnic composition of the MSA (i.e. percent white, black, and “other race” and percent Hispanic ethnicity), proportion of individuals below the poverty line, and unemployment rate. We also tested alternative models with more socioeconomic indicators, but the total percent explained in decompositions was very similar.

Statistical Analysis

We first calculated unadjusted completion rates for each race/ethnicity separately for alcohol and marijuana treatment. We calculated χ^2 statistics for differences in means between whites and minorities. We also examined reasons for not completing treatment by group, and calculated χ^2 statistics to test for white-minority differences in response categories.

Where we identified statistically significant differences between whites and minorities in treatment completion ($p < .05$), we estimated logistic regression models to identify correlates of completion and used regression-based decomposition to assess how differences in the values of each of the covariates contribute to overall differences. For each difference, we estimated a single pooled logistic regression model with the white and minority subgroup of

interest. The regression model estimated the probability of treatment completion conditional on individual-level, service system, and social context variables mentioned above.

For the decomposition analysis, we used the Fairlie method,[25] which is tailored to non-linear outcomes and has been previously used in disparities research.[26,27] Using regression coefficients from the models for each substance and minority-white difference, we calculated the predicted probability of treatment completion for each individual. We ranked individuals within their racial/ethnic groups by this predicted probability. We then selected a random sample of whites equal to the number of minorities, and matched each minority individual with an equivalently ranked white individual. To assess the contribution of each variable, we calculated the change in the average predicted probability from replacing the minority distribution with the white distribution of that variable while holding the distributions of the other variable constant. Summing together each variable's contribution permits calculation of the overall difference between groups explained by observable variables; the remaining (unexplained) portion is attributable to either differences in the influence of coefficients by race/ethnicity or to unobserved variables. To ensure reliable estimates, decomposition was replicated 1,000 times, each time sampling with replacement a new subgroup of whites. Standard errors were calculated using the delta method.

RESULTS

Racial/Ethnic Differences in Treatment Completion Rates

The left panel of Table 1 displays unadjusted treatment completion rates for treatment episodes by race/ethnicity separately for alcohol and marijuana. Black and Hispanic youth were significantly less likely to complete treatment for each substance than whites. For alcohol treatment, the black-white treatment completion gap was 14 percentage points, and the Hispanic-white gap was 13.6 points. For marijuana the black-white gap was 13.4 points, and the Hispanic-white gap was 8.7 points. However, rates for Native Americans and Asian Americans were very similar to, and not statistically different than, rates for whites for both substances.

The right panel of Table 1 illustrates that reasons for non-completion significantly varied between whites and each minority subgroup. "Left against professional advice" was the most common reason for non-completion in all groups, but particularly so for Hispanics, Native Americans, and Asian Americans. Blacks and Native Americans were also more likely to have "treatment terminated by the facility" and blacks and Hispanics were relatively more likely to have not completed because of incarceration.

Black-White Differences in Explanatory Variables

Most of individual-level differences between white and black youth in both alcohol and marijuana treatment were relatively modest (Table 2): exceptions were that black youth in alcohol treatment were more likely to be younger and black youth in marijuana treatment were much less likely to use other substances. Black youth in marijuana treatment were also much more likely to enter treatment through criminal justice referrals. Black youth lived in

MSAs that were somewhat more disadvantaged than white youth. Black youth were also much more likely than whites to receive treatment in MSAs with higher proportions of blacks and somewhat higher proportions of Hispanics. On average, blacks lived in MSAs with lower provider participation in managed care, and lower acceptance of Medicaid and private insurance (as opposed to receiving funding directly from other state and local sources). The ratio of adolescent-serving providers to population was also smaller in these areas.

Hispanic-White Differences in Explanatory Variables

At the individual-level, Hispanic youth in both alcohol and marijuana treatment were relatively similar to white youth across most measures (Table 2). Exceptions were that Hispanic youth were younger than white youth on average, used substances less frequently in the marijuana treatment group, and were more likely to receive services in non-intensive outpatient settings in the alcohol treatment group. Hispanic youth tended to live in quite different MSAs than white youth: these areas were more disadvantaged and more likely to have concentrated Hispanic populations (notably, co-residence with members of the same group was much higher for Hispanic than for black youth). Of the three groups, Hispanic youth also lived in MSAs with lowest managed care penetration and lowest acceptance of Medicaid and private insurance.

Black-White Decomposition Estimates

Odds ratios from pooled logistic regression models used in the decomposition are displayed in Table 3. Individual-level variables predicting higher completion were similar for both alcohol and marijuana: using substances less frequently, receiving treatment in residential settings (versus outpatient), living with parents or other adults, and receiving a referral from schools or the criminal justice system (versus self-referral) were generally associated with higher completion rates. Several variables related to social context and treatment system had modest effects (but were imprecisely estimated): odds of completion was lower in regions with higher density of Hispanics, and higher in those with greater ratios of Medicaid-accepting providers and providers offering wider arrays of treatment modalities.

Overall, black-white covariate differences only explained 12.7% of the alcohol treatment completion gap and 7.6% of the marijuana treatment gap (Table 4). Most explained variation for both substances was attributable to social context (particularly demographic composition of metro areas). Individual-level characteristics only contributed slightly to black-white differences in the marijuana treatment group, and actually had slight protective effects for black youth in alcohol treatment (they would be predicted to complete treatment at even lower rates if, for example, they used substances as frequently as white youth). The contribution of service system variables was similarly small and inconsistent.

Hispanic-White Decomposition Estimates

Predictors of Hispanic-white treatment completion for each substance were very similar to black-white predictors (Table 3). However, these variables had much greater effects in the decomposition analysis (Table 4). This was mainly because differences in explanatory variables were larger between whites and Hispanic youth than between black and white

youth, particularly in terms of social context and service system. The variables overall accounted for 57.4% of the Hispanic-white alcohol treatment gap and 19.8% of the marijuana treatment gap.

For both substances, variables measured at the individual-level did not contribute to the Hispanic-white gap, and certain variables, such as higher rates of residence with parents or other guardians, appear to be protective for Hispanic youth. The main factor associated with lower Hispanic completion rates was residence in MSAs with large Hispanic populations, as completion rates were lower on average for all groups in these MSAs. System-level variables also had a measurable contribution to differences – as noted, Hispanics were most likely to live in MSAs where providers did not accept Medicaid and private insurance.

DISCUSSION

We examined racial/ethnic differences in alcohol and marijuana treatment among youth receiving treatment from publicly-funded providers located in MSAs. We found that more than one third of white youth in our sample did not complete treatment for either substance. Non-completion rates were significantly higher for black and Hispanic youth: about half did not complete treatment for each substance.

We examined the explanatory role of variables in three domains: individual-level factors, service systems, and social context.

We hypothesized that differences in individual-level factors would not contribute to racial/ethnic treatment completion differences. In fact, our decomposition results indicate that if black and Hispanic youth had the same substance use history, living and schooling arrangements, and referral pathways as white youth they would actually fare *even worse* in treatment than white youth. The apparent protective effect of these individual-level factors shows that, at the least, differences between groups cannot be explained away by greater severity or need among minorities. An important direction for research is to understand whether these factors may foster resilience for minority youth in spite of other disadvantage, and if so, whether interventions could be developed to focus on these strengths.

Service system-level variables had virtually no impact on white-black treatment completion differences, but were substantial contributors to white-Hispanic differences. Hispanic youth were the group most likely to reside in MSAs where fewer services were offered and fewer providers accepted Medicaid, factors were associated with lower completion rates. Related to social context, we found that both black and Hispanic youth were much more likely to live in MSAs with greater concentration of minorities, which was associated with lower completion rates for both groups.

Our study adds to a growing literature suggesting area-level variables are among the most important contributors to racial/ethnic differences in behavioral health treatment access and outcomes.[28] The quality and comprehensiveness of the treatment system in a metro area is one likely reason for these differences. Behavioral health treatment has historically been administered and financed by states and localities,[29] and minority youth appear to live in poorer areas and those with less comprehensive publicly financed addiction treatment.[30]

Service system factors are most distinct for metro areas where Hispanic youth disproportionately receive their treatment. Higher rates of acceptance of Medicaid by providers in MSAs appears to be linked to higher completion rates overall and lower disparities especially for black youth, which could reflect several factors including more reliable funding for providers or a more comprehensive benefit package for youth in these areas (substance abuse treatment benefits vary widely across state Medicaid programs).[31]

Greater exposure to poverty and social exclusion could also directly influence treatment completion differences for minority youth. Living in an environment with diminished employment and educational opportunities could be a hindrance to treatment completion, and could also shape peer group influences on youth within the treatment system.[32] We found that racial/ethnic composition of the metro area was a strong predictor of treatment completion differences, particularly for Hispanic youth. Although co-residence with members of one's own racial/ethnic group can have a protective effect against risk behaviors,[33] it can also indicate higher rates of exclusion and socio-economic disadvantage not otherwise captured by other indicators such as the unemployment rate. Moreover, some disadvantage may arise at the level of neighborhoods, rather than at the level of metropolitan areas which are much more heterogeneous. Neighborhood-level disadvantage is likely to contribute to treatment completion differences distinct from MSA-level disadvantage, particularly for black youth who tend to be more racially segregated within metropolitan areas.[34]

While our study cannot establish the exact mechanisms leading to lower treatment completion among minority youth, it raises intriguing possibilities for future research. For example, leaving against professional advice was a more common reason for terminating treatment for Hispanic youth than for white youth, which could be linked to some of the social stressors (such as living in an area with higher poverty) described above, to dissatisfaction with the quality of treatment received in the area, or to low cultural competence from providers. Of note, three quarters of Asian Americans that did not complete left against professional advice.

Black youth were at higher risk for terminating treatment because of reported non-compliance with treatment and because of incarceration, which could reflect interpersonal or legal difficulties not easily measured by our study variables. Black youth were also more likely to enter marijuana treatment through criminal justice referrals, likely indicating higher rates of mandated treatment. Incarceration may therefore be a consequence of non-compliance with court ordered treatment.

Limitations

While our results reveal important associations, they cannot establish causality. Decomposition methods are sensitive to the influence of omitted variables.[35] Several individual and neighborhood-level variables that might further explain the gaps were not collected: poverty status, insurance coverage, and the spatial distribution of services within the MSA. While some of these variables may be captured in MSA-level variables, there are unique contextual effects that observable variables may not capture.[36] Cultural context, including concordance between the values and norms of providers and youth receiving

treatment, is another important omitted variable, highlighted in the framework from Alegría and colleagues.[17] Low cultural competence from providers is likely to contribute to greater minority youth disengagement and drop-out from treatment.

There are some limitations inherent to administrative data. Treatment completion is a process of care variable reflecting the status of treatment at the time of discharge. Although it does not represent a clinically validated endpoint, completion is a predictor of future abstinence and recovery.[37] Other variables in the TEDS, such as substance use history, are self-reported and could be subject to recall and social desirability bias. However, these self-report measures have been shown to be accurate in other studies.[38] To our knowledge, there is no evidence suggesting that these variables are less accurately reported by minority youth, but this topic requires further study. Race/ethnicity was reported by providers, and may also be subject to reporting error; administrative databases are most accurate at identifying black, Asian American, and white individuals, and may misclassify Hispanics and Native Americans at higher rates.[39] Finally, although our sample represents a large number of treatment admissions in MSAs, it does not represent the experiences of youth receiving care in other settings such as private doctors' offices nor does it necessarily represent youth residing in rural areas. Future research should rural youth since the treatment options and profile of substance use is likely to be different in these areas.

Conclusions

Using national discharge data, our study highlights the contribution of MSA-level variables to racial/ethnic differences in addiction treatment completion, particularly between white and Hispanic youth. Improving the quality of substance abuse treatment and enlarging the role of Medicaid funding could help to mitigate these differences, and may be particularly effective if these efforts are coupled with place-based interventions to improve access to employment and educational opportunities. In the near term, the Affordable Care Act is likely to result in major transformations to substance abuse treatment.[40] Related to financing, the ACA expands Medicaid coverage in many states, raising the importance of Medicaid in financing and organizing addiction treatment. The ACA also eliminates cost-sharing for preventive care in both public and private insurance, which is likely to increase screening and referral to addiction treatment. While these developments are ultimately likely to be positive for minority youth in treatment, it is critical that the needs of this population continue to be addressed during the implementation period as demand for addiction treatment increases system-wide.

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Table 1
Unadjusted Treatment Completion Rates and Reasons for Non-Completion by Race/Ethnicity for Alcohol and Marijuana Treatment

Panel A. % Completing Treatment				Panel B. Reasons for Not Completing Treatment						
Alcohol Treatment	N	Treatment Completed (%)	Treatment Incomplete (%)	χ^2 -test	Left Against Professional Advice	Terminated by Facility	Incarcerated	Death	Other	χ^2 -test
White	7,872	64.9 (63.8, 65.9)	35.1 (34.1, 36.2)		56.4	18.7	5.1	0.3	19.5	
Black	1,392	50.9 (48.3, 53.6)	49.1 (46.4, 51.7)	***	55.8	21.1	7.7	0.3	15.1	***
Hispanic	3,372	51.3 (49.6, 53)	48.7 (47, 50.4)	***	67.6	18.3	7.1	0.1	6.9	***
Native American	768	66.3 (62.9, 69.6)	33.7 (30.4, 37.1)		67.5	19.1	3.5	0.0	10.0	***
Asian American	279	65.2 (59.6, 70.8)	34.8 (29.2, 40.4)		74.5	8.2	4.5	0.4	12.4	***
Marijuana Treatment										
White	24,959	61.2 (60.6, 61.8)	38.8 (38.2, 39.4)		57.1	18.6	5.0	0.4	18.9	
Black	13,939	47.8 (47, 48.6)	52.2 (51.4, 53)	***	55.8	21.0	7.9	0.3	15.0	***
Hispanic	12,709	52.5 (51.6, 53.3)	47.5 (46.7, 48.4)	***	69.2	17.1	7.1	0.2	6.4	***
Native American	1,138	59.4 (56.5, 62.2)	40.6 (37.8, 43.5)		62.8	22.4	2.9	0.1	11.8	***
Asian American	632	57.8 (53.9, 61.6)	42.2 (38.4, 46.1)		74.3	9.0	4.7	0.3	11.7	***

Note: Statistically significant difference in means versus whites

Source: Authors' analysis of the 2007 Treatment Episode Data Set

* $p < .05$,

** $p < .001$,

*** $p < .0001$. 95% intervals are shown in parentheses

Table 2
Sample Means for Key Predictor Variables by Race/Ethnicity and Type of Treatment

Variable	Alcohol Treatment			Marijuana Treatment		
	White	Black	Hispanic	White	Black	Hispanic
Individual-Level						
Male	58.8%	67.4%	61.2%	74.9%	82.6%	79.0%
>14 Years Old	11.3%	18.0%	18.8%	13.3%	14.7%	18.2%
Poly-substance user	64.8%	55.5%	56.6%	64.0%	37.0%	58.2%
0 use in past month	36.7%	41.7%	42.6%	29.0%	30.5%	37.6%
1-3 uses in month	31.4%	27.1%	29.7%	19.7%	16.1%	18.1%
1-2 uses in week	14.9%	14.3%	16.5%	13.1%	14.6%	14.3%
3-6 uses in week	10.3%	10.5%	8.3%	15.1%	15.5%	14.6%
Daily user	6.8%	6.5%	2.9%	7.0%	7.0%	7.0%
<i>Prior Treatment (No prior is omitted group)</i>						
One prior	18.5%	14.7%	14.2%	21.1%	19.4%	19.2%
Two prior	7.1%	4.1%	3.1%	7.6%	5.5%	5.5%
Three prior	5.0%	3.4%	2.0%	6.3%	5.0%	3.3%
<i>Education (less than high school is omitted group)</i>						
High School graduate	5.8%	2.9%	2.9%	3.9%	2.5%	2.3%
Some college	0.2%	0.1%	0.1%	0.2%	0.1%	0.1%
homeless	0.9%	1.7%	0.6%	0.9%	1.1%	0.6%
Dependent living	67.5%	72.1%	83.1%	70.4%	70.8%	82.8%
Not in Labor Force	77.7%	84.6%	82.7%	82.0%	86.2%	85.8%
<i>Treatment Setting (Residential treatment is omitted group)</i>						
Intensive outpatient	11.8%	11.3%	11.1%	15.8%	17.7%	19.3%
Not intensive outpt	74.6%	79.0%	82.8%	64.2%	65.4%	65.3%
<i>Referral Source (Self/Parent referral is omitted group)</i>						
SUD Provider	6.2%	4.7%	3.7%	7.4%	5.6%	5.8%
Health Provider	6.0%	4.0%	3.5%	4.5%	3.5%	3.1%
School	14.9%	17.2%	26.9%	10.0%	8.9%	14.1%
Criminal Justice	45.5%	47.3%	40.3%	51.4%	61.4%	52.2%
Community org	8.2%	15.5%	10.1%	8.9%	11.7%	11.0%
MSA-Level Characteristics						
<i>Socioeconomic Characteristics</i>						
Poverty ^a	-0.31	-0.18	0.13	-0.23	-0.11	0.29
Unemployment ^a	-0.11	0.10	0.26	-0.04	0.08	0.15
<i>Demographic Characteristics</i>						
Fraction Hispanic ^a	-0.24	0.18	0.99	-0.20	-0.06	1.10
Fraction black ^a	0.08	0.48	-0.24	0.26	0.80	-0.05
<i>Service System Variables</i>						

Variable	Alcohol Treatment			Marijuana Treatment		
	White	Black	Hispanic	White	Black	Hispanic
Managed care fraction ^a	0.31	-0.32	-0.76	0.20	-0.19	-0.65
Medicaid fraction ^a	0.24	-0.13	-0.48	0.20	0.13	-0.44
Private insurance fraction ^a	0.23	-0.28	-1.00	0.19	0.01	-0.77
Provider-Adolescent Ratio ^b	2.08	1.48	2.77	1.87	1.35	2.07
Treatment count ^c	25.20	24.54	23.80	25.23	25.00	23.78
Wraparound svcs count ^c	3.85	3.86	3.69	3.79	3.77	3.61

^aValues are expressed in terms of standard deviations (mean MSA value is set to 0 and MSA at 1 standard deviation equals 1)

^bRatio of adolescent-serving facilities per 10,000 residents of MSA

^cTreatment services maximum is 30, wraparound services maximum is 5

Table 3
Odds Ratios for the Probability of Completing Treatment by Substance

Variables	Black-White Logistic Regression Model				Hispanic-White Logistic Regression Models			
	Alcohol		Marijuana		Alcohol		Marijuana	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Individual-Level								
Male	0.93	(0.84, 1.03)	0.93 *	(0.86, 1)	0.93	(0.85, 1.03)	0.96	(0.88, 1.04)
>14 Years Old	0.99	(0.85, 1.15)	0.93	(0.85, 1.02)	0.9	(0.76, 1.07)	0.91 ***	(0.85, 0.97)
Poly-substance user	0.75 ***	(0.65, 0.87)	1.05	(0.98, 1.14)	0.72 ***	(0.62, 0.84)	0.94	(0.88, 1)
0 use in past month	1.5 ***	(1.11, 2.01)	1.42 ***	(1.25, 1.61)	1.35 *	(1.01, 1.81)	1.45 ***	(1.28, 1.64)
1-3 uses in month	1.48 *	(1.02, 2.16)	1.24 *	(1.03, 1.5)	1.3	(0.94, 1.8)	1.26 ***	(1.08, 1.48)
1-2 uses in week	1.25	(0.94, 1.67)	1.07	(0.94, 1.22)	1.21	(0.92, 1.6)	1.11	(0.99, 1.24)
3-6 uses in week	1.17	(0.9, 1.51)	1.08	(0.99, 1.18)	1.09	(0.83, 1.43)	1.1	(1, 1.21)
<i>Prior Treatment (No prior is omitted group)</i>								
One prior	1.16	(0.97, 1.38)	0.98	(0.9, 1.08)	1.21 *	(1, 1.45)	1	(0.9, 1.1)
Two prior	0.99	(0.66, 1.51)	0.99	(0.87, 1.14)	1.09	(0.73, 1.61)	0.96	(0.82, 1.13)
Three prior	0.8	(0.61, 1.07)	1.04	(0.88, 1.23)	0.87	(0.67, 1.13)	0.96	(0.83, 1.12)
<i>Education (less than high school is omitted group)</i>								
High School graduate	1.25 *	(1.03, 1.52)	1.14	(0.99, 1.31)	1.17	(0.93, 1.47)	1.13	(0.96, 1.33)
Some college	1.06	(0.38, 3.01)	1.53	(0.76, 3.08)	1.58	(0.49, 5.11)	1.08	(0.64, 1.82)
homeless	1.09	(0.76, 1.58)	1.36	(0.85, 2.16)	0.87	(0.55, 1.37)	1.41	(0.94, 2.1)
Dependent living	1.72 ***	(1.36, 2.18)	1.54 ***	(1.23, 1.94)	1.75 ***	(1.32, 2.31)	1.77 ***	(1.44, 2.17)
Not in Labor Force	1.02	(0.87, 1.2)	1.08	(0.95, 1.22)	0.97	(0.85, 1.11)	1.08	(0.98, 1.2)
<i>Treatment Setting (Residential treatment is omitted group)</i>								
Intensive outpatient	0.6 ***	(0.43, 0.83)	0.72 ***	(0.56, 0.92)	0.57 ***	(0.41, 0.81)	0.7 ***	(0.55, 0.91)
Not intensive outpt	0.42 ***	(0.32, 0.56)	0.58 ***	(0.45, 0.74)	0.41 ***	(0.31, 0.54)	0.58 ***	(0.47, 0.7)
<i>Referral Source (Self/Parent referral is omitted group)</i>								
SUD Provider	1.09	(0.81, 1.47)	1.39 *	(1.02, 1.91)	1.1	(0.85, 1.42)	1.33 *	(1.03, 1.72)
Health Provider	1.02	(0.8, 1.31)	0.96	(0.75, 1.23)	1.03	(0.81, 1.32)	1.05	(0.84, 1.31)
School	1.41 *	(1.04, 1.93)	1.18	(0.98, 1.43)	1.34	(0.99, 1.81)	1.19 **	(1.03, 1.38)
Criminal Justice	1.42 ***	(1.13, 1.79)	1.17	(0.99, 1.39)	1.52 ***	(1.25, 1.84)	1.3 ***	(1.14, 1.49)
Community org	0.83	(0.65, 1.05)	0.96	(0.8, 1.16)	1.07	(0.86, 1.32)	0.92	(0.79, 1.08)
MSA-Level Characteristics								
<i>Socioeconomic Characteristics</i>								
Poverty ^a	1.02	(0.87, 1.19)	0.97	(0.86, 1.09)	1.04	(0.9, 1.21)	1.03	(0.91, 1.17)
Unemployment ^a	0.93	(0.79, 1.09)	1.03	(0.9, 1.18)	0.93	(0.8, 1.08)	0.97	(0.85, 1.1)
<i>Demographic Characteristics</i>								
Fraction Hispanic ^a	0.85	(0.68, 1.08)	0.92	(0.73, 1.16)	0.84	(0.69, 1.01)	0.95	(0.8, 1.11)
Fraction black ^a	0.97	(0.86, 1.1)	0.95	(0.85, 1.07)	1.02	(0.87, 1.19)	1.05	(0.93, 1.2)

Variables	Black-White Logistic Regression Model				Hispanic-White Logistic Regression Models			
	Alcohol		Marijuana		Alcohol		Marijuana	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
<i>Service System Variables</i>								
Managed care fraction ^a	0.92	(0.8, 1.07)	0.95	(0.84, 1.07)	0.88	(0.77, 1.02)	0.91	(0.81, 1.02)
Medicaid fraction ^a	1.18 *	(1.02, 1.37)	1.11	(0.96, 1.27)	1.17 *	(1.02, 1.35)	1.12	(0.97, 1.29)
Private insurance fraction ^a	1.01	(0.84, 1.22)	0.98	(0.84, 1.14)	1.07	(0.9, 1.28)	1.05	(0.91, 1.21)
Provider-Adolescent Ratio ^b	0.97	(0.93, 1.01)	0.99	(0.95, 1.04)	0.98	(0.94, 1.02)	1	(0.96, 1.04)
Treatment count ^c	1.12	(0.94, 1.34)	1.09	(0.94, 1.28)	1.12	(0.95, 1.32)	1.1	(0.97, 1.25)
Wraparound svcs count ^c	0.94	(0.81, 1.1)	0.94	(0.82, 1.06)	0.98	(0.84, 1.14)	0.93	(0.83, 1.05)
Intercept	3.03 ***	(1.66, 5.54)	1.15	(0.72, 1.84)	3.88 ***	(2.13, 7.09)	1.33	(0.88, 2.02)

Note: Statistically significant difference in means versus whites

Source: Authors' analysis of the 2007 Treatment Episode Data Set

* $p < .05$,

**
 $p < .001$,

 $p < .0001$, paired t-test, standard errors clustered at MSA

^aValues are expressed in terms of standard deviations (mean MSA value is set to 0 and MSA at 1 standard deviation equals 1)

^bRatio of adolescent-serving facilities per 10,000 residents of MSA

^cTreatment services maximum is 30, wraparound services maximum is 5

Table 4
Regression Decomposition Estimates by Substance

	Black-White Differences		Hispanic-White Differences	
	Alcohol	Marijuana	Alcohol	Marijuana
Difference	0.143	0.134	0.125	0.082
Total explained	0.018	0.010	0.071	0.016
Total % explaine	12.7%	7.6%	57.4%	19.8%
<i>Individual Characteristics</i>				
Age and sex	0.002 (0.001) 1.40%	0.002 * (0.000) 1.49%	0.002 * (0.001) 1.61%	0.001 * (0.000) 1.22%
Substance Use history	−0.009 *** (0.002) −6.31%	0.006 *** (0.002) 4.47%	−0.009 *** (0.002) −7.23%	−0.008 *** (0.001) −9.78%
School, work, living place	−0.006 *** (0.001) −4.21%	−0.001 * (0.000) −0.74%	−0.018 *** (0.002) −14.45%	−0.016 *** (0.001) −19.56%
Treatment Setting	0.007 *** (0.001) 4.91%	0.002 *** (0.000) 1.49%	0.013 *** (0.001) 10.44%	0.004 *** (0.000) 4.89%
Referral Source	−0.001 (0.002) −0.70%	−0.002 * (0.001) −1.49%	−0.004 * (0.002) −3.21%	−0.001 (0.000) −1.22%
<i>Social Context</i>				
MSA poverty and unemployment	0.003 * (0.001) 2.10%	0.001 (0.000) 0.74%	0.003 (0.003) 2.41%	−0.001 (0.002) −1.22%
MSA racial composition	0.015 * (0.005) 10.52%	0.007 *** (0.002) 5.21%	0.051 *** (0.009) 40.95%	0.019 *** (0.004) 23.23%
<i>Service System</i>				
Financing and organization	0.002 (0.004) 1.40%	−0.005 *** (0.001) −3.72%	0.017 * (0.006) 13.65%	0.008 * (0.003) 9.78%
Services offered	0.004 (0.002) 2.81%	0.001 (0.001) 0.74%	0.016 *** (0.003) 12.85%	0.009 *** (0.002) 11.00%

Note: Coefficients represent estimated contribution from Fairlie decomposition. Standard errors are displayed in parentheses below, and percent contribution is shown below standard errors. Substance use variables include age of first use, number of previous treatment episodes, frequency of use at the time of admission, and types of substances used. P-values indicate that portion explained is significantly different than zero,

* $P < .05$,

**
 $P < .001$,

 $P < .0001$. Treatment settings are either inpatient, intensive outpatient, or non-intensive outpatient. Financing and organization include MSA-averaged measures of Medicaid, private insurance acceptance, and managed care penetration. Services variables are the frequency of using different types of treatment modalities and wrap-around services offered by adolescent-serving providers in the MSA.