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Racial and Ethnic Composition as a Correlate of Medication Availability within Addiction Treatment Organizations

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Abstract

Most analyses of racial and ethnic disparities in healthcare focus on individuals rather than organizations. Healthcare organizations may be one mechanism that produces disparities if the representation of minorities within organizations' patient populations is associated with differential patterns of service delivery. This research considers whether the racial and ethnic composition of addiction treatment centers' caseloads is associated with the likelihood that organizations offer any prescription medications to treat addiction, psychiatric conditions, or pain. Data were collected from 288 publicly-funded substance abuse treatment centers in the US. Logistic regression was used to estimate models of medication availability. The percentage of racial and ethnic minority patients was negatively associated with the odds of medication availability, even after controlling for organizational characteristics and patients' diagnostic characteristics. Future research should continue to investigate how healthcare organizations may produce inequalities in access to high-quality care.

A major stream of sociological inquiry has considered how race and ethnicity are central sources of social stratification in the U.S (Williams and Collins 1995). Much attention has been paid to race and ethnicity as social-political constructions that yield social advantages for whites and disadvantages for racial and ethnic minorities across a range of social institutions. The rapidly expanding amount of research directed at documenting racial and ethnic differences in access to high quality healthcare services highlights the social significance of these constructs (Ford and Kelly 2005; van Ryn and Fu 2003). Most discussions of race and ethnicity in healthcare focus on individuals as the unit of analysis without considering whether these sources of social stratification are relevant at the level of organizations. Few studies have considered whether the racial and ethnic composition of an organization's patient population is associated with the quality of available services. In this research, we draw on data from 288 addiction treatment organizations to examine whether the racial and ethnic composition of these centers' caseloads is associated with the odds of the adoption of medications as a treatment technology.

INEQUALITY IN HEALTHCARE: INDIVIDUALS AND ORGANIZATIONS

Growing concern about racial and ethnic disparities in healthcare led to a report released by the Institute of Medicine (2003) that documented the widespread disadvantages faced by

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racial and ethnic minority patients in accessing and receiving high-quality care in the U.S. (Fiscella et al. 2000; Kelley et al. 2005). This report documented minority disadvantages in receiving state-of-the-art care relative to white patients across a range of medical conditions, including heart disease, cancer, HIV and AIDS, diabetes, and asthma (IOM 2003).

Differences in access to high-quality services have also been documented for mental and behavioral health conditions (Alegria et al. 2002; Chow et al. 2003; Daley 2005). For example, recent research has revealed significant racial and ethnic differences in the likelihood that patients receive psychotropic medications (Kuno and Rothbard 2002; Leslie et al. 2003; Melfi et al. 2000; Opolka et al. 2004; Sclar et al. 1998). There is also evidence of racial and ethnic differences in access to addiction treatment programs (Lundgren et al. 2001; Schmidt et al. 2007; Schmidt, Greenfield, and Mulia 2006) and unmet treatment needs for both substance abuse and mental disorders (Wells et al. 2001). Some differences between minorities and whites have been identified in terms of length of treatment and treatment completion (Campbell, Weisner, and Sterling 2006; Jacobson, Robinson, and Bluthenthal 2007a), although the literature on racial and ethnic differences in outcomes is somewhat mixed (Brower and Carey 2003).

What is particularly notable across this expanding body of research on both general medical care and behavioral health care is its near exclusive focus on individuals as the unit of analysis. Most of this research considers the race and ethnicity of individuals as a correlate of receiving specific aspects of medical care (Fiscella et al. 2000; van Ryn and Fu 2003). Some research has considered whether the socioeconomic status mediates observed racial and ethnic differences in the likelihood of receiving services, although differences often persist even after controlling for income and health insurance (Schneider, Zaslavsky, and Epstein 2002). Other researchers have focused on the relationship between individual physicians and patients as a mechanism for producing inequalities in medical care (Doescher et al. 2000; Johnson et al. 2004; Malat and Hamilton 2006; Saha, Arbelaez, and Cooper 2003).

This body of research points to the significance of race and ethnicity in structuring individual-level experiences within the healthcare system. However, these analyses do not address how these individual-level experiences are actually embedded within the social contexts of healthcare organizations, which may vary in their adoption of evidence-based practices. Sociologists have previously considered the racial and ethnic composition of the workforce as a key structural characteristic of organizations (Reskin, McBrier, and Kmec 1999). In service organizations, there may be value in also considering the racial and ethnic composition of organizations' patients. Studying race and ethnicity at the organizational level offers the chance to consider a meso-level of analysis which may elucidate some of the connections between the macro-level institution of healthcare with the micro-level experiences of individuals. The IOM (2003) report briefly suggests that the intersection of where individuals seek care and the quality of the services offered by those providers may partially explain disparities, but this issue of service quality has been understudied (Hasnain-Wynia et al. 2007).

A handful of recent studies have explored the role of organizations in explaining observed racial and ethnic differences. Research has pointed to higher rates of mortality following acute myocardial infarction in hospitals that treat a higher proportion of African American patients (Skinner et al. 2005). A recent study by Barnato et al. (2006) found racial and ethnic differences in the use of intensive care (ICU) during terminal hospitalizations. These differences were not a function of differential use of ICU for whites, blacks, and Hispanics within the same hospital, but rather due to blacks and Hispanics being clustered in hospitals with higher use of ICU for all patients. These studies are suggestive patients' race and

ethnicity may be important at the organizational level in terms of healthcare services and utilization.

In part, findings of differential healthcare practices being associated with organization-level measures of patients' race and ethnicity may point to processes of "unequal diffusion" (Levine et al. 2007, p. 1890). Rogers (2003), in his classic theory of innovation diffusion, noted that adoption patterns are often uneven and that such unevenness may be related to larger patterns of social inequality. For example, recent work has documented how hospitals with higher proportions of African American patients have lower utilization rates of innovative surgical techniques (Groeneveld, Laufer, and Garber 2005). This nascent literature suggests that healthcare organizations serving greater proportions of minority patients may be less likely to adopt and implement evidence-based treatment techniques, which has negative impacts for the quality of care received by all patients.

MEASURING RACE AND ETHNICITY IN ORGANIZATIONS

Studying race and ethnicity as characteristics of organizations poses a challenge because such measures constitute a set of categories that are not independent. Conceptualizing measures of organizational composition is fairly simple if there are only two possible groups. For example, sociologists have considered how gender composition within organizations is related to a variety of dependent variables (Reskin et al. 1999). A measure of the percentage of females has intuitive meaning because there is a clear reference group; that is to say, when the representation of females within an organization is larger, the percentage of males is lower by definition.

In contrast, the presence of multiple racial and ethnic groups makes measurement more challenging. One approach might be to use a diversity index, such as Blau's index (1977) which is based on the proportional representation of each group. However, Blau's diversity index ignores the social meanings, in terms of advantage and disadvantage, ascribed to particular groups (Rushton 2008). Using Blau's formula, an organization comprised of 70% white, 20% African American, and 10% Hispanic or Latino has a diversity score that is the same as an organization that is 70% African American, 20% Hispanic or Latino, and 10% white. Given that research at the individual level has repeatedly shown that racial and ethnic receive lower quality care relative to whites, it seems erroneous to use a measure of racial and ethnic composition that ignores the social meanings of these groups.

Another approach might be to consider the proportion of each racial and ethnic group, including whites, within the organization. Intuitively, such an approach is appealing because it is directly measurable and addresses the relative magnitude of each group's presence. Such an approach, however, has a major statistical problem in that the increasing representation of one group necessarily means that the measures for the other groups decrease; the assumption that these variables are independent is violated. Multicollinearity will surely be a problem if all of the variables are entered simultaneously. To look at each racial and ethnic minority group measure separately is also unsatisfactory because the variable then reflects a particular group versus an undifferentiated mass of all others (i.e. whites and the other racial and ethnic minority groups).

The question then arises: To what extent is the organization-level issue really about the relative presence of minorities in relation to whites? This is often the logic of individual-level studies where whites are used as the reference group because of their hypothesized social advantages. If whites are advantaged as individuals, what is the sociological significance of a greater collectivity of this advantaged group within organizations? Conversely, if individuals of minority groups are disadvantaged relative to whites, then it may be important to consider a measure of the overall minority composition of an

organization's patients. Thus, in this research, we examine a measure of the percentage of minorities typically treated, which sums the percentages of African American, Hispanic or Latino, Native American, and Asian or Pacific Islander patients in the organization's caseload.

EVIDENCE-BASED PRACTICE IN SUBSTANCE ABUSE TREATMENT

In the substance abuse treatment system, there is ample evidence of heterogeneity in the services offered by different organizations, including the intensity of treatment and the use of evidence-based practices (Roman, Ducharme, and Knudsen 2006). This variability makes addiction treatment an interesting sector of healthcare for studying whether organizational characteristics are associated with the adoption of specific services, practices, or technologies. In particular, the overall representation of minorities in the organization's caseload can be examined as a correlate of the adoption of evidence-based practices. Then other organizational characteristics can be controlled in order to examine whether the association for minority composition is attenuated by other correlates of adoption.

Overall, the pace of adoption of evidence-based practices by addiction treatment organizations has been slow (IOM 1998; IOM 2006). The adoption of medications, as an adjunct to counseling, has been particularly modest (McGovern et al. 2004; Saxon and McCarty 2005). There are a limited number of medications that are FDA-approved to treat addiction: disulfiram and acamprosate for alcohol dependence, naltrexone for alcohol or opiate dependence, and methadone and buprenorphine for the treatment of opiate dependence. Mood disorders are highly prevalent in individuals seeking addiction treatment (Kessler et al. 2005). Psychotropic medications, such as selective serotonin reuptake inhibitors (SSRIs), may improve outcomes for co-occurring substance abuse and mood disorders (Nunes and Levin 2004), although there is an ongoing debate about the effectiveness of SSRI medications (Kirsch et al. 2008; Turner et al. 2008). Medications are not necessarily appropriate for every patient, but without organization-level adoption of pharmacotherapies, no patients can benefit from these technologies.

Previous work on medication adoption in addiction treatment has largely focused on particular medications rather than pharmacotherapy more generally as a treatment technology. Studies have examined the organizational correlates of the adoption of disulfiram (Knudsen et al. 2005), acamprosate (Ducharme, Knudsen, and Roman 2006), naltrexone (Roman and Johnson 2002; Fuller et al. 2005; Mark et al. 2003; Oser and Roman 2007; Thomas et al. 2003), buprenorphine (Koch et al. 2006; Knudsen, Ducharme, and Roman 2006), and SSRIs (Knudsen, Ducharme, and Roman 2007b). There is emerging evidence that pharmacotherapies may represent a "technology cluster" (Rogers 1995), such that once an organization adopts one medication, it becomes more likely that they will integrate additional medications into their treatment protocols (Fuller et al. 2005; Koch et al. 2006; Knudsen, Ducharme, and Roman 2007a; Oser and Roman 2007). It is important to understand the relevant characteristics of organizations that have adopted any medications rather than focusing on specific medications. To date, there are no studies that have considered this broader issue, so are no studies on minority composition as a correlate of any medication adoption. However, one study of SSRI adoption found that organizations which treated more minority clients were less likely to adopt these psychotropic medications (Knudsen, Ducharme, and Roman 2007c).

Research has demonstrated that organizational structure, staffing, and culture are associated with the adoption of specific medications. Structural characteristics, such as ownership, organizational affiliation, and accreditation, have been shown to be associated with the availability of medications (Knudsen et al. 2007a; Roman & Johnson 2002; Oser & Roman

2007). Some organizations may have treatment philosophies, such as those based on a 12-step treatment model, that are ambivalent or unsupportive of the use of medications (McGovern et al. 2004; Rieckmann et al. 2007; Oser & Roman 2007). In addition, the availability of medical and psychiatric personnel, such as physicians and nurses, is necessary to facilitate the use of medications, but access to medical personnel is highly variable (Miller, Sorensen, Selzer, and Brigham 2006).

In this research, we consider the adoption of medications using data collected from a large sample of substance abuse treatment organizations. Our research questions are two-fold. First, is there evidence that the minority composition of organizations' caseloads is associated with the adoption of medications? Second, does this association persist after controlling for patients' diagnostic characteristics and organizational characteristics previously shown to be associated with medication adoption, such as structure, staffing, and treatment philosophy?

METHODS

Sample

This study draws on cross-sectional data collected from administrators and clinical directors of a national sample of publicly-funded addiction treatment centers. The sample was initially constructed between late 2002 to early 2004. All U.S. counties were sorted into 10 population-based strata; counties were then randomly selected in order to proportionately represent the U.S. population. Within these sampled counties, all substance abuse treatment facilities were enumerated using current directories obtained from the Substance Abuse and Mental Health Services Administration (2001) and the Single State Agencies (which are regulatory bodies that oversee substance abuse treatment services). The use of these state directories expanded the range of facilities for sampling; about 26% of sampled facilities did not appear in the SAMHSA national directory (Knudsen et al. 2006). From this compilation of centers and proportional to the population-based strata, facilities were randomly selected and screened by telephone for eligibility until 363 treatment centers were deemed eligible and participated in the face-to-face interview (response rate = 80.0%).

Three criteria were used to define study eligibility. First, centers were required to be open to the general public, which excluded correctional and Veterans' Health Administration-based programs. Second, centers were required to offer a minimum level of care that was at least equivalent to structured outpatient treatment (Mee-Lee et al. 1996). This second criterion excluded counselors in private practice, halfway houses and transitional living facilities, driver under the influence (DUI) programs, detoxification-only facilities, and programs that exclusively offer methadone maintenance from the sample. Finally, centers were defined as publicly-funded if they indicated that their program received at least half of their past-year revenues came from government block grants or contracts or if at least half of their patients' expected source of primary payment was from public funds other than Medicaid and Medicare. These public funds included combinations of state-administered federal block grant funding, contracts with state and local criminal justice systems, and other funding from state and local governments. The rationale for excluding Medicaid and Medicare funding from our definition of "public funding" is that those programs largely operate like managed care plans in reimbursing patient care. Our focus on this publicly-funded treatment system is significant because this sector treats the majority of clients in the U.S. (Cartwright and Solano 2003).

The present study draws on data collected during a second round of face-to-face interviews conducted between November 2004 and December 2006. Participating centers from the first round of interviews (n = 245) were re-contacted and assessed for eligibility based on the

same criteria as the previous round of data collection. To increase the sample size, a sample of replacement centers ($n = 73$) was drawn using the same techniques and eligibility criteria employed to generate the initial sample. These 318 participating centers, which provided the data for the current analysis, represent 79.9% of the programs that were open and eligible for the study. All centers received an honorarium of \$100 for their participation. The research design was approved by the University of Georgia's Institutional Review Board.

To test for potential sampling bias that might result from the addition of replacement centers to our analysis, the original sample ($n = 245$) was compared to the replacement sample ($n = 73$) on all variables used in the analysis. Fisher's exact tests for categorical variables and t-tests for continuous variables were used to examine potential differences; Levine's test was used for the continuous variables to assess normality. No significant differences at $p < .05$ (two-sided) were detected, suggesting that it was appropriate to combine these two samples for analysis.

Measures

The dependent variable was whether the treatment center currently used any medications. Participants were asked, "Does this center prescribe or dispense any medications specifically for the treatment of addiction, psychiatric conditions, or pain management?" To validate affirmative responses to this dichotomous measure (1 = yes, 0 = no), we examined a series of items about the use of specific medications. All centers coded as medication-using facilities indicated the use of at least one specific medication.

Four items related to the racial and ethnic composition of the center's caseload were included in the interview. Participants were asked, "Typically, what proportion of your total caseload are African American?" This question was repeated to ascertain the proportions of the caseload who were Hispanic or Latino, Asian or Pacific Islander, and Native American. These four items were summed to reflect a measure of overall minority composition within the center's caseload. Cases that exceeded 100% on this additive measure ($n = 11$) were recoded to 100.

In addition, we examine basic organizational characteristics of the treatment center, including structure, staffing, treatment model, funding, and clients' diagnostic characteristics. The measures of organizational structure were ownership (1 = owned by state, county or local government, 0 = privately-owned), location in a hospital setting (1 = hospital, 0 = non-hospital), and accreditation (1 = accredited, 0 = not accredited). The measure of treatment center culture categorized centers into those that reported using the 12-step model (reference category), cognitive-behavioral therapy (CBT) model, or an eclectic model with no dominant philosophy. Staffing was measured by the number of physicians (including psychiatrists and other physicians), number of nursing staff (including registered nurses, licensed practical nurses, and nurse practitioners), and the percentage of counselors with at least a master's-level degree. The funding measure asked administrators about the percentage of clients for whom other public (non-Medicaid or non-Medicare) funds were the expected source of primary payment. The three measures of clients' diagnostic characteristics were the percentages of clients with a diagnosis of alcohol abuse or dependence, clients with a diagnosis of heroin abuse or dependence, and clients with a co-occurring mental health condition.

Analysis

Given the dichotomous nature of the dependent variable, logistic regression was used to analyze the data. First, we estimated a bivariate logistic regression model of medication adoption that included minority composition as a covariate. In the second model,

organizational characteristics and patient diagnostic characteristics were added as covariates in order to test whether these measures attenuated the association between minority composition and medication adoption. To consider the issue of multicollinearity, we used the diagnostic procedures suggested by Allison (1999); there was no evidence of multicollinearity between the independent variables (results available by request). Listwise deletion was used in all analyses, yielding a final sample size of 288 publicly-funded addiction treatment centers. To examine the issue of bias due to item non-response, we compared included cases to those excluded due to missing data on all measures using Fisher's exact tests for categorical indicators and t-tests for continuous variables. There were no significant differences at the $p < .05$ level between these groups. All analyses were conducted using Stata 10.0 (StataCorp, College Station, TX).

RESULTS

Overall, the adoption of any medications by this sample of publicly-funded addiction treatment organizations was low. About 37.5% of centers had adopted some type of medication to treat addiction, psychiatric conditions, or pain. Descriptive statistics for the independent variables appear in Table 1.

The average center's caseload consisted of about 31.5% African American, 14.2% Hispanic or Latino, 3.1% Native American, 2.1% Asian or Pacific Islander patients. The distribution of each of these four groups tended to be fairly skewed, with large numbers of centers having relatively low percentages of any particular racial or ethnic group. For example, more than half of the centers (55.6%) reported having less than 10% of their caseloads who were Hispanic or Latino. The distributions were even more skewed for Native American and Asian clients, with 88.5% and 96.9% of centers reporting that less than 10% of their patients consisted of these groups, respectively. Only 30.2% of centers reported fewer than 10% of their patients were African American. When these four groups were combined into a single additive measure of minority composition, the average center's caseload was comprised of 50.5% racial and ethnic minorities. Just 6.9% of centers indicated that less than 10% of their clients were racial and ethnic minorities. In general, the distribution of this additive measure of minority composition had about 10% of centers within each decile of minority composition.

Table 1 also presents comparison of medication-adopting centers and those that have not adopted medications on the independent variable. Notably, adopters and non-adopters did not differ on the representation of any specific minority group, but adopters reported a significantly lower percentage of minority clients when the four specific racial and ethnic groups were summed. Adopters and non-adopters differed on a variety of other organizational characteristics, including ownership, location in a hospital setting, number of physicians, number of nurses, counselor education, and governmental funding. In addition, adopting centers reported treating statistically greater percentages of clients diagnosed with heroin dependence and clients with co-occurring mental health conditions.

The logistic regression model of medication availability is presented in Table 2. The first column presents the bivariate association between the percentage of minority clients and the availability of medication as a treatment technology. The significant bivariate association indicates that a standard deviation increase in minority patients ($SD = 29.8$) is associated with a 25.9% decrease in the odds of medication availability. Adding the other organizational characteristics did not attenuate this association; in fact, the association became somewhat stronger once other organizational factors were controlled. Net of the other organizational characteristics, a standard deviation increase in the percentage of minority patients was associated with a 37.1% decrease in the odds of medication adoption.

Several of the organizational characteristics were significantly associated with medication availability in the multivariate logistic regression model. Government-owned centers were 2.4 times more likely to adopt medications than privately owned treatment centers. There was a positive association between the number of physicians and medication availability (odds ratio = 2.2). Similarly, the number of nurses was positively correlated with the medication adoption (odds ratio = 1.7). Finally, there was a positive association between the percentage of clients with a co-occurring mental health condition and the availability of medications, such that a standard deviation increase in these clients ($SD = 26.5$) was associated with a 51.7% increase in the odds of medication adoption.

DISCUSSION

Data from a large sample of publicly-funded substance abuse treatment centers indicated that the percentage of minority clients in the center's caseload was negatively associated with the odds of medication adoption, even after controlling for a number of other organizational characteristics. The significance of this association, after controlling for patient diagnostic characteristics indicative of clinical need, is suggestive of a disparity rather than a mere difference in service delivery (Rathore and Krumholz 2004).

These findings suggest that there may be merit in conceptualizing disparities as an organizational phenomenon, rather than only as inequalities that occur at the individual-level. This line of reasoning has been supported by recent research about the quality of services delivered by other types of healthcare organizations, such as hospitals (Barnato et al. 2005; Groeneveld et al. 2005; Hasnain-Wynia et al. 2007; Skinner et al. 2005), dental practices (Gilbert, Litaker, and Makhija 2007), and nursing homes (Miller, Papandonatos, Fennell, and Mor 2006; Smith et al. 2007). An organizational approach is also supported in recent work on racial and ethnic differences in access to residential drug treatment programs (Blumenthal, Jacobson, and Robinson 2007). Much more research is needed on whether the racial and ethnic composition of patients is associated with other services within addiction treatment and in other types of healthcare organizations.

It is important to note that associations between minority composition and service quality have implications for all individuals served by those organizations. Work by Groeneveld et al. (2005) documented how both black and white patients were disadvantaged by the lower quality of care delivered by hospitals with higher concentrations of minority patients. Clarke et al. (2007) reported that such differences increased risks of mortality for all patients. In the context of substance abuse treatment, the failure to adopt medications has implications for the quality of treatment received by all patients in those facilities.

Identifying disparities is only the first step in understanding inequalities within the U.S. healthcare system. In addition to research that describes the different organizational contexts in which disparities exist, there is a need for research that untangles the complicated question about why organizations differ in their ability to deliver high-quality, evidence-based healthcare. The persistence of residential segregation and neighborhood disadvantage in the US may represent one important explanation for disparities (Kirby and Kaneda 2005; Williams and Collins 2001). Patterns of residential segregation are linked to disadvantages in terms of education, employment, income, and health insurance coverage as well as the quality of services within these communities (Williams and Jackson 2005). Residential segregation in communities may also translate into segregation within healthcare organizations such as hospitals (Clarke et al. 2007) and nursing homes (Smith et al. 2007). Recent research indicates that the degree of disadvantage in the neighborhood surrounding alcohol treatment facilities explains a substantial amount of variance in differential treatment completion between African Americans and whites (Jacobson, Robinson, and Blumenthal

2007b). However, there is an ongoing need for more research on the linkages between residential segregation, segregation in healthcare organizations, and neighborhood disadvantage in modeling the quality of available services.

These data indicated that the association between minority composition and medication adoption remained significant after controlling for a variety of other organizational and patient diagnostic characteristics. Future research might consider how program administrators construct meanings about the race and ethnicity of their clients, and how those perceptions influence organizational decision-making. The current study cannot address whether organizational decisions to not adopt medications reflect biases about minority clients (Burgess et al. 2006; van Ryn and Burke 2000; van Ryn and Fu 2003), such as stereotypes that minorities would be less compliant with medication regimens (Bogart et al. 2001). Alternatively, decisions to not adopt may be reflective of the structural conditions that Jacobson (2004) calls the “treatment ecology,” meaning the local area surrounding treatment centers. Some research suggests that pharmacies in minority neighborhoods may differentially stock prescription medications (Morrison et al. 2000); in this type of treatment ecology, treatment organizations may be unwilling to adopt medications if they perceive that their clients will be unable to actually access these medications via local pharmacies. These are research questions that cannot be addressed in the current study, but represent important directions for future research.

From the perspective of public policy, addressing racial and ethnic inequalities in healthcare will clearly require a complex array of approaches. Some have argued that broader movements towards quality improvement in healthcare organizations have the potential to decrease the magnitude of disparities at the individual-level (Trivedi et al. 2005), particularly if those efforts are targeted at the types of organizations that treat predominantly minority populations. This line of argumentation suggests the need for studies of organization-level quality improvement interventions that also measure whether such efforts reduce disparities. The current study focused on publicly-financed treatment programs, this research minimized the impact of differences in insurance coverage which accounts for some disparities in other healthcare contexts (Schmidt et al. 2006). The reliance on governmental funding among these programs suggests that public policymakers may be uniquely positioned to address the lack of medication adoption by programs that are funded through governmental resources.

Several limitations are implicit within these data. First, these analyses draw on cross-sectional data, so causality cannot be established. Second, all data were self-reported by program administrators so there are potential limitations due to errors in recall and desirability bias. The measures of racial and ethnic composition were framed as what was typical for the center’s caseload; no verification of patient records was required. Comparing these self-reported data on racial and ethnic composition to other sources of information about addiction treatment in the US is difficult. For example, the large-scale federal data collection system on program-level characteristics, called the National Survey of Substance Abuse Treatment Services (N-SSATS), uses administrator self-reports but does not measure racial and ethnic composition (SAMHSA 2007). The racial and ethnic composition in our data was similar to a survey of over 300 drug treatment units participating in a large research network known as the National Drug Abuse Treatment Clinical Trials Network (CTN); the average CTN-affiliated program reported that 29% of their clients were African American, 17% were Latino, and 2.5% were American Indians (McCarty et al. 2008).

Other limitations are related to the measures and sample. This analysis only considered one category of evidence-based addiction treatment, so it is not known whether similar findings would result from studying the adoption of other categories of evidence-based practices,

such as behavioral interventions or wraparound services. An additional limitation is that these analyses cannot speak to the likelihood that a given individual will receive pharmacotherapies within these centers. Further research is needed on the rates of implementation, or the extent to which these medications are routinely used, within these programs. Additionally, these data are only representative of the publicly-funded addiction treatment system. It is not known if these findings would generalize to treatment programs that are privately funded or located within specific systems such as the Veterans' Health Administration or correctional-based treatment programs. It would also be inappropriate to generalize these findings to other types of healthcare organizations. Continued research on organizational- and system-level disparities in the availability of quality care for the treatment of addiction is warranted.

Although we attempted to control for a variety of factors that have been previously associated with medication adoption, there are likely additional variables that we were unable to consider in our analysis. Perhaps the largest factor that we could not address is the issue of consumer demand and patient preferences. Other studies of individuals have found racial and ethnic differences in perceptions of mental health needs (Kimerling and Baumrind 2005), beliefs about alcoholism as a moral weakness (Caetano 1989; Caetano 2003), and in rates of filling prescriptions for antidepressant medications (Harman, Edlund, and Fortney 2004). The inclusion of measures of the patients' substance abuse and co-occurring mental health diagnoses were intended as proxies for consumer demand, but these are imperfect measures at best. Future research should explore the role of consumer demand in organizational decision-making about adopting medications, perhaps by including data from program managers as well as clients.

It has been argued that the availability of evidence-based treatment practices is a sound indicator of an organizational orientation toward treatment quality, even if a particular intervention is not medically appropriate for all or even a majority of patients. These data suggest that the odds of organizational adoption of medications as a treatment technology are negatively associated with the racial and ethnic composition of its caseload. Rectifying such inequalities may require system-level efforts to enhance program quality and increase rates of adoption. Improvements in the quality of services delivered by these organizations have the potential to benefit all patients served by these organizations.

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TABLE 1

Descriptive Statistics of Addiction Treatment Organizations ($n = 288$)

Variable	Entire Sample Mean (SD) or %	Medication Adopters ($n = 108$)	Non-Adopters ($n = 180$)
% African American clients	31.5 (27.7)	30.1 (26.1)	32.3 (28.7)
% Hispanic or Latino clients	14.2 (20.4)	11.7 (17.0)	15.7 (22.1)
% American Indian clients	3.1 (8.0)	2.1 (4.5)	3.7 (9.5)
% Asian or Pacific Islander clients	2.1 (8.3)	1.4 (4.0)	2.5 (10.0)
% racial/ethnic minority clients	50.5 (29.8)	45.1 (28.7)*	53.8 (30.1)
Government-owned center	22.9%	36.1%***	15.0%
Hospital-based center	8.3%	13.9%*	5.0%
Accredited center	45.8%	52.8%	41.7%
Number of physicians	0.5 (1.1)	1.0 (1.4)***	0.2 (0.7)
Number of nurses	1.5 (3.9)	3.5 (5.7)***	0.3 (1.1)
% of counselors with at least master's level degree	39.0 (33.1)	46.9 (31.2)**	34.3 (33.3)
Treatment model			
12 Step Model	49.7%	48.2%	50.6%
Cognitive Behavioral Therapy Model	17.7%	13.9%	20.0%
Eclectic Model	32.6%	38.0%	29.4%
% patients covered by government block grant or contract funds	65.4 (33.7)	56.4 (37.1)***	70.8 (30.3)
% patients with alcohol abuse or dependence	61.1 (26.1)	61.1 (24.9)	61.0 (26.9)
% patients with heroin abuse or dependence	16.7 (20.8)	21.3 (24.1)**	13.9 (17.9)
% patients with co-occurring mental health condition	46.6 (26.5)	51.6 (25.2)*	43.6 (26.9)

Note: Significant difference between medication adopters and non-adopters

*
 $p < .05$ **
 $p < .01$ ***
 $p < .001$ (two-tailed tests)

TABLE 2

Logistic Regression Model of Medication Adoption on Minority Composition of Patients and Organizational Characteristics ($n = 288$)

Variable	Model 1 b (SE)	Model 2 b (SE)
% racial/ethnic minority patients	-.010 (.004)*	-.016 (.006)**
Government-owned center (vs. not government-owned)		.892 (.372)*
Hospital-based center (vs. not hospital-based)		.852 (.612)
Accredited center (vs. not accredited)		.103 (.321)
Number of physicians		.773 (.222)*
Number of nurses		.516 (.123)***
% of counselors with at least master's level degree		.006 (.005)
Treatment model		
12 Step Model		Reference
Cognitive Behavioral Therapy Model		-.314 (.442)
Eclectic Model		-.122 (.368)
% patients covered by government block grant or contract funds		-.009 (.005) ⁺
% patients with alcohol abuse or dependence		.006 (.006)
% patients with heroin abuse or dependence		-.002 (.009)
% patients with co-occurring mental health condition		.016 (.006)*
Constant	-.015 (.237)	-1.660 (.684)*
McKelvey & Zavoina's R^2	.027	.694

⁺
 $p < .10$

*
 $p < .05$

**
 $p < .01$

 $p < .001$ (two-tailed tests)