Are Racial Disparities in Alcohol Treatment Completion Associated With Racial Differences in Treatment Modality Entry? Comparison of Outpatient Treatment and Residential Treatment in Los Angeles County, 1998 to 2000

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Objective: To determine whether racial and ethnic disparities in publicly funded alcohol treatment completion are due to racial differences in attending outpatient and residential treatment.

Methods: Statistical analysis of alcohol treatment completion rates using alcohol treatment patients’ discharge records from all publicly funded treatment facilities in Los Angeles County from 1998 to 2000 ($n = 10,591$).

Results: Among these patients, African American (OR = 0.52; 95% CI 0.47, 0.57) and Hispanic (OR = 0.89; 95% CI 0.81, 0.99) patients were significantly less likely to complete treatment as compared with White patients. We found that the odds of being in outpatient versus residential care were 1.42 (95% CI 1.29, 1.55) and 2.05 (95% CI 1.85, 2.26) for African American and Hispanic alcohol treatment patients, respectively, compared with White patients. Adjusting for addiction characteristics, employment, other patient-level factors that might influence treatment enrollment, and unobserved facility-level differences through a random effects regression model, these odds increased to 1.89 (95% CI 1.22, 2.94) for African American and to 2.12 (95% CI 1.40, 3.21) for Hispanics. We developed a conditional probability model to assess the contribution of racial differences in treatment modality to racial disparities in treatment completion. Estimates from this model indicate that were African American and Hispanic patients observed in outpatient care in this population to have the same probability of receiving residential care as White patients with otherwise similar characteristics, the White–African American difference in completion rates would be reduced from 13.64% (95% CI 11.58%, 15.71%) to 11.09% (95% CI 8.77%, 13.23%) and the White–Hispanic difference would disappear, changing from 2.63% (95% CI 0.29%, 4.95%) to 0.45% (−3.52%, 2.43%).

Conclusion: It appears that reductions in racial disparities in treatment completion could be gained by increasing enrollment in residential alcohol treatment for African American and Hispanic alcohol abusers in Los Angeles County. Further research addressing why minority alcohol abusers are less likely to receive residential alcohol treatment should be conducted, as well as research that examines why African American alcohol treatment patients have lower completion rates as compared with White patients regardless of treatment modality.

Key Words: Health Disparities, Treatment Completion, Health Services, Treatment Modality, Racial Differences.

In the United States, the negative consequences of alcohol use and abuse have disproportionately impacted racial and ethnic minorities (Boyd et al., 2003; Lee et al., 1991; McDonald et al., 2004) despite findings indicating that there are modest differences in alcohol consumption patterns by race/ethnicity (Aciniega et al., 1996; Caetano, 2003; Dawson, 1998). In addition, African American and Hispanic drinkers are more likely to develop alcohol-related dependence problems (Caetano, 1997) but less likely to receive treatment (Schmidt et al., 2007; Wells et al., 2001). However, once in treatment, many studies have found little difference in treatment completion rates by race or ethnicity (Schmidt et al., 2006).
As with many responses to health disparities, the most promising approaches are to increase access to treatment and once in treatment, improve the quality of care (Schmidt et al., 2006; Smedley et al., 2003). However, research to date on racial and ethnic disparities in alcohol treatment access and outcomes has found significant inconsistencies. For instance, some studies have found no racial or ethnic differences in alcohol treatment access (Fosados et al., 2007), whereas other studies have noted lower access for African American and Hispanics (Schmidt et al., 2007; Wells et al., 2001; Wu and Ringwalt, 2005). On the other hand, once in treatment, studies have noted few racial and ethnic differences in treatment completion rates (Schmidt et al., 2006; Tonigan, 2003). Lastly, there remains an urgent need for additional studies in this area to help resolve these inconsistent findings and develop effective strategies for addressing the source of health disparities.

Our previous studies have documented substantial racial disparities in alcohol treatment completion in a very large publicly funded treatment system (Los Angeles County; LAC). Specifically, we found significantly lower alcohol treatment completion rates for African Americans in this publicly funded system. These differences appear to be strongly related to racial differences in economic resources, but remain largely unexplained (Jacobson et al., 2007b). In subsequent analyses considering neighborhood context, we also found significant effects of treatment site neighborhood socioeconomic characteristics on alcohol treatment completion rates. Approximately a third of the difference in treatment completion rates between African American and White treatment patients was accounted for by treatment neighborhood disadvantage (Jacobson et al., 2007a). That is, African Americans attended treatment programs in areas of lower socioeconomic status. Treatment programs in these areas had consistently lower completion rates as compared with treatment programs attended by White patients.

In this study, we examined whether African American and Hispanic alcohol patients are more likely to be assigned to outpatient treatment, where completion rates are significantly lower for all race groups as reported in our original analysis of the Los Angeles data (Jacobson et al., 2007a) and elsewhere (McKay et al., 2002; Pettinati et al., 1999; Rychtarik et al., 2000; Wickizer et al., 1994). We then address our 2 principle research questions: (1) Do racial differences in alcohol treatment completion persist independently of patient-level characteristics and facility-level clustering? (2) Based on observed rates of treatment completion for African American, Hispanic, and White patients in outpatient and residential settings, how would African American- and Hispanic–White differences in treatment completion be expected to change were African American and Hispanic patients as likely to receive residential versus outpatient treatment as White patients with similar characteristics? The second research question is addressed by developing a conditional probability model to predict outcomes under a scenario of racially and ethnically equalized rates of residential treatment modality, which relies on observed variation in treatment setting and treatment completion between racial and ethnic groups.

**METHODS**

**Sample**

Data are from standardized patient intake and discharge forms completed by treatment counselors at all alcohol and drug treatment programs in LAC that receive county, state, or federal funds. Programs in LAC are required to collect and report information on all patients whose treatment is funded by these sources, as part of the Los Angeles County Participant Reporting System (LACPRS), which is administered by the Los Angeles County Alcohol and Drug Programs Administration (ADPA). Patients funded by other sources are generally not included in this reporting system. Data collected include demographics, substance abuse problems, source of referral, legal status (an indicator of being on parole or probation), employment, program completion, and other information collected at admission and discharge.

We analyzed LACPRS data from the 170 publicly funded outpatients or residential recovery (i.e., not detoxification) programs in LAC during fiscal years 1998 to 2000, applying the following inclusion criteria: ages 18 years or older; discharged during fiscal years 1998 to 2000; reporting alcohol as the primary substance abuse problem at admission; self-identifying as White or Caucasian, African American or Black, Hispanic or Latino; and not receiving methadone for a secondary opiate problem because methadone maintenance is a pharmacological treatment often of indeterminate duration. Patients meeting these inclusion criteria account for the vast majority (94%) of all primary alcohol patients discharged from public programs during this period.

Many patients in the sample were treated more than once during 1998 to 2000. To permit generalization of findings to the population of patients rather than episodes, only the first episode for each patient during 1998 to 2000 that did not end in transfer or referral to another program is included in the analysis. The final sample includes 4141 African American, 3120 Hispanic, and 3330 White patients, for a total of 5795 outpatient and 4796 residential treatment observations.

**Measures**

Treatment completion status is coded at discharge by treatment counselors as follows: (i) “completed treatment/recovery plan, goals”; (ii) “left before completion with satisfactory progress”; or (iii) “left before completion with unsatisfactory progress.” We created a dichotomous indicator coded 1 if the patient unambiguously completed treatment and 0 otherwise because what constitutes “satisfactory” versus “unsatisfactory” progress is not defined in instructions provided to counselors. Determination of a patient’s “recovery plan” and “goals” is also inherently subjective, but in our view it is less subject to racial bias because treatment programs typically have clear and established guidelines regarding what patients must achieve to graduate treatment. Completion rates are not used by ADPA to determine funding levels or other incentives or disincentives to contracted programs.

Patient characteristics at admission, including demographics, economic resources, addiction characteristics, chronic mental illness, referral, and indicators of legal problems, are constructed from the treatment admission record to assess whether they explain racial differences in treatment completion. Demographics measures are age in years, sex, and highest school grade completed. Economic resources are represented by homelessness, employment status, and Medi-Cal beneficiary status. Employment is reported as full-time (≥35 h/wk), part-time (<35 h/wk), unemployed, or not in the labor force (not seeking work in the past 30 days).
Addiction characteristics include indicators of any secondary and tertiary, nonalcohol substances reported as problems at admission, injection drug use, whether the patient has ever received prior treatment, age at first use or intoxication (in years), and approximate days of alcohol and nonalcohol use during the month prior to admission. We approximate the days of past-month use by recoding the latter item for each substance as follows: “no past month use” = 0 days; “1 to 3 times in past month” = 2 days; “1 to 2 times per week” = 6 days; “3 to 6 times per week” = 18 days. Days of nonalcohol drug use is then calculated as the sum of days of use of any secondary and tertiary substances reported. Whether the patient has ever been diagnosed with a chronic mental illness is included because psychiatric problems complicate recovery from addiction (McLellan et al., 2000). Finally, source of referral into treatment is classified as court or criminal justice, school or employer, self-referral, or other. The latter captures referrals from health care providers, 12-step groups, and other community organizations. Legal status is an indicator coded 1 if the patient was on parole or probation at admission.

Statistical Analyses

African American and Hispanic patients were compared with Whites to identify differences in outpatient versus residential treatment setting and in patient characteristics that might be related to treatment setting choice and treatment completion. We also compared groups in terms of treatment rates to confirm the disparity revealed in earlier work (Jacobson et al., 2007b). Two-sample, two-sided tests of proportions were carried out to identify whether any African American–White and Hispanic–White differences observed in treatment setting and completion rates might be due to chance. African American–White and Hispanic–White differences in patient characteristics previously linked to treatment outcomes in the treatment literature were identified using chi-square tests for dichotomous indicators and t-tests for continuous variables. Wilcoxon rank sum tests of median differences produced similar results. Effect sizes of group differences with respect to continuous variables were computed using Cohen’s d (Cohen, 1992).

To assess whether race/ethnic differences in treatment setting persist after accounting for available patient characteristics, a logistic regression predicting outpatient (vs. residential) setting as a function of African American and Hispanic indicators (with White as the reference group) was conducted. The model controls for a vector of patient characteristics, X, previously linked with treatment outcomes in the treatment literature (left column of Table 1). The same set of patient characteristics also appears in models mentioned below. In all regression models, robust standard errors are estimated to account for nonconstant variance due to facility-level clustering using the Huber-White method (Huber, 1967; White, 1982). Estimated odds ratios from this model provide an estimate of the measures of the racial disparity in treatment setting. Ratios > 1 indicate elevated odds of attending outpatient versus residential treatment relative to Whites.

Then, a simple probability model was developed to estimate the part of race/ethnic differences in completion that is attributable to race/ethnic differences in treatment setting. Our approach is to determine the number of African American and Hispanic outpatients who would have been expected to complete treatment had they been as likely to attend residential (instead of outpatient) care as White patients in the sample with similar characteristics. Comparing the number of additional African American and Hispanic outpatients expected to complete under this counterfactual scenario, as compared to the number observed to complete in the sample, provides one measure of the number of incompletes in these groups that are due to higher rates of outpatient treatment by non-White patients. We make the important simplifying assumption that African American and Hispanic outpatients, were they to attend residential care, would complete at the same rate as African American and Hispanics patients with similar characteristics who did in fact attend a residential program. The counterfactual prediction was developed separately for African Americans and Hispanics. For details of the calculations, see the Technical Appendix. Below, we summarize the steps of the counterfactual prediction in terms of African Americans:

1. A logistic regression predicting residential modality was fit to the White subsample, controlling for patient characteristics.
2. This fitted-regression equation was used to predict the probability that each African American outpatient in the sample would have received residential treatment, had the patient had the same probability of receiving residential care as a White patient with otherwise similar characteristics.
3. A second logistic regression, predicting treatment completion of residential care was fit to the subsample of African Americans who actually attended residential programs, controlling for patient characteristics.
4. This fitted-regression equation was applied to African American outpatients to predict the probability they would have completed treatment had they attended a residential program.
5. Calculations based on these two probabilities for each patient were carried out to predict the total number of additional treatment completions under a scenario of racially equal odds of receiving residential care.

Ninety-five percent confidence intervals for all predictions were computed using the nonparametric, bias-corrected bootstrap (Efron and Tibshirani, 1993). In all regression models, continuous covariates were centered by subtracting their sample means to reduce skew and facilitate interpretation. An estimated odds ratio on a centered continuous covariate represents the change in the log odds of completion that would be expected from a unit increase over the covariate’s sample mean. Quadratic terms of the continuous covariates were also considered, but likelihood ratio tests showed that none improved the models significantly. Variance inflation factors from linear versions of the models were all under 3, indicating the absence of multicollinearity problems.

RESULTS

In Table 1, we report comparisons between White (n = 1,537), African American (n = 2,270), and Hispanic patients (n = 1,988) on key individual characteristics. African American patients were significantly less likely than White patients to complete alcohol treatment, to be in residential (as opposed to outpatient) treatment programs, to report heroin or amphetamine use, injection drug use, chronic mental illness, and to report being under legal supervision. However, African American patients were more likely than White patients to report unemployment, cocaine/crack use, marijuana use, any secondary drug use, and more frequent secondary drug use in the past month. Similar differences were observed when comparing Hispanic patients with Whites patients with some notable exceptions. For instance, Hispanic patients were less likely to report previous treatment experience, homelessness, and had similar rates of secondary drug use as compared with White patients. In addition, Hispanic patients were more likely to report being under legal supervision than White patients. Nonetheless, both African American patients and Hispanic patients were less likely to complete treatment overall.

In this sample, treatment completion rates differed by treatment modality for each race, with patients in residential
American and Hispanic alcohol treatment patients, respectively, compared with White patients (Table 2). Adjusting for addiction characteristics, employment, other patient-level factors that might influence the choice of treatment setting, and facility clustering, these figures increase to 1.89 (95% CI 1.22, 2.94) for African American patients and 2.12 (95% CI 1.40, 3.21) for Hispanic patients.

To assess the contribution of racial differences in treatment modality entry to racial disparities in treatment completion, we developed a conditional probability model. Estimates from this model (Table 3) indicate that if African American and Hispanic patients observed in outpatient care in this sample were to have the same probability of receiving residential

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**Table 1. Discharge Status, Treatment Setting, and Patient Characteristics of African American and Hispanic Patients Compared With White Patients: Unadjusted Sample Percentages and Mean Values**

<table>
<thead>
<tr>
<th>Variables</th>
<th>White (n = 3,330)</th>
<th>African American (n = 4,141)</th>
<th>Hispanic (n = 3,120)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge status (%)&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed treatment</td>
<td>37.1</td>
<td>***23.5</td>
<td>**34.5</td>
</tr>
<tr>
<td>Treatment Setting (%)&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outpatient</td>
<td>46.2</td>
<td>***54.8</td>
<td>***63.7</td>
</tr>
<tr>
<td>Residential</td>
<td>53.8</td>
<td>***45.2</td>
<td>***36.3</td>
</tr>
<tr>
<td>Patient characteristics (%)&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>68.6</td>
<td>***61.9</td>
<td>***73.1</td>
</tr>
<tr>
<td>Ever received prior treatment</td>
<td>60.9</td>
<td>61.9</td>
<td>**49.2</td>
</tr>
<tr>
<td>Additional drug problems&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heroin</td>
<td>7.7</td>
<td>***2.0</td>
<td>8.4</td>
</tr>
<tr>
<td>Amphetamines</td>
<td>21.5</td>
<td>***1.6</td>
<td>***13.9</td>
</tr>
<tr>
<td>Cocaine/crack</td>
<td>26.2</td>
<td>***57.7</td>
<td>***31.9</td>
</tr>
<tr>
<td>Marijuana</td>
<td>26.2</td>
<td>***31.0</td>
<td>***22.2</td>
</tr>
<tr>
<td>Other not listed above</td>
<td>6.9</td>
<td>***3.3</td>
<td>**5.7</td>
</tr>
<tr>
<td>No other drug</td>
<td>39.8</td>
<td>***29.1</td>
<td>40.2</td>
</tr>
<tr>
<td>Injection drug use</td>
<td>12.2</td>
<td>***5.0</td>
<td>***10.0</td>
</tr>
<tr>
<td>Chronic mental illness</td>
<td>14.4</td>
<td>***6.8</td>
<td>***4.5</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not in labor market</td>
<td>65.6</td>
<td>***62.5</td>
<td>***53.0</td>
</tr>
<tr>
<td>Unemployed</td>
<td>20.5</td>
<td>***31.5</td>
<td>***26.8</td>
</tr>
<tr>
<td>Part-time (5 to 34 h/wk)</td>
<td>3.9</td>
<td>***2.4</td>
<td>***6.0</td>
</tr>
<tr>
<td>Full-time (&gt;34 h/wk)</td>
<td>9.9</td>
<td>***3.5</td>
<td>***14.2</td>
</tr>
<tr>
<td>Homeless</td>
<td>36.9</td>
<td>***38.6</td>
<td>***26.9</td>
</tr>
<tr>
<td>Medi-Cal beneficiary</td>
<td>12.7</td>
<td>***10.7</td>
<td>***9.4</td>
</tr>
<tr>
<td>Under legal supervision</td>
<td>34.6</td>
<td>***28.2</td>
<td>***40.6</td>
</tr>
<tr>
<td>Principle source of referral</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-referral</td>
<td>42.0</td>
<td>***44.5</td>
<td>***28.8</td>
</tr>
<tr>
<td>Court/criminal justice</td>
<td>23.1</td>
<td>***14.6</td>
<td>***30.0</td>
</tr>
<tr>
<td>School/employer</td>
<td>1.0</td>
<td>***0.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Other</td>
<td>33.8</td>
<td>***40.2</td>
<td>***40.1</td>
</tr>
<tr>
<td>Patient characteristics: mean (effect size compared with Whites)&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age in years</td>
<td>38.6</td>
<td>***39.4 (0.1)</td>
<td>***35.8 (0.3)</td>
</tr>
<tr>
<td>Highest school grade</td>
<td>12.1</td>
<td>***11.8 (0.2)</td>
<td>***10.5 (0.7)</td>
</tr>
<tr>
<td>Days drinking in past month</td>
<td>20.1</td>
<td>20.5 (0.0)</td>
<td>***15.5 (0.4)</td>
</tr>
<tr>
<td>Days secondary drug use in past month</td>
<td>8.9</td>
<td>**12.7 (0.3)</td>
<td>***7.5 (0.1)</td>
</tr>
<tr>
<td>Age of first substance abuse in years</td>
<td>15.0</td>
<td>***16.0 (0.2)</td>
<td>***15.9 (0.2)</td>
</tr>
</tbody>
</table>

Table excludes patients whose first episode in 1998 to 2000 ended in referral or transfer elsewhere.

<sup>a</sup>p-value ≤ 0.1,  **p-value ≤ 0.05,  ***p-value ≤ 0.01.
<sup>b</sup>Chi-Squared tests comparing each group to Whites; Cohen's d (effect size) appears in parentheses.
<sup>c</sup>Percentages may not sum to 1 because patients can report multiple substance abuse problems (up to 3).
<sup>d</sup>Two-sample, two-sided t-tests comparing each group with White patients.

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**Table 2. Logistic Models Predicting Outpatient Versus Residential Treatment Settings (n = 10591)**

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Model 0</th>
<th>OR 95% CI</th>
<th>Model 1</th>
<th>OR 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>1.42</td>
<td>(1.29–1.55)</td>
<td>1.89</td>
<td>(1.22–2.94)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2.05</td>
<td>(1.85–2.26)</td>
<td>2.12</td>
<td>(1.40–3.21)</td>
</tr>
<tr>
<td>White</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.88</td>
<td>(0.50–1.57)</td>
<td>1.02</td>
<td>(1.00–1.03)</td>
</tr>
<tr>
<td><strong>Age in years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.02</td>
<td>(1.00–1.03)</td>
<td>1.03</td>
<td>(0.99–1.07)</td>
</tr>
<tr>
<td><strong>Highest school grade</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.03</td>
<td>(0.99–1.07)</td>
<td>1.03</td>
<td>(0.99–1.07)</td>
</tr>
</tbody>
</table>

---

American and Hispanic alcohol treatment patients, respectively, compared with White patients (Table 2). Adjusting for addiction characteristics, employment, other patient-level factors that might influence the choice of treatment setting, and facility clustering, these figures increase to 1.89 (95% CI 1.22, 2.94) for African American patients and 2.12 (95% CI 1.40, 3.21) for Hispanic patients.

To assess the contribution of racial differences in treatment modality entry to racial disparities in treatment completion, we developed a conditional probability model. Estimates from this model (Table 3) indicate that if African American and Hispanic patients observed in outpatient care in this sample were to have the same probability of receiving residential
DISCUSSION

We found that African American alcohol patients were significantly less likely to complete both outpatient and residential alcohol treatment. Few studies have noted racial differences in alcohol treatment completion rates. The relatively lower completion rates of African American patients in publicly funded treatment programs are of concern and may explain the relatively higher alcohol-related negative consequences observed among African American patients as compared with White patients.

We found that the under-representation of African American and Hispanic alcohol patients in residential treatment actually increased, once potential confounders were included in the model. This suggests that minority under-representation in residential treatment is even greater than it may appear once the relatively higher rates of alcohol-related problems among racial and ethnic minority patients are taken into account. More research considering the patient-level, community and system-level attributes that contribute to this outcome are needed.

In addition, we estimated that a nearly 20% reduction in the treatment completion disparity between African American and White patients might be obtained through higher enrollment of African American patients in residential treatment. For Hispanic patients, the modest racial difference in alcohol treatment completion would be eliminated with increased enrollment in residential treatment if our estimates are accurate. These data and other previously published results suggest that African American and Hispanic alcohol patients would benefit from greater proportional enrollment in residential alcohol treatment (Jacobson et al., 2007b). The higher completions rates for residential treatment patients have been observed in clinical studies as well as assessments of publicly funded alcohol and drug treatment systems (McKay et al., 2002; Pettinati et al., 1999; Rychtarik et al., 2000; Wickizer et al., 1994).

Lastly, it is worth noting that differences in completion rates were not consistent for racial and ethnic minority groups as compared with White patients. We did not find differences in treatment completion rates among White and Hispanic patients (Jacobson et al., 2007b). Other studies have found little differences in treatment completion between White and Hispanic patients (Arroyo et al., 1998; Tonigan et al., 2002). One implication of this finding is that racial disparities in alcohol-related consequences might be more easily reduced if alcohol problem screening, treatment access, and entry into residential treatment could be increased among Hispanic alcohol abusers. Further research appears warranted on interactions between Hispanic and African American patients and alcohol treatment programs and systems of care as suggested elsewhere (Arroyo et al., 2003). Such research may shed light on how the more persistent racial disparities in alcohol treatment completion among African Americans might be diminished.

These results should be considered in light of the following limitations. This is a cross-sectional analysis and therefore, we cannot conclude that increasing the enrollment of either African American or Hispanic patients in residential treatment would necessarily lead to a reduction in racial differences in treatment completion rates. However, given that improve-
ments in completion rates were observed for all ethnic and racial groups there is strong face validity for this contention. Another limitation is the modest amount of information collected on each patient and treatment program. Some important factors associated with treatment success that are unavailable include client engagement in treatment, program methodologies and resources, availability of community, family, and peer support, and severity of psychiatric disorders. Lastly, race and ethnicity were only considered in a superficial manner and issues such as ethnic and racial belonging, commitment, affirmation, and identification were not considered.

Nonetheless, the significant racial differences in treatment completion, particularly between White and African American patients, are a serious issue that requires additional research, and reconsideration of how treatment assignment is accomplished in the large publicly funded treatment system. Other barriers to providing alcohol abusers with the most appropriate and successful treatment modalities should continue to be researched.

ACKNOWLEDGMENTS

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REFERENCES


TECHNICAL APPENDIX

This section provides details of the counterfactual model used to estimate how equal odds of receiving residential versus outpatient treatment would affect racial differences in treatment completion, in terms of the African American–White comparison.

1. A logistic regression estimated on the White subsample predicting residential modality, controlling for patient char-
acteristics \( X_i \) was used to predict the probability, \( r_i^w \), that each African American outpatient \( i \) in the sample would have been in residential treatment, had that patient had the same probability of receiving residential care as a White counterpart:

\[
r_i^w = \Pr(\text{residential}|X, \text{white}).
\]

2. The probability that each African American \( i \) in the outpatient sample would have completed residential care, \( c_i^a \) had he or she entered residential instead of outpatient treatment was predicted by using a logistic regression fitted on the sample of African Americans observed in residential care:

\[
c_i^a = \Pr(\text{completeresidential}|X, \text{AfricanAmerican}).
\]

3. For African Americans who actually received outpatient treatment these results are combined to predict the overall probability of completion, \( a_i \), given racially equal odds of receiving residential care:

\[
a_i = (r_i^w \cdot c_i^a) + (1 - r_i^w) \cdot C_i,
\]

where \( C_i \) is the observed completion outcome (0/1) for an outpatient, \( i \), who even under the counterfactual scenario would still have received outpatient care.

4. The predicted completion rate, \( Y_{a^p} \), for all African American patients is then the sum of \( a_i \) plus the number of African Americans observed to complete in residential care, \( CR_a \), divided by the total number of African Americans in the sample:

\[
Y_a = (\sum a_i + CR_a) / N_a
\]

5. The observed White-African American difference in completion rates, \( D_a \), is the difference in observed rates, \( Y_w - Y_a \). The predicted difference under the scenario, \( D_a' \), is the observed White completion rate less the predicted African American completion rate, \( Y_a' \):

\[
D_a' = Y_w - Y_a'.
\]

6. The predicted annual increase, \( K_a \), in the number of African American patients who would complete treatment under the scenario, taking into account that the sample represents 2 years of treatment discharges, is:

\[
K_a = 1/2(Y_b - Y_b) \cdot O_a
\]

where \( O_a \) is the number of African American outpatients observed in the sample. Finally, the percentage point reduction in the disparity under the scenario, \( R_a \), is then

\[
R_a = D_a - D_a'
\]

and the proportion, \( Q_a \), of the observed difference in completion rates that is attributable to lower rates of residential care among African Americans compared with Whites, is

\[
Q_a = (Y_a - Y_a) / (Y_w - Y_a).
\]