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Summary

Although African Americans and American Indians are overrepresented in treatment relative to their numbers in the population or their need for treatment as expressed in surveys, these groups are probably not being "over-treated." African Americans and American Indians in treatment tend to exhibit higher levels of use and more serious problems than do other racial/ethnic groups. Among people in treatment, African Americans are more likely than others to abuse crack or heroin, and American Indians are more likely than others to abuse opiates other than heroin. African Americans and American Indians are less likely than others to complete treatment and more likely to have problems at discharge on federally mandated National Outcome Measures and several measures adapted from the American Society of Addiction Medicine. However, African Americans and American Indians who receive treatment in facilities in which 25% to 75% of other clients share their racial classification achieve rates of completion that are comparable to those of whites. Furthermore, referrals to housing and support groups substantially increase the likelihood of completing treatment. These results suggest that referring African Americans and American Indians to integrated treatment facilities and referring those in need to housing and support groups should be important pathways to reducing disparities in outcomes.

This report examines racial differences in various aspects of the process of treatment for substance abuse or dependence in Minnesota. The National Center on Addiction and Substance Abuse (2009) estimates that Minnesota spent almost $3 billion on substance abuse and its consequences in 2005. While one can reasonably question some of the assumptions made in arriving at such a high figure, one cannot deny that the costs of addiction are substantial. The Substance Abuse and Mental Health Services Administration (SAMHSA 2008a: Chapter 6) notes that, "substance abuse is a major health problem affecting racial/ethnic subgroups in the United States" and "there are substantial racial/ethnic differences in the prevalence of licit and illicit substance use, alcohol dependence, and need for illicit drug abuse treatment."

We classify people based on their responses to questions on race and ethnicity, with categories *white* (non-Hispanic), *African American* (non-Hispanic), *Asian* or Pacific Islander (non-Hispanic), *Hispanic* (regardless of racial classification) and *other* (multiple races, unknown race, or some other race). The other category is so heterogeneous that we include it for the sake of completeness but do not comment on it. We view race and ethnicity as largely social constructs and refer to the joint classification as "race" in the remainder of this report.

Data for the United States

The U.S. Census Bureau (2009a) estimates that 66% of people in the United States in 2007 were white, 15.1% were Hispanic, 12.3% were African American, 4.5% were Asian, 0.8% were American Indian, and 1.4% were other. The socioeconomic situation of these groups varies dramatically. Data from the 2005-2007 American Community Survey (U.S. Census Bureau 2009b) show that 25.8% of American Indians, 25.3% of African Americans, 21.5% of Hispanics, 11.2% of Asians, and 10.5% of whites lived below the poverty level. (The Census Bureau includes people of both Hispanic and non-Hispanic origin in all categories other than Hispanic in this tabulation.) Data on median household income show a similar pattern, although the median income of Asians exceeds that of whites.

Data from the 2007 National Survey on Drug Use and Health (NSDUH) provide a picture of substance abuse and dependence in the United States (SAMHSA 2008b). They indicate that 13.4% of American Indians answer a series of questions in a way that indicates substance dependence or abuse. Those who exhibit substance abuse or dependence are generally described as being in need of treatment. The percentages in need of treatment for the other groups are 10.8% of others, 9.9% of Native Hawaiians and Pacific Islanders, 9.4% of whites, 8.5% of African Americans, 8.3% of Hispanics, and 4.7% of Asians (not including Hawaiians and other Pacific Islanders).

SAMHSA (2009a) also provides national data on admissions to treatment in 2007. Whites comprised 59.6% of all admissions, African Americans comprised 20.7%, Hispanics comprised 14.2%, Others comprised 5.5%, American Indians comprised 2.3%, and Asians comprised 1.0%. Comparing these proportions to data on representation in the U.S. total population shows that whites and Asians are underrepresented in treatment, African Americans and American Indians are overrepresented, and Hispanics are approximately proportionately represented. We can also apply the estimates of treatment need to the total population of the United States to estimate the number of people in the different racial categories that need treatment; this leads easily to calculating the proportion of the total population in need that is in each racial group. Comparing these proportions to the proportions in treatment leads to a similar conclusion: whites and Asians are underrepresented in treatment, African Americans and American Indians are overrepresented, and Hispanics are approximately proportionately represented.

It is interesting that, at the level of racial groupings, need for treatment, as measured by NSDUH, is largely unrelated to socioeconomic status, as measured by the proportion in poverty or median income, but the likelihood of being overrepresented in treatment is very closely related to socioeconomic status. Whites and Asians, groups with the highest median incomes and lowest proportions in poverty, are underrepresented in treatment; African Americans and American Indians, groups with the lowest median income and highest proportions in poverty, are overrepresented in treatment; while Hispanics, a group with an intermediate median income and proportion in poverty, are proportionately represented in treatment. It may be that poverty and low median incomes are associated with patterns of use (and abuse and dependence) that are undetected by surveys such as NSDUH, or it may be that poverty and low incomes increase the likelihood that a given level of use (and abuse and dependence) will result in treatment. The former explanation would hold if surveys failed to include poor users or if poor users were more likely to deny use. The latter explanation

would hold if poor users engaged in patterns of use, such as drinking or using in public rather than private places, that were more likely to be observed by authorities, or if poor users were more likely to engage in other deviant behavior that enabled authorities to become aware of substance use. Disentangling these two causal pathways is not possible with these data, and it may well be that both are operating.

Background data for Minnesota

Minnesota, of course, is predominantly white. The U.S. Census Bureau (2009a) estimates that in 2008, 85.4% of the population was white, 4.4% was African American, 4.1% was Hispanic, 3.5% was Asian, 1.1% was American Indian, and 1.4% was other. The socioeconomic situations of these groups diverge even more in Minnesota than they do in the nation. Data from the 2005-2007 American Community Survey (U.S. Census Bureau 2009b) show that, in Minnesota, 33.5% of African Americans, 30.3% of American Indians, 22.1% of Hispanics, 16.6% of Asians, and 7.6% of whites lived below the poverty level. The proportion of whites in poverty in Minnesota is less than the proportion in the United States, but the proportion of every other group in poverty is higher in Minnesota than in the United States although the difference for Hispanics is very slight. (As with the national data, the Census Bureau includes people of both Hispanic and non-Hispanic origin in all categories other than Hispanic in this tabulation.) Data on median household income show a similar pattern in Minnesota although the median income of Asians slightly exceeds that of whites.

Use of substances and need for treatment in Minnesota

The first question is whether racial groups differ in their use of substances and consequent need for treatment. Park (2006) addresses this question with data from the 2004 Minnesota Student Survey (MSS) and the Minnesota Survey on Adult Substance Use (SASU) conducted in 2004 and 2005. In general, use of alcohol, drinking heavily, and use of other drugs is greatest among American Indians, intermediate among whites and Hispanics, and lowest among Asians and African Americans. Similarly, the need for treatment is highest among American Indians, intermediate among whites, and lowest among Hispanics, African Americans and Asians.

Park (2008) updates this analysis with data from the 2007 MSS that we summarize in Table 1. The MSS is a school-based survey of public school students in sixth, ninth and twelfth grades; all students are asked to participate and 136,549 or 66% did so, although only ninth and twelfth graders were asked the questions used to assess the need for treatment. Racial categories are ordered by the need for treatment. This ordering works amazingly well for the other measures as well, with the prime exception being that African Americans are more likely to use marijuana than would be expected. In general, American Indians show the most use and need for treatment, while African Americans and Asians show the least. Hispanics, whites, and those of multiple races tend to be intermediate.

Table 1. Percentages of Students in Racial Groups Who Use Alcohol, Marijuana and Need Treatment: 2007 Minnesota Student Survey.

Race	Alcohol[a]	Drank Heavily[b]	Marijuana[a]	Need Treatment[c]
American Indian	25.9	31.3	19.0	15.9
Other	25.3	22.7	12.6	11.5
Hispanic	23.2	22.7	11.2	10.0
White	24.2	20.4	8.8	9.3
African American	15.6	13.9	11.1	5.9
Asian	16.7	14.6	5.3	4.1

[a] Used in the past month.
[b] Had five or more drinks in one setting in the past two weeks.
[c] Based on DSM-IV criteria for substance abuse or dependence.

Table 2 provides similar information from the 2004-5 SASU, which is a telephone survey of a sample of 16,891 Minnesotans aged 18 and older. The sample is stratified by region and race, so responses are weighted in order to represent all non-institutionalized adult Minnesotans; the weighted response rate was 55%. As in Table 1, racial categories are ordered by the need for treatment. The order among adults is identical to that for students: American Indians show the most use and need for treatment, with African Americans and Asians showing the least; Hispanics, whites, and others tend to be intermediate. The primary exceptions to the ordering are that whites are more likely to have consumed alcohol, and African Americans are less likely to have drunk heavily and more likely to have used marijuana than would be expected. Nevertheless, the two tables show remarkable similarities in the patterns of use and need for treatment.

Table 2. Percentages of Adults in Racial Groups Who Use Alcohol, Marijuana and Need Treatment: 2004-5 SASU.

Race	Alcohol[a]	Drank Heavily[b]	Marijuana[a]	Need Treatment[c]
American Indian	48.8	30.5	16.3	20.4
Other	48.2	20.2	10.1	20.0
White	62.8	19.3	3.3	9.6
Hispanic	32.7	15.1	2.2	7.4
African American	33.4	9.5	6.3	7.1
Asian	34.2	13.0	1.1	4.0

[a] Used in the past month.
[b] Had five or more drinks in one setting in the past month.
[c] Based on DSM-IV criteria for substance abuse or dependence.

Treatment in Minnesota

Data on treatment for substance abuse or dependence are maintained by the Minnesota Department of Human Services (DHS) in the Drug and Alcohol Abuse Normative Evaluation System (DAANES). All providers of treatment are required to submit data at admission and discharge to DHS for all episodes of treatment; a few providers, such as the U.S. Department of Veteran Affairs and the Minnesota Department of Corrections, are exempted from this requirement. In 2007, data for 47,430 admissions of Minnesota residents to treatment were submitted to DHS.

Table 3 shows the racial distribution of these admissions to treatment. About three-fourths of the admissions were for whites. These numbers are difficult to interpret without comparing them to the distribution of the need for treatment in Minnesota. The third and fourth columns provide information on this distribution. The numbers in the third column result from multiplying the proportions of people in need of treatment from the MSS and SASU by the numbers of people in the different categories in the cross-classification of age and race in the total population. The entries in the fourth column result from dividing each of the numbers in the third column by the total for that column. The fifth column provides the ratio of the percentage in treatment to the percentage in need of treatment; a number less than one indicates that the racial group is underrepresented in treatment, and a number greater than one indicates that it is overrepresented. Therefore, we see that whites and Asians are underrepresented, while African Americans, American Indians, and, to a lesser extent, Hispanics are overrepresented. Park (2006) notes that a similar pattern results in part because African Americans and American Indians are more likely to be involved with drugs, and using drugs is more likely than using alcohol to result in treatment. As is true at the national level, those groups that are overrepresented in treatment tend to exhibit a higher level of poverty and lower median incomes.

Table 3. Distributions of Admission to Treatment and Need for Treatment by Race.

	In Treatment		In Need of Treatment		Ratio of % of Treatment
Race	**Number**	**Percent**	**Number**	**Percent**	**to % of Need**
White	35,139	74.2	356,040	88.4	0.839
African American	5,450	11.5	12,079	3.0	3.837
American Indian	3,812	8.1	8,205	2.0	3.951
Hispanic	1,715	3.6	10,975	2.7	1.329
Asian	356	.8	5,589	1.4	0.542
Other	868	1.8	9,660	2.4	0.764
Total	47,340	100.0	402,548	100.0	1.000

The estimates of need for African Americans and American Indians might be too low and the subsequent level of overrepresentation might be too high for several reasons. Harrison and Hughes (1997:3) report that, "...self-report is less valid both for the more stigmatized drugs ... and ... for those involved with the criminal justice system." Since African Americans and American Indians are more likely to use more stigmatized drugs and be involved with the criminal justice system, their need might be underestimated. In a similar vein, Fendrich and Johnson (2005) report lower levels of concordance between self-reports and urine or saliva tests for cocaine and marijuana among African Americans than among whites. But the problem probably goes deeper than the issue of self-reports. Both African American and American Indian adolescents are less likely to be in school than their counterparts from other groups (Greene and Winters 2002), and it seems likely that those who are not, either because they have dropped out or are truant, are more likely to be involved with alcohol or drugs (Swaim et al. 1997). Similarly, response rates to surveys are often lower for African Americans and American Indians, and it seems likely that drug and alcohol use are higher among those who are not surveyed. As Brunswick (1997:1) notes, "Household and school surveys ... underrepresent the most socially distressed and disarticulated segments of the Black population" and "the distribution of drug involvement is strongly skewed toward the low, no regular income portion of the African American population compared to its distribution by class/wealth among Whites." It seems likely that the same process occurs in the American Indian population.

Another piece of evidence for the hypothesis that the need for treatment among African Americans and American Indians might be higher than that captured by surveys comes from DAANES. Being overrepresented in treatment suggests that the threshold for that group to get into treatment is lower. Therefore, we might suspect that patterns of use among overrepresented groups would be less than among underrepresented groups. This is not the case. The average numbers of days that patients used drugs in the 30 days prior to admission are higher for African Americans and American Indians than for whites, Asians and Hispanics. A similar pattern holds for African Americans regarding alcohol, although use was less frequent among American Indians than among the other groups.

How people get to treatment does vary some by race. Providers code up to two sources of referral at admission, and Table 4 shows how referrals vary by race. For whites and African Americans, the modal source is personal, which includes referrals by self, family, or friends. For American Indians, Hispanics and Asians, the modal source is the criminal justice system. Additional notable differences are that whites are more likely to receive professional (health care and chemical dependence) referrals, African Americans are more likely to be referred by counties, and American Indians are more likely to have other, especially tribal, referrals.

Table 4. Percentage Distribution of Sources of Referrals to Treatment by Race.

Race	Source of Referral				
	Personal	Criminal Justice	Professional	County	Other
White	50.3	36.6	26.4	34.3	20.8
African American	44.1	36.6	21.4	43.7	16.2
American Indian	37.2	46.9	19.4	39.5	30.2
Hispanic	38.3	50.0	19.9	39.2	17.4
Asian	42.7	48.3	21.6	32.3	24.7
Other	46.3	37.1	24.8	34.7	23.0
Total	48.0	38.0	24.9	35.9	21.0

The age distribution of people in treatment also varies by race. Table 5 shows that whites and African Americans are much more likely than other groups to be adults and African American adults tend to be older than white adults. Whereas less than 10% of whites and African Americans in treatment are adolescents, well over 10% of the other groups fall into this category. The modal category for all groups is 25 to 44.

Table 5. Percentage Distribution of Age of People in Treatment by Race.

	Age				
Race	**8-17**	**18-24**	**25-44**	**45-64**	**65+**
White	8.9	20.9	46.9	22.0	1.2
African American	5.1	10.9	55.7	28.1	0.2
American Indian	14.4	25.0	49.6	10.8	0.2
Hispanic	17.1	21.3	49.4	11.8	0.3
Asian	19.1	25.8	44.4	9.6	1.1
Other	17.5	25.4	45.8	11.1	0.2

The gender distribution also varies by race. The percentages of admissions that are for men are highest for Hispanics (75.4%) and African Americans (73.0%) and slightly lower for Asians (70.5%) and whites (67.5%). Admissions of American Indians are more evenly balanced between men (54.0%) and women (46.0%).

Although DAANES is somewhat limited in its measures of socioeconomic status, it does include measures of education and labor force status. Table 6 presents the educational distributions of the different racial groups. Reflecting differences in the wider society, whites are more likely to have higher levels of education; for example, about 10% of whites have graduated from college or attended graduate school, whereas less than 5% of the other groups have done so. Since education influences the resources that one can bring to bear on problems in living, these differences could have important implications for racial differences in the outcomes of treatment.

Table 6. Percentage Distribution of Education by Race.

Race	< HS Grad	HS Grad	Some College	College Grad+
White	23.7	40.0	26.2	10.2
African American	37.3	41.7	17.5	3.6
American Indian	44.4	38.6	15.4	1.6
Hispanic	47.6	32.9	15.8	3.7
Asian	42.5	34.4	18.5	4.5
Other	40.6	35.2	19.7	4.5

Labor force status can also influence the resources that one can bring to bear on problems, and Table 7 shows important differences between racial groups. Whites are more likely to be employed full and part-time, whereas African Americans and American Indians are especially likely to be unemployed.

Table 7. Percentage Distribution of Labor Force Status at Admission by Race.

	Labor Force Status				
Race	**Full-time**	**Part-time**	**Student**	**Unemployed**	**Other**
White	27.7	9.9	9.1	38.1	15.2
African American	11.1	6.3	5.4	52.7	24.5
American Indian	8.8	5.7	15.2	49.7	20.5
Hispanic	19.5	9.2	16.0	38.6	16.6
Asian	19.8	9.1	18.9	35.2	17.0
Other	13.1	8.1	17.8	42.0	19.0

The primary substance that people abuse also varies by race. Table 8 shows that alcohol is most likely to be the primary substance for all groups. For whites, Hispanics, and Asians, the second and third most prominent primary substances are marijuana and methamphetamine, respectively. For African Americans, crack is the second most prominent substance and marijuana is third; furthermore, a disproportionate number of African Americans are treated for heroin addiction. For American Indians, marijuana is second and other opiates are third.

Table 8. Percentage Distribution of Primary Substance by Race.

Primary Substance	White	African American	American Indian	Hispanic	Asian	Other
Alcohol	56.3	33.7	55.6	48.2	36.0	37.5
Marijuana	15.2	21.6	20.3	24.5	23.3	27.8
Methamphetamine	12.0	0.6	4.1	10.3	21.6	8.3
Cocaine	2.5	4.5	1.8	4.7	2.0	4.8
Crack	3.5	28.3	4.3	5.9	3.7	10.6
Heroin	3.0	8.5	1.3	2.8	2.2	3.8
Other opiates	4.5	1.1	10.8	1.7	6.7	4.0
Other	1.4	0.4	1.1	0.6	1.4	1.2
Unknown	1.5	1.4	0.7	1.4	3.1	2.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 9 shows that the mean number of previous admissions to treatment varies by race. American Indians have, on average, been in treatment most frequently, followed, in order, by African Americans, whites, Asians, and Hispanics. Since the distribution is highly skewed and means are heavily influenced by skew, examining the median is also worthwhile. The median for African Americans and American Indians is two, whereas all other groups have a median of one.

Table 9. Mean Number of Previous Admissions to Treatment by Race.

Race	Mean	Median	Standard Deviation
White	2.15	1	3.435
African American	2.55	2	3.281
American Indian	2.85	2	3.464
Hispanic	1.64	1	2.332
Asian	1.68	1	5.140
Other	2.07	1	2.858
Total	2.23	1	3.401

We do not have good documentation about what happens in treatment, but we get general information about the treatment setting and whether certain broadly categorized services are received.

Treatment settings do not vary much by race. About half (50.3%) of patients receive outpatient treatment, about one-fourth (27.5%) are in short-term residential (generally called inpatient), and about one-fifth (19.2%) are in long-term residential (generally called halfway houses or extended care). The principal exceptions to these generalizations are that American Indians are more likely to be in long-term residential (34.3%) and less likely to be in outpatient (38.6%).

There is considerable concern that people receive treatment that is culturally appropriate. While we do not have measures of this, we can calculate the proportion of clients in the different racial groups for each provider. Table 10 cross-classifies the race of the patient by the proportion of people treated at that facility who are white. This table shows, for example, that only 0.4% of whites received treatment in facilities where 25% or fewer of the patients were white and 76% of whites received treatment in facilities where over 75% of patients were white. The table shows that much smaller proportions of the other groups received treatment in predominantly white facilities, although these proportions are considerably higher for Hispanics, Asians, and others than for African Americans and American Indians. The patterns are strikingly different for African Americans and American Indians: African Americans are much more evenly distributed across the four categories, whereas American Indians are most likely to receive treatment in facilities where 25% or less of patients are white.

Table 10. Percentage Distribution of Racial Characteristic of Facility (% White) by Race of Patient.

	Percentage of Patients Who Are White				
Race	**0-25**	**25.1-50**	**50.1-75**	**75.1-100**	**Total**
White	0.4	5.0	18.6	76.0	100.0
African American	18.8	27.4	24.7	29.1	100.0
American Indian	30.7	13.4	28.1	27.8	100.0
Hispanic	8.0	12.6	24.4	55.0	100.0
Asian	2.0	21.9	26.4	49.7	100.0
Other	4.3	17.6	27.2	50.9	100.0

Another way to think about this issue is to examine the cross-classification of race and the proportion of patients who are the same race as the patients designated in the rows. Table 11 presents this distribution. The row for whites is, of course, identical to the row for whites in Table 10. We do not include a row for others because its heterogeneity does not allow an estimation of the racial similarity to other patients. The entries in the first column indicate that about half of African Americans and American Indians received treatment in facilities in which they were distinct minorities. Over 90% of Hispanics and all Asians were a quarter or less of patients in the facilities in which they received treatment. At the opposite extreme, about one in ten African Americans received treatment in facilities in which over three-fourths of patients were also African Americans, and about one in three American Indians received treatment in facilities in which over three-fourths of patients were also American Indians.

Table 11. Percentage Distribution of Racial Characteristic of Facility (% Same Race) by Race of Patient.

	Percentage of Patients Who Are the Same Race as the Row Classification				
Race	**0-25**	**25.1-50**	**50.1-75**	**75.1-100**	**Total**
White	0.4	5.0	18.6	76.0	100.0
African American	48.5	27.5	12.0	12.0	100.0
American Indian	49.3	15.3	5.1	30.3	100.0
Hispanic	94.4	0.9	0.0	4.7	100.0
Asian	100.0	0.0	0.0	0.0	100.0

We can also classify facilities by the percentage of patients who successfully complete treatment. Statewide, about 63% of patients complete treatment. Table 12 shows the percentage of clients in the different racial groups who get treatment in facilities with various rates of completion. Whites and Hispanics are about equally likely to get treatment in facilities with completion rates above 75%, although whites are slightly more favorably situated in facilities with lower rates of completion. American Indians are the least likely to be in facilities with completion rates over 75%, with African Americans and Asians occupying intermediate positions. However, Asians, African Americans, and American Indians are more likely than other groups to receive treatment in facilities in which half or less of the patients complete treatment.

Table 12. Percentage Distribution of Receipt of Treatment in Facilities with Different Rates of Completion by Race.

	Percentage of Patients in Facility Who Complete Treatment				
Race	**0-25**	**25.1-50**	**50.1-75**	**75.1-100**	**Total**
White	3.8	14.8	58.6	22.9	100.0
African American	7.3	26.6	49.0	17.1	100.0
American Indian	8.0	22.7	57.7	11.6	100.0
Hispanic	3.9	19.5	53.5	23.0	100.0
Asian	11.0	25.0	44.4	19.7	100.0
Other	6.2	22.6	48.2	23.0	100.0

Table 13 presents information about the percentage who received services in eleven categories. Several features of this table are notable. First, American Indians are more likely than other groups to receive most services; in fact, higher percentages of American Indians receive nine of the eleven services. Hispanics are most likely to receive group counseling, although the difference is minor, and whites are most likely to receive treatment for a co-occurring psychiatric disorder. Second, relatively low percentages of African Americans and Asians receive most services. Significantly lower percentages of African Americans receive nine of eleven services; differences in receipt of individual counseling and transportation are not statistically significant. Significantly lower percentages of Asians receive detox, medical care, family counseling, spiritual support, and transportation.

Table 13. Percentage of Racial Groups That Receives Various Services in Treatment.

	Race					
Service	**White**	**African American**	**American Indian**	**Hispanic**	**Asian**	**Other**
Detox	10.2	5.0	11.0	5.6	4.7	8.5
AOD Testing	44.2	42.2	56.7	48.2	39.9	44.9
AOD Education	74.8	71.4	79.7	73.6	71.7	73.0
Medical care	24.4	19.5	35.5	19.4	15.1	23.3
Individual Counseling	70.1	71.9	77.7	70.1	67.0	70.5
Group Counseling	86.7	80.1	87.0	87.3	84.3	83.1
Family Counseling	18.1	11.4	26.3	15.3	13.2	19.6
Psychiatric Disorder	26.8	24.7	24.6	18.1	24.2	25.2
Spiritual	42.4	33.2	54.7	38.1	30.5	36.0
Coordination	20.1	18.1	27.9	21.0	18.2	23.9
Transportation	21.4	24.6	42.5	22.6	15.7	25.2

The care and support that patients receive upon leaving formal treatment play a critical role in determining whether they can improve their lives and remain abstinent from substances. Therefore, referrals to post-treatment services can be very important. Table 14 examines the distribution of referrals to various post-treatment services. The most common type of referral is to support groups such as Alcoholics Anonymous or professionally led groups offered by treatment providers. In fact, more people of each group are referred to support groups than

any other type of service. Whites are the most likely to be referred to such groups. About half as many are referred to additional treatment or to therapists for counseling. African Americans are most likely to be referred to additional treatment, and Asians are most likely to be referred to therapy. About 20% of patients are referred to housing, 10% to medical facilities, and 3% to vocational services. African Americans are the most likely to receive housing referrals; whites are the most likely to receive medical referrals; and Hispanics are the most likely to receive vocational referrals.

Table 14. Percentage Distribution of Referrals to Post-Treatment Services by Race.

Race	Treatment	Support	Housing	Therapy	Medical	Vocational
White	30.9	66.6	19.3	32.9	10.9	2.7
African American	37.6	57.0	25.7	26.3	8.3	4.0
American Indian	32.2	57.7	20.5	26.7	8.9	3.1
Hispanic	32.7	64.4	21.1	31.5	9.0	4.8
Asian	33.0	62.9	16.4	33.6	6.9	4.4
Other	36.8	58.5	21.4	37.1	11.4	4.6
Total	31.9	64.5	20.2	31.7	10.3	3.0

Assessing the effectiveness of treatment in Minnesota

An important predictor of post-treatment abstinence is whether patients complete treatment. In fact, Harrison and Asche (2000) state that it is the most important such predictor in their study of abstinence six months after treatment in Minnesota. Table 15 shows how completion of treatment varies by race. Whites have the highest rates of completion, followed by Asians and Hispanics. African Americans and American Indians have the lowest rates of completion.

Table 15. Percent Who Complete Treatment by Race.

Race	White	African American	American Indian	Hispanic	Asian	Other	Total
% Complete	65.4	53.1	55.1	58.5	61.6	54.1	62.7

DHS obtains several other measures in DAANES that assess various dimensions of functioning and addiction at admission and discharge. Six of these correspond to the dimensions specified by the American Society of Addiction Medicine (ASAM 2001) to be used in assessing addiction. They are (1) acute *intoxication* and/or potential for withdrawal, (2) *biomedical* conditions and complications, (3) emotional/behavioral conditions and complications, (*psychological*), (4) treatment acceptance/resistance (*readiness*), (5) *relapse*/continued use potential, and (6) recovery *environment*. The Substance Abuse and Mental Health Services Administration (SAMHSA) provides a nice summary of these dimensions in its TIP 26 (Blow 1998). Providers evaluate each client on each dimension as having (0) no problem, (1) a minor problem, (2) a moderate problem, (3) a serious problem, or (4) an extreme problem.

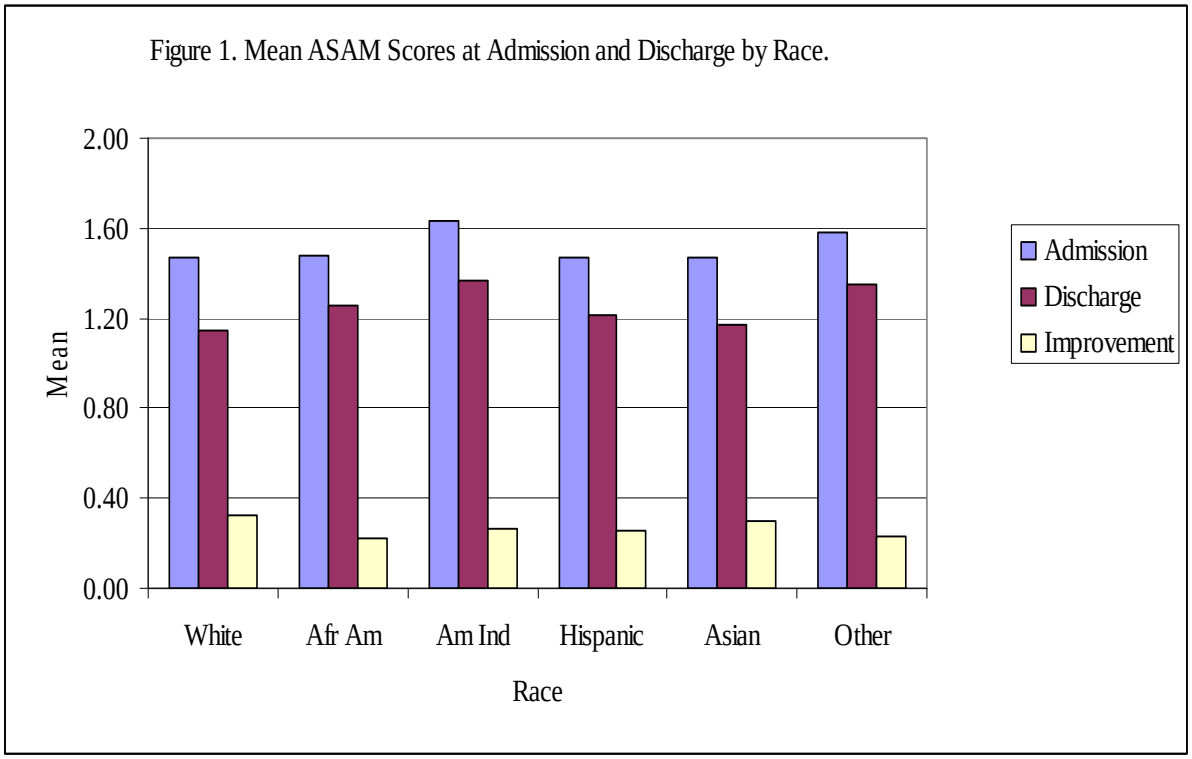
Table 16 displays the mean score on each dimension at admission and discharge for each racial group. The third panel in the table, labeled Improvement, shows the improvement in scores from admission to discharge. Although many points could be made about these data,

we concentrate on several main tendencies. First, scores at admission tend to be considerably higher than those at discharge; in fact, every group shows considerable improvement on every dimension. Second, scores at admission and discharge tend to be higher for relapse and environment and lowest for intoxication and biomedical. Third, scores at admission and discharge tend to be higher for American Indians. At least as measured by these indicators, they enter and leave treatment with more serious problems. Fourth, improvement, the difference between admission and discharge, tends to be highest for whites and Asians and lowest for African Americans; American Indians and Hispanics are intermediate.

Table 16. Mean Scores on ASAM Dimensions of Addiction at Admission and Discharge by Race.

		Race						
Measure	**Dimension**	**White**	**African American**	**American Indian**	**Hispanic**	**Asian**	**Other**	**Mean**
Admission	**Intoxication**	0.38	0.31	0.42	0.30	0.22	0.33	0.37
	Biomedical	0.64	0.68	0.74	0.49	0.39	0.57	0.64
	Psychological	1.63	1.52	1.79	1.59	1.64	1.76	1.63
	Readiness	1.68	1.72	1.95	1.81	1.94	1.89	1.71
	Relapse	2.43	2.45	2.57	2.46	2.54	2.62	2.45
	Environment	2.07	2.17	2.33	2.17	2.10	2.33	2.11
	Mean	1.47	1.48	1.63	1.47	1.47	1.58	1.49
Discharge	**Intoxication**	0.23	0.25	0.33	0.21	0.16	0.26	0.24
	Biomedical	0.49	0.53	0.60	0.40	0.32	0.48	0.50
	Psychological	1.33	1.41	1.53	1.37	1.36	1.61	1.36
	Readiness	1.33	1.54	1.67	1.53	1.48	1.68	1.40
	Relapse	1.92	2.06	2.17	2.02	2.03	2.17	1.96
	Environment	1.61	1.76	1.93	1.77	1.71	1.92	1.66
	Mean	1.15	1.26	1.37	1.22	1.18	1.35	1.18
Improvement	**Intoxication**	0.15	0.06	0.09	0.09	0.05	0.07	0.13
	Biomedical	0.15	0.15	0.14	0.09	0.07	0.10	0.15
	Psychological	0.30	0.11	0.26	0.22	0.29	0.16	0.27
	Readiness	0.35	0.18	0.28	0.28	0.46	0.20	0.32
	Relapse	0.52	0.40	0.40	0.44	0.52	0.45	0.49
	Environment	0.45	0.40	0.41	0.41	0.40	0.41	0.44
	Mean	0.32	0.22	0.26	0.25	0.30	0.23	0.30

Figure 1 illustrates several of these points graphically by plotting the mean admission, discharge, and improvement scores by race. It is heartening that American Indians, who show the most serious problems at admission, show considerable improvement but disheartening that African Americans show the lowest level of improvement.



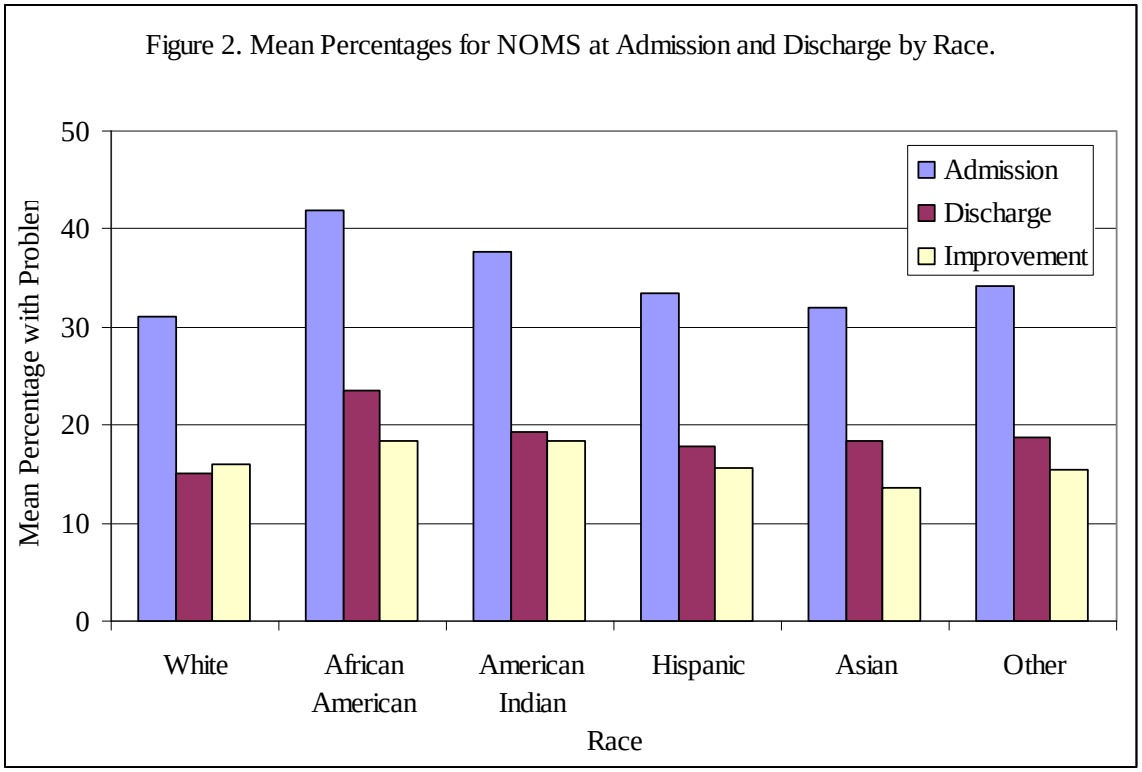
DHS also collects data that assess functioning at admission and discharge in several domains of living. SAMHSA (2009b) is in the process of finalizing a series of National Outcome Measures (NOMS) that all states are required to collect. The domains measured cover the 30 days prior to admission and discharge and include housing, participation in school or the labor force, criminal justice involvement, abstinence from alcohol and drugs, and social support. In particular, DAANES includes information at admission and discharge on whether patients are homeless, working full or part-time or a student, arrested in the prior thirty days, abstinent from alcohol, abstinent from drugs, participating in a self-help group, and having a family that is supportive of abstinence. We code all of these measures so that the percentages indicate the portion of the population that is experiencing difficulty; for example, we present the percentage that is not participating in a self-help group.

Table 17 shows the percentages experiencing difficulty on each NOMS in each racial group at admission and discharge. The third panel in the table, labeled Improvement, shows the reduction in the percentages from admission to discharge. Several features of this table are notable. First, every group shows considerable improvement on every dimension (except for others on family support). Second, larger percentages of patients experienced problems with labor force participation and use of substances at admission and discharge; homelessness was the least frequently mentioned problem, although this was a much greater problem for African Americans than for other groups. Third, higher percentages of African Americans and American Indians experience problems at admission and discharge. Fourth, African Americans and American Indians experience the greatest reduction in the percentages experiencing problems between admission and discharge.

Table 17. Percentages with Problems on NOMS at Admission and Discharge by Race.

		NOMS							
Measure	**Race**	**Homeless**	**Labor force**	**Arrest**	**Alcohol**	**Drugs**	**Support Group**	**Family**	**Mean**
Admission	**White**	4.4	51.1	12.7	45.7	33.1	57.0	14.0	31.1
	African American	15.4	73.7	12.6	45.6	53.7	63.8	28.1	41.8
	American Indian	7.9	67.5	20.4	43.9	41.4	63.9	18.7	37.7
	Hispanic	7.0	51.8	16.2	41.0	36.9	61.7	19.4	33.4
	Asian	4.0	45.6	17.7	38.8	34.4	63.7	19.8	32.0
	Other	9.4	55.8	11.3	43.5	45.9	58.4	14.4	34.1
	Total	6.1	55.0	13.4	45.3	36.3	58.5	16.1	32.9
Discharge	**White**	2.7	46.5	3.7	12.8	11.1	18.6	10.1	15.1
	African American	10.5	70.5	4.6	15.5	21.9	22.2	19.2	23.5
	American Indian	3.8	64.9	5.5	12.1	12.1	23.7	13.3	19.3
	Hispanic	4.8	47.9	4.9	12.9	16.2	24.3	14.2	17.9
	Asian	3.0	43.9	4.9	12.7	17.7	30.1	16.1	18.3
	Other	5.6	53.0	5.2	13.2	17.8	21.3	15.1	18.7
	Total	3.8	50.7	4.0	13.0	12.7	19.7	11.6	16.5
Improvement	**White**	1.6	4.7	9.0	32.9	22.0	38.3	3.9	16.1
	African American	4.9	3.2	7.9	30.1	31.8	41.5	8.9	18.3
	American Indian	4.1	2.6	14.9	31.8	29.2	40.1	5.4	18.3
	Hispanic	2.2	3.9	11.2	28.1	20.7	37.5	5.2	15.5
	Asian	1.0	1.8	12.8	26.1	16.7	33.6	3.6	13.7
	Other	3.8	2.8	6.1	30.3	28.1	37.1	-0.7	15.4
	Total	2.3	4.3	9.4	32.3	23.6	38.7	4.5	16.4

Figure 2 shows how the percentages, averaged over the dimensions, change from admission to discharge for the different racial groups. Higher percentages of African Americans and American Indians show problems at admission, but these groups also show the most improvement. Unfortunately, they continue to show the highest percentages at discharge.



Another measure of the effectiveness of treatment is whether patients are readmitted to treatment within a year of the discharge. To address this, we linked episodes of treatment for the same people and defined episodes that are separated by less than thirty days as part of the same treatment span. We then followed people for one year after discharge from the final episode in the span (including those spans that consist of only one episode) to see if they are readmitted. Because providers take considerable time to submit data to DAANES and we need one year after the final discharge, we present data for treatment spans that ended in 2005. Rodgers (2009) provides more detail on how these data were linked. Table 18 shows the percentages of people in the different racial groups who were readmitted to treatment within one year of discharge. American Indians and African Americans have the highest rates of readmission, while Hispanics, Asians, and whites have the lowest.

Table 18. Percentage of People Who Were Readmitted to Treatment Within One Year of Discharge in 2005 by Race.

Race	Percent Readmitted
White	20.8
African American	26.8
American Indian	30.1
Hispanic	18.8
Asian	20.5
Other	25.3

In summary, African Americans and American Indians are less likely to complete treatment, likely to have higher scores on the ASAM dimensions at discharge, more likely to have problems as measured by NOMS at discharge, and more likely to be readmitted to treatment within a year of discharge. It would seem that treatment is not as effective for American Indians and African Americans as it is for others. However, we emphasize that treatment does produce positive results for American Indians and African Americans in that they show considerable improvement on both ASAM and NOMS; in fact, improvement on NOMS for these groups is greater than the improvement shown by any other group. Furthermore, it is worth noting that while higher percentages of American Indians and African Americans than others are readmitted, most do remain out of treatment in the year following discharge.

Multivariate analysis of treatment completion in Minnesota

In this section, we assess whether the differences in completion rates between racial groups can be attributed to differences in the other factors, such as education or primary substances, that we report above. We concentrate on completion of treatment rather than the ASAM or NOMS measures because completion is measured at the end of treatment rather than in the 30 days prior to the end of treatment. While a similar logic would argue for focusing on readmission rather than completion, we favor completion because we can use more recent data. After investigating whether any of these factors substantially reduce differences between racial groups, we investigate whether the effects of race depend on these other factors. Technically, we estimate a series of logistic regression models; the first of these includes effects of race, the second includes effects of race and the other factors, and the third adds interactions between race and the other factors. We employ an iterative procedure of adding and removing factors and interactions to arrive at a preferred model that includes only significant effects.

The effects of race on completing treatment withstand the inclusion of controls for most of the other factors, but introducing the proportion of patients who are the same race reduces the effects of being African American and Hispanic to insignificance and increases the effect of being Asian to a level that is significant. In other words, the fact that African Americans and Hispanics have lower rates of completion than whites do results from the fact that they receive treatment in facilities in which lower proportions of the other patients are the same race that they are. If African Americans and Hispanics received treatment in facilities in which higher proportions of the other patients were African American and Hispanic, respectively, their rates for completion would be indistinguishable from those of whites. Conversely, if Asians, who have slightly lower rates of completion than whites do, received treatment in facilities with higher proportions of Asian patients, they would have rates of completion that would be even higher than those of whites. The effect of being American Indian is attenuated some by controlling for the proportion for patients who are the same race but remains significant.

Table 19. Additive Model of Logistic Regression of Completion.

Variable	Indicator	B	S.E.	p	Odds ratio
Race[a]	**African American**	-0.024	0.058	0.680	0.977
	American Indian	-0.212	0.063	0.001	0.809
	Hispanic	-0.096	0.085	0.260	0.909
	Asian	0.416	0.165	0.012	1.516
Drug use		-0.160	0.031	0.000	0.852
Education		0.067	0.017	0.000	1.070
Age		0.155	0.020	0.000	1.168
Labor force[b]	**Part-time**	-0.104	0.053	0.048	0.901
	Student	0.162	0.063	0.011	1.176
	Unemployed	-0.219	0.039	0.000	0.803
	Other	-0.382	0.046	0.000	0.683
Source of referral	**Criminal justice**	0.358	0.031	0.000	1.430
	Professional	-0.299	0.033	0.000	0.741
Primary substance[c]	**Methamphetamine**	-0.215	0.046	0.000	0.807
	Cocaine	-0.195	0.080	0.015	0.823
	Crack	-0.287	0.057	0.000	0.751
	Marijuana	-0.265	0.042	0.000	0.767
	Heroin	-0.542	0.088	0.000	0.581
	Other opiates	-0.331	0.074	0.000	0.718
	Other drugs	-0.316	0.116	0.006	0.729
	Unknown	0.113	0.150	0.452	1.119
Previous treatment		-0.029	0.005	0.000	0.971
Setting[d]	**Hospital inpatient**	0.608	0.070	0.000	1.836
	Short-term residential	0.644	0.041	0.000	1.905
	Long-term residential	0.048	0.041	0.241	1.050
	Methadone	-0.284	0.205	0.166	0.753
Proportion white		-0.063	0.019	0.001	0.939
Proportion same race		0.076	0.018	0.000	1.079
Proportion complete		0.947	0.023	0.000	2.579
Services	**Detoxification**	0.343	0.053	0.000	1.409
	individual counseling	0.179	0.036	0.000	1.196
	Group counseling	0.243	0.043	0.000	1.275
	Family counseling	0.116	0.039	0.003	1.123
	Spiritual counseling	0.359	0.035	0.000	1.432
	Care coordination	-0.197	0.037	0.000	0.821
	Transportation	0.202	0.038	0.000	1.224
Post-treatment referrals	**Treatment**	-2.521	0.031	0.000	0.080
	Support	1.492	0.029	0.000	4.445
	Housing	0.189	0.035	0.000	1.208
	Therapy	0.148	0.031	0.000	1.159
	Vocational	0.225	0.080	0.005	1.253
Constant		-3.318	0.146	0.000	0.036

[a] Effects are relative to white.
[b] Effects are relative to full-time.
[c] Effects are relative to alcohol.
[d] Effects are relative to outpatient.

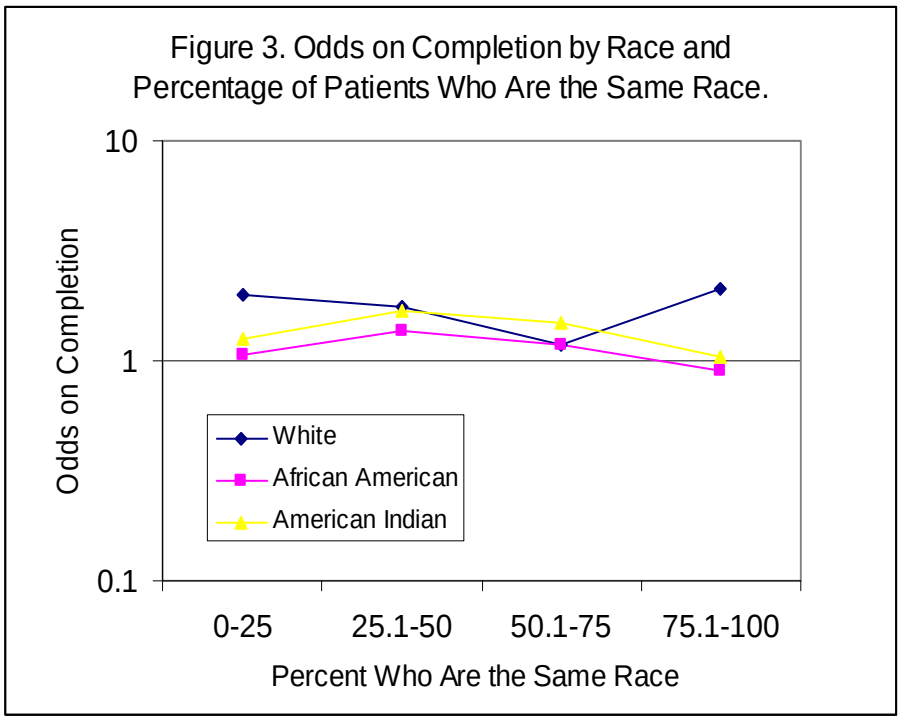
Table 19 presents the coefficients from the logistic regression of the odds on completion on the various factors. The model portrayed includes effects only for those variables that significantly affect the likelihood of completion, net of the other variables in the model. The column labeled b provides the logistic regression coefficient, which describes the effect on the natural logarithm of the odds on completing treatment, and the next column provides the standard error of the b; the ratio of b to its standard error tests the significance of the coefficient, which is provided in the next column. The last column provides the odds ratio; since an odds ratio of 1 indicates no effect, an odds ratio greater than 1 indicates a "positive" effect, and an odds ratio less than 1 indicates a "negative" effect. Two examples should help to understand these entries. The effects of race are calculated relative to the odds for whites. The odds ratio of 0.81 for American Indians indicates that being American Indian rather than white lowers the odds on completion by a factor of 0.81; alternatively, the odds on completing for American Indians are 81% of the odds for whites. Conversely, the odds ratio of 1.52 for Asians indicates that being Asian rather than white increases the odds on completing treatment by a factor of 1.52 or that the odds on completing are 52% greater for Asians than for whites. The fact that the effects for African Americans and Hispanics are not significant ($p > 0.05$) indicates that, controlling for the other factors in the model, the odds on completing are not significantly different for whites, African Americans, and Hispanics.

We briefly summarize the other effects in the model. Those who used drugs in the 30 days prior to admission are less likely to complete treatment. Age and additional education both increase the odds on completion. In terms of labor force status, students are most likely to complete treatment, followed by full-time workers, part-time workers, unemployed people, and others. Those with referrals from the criminal justice system are more likely and those with professional referrals are less likely than others to complete treatment. In terms of the primary substance of abuse, completion rates are ordered, from high to low, as follows: unknown substances and alcohol, cocaine, methamphetamine, marijuana, crack, other drugs, other opiates, and heroin. Having received treatment previously lowers the likelihood of completion. Patients who receive treatment in short-term residential (inpatient) settings are most likely to complete, followed by hospital inpatient, long-term residential (halfway house), outpatient, and methadone. Several other characteristics of the facility affect the likelihood of completion. The proportion of patients who are white lowers the odds on completion, whereas the proportion who are the same race as the patient and the proportion of patients who complete treatment increase the likelihood of a patient completing treatment. Receiving detoxification; individual, group, family or spiritual counseling; and transportation all increase the odds on completion; but receiving care coordination reduces these odds. We suspect that this reflects the fact that people who received care coordination received multiple services for multiple deficiencies and that it is the multiple deficiencies and not the coordination that affects the likelihood of completion. Finally, those who are referred to support, housing, and vocational services show higher odds on completion, but those who are referred to additional treatment show lower odds on completion.

To estimate the model with interactive effects, we separately tested the interactions of race with each of the factors that significantly affect the odds on completing treatment, as shown in Table 19. We then combined the significant interactions in one model and retained only those that remain significant in the presence of the other interactions. Our preferred model includes interactions of race with the proportion of patients who are the same race, race with receiving group counseling, and race with referrals to additional treatment, support groups,

and housing. Because the interactions are somewhat difficult to understand by examining the parameters of the model, we explain the interactions below by cross-classifying the variables of interest.

Figure 3 shows how the odds on completion vary by race of the patient and the percentage of patients in the facility who are the same race as the patient. Since the vast majority of Hispanics and Asians receive treatment in facilities with a small percentage of other patients of their race, we confine attention to whites, African Americans, and American Indians. The figure shows that the odds on completion are highest for African Americans and American Indians when the percentage of patients who are the same race is between 25% and 75%. For whites, the odds on completion are highest when the percentage is above 75%. When the percentage of patients who are of the same race is between 25% and 75%, the odds on completion are very similar for all three groups. At percentages outside of this range, the disparities between these groups are larger.



The interactive effect of race and receiving group counseling is easier to understand. All racial groups benefit from group counseling, but American Indians and whites benefit more. Receiving group counseling raises the odds on completing treatment by a factor of about 1.8 for African Americans, Hispanics and Asians, but by a factor of 2.4 for whites and 3.3 for American Indians. In other words, the beneficial impact of group counseling is larger by a factor of 1.3 for whites and 1.8 for American Indians.

The interactive effect of race and being referred to additional treatment is also fairly simple. In general, those who are referred to additional treatment are considerably less likely than others to complete treatment. This effect is attenuated among African Americans and, to a lesser extent, among American Indians. Being referred to additional treatment lowers the odds on completion by a factor of 0.10 among whites, but by 0.18 among African Americans

and 0.13 among American Indians. Hispanics and Asians show patterns similar to that of whites.

The interactive effects of race and being referred to housing and to support groups are very similar. Both show that the beneficial effect of being referred are greater for African Americans, American Indians, and Hispanics than for Asians and whites. For whites and Asians, the odds on completion do not vary much by whether the patient was referred to housing. However, for African Americans and American Indians, being referred to housing doubles the odds on completion; for Hispanics, being referred to housing raises the odds on completion by a factor of 1.3.

Being referred to support groups raises the odds on completion for all racial groups. For whites and Asians, being referred to support groups raises the odds on completion by a factor of 4.4; for African Americans, American Indians and Hispanics, this factor is over 6.0.

The causal ordering of referrals and completion status is problematic. It may be that the referral affects the likelihood of completion, but it is also possible that those who are more likely to complete receive a different pattern of referrals. The cross-sectional nature of the data used in this study precludes a definitive statement on causal ordering. It is clear, though that the associations of completion status with referrals to housing and support groups are stronger for African Americans and American Indians than for the other groups.

Conclusions

Most people who receive treatment for substance abuse or dependence in Minnesota are white, but there are more African Americans and American Indians in treatment than would be expected on the basis of representation in the population or estimates of need for treatment from surveys. It does not appear to be the case, though, that African Americans and American Indians are being over-treated, because, among those in treatment, people in these groups tend to use more and to exhibit more problems, as measured by NOMS and ASAM. Surveys of need probably do not function as effectively for these groups as for others, so the need for treatment may be underestimated for African Americans and American Indians.

The characteristics of people in treatment vary considerably be race. Whites and African Americans tend to be older and whites tend to be better educated. Whites are more likely to be employed full-time, and African Americans and American Indians are more likely to be unemployed.

Alcohol is the modal primary substance for all groups, but disproportionate numbers of African Americans report crack and heroin as primary substances, while disproportionate numbers of American Indians report other opiates as a primary substance. Users of all three of these substances are less likely than users of alcohol to complete treatment.

Placement into different types of treatment settings does not vary much by race, but, not surprisingly, all groups other than whites are more likely to get treatment in facilities in which they occupy a minority status. Whites and Hispanics are most likely to get treatment in facilities with high rates of completion.

Most measures of the outcomes of treatment indicate that whites and Asians do somewhat better, African Americans and American Indians do somewhat worse, and Hispanics have intermediate outcomes. The primary exception to this is that African Americans and American Indians improve more than the other groups do on NOMS, although African Americans and American Indians show more problems on NOMS at both admission and discharge.

The logistic regressions reveal that the lower completion rates of African Americans are due in large part to getting treatment in facilities in which a small portion of other patients are African American. The analysis of interactive models shows that African Americans, American Indians, and whites are about equally likely to complete treatment in facilities in which 25% to 75% of the other clients are of their race. Both African Americans and American Indians have lower rates of completion when these percentages are either lower or higher. Lacking random assignment, it is possible that the higher success rates in more integrated facilities result from more "treatable" patients with higher probabilities of success being referred to such facilities, but it seems likely that the level of integration of the facility has an effect. Given the relatively poor outcomes of African Americans and American Indians, referrals to more integrated facilities seems advisable.

Two other results from the analysis of interactions are notable. Being referred to housing and to support groups increases the odds on completion more for African Americans, American Indians, and Hispanics than for whites and Asians. African Americans, American Indians, and Hispanics are more likely to be homeless at admission and discharge, so therapists should emphasize finding stable housing for those in need. Members of all racial groups benefit from support groups but this effect is especially large for African Americans, American Indians, and Hispanics. Ensuring that people in these groups are referred to support groups and encouraged to participate should help to reduce disparities in outcomes.

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