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# Intersectional disparities in outpatient alcohol treatment completion by gender and race and ethnicity

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## Abstract

**Background:** Untreated alcohol use disorder (AUD) can lead to negative outcomes and premature death. Completing AUD specialty treatment can lead to improved economic and educational outcomes. There are large racial and ethnic disparities in treatment completion, but how these disparities vary intersectionally across gender is unknown. Recent studies suggest not using an intersectional approach can mask important disparities. This study estimated disparities in AUD non-intensive outpatient treatment completion by gender alone, race and ethnicity alone, and intersectionally in a gender-by-race-and-ethnicity model. Accurately quantifying treatment completion disparities is critical for not only understanding but also eventually eliminating healthcare disparities and advancing health equity.

**Methods:** Data are from SAMHSA's 2017 to 2019 Treatment Episode Dataset–Discharges for adults 18+ who entered non-intensive outpatient treatment primarily for alcohol (n=559,447 episodes; 30.3% women; 63.7% White, 18.0% Black, 14.4% Hispanic/Latinx, 2.1% American Indian/Alaska Native [AIAN], 1.0% Asian/Pacific Islander). Using the rank-and-replace method, treatment completion disparities were estimated by gender, race and ethnicity, and gender-by-race-and-ethnicity due to any reason other than differences in need for treatment, consistent with the Institute of Medicine's definition of healthcare disparity.

**Results:** The intersectional gender-by-race-and-ethnicity model identified the widest range of disparities among all models tested. Using this model, the largest disparities were identified for minoritized women's treatment episodes. Compared to White men (60.79%, 95% confidence interval [CI]: 60.06, 60.98), Black, Hispanic/Latina, AIAN, and AAPI women had treatment episode completion rates that were 12.35 (CI: 12.33, 12.37), 9.08 (CI: 9.06, 9.11), 10.27 (CI: 10.22, 10.32), and 4.87 (CI: 4.78, 4.95) percentage points lower, respectively.

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**Conclusions:** In the United States treatment completion rates for non-intensive outpatient alcohol treatment episodes are significantly lower for minoritized women compared to White men. The extent of the disparity is not apparent in univariate models, highlighting the importance of an intersectional approach to understand treatment completion disparities.

### Keywords

alcohol treatment; healthcare disparities; minoritized women; intersectionality; racial and ethnic disparities

## INTRODUCTION

Approximately 40% of American adults in specialty treatment for an alcohol use disorder (AUD) do not complete treatment (Substance Abuse and Mental Health Services Administration, 2021). Some studies find that alcohol treatment utilization is lower for individuals from minoritized racial and ethnic backgrounds (Zemore et al., 2014), particularly at higher levels of alcohol severity (Schmidt et al., 2007) and among women (Zemore et al., 2014). This is concerning, as untreated AUD can lead to economic instability, disruption in education and/or employment, and premature mortality (World Health Organization, 2018), outcomes that disproportionately affect Black and Hispanic/Latinx individuals compared to White individuals (Boyd et al., 2003; Caetano, 2003; Caetano et al., 2001; Iguchi et al., 2005).

Past research has estimated disparities in alcohol-specific and all substance use treatment completion by race and gender separately – a univariate approach. Compared to White individuals, Black individuals have been found to be 1.5 to 2 times less likely to complete treatment (Arndt et al., 2013; Grooms and Ortega, 2022; Longinaker and Terplan, 2014; Lucabeche and Haney, 2018; Mennis et al., 2019; Mutter et al., 2015; Sahker et al., 2015; Saloner and Cook, 2013; Stahler et al., 2016). Several studies have found a smaller disparity for Hispanic/Latinx (compared to White) individuals (Arndt et al., 2013; Grooms and Ortega, 2022; Longinaker and Terplan, 2014; Lucabeche and Haney, 2018; Mennis et al., 2019; Saloner and Cook, 2013). The few studies that examined Asian-American/Pacific Islander (AAPI) individuals showed higher treatment completion rates (Garrison et al., 2019; Mutter et al., 2015; Saloner and Cook, 2013), while American Indian/Alaska Native (AIAN) individuals have lower rates (Mutter et al., 2015; Saloner and Cook, 2013), compared to White individuals. Studies are mixed regarding gender, with some finding men to be 1.3 times more likely to complete treatment than women (Lucabeche and Haney, 2018; Mennis and Stahler, 2016) and others finding a small or no effects (Arndt et al., 2013; Mennis et al., 2019). As all these prior studies used the same national administrative data source, Treatment Episode Data Set-Discharges, mixed findings could be the result of varying inclusion criteria (e.g., years of data and/or treatment settings) or methods for handling missing data.

Recently there have been calls to use an intersectional approach in population health research to advance health equity (Bauer, 2014; Bowleg, 2012). Intersectionality is the theoretical framework introduced by Black feminist scholars in the 1990s (Collins, 1991;

Crenshaw, 1991) to examine how "social identities such as race, gender, sexual orientation, and socioeconomic status intersect at the microlevel of individual experience to reflect interlocking systems of privilege and oppression" (Bowleg, 2012). The premise is that individuals' lived experiences reflect their multiple social identities, for instance, being both Black and a woman or both AIAN and a man. One cannot assume that simply adding social inequalities estimated using a univariate approach will accurately capture the magnitude of disparities or distinctive experiences of persons with multiple oppressed statuses. As an example, one cannot add the inequalities faced by women and by Black individuals to understand the inequalities faced by Black women (Bowleg, 2012; Collins, 2015; Crenshaw, 1991). Intersectionality also recognizes that some individuals occupy multiple advantaged statuses (e.g., White men). One can compare the health outcomes of other intersectional groups to the most advantaged group to estimate health disparities. An intersectional approach can provide more precise identification of inequities faced by communities and aid in developing intervention strategies to address those inequities (Bauer, 2014).

As noted in a recent review focused on alcohol-related disparities (Mulia and Bensley, 2020), few studies of alcohol treatment services have applied an intersectional approach, in part because the latter requires "big data" and sufficient sample sizes to study treatments used by a small percentage of the population with AUD. Intersectional disparities have been more often examined in large epidemiologic studies of drinking patterns and alcohol-related problems (e.g., Caetano et al., 1998; Grant et al., 2012, Karriker-Jaffe et al., 2012; Mulia et al. 2018). In an early population-based study of intersectional differences in alcohol treatment utilization based on U.S. National Alcohol Survey data, Zemore and colleagues (2014) reported that Black and Latina women had lower lifetime odds of receiving specialty alcohol treatment relative to White women, and that racial and ethnic treatment disparities were notably larger among women than men. More recently, research based on electronic health records has revealed that women from minoritized groups are less likely than White women to receive brief intervention (Parthasarathy et al., 2023). Intersectional research is needed to investigate disparities that might exist at different points across the cascade of care for unhealthy drinking and AUD to assess the ability of the treatment system to successfully engage and retain diverse population groups in treatment aimed at facilitating recovery from alcohol problems.

Addressing this need, the current study investigated the benefits of using an intersectional approach to estimate disparities in completion of non-intensive outpatient alcohol treatment. To our knowledge, this is the first study to analyze intersectional disparities in US alcohol treatment completion. We estimated treatment completion disparities by gender alone, by race and ethnicity alone, and intersectionally, that is, by gender and race and ethnicity together. We compared the disparities calculated by gender-alone and race-and-ethnicity-alone models to the disparities calculated by the intersectional model to assess whether conclusions about the magnitude of disparities would differ, and whether the intersectional approach provides more precise information about inequitable outcomes. Following the Institute of Medicine's (IOM) definition of healthcare disparities, which considers differences in need for treatment a legitimate source of differences in completion rates, we used the rank-and-replace method to estimate disparities in treatment complete from all causes except for need for treatment (Cook et al., 2012).

# METHODS

## Data source and sample

Data are from the Substance Abuse and Mental Health Services Administration's 2017 to 2019 Treatment Episode Data Set-Discharges (TEDS-D). The TEDS-D contains discharges from substance use treatment facilities in the United States. State health departments are requested to submit discharge records from any treatment program receiving public funds; however, states decide provider eligibility. Each record provides discharge information for the initial admission within a treatment episode. Individuals who have multiple treatment episodes during the study period may have multiple records in the analytic sample. Combining three years of data created a large enough sample to examine minoritized groups and ensured findings did not reflect an outlier year.

We included discharges for treatment episodes for adults, ages 18 years or older, who received treatment in the non-intensive outpatient setting with alcohol as the primary substance being treated. We are focused on the non-intensive outpatient setting as the majority (56.5%) of adults receiving non-detox specialty treatment for an AUD do so in a non-intensive outpatient program (Substance Abuse and Mental Health Services Administration, 2021).

A total of 14,124 (2.4%) cases were excluded for missing data. This included 188 (0.03%) cases missing gender, 12,581 (2.1%) cases missing data on Hispanic origin, and 1,355 cases (0.3%) listed as non-Hispanic but missing data on race. Cases where Hispanic origin was indicated were included regardless of whether race was missing. Additionally, cases coded as 'non-Hispanic other single race' or 'non-Hispanic two more races' (n=17,469; 3.0%) were excluded. The final sample included 559,447 records from 47 states and the District of Columbia. Oregon and West Virginia did not provide data for the years analyzed. Discharges from Arizona were excluded due to concerns about accuracy of the outcome measure. The analysis plan for this study was not pre-registered, and therefore findings are exploratory in nature.

## Measures

**Outcome measure—**We used Saloner and colleagues' (2013) definition of treatment completion, which encompasses any planned discharge from treatment, including transfer to another treatment facility. All other reasons for discharge, including dropped out of treatment, terminated by facility, incarceration, death, and 'other' were coded as incomplete treatment.

**Independent variables—**Gender and race and ethnicity were the independent variables of interest. Hispanic/Latinx individuals of any race were coded as Hispanic/Latinx, and other categories included non-Hispanic White, Black, AIAN, and AAPI. Need-for-treatment variables included other drug use reported at admission (opioids, cocaine, stimulant, cannabis, and other; each measured dichotomously), age at first alcohol use, frequency of alcohol use in month prior to admission, and prior substance use treatment. Additional variables incorporated in the analysis, all of which are associated with treatment completion

in prior studies, included indicators of socioeconomic status (SES; employment status, living arrangement, educational attainment), age, and treatment referral source (Arndt et al., 2013; Longinaker and Terplan, 2014; Lucabeche and Haney, 2018; Mennis and Stahler, 2016; Mennis et al., 2019; Mutter et al., 2015; Sahker et al., 2015; Stahler et al., 2016). Missing data are described in Table 1 and Supporting Information, Suppl Table 1. Missing values were coded as a separate response category so that cases with missing covariates are included in analyses.

## Statistical methods

Descriptive statistics were generated for all variables stratified on gender by race and ethnicity. Disparities were calculated by gender with men as the referent, by race and ethnicity with White individuals as the referent, and by gender by race and ethnicity with White men as the referent. Supporting Information, Table 2 presents results for four gender-within-race and ethnicity models (e.g., Black women compared to Black men) and by race and ethnicity for women only (White women as referent).

We used the rank-and-replace method developed by Cook and colleagues (Cook et al., 2012; McGuire et al., 2006; Saloner and Cook, 2013) to approximate the IOM's definition of a healthcare disparity. The IOM defines a healthcare disparity as arising from differences in the clinical appropriateness of care received and in access to care among individuals with the same level of clinical need for care (Cook et al., 2012). Applied to alcohol treatment, group differences in completion rates associated with differences in *clinical need* (i.e., differences in need for treatment) are not considered indicators of a disparity. However, group differences that exist after accounting for clinical need *are* considered a disparity, and encompass a range of systemic and individual causes, including discrimination, operations of healthcare systems, legal and regulatory climate, and socio-economic factors (Smedley et al., 2003). The rank-and-replace approach estimates the disparity by creating a counterfactual population for each subgroup (e.g., Black individuals) that has the same need for treatment as a referent group (e.g., White individuals), but retains the original distribution for all other factors which may contribute to a disparity (e.g., SES, age, race and ethnicity, and treatment referral source). The difference between completion rates of the counterfactual population and the referent group is the disparity estimate.

For the first step in creation of the counterfactual sample, we generated a logistic model regressing treatment completion on race and ethnicity, gender, the need-for-treatment variables, and the additional covariates (SES indicators, age, referral source), as well as dummy variables for state in which treatment was received. We clustered standard errors at the state level to account for potential unequal variances across states, which could be caused by factors such as differences in state-level policies regarding specialty alcohol treatment and state-level demographic differences. Next, we calculated a need-for-treatment univariate index score for each case by summing the products of each variable's regression coefficients and values across all need-for-treatment variables. Within each subgroup, cases were ranked by their index score, and then the need for treatment index score for each case was replaced with the index score of an equivalently ranked case from the referent. This created a counterfactual sample, where the original values for gender, race and ethnicity,

SES indicators, age, referral source and state were retained, but each subgroup (e.g., Black men) had the same average need-for-treatment as the referent (e.g., White men). We then calculated an "adjusted" predicted likelihood of treatment completion for the counterfactual sample, using the replaced need-for-treatment index score and the original values of all other variables (i.e., gender, race and ethnicity, SES indicators, age, referral source, and state). Using these predictions, we calculated a need-adjusted treatment completion rate for each subgroup. The difference between the need-adjusted completion rates and those of the unadjusted referent group values is the healthcare disparity.

Confidence intervals (CI) for unadjusted rates were model based. Bias-adjusted confidence intervals were calculated using the bootstrap method, with 100 replications, for need-adjusted rates and healthcare disparities estimates. Disparities estimates with a CI not containing zero were considered to be statistically significant, and unadjusted and need-adjusted rates were significantly different if they did not have overlapping CIs. Analyses were conducted in STATA 17.1 (StataCorp LLC, College Station, TX).

### Sensitivity Analyses

We re-estimated the gender-by-race-and-ethnicity model with transfers to another facility coded as incomplete treatment (rather than as complete) in case these respondents did not complete treatment after transfer. Second, as coercion into treatment through the legal system is cited as a major predictor of treatment completion (Arndt et al., 2013; Longinaker and Terplan, 2014; Mutter et al., 2015; Sahker et al., 2015; Stahler et al., 2016) and prevalence of legal system involvement varies across gender-by-race-and-ethnicity groups, we estimated the gender-by-race-and-ethnicity model adjusting our counterfactual groups to have the same referral source, in addition to need for treatment, as White men. Third, as the dataset represents treatment episodes and not unique individuals, we re-estimated the gender-by-race-and-ethnicity model restricting the dataset to records that indicated the individual had no prior treatment as a sensitivity analysis, which limits the analysis to non-duplicated individuals seeking treatment for the first time.

## RESULTS

### Sample characteristics

Table 1 provides selected descriptive statistics for treatment episodes for each gender-by-race-and-ethnicity group. Full descriptive statistics are available in Supporting Information, Suppl Table 1. Treatment episodes in the sample were predominately for White individuals (63.7%) and/or men (69.7%), with 42.9% being treatment episodes involving White men. Compared to those for men, treatment episodes for women of all races and ethnicities had lower rates of referral to treatment by the legal system. Episodes for White and Black individuals of either gender had roughly double the rate of daily alcohol use in the month prior to admission compared to other race and ethnic groups. Episodes for Hispanic/Latino and AAPI men and women were less likely than those for their White counterparts to involve prior substance use treatment. Socioeconomic disadvantage was higher in treatment episodes for Black and AIAN individuals and for Hispanic/Latina women compared to

White men, based on lower rates of full-time employment, completing high school, and being housed.

## Unadjusted and need-adjusted treatment completion rates and healthcare disparity estimates

Table 2 presents the unadjusted and need-adjusted completion rates, as well as disparities estimates for the gender model, race-and-ethnicity model, and gender-by-race-and-ethnicity models. Supporting Information, Suppl Table 3 contains the full regression output for the gender-by-race-and-ethnicity model. In all models, all estimated disparities were statistically significant.

In the gender-only model (Table 2), after adjusting for need, the completion rate for treatment episodes among women (55.13%) was 4.37 percentage points lower than the rate for episodes among men (59.49%). In the race-and-ethnicity model (Table 2), when compared to episodes for White individuals (59.63%), treatment completion rates were 6.42, 2.30, and 6.36 percentage points lower for episodes involving Black, Hispanic/Latinx, and AIAN individuals, respectively. Conversely, episodes for AAPI individuals' need-adjusted treatment completion rate was 2.50 points higher than episodes for White individuals' rate.

The intersectional gender-by-race-and-ethnicity model resulted in the widest range of estimated treatment disparities (Table 2). The largest disparities were found among episodes among Black, Hispanic/Latina, and AIAN women whose need-adjusted completion rates, compared to episodes for White men (60.79%), were 12.35, 9.08, and 10.32 percentage points lower, respectively. Disparities in reference to White men's treatment episodes were greater for all minoritized women's groups compared to men of the same race and ethnicity, and these intersectional disparities were greater than what would be inferred by the results from the gender-only and race-only models for all women of color except for AIAN women. Specifically, with White men's treatment episodes as the referent, disparities in treatment completion were twice as high for Black women's episodes compared to Black men's (12.35 vs 5.89), five times higher for Hispanic/Latina women's episodes compared to Hispanic/Latino men's (9.08 vs 1.77), and almost twice as high for AIAN women's episodes than AIAN men (10.27 vs 5.99). When compared to the disparity estimated for White women's treatment episodes (3.65 percentage points lower than White men), disparities for Black, Hispanic/Latina, and AIAN women's treatment episodes were two to three times higher, and the disparity was 33% higher for AAPI women's treatment episodes. Notably, in the race-only model, AAPI individuals' treatment episodes had higher completion rates than White individuals'. In the gender-by-race-and-ethnicity model, this only held true for treatment episodes among AAPI men; AAPI women's episode completion rate was 4.87 points lower than that for White men.

Within each intersectional group, we compared unadjusted and need-adjusted treatment episode completion rates (the latter adjusted to have the same need-for-treatment as the referent group). Differences were found for Hispanic/Latinx men's and women's and for AAPI men's treatment episodes, with adjusted completion rates lower compared to unadjusted rates. Our model showed these groups' episodes indicated a lower need

for treatment than White men's episodes and, therefore, fewer would complete alcohol treatment if they had the same need for treatment as White men.

Results for gender differences within racial and ethnic groups, and for racial and ethnic differences among women, can be seen in Supporting Information, Table S2. In all cases, women's treatment episodes had lower completion rates compared to episodes involving men of the same race and ethnicity. Additionally, all minoritized women's treatment episodes had lower completion rates compared to White women's. None of these models estimated the same magnitude of disparities found when comparing completion rates to White men's treatment episodes using the intersectional approach.

### Results of sensitivity analysis

Sensitivity analyses that coded transfers to another facility as incomplete treatment, as opposed to complete, generated estimated disparities consistent with the original gender-by-race-and-ethnicity model. When adjusting for referral source in addition to need for treatment, the disparities among women's treatment episodes were consistent but slightly smaller, indicating some of the disparities are possibly due to these groups' lower rates of referral from the legal system. Conversely, the disparity for Hispanic/Latino men's treatment completion increased from 1.77 percentage points less to 4.08 percentage points less than White men's completion rate once episodes involving referral from the legal system were accounted for (results available upon request). In sensitivity analysis that restricted the sample to episodes for people with no prior treatment experience, the magnitude of the disparity was slightly larger in all groups, with the exception of AAPI men who were the only group in both the full sample and this subsample to show no disparity (Supporting Information, Suppl Table 4).

## DISCUSSION

### Main findings

Using national administrative data on substance use treatment discharges, we examined the benefit of an intersectional versus a univariate approach to estimate disparities in completion of non-intensive outpatient specialty alcohol treatment by gender and race and ethnicity. We believe this is the first study to use an intersectional approach to estimate these disparities. The findings from our univariate approach are consistent with previous studies that show a modest disparity for women compared to men, and lower treatment completion rates for Black, Hispanic/Latinx, and AIAN individuals and higher treatment completion for AAPI individuals compared to White individuals (Arndt et al., 2013; Garrison et al., 2019; Grooms and Ortega, 2022; Longinaker and Terplan, 2014; Lucabeche and Haney, 2018; Mennis et al., 2019; Mutter et al., 2015; Sahker et al., 2015; Saloner and Cook, 2013; Stahler et al., 2016). The results of our intersectional gender-by-race-and-ethnicity approach indicated a much broader range of disparities across groups, and highlighted particularly striking disparities for minoritized women that were obscured in the univariate models. Specifically, when the most advantaged intersectional group (White men) is the referent, the estimated disparity for Black, Hispanic/Latina and AIAN women are greater than any disparity estimated in univariate models. Additionally, whereas the univariate race-

and-ethnicity model indicated higher completion rates for AAPI than White individuals, the intersectional model indicated this holds true only for AAPI men, and that AAPI women are completing treatment at lower rates than White men. Taking an intersectional approach thus revealed greater population-level inequities in substance use treatment completion that underscore the value of an intersectional lens.

### Impact of adjusting for need for treatment

Consistent with the IOM definition of healthcare disparities, our disparity estimates adjusted for group differences in need for treatment. This adjustment had minimal impact on estimated completion rates; however, a few groups did show modest changes. After adjusting groups' need for treatment to be similar to White men, completion rates declined for AAPI men, consistent with other findings (Saloner and Cook, 2013), and to a lesser extent declined for Hispanic/Latinx men and women. Previous research indicates that early onset of drinking, daily alcohol use in the month prior to treatment entry, prior treatment receipt, and co-occurring drug problems are associated with lower odds of treatment completion (Longinaker and Terplan, 2014; Lucabeche and Haey, 2018; Mutter et al., 2015). Apart from greater co-occurring cocaine use among Hispanic/Latinx individuals and greater stimulant use for Hispanic/Latina women, AAPI and Hispanic/Latinx men and women had lower prevalence of these need-for-treatment factors than White men. Thus, when their treatment need is equated to that of White men, their predicted completion rate is lowered.

Although our IOM-informed analysis did not view group differences in clinical need as a source of a healthcare disparity, it is important to recognize that group differences in the need for treatment can be caused by unjust social, political, economic, and environmental conditions and resources (Mulia and Zemore, 2012; Witbrodt et al., 2014; Zemore et al., 2016). Thus, such differences in need for treatment may represent a health inequity that warrants attention in addition to inequities in healthcare services.

### Possible explanations for disparities in alcohol treatment completion by minoritized women versus White men

By analyzing these data with an intersectionality lens, we identified stark disparities for women of color. Because we adjusted for differences in need for treatment, estimated disparities in treatment completion are expected to reflect barriers such as limited treatment access and ancillary services as well as lower quality and satisfaction with care. Many of these barriers that influence treatment completion can also contribute to disparities in seeking and entering treatment (Mulia and Bensley, 2020). Even after treatment entry, access to treatment can be an ongoing issue for those in treatment due to factors such as lack of job flexibility, childcare, and transportation (Blow, 2000; Frazer et al., 2019), limited insurance coverage, and inability to pay (Saloner and Cook, 2013; Tucker et al., 2004). Lack of childcare is a particular barrier for women, as they are approximately twice as likely to be living with a child compared to men in treatment (Guerrero et al., 2014). Black and Latina women might face special challenges as they are more likely than White women to be single parents (United States Census Bureau, 2022). Only 5.8% of treatment programs provide childcare (Substance Abuse and Mental Health Services Administration, 2019). Socioeconomic factors such as housing instability, lower educational attainment and

less-than-full-time employment are each associated with not completing treatment (Arndt et al., 2013; Jacobson et al., 2007; Mennis and Stahler, 2016; Mennis et al., 2019; Mutter et al., 2015; Saloner and Cook, 2013; Stahler et al., 2016), and the Black, Hispanic/Latina, and AIAN women in our sample had greater socioeconomic disadvantage than White men. Experiencing stigmatization and discrimination during treatment also can lead to leaving prematurely (Mays et al., 2017). Stigma may be a larger barrier for Black and Hispanic/Latina women compared to White women (Pinedo et al., 2020), and it may be especially salient for mothers and pregnant women of color (Nichols et al., 2021). Women of color also report facing discriminatory healthcare providers at higher rates compared to White women (Hall et al., 2015; SteelFisher et al., 2019; Tajeu et al., 2015). Lack of culturally tailored and linguistically accessible treatment could also account for lower rates of treatment entry and retention for minoritized groups (Alegría et al., 2006; Guerrero et al., 2013). Lastly, a lack of mental health services may disproportionately impact women, as there is evidence that women enter alcohol treatment with greater need for these services (Krawczyk et al., 2017; McCrady et al., 2020). Deeper examination of each of these hypothesized factors is outside the scope of this paper but critical for a truly intersectional inquiry into treatment completion disparities.

## Strengths and Limitations

This study utilized a large national dataset designed to capture discharge information on all publicly-funded non-intensive outpatient treatment programs in the United States (Substance Abuse and Mental Health Services Administration, 2021). The large sample allowed us to estimate disparities for racial and ethnic minoritized groups that cannot be assessed in smaller datasets. Due to the large sample size, almost all tests were statistically significant; however, we did find large effects that have clinical relevance. Limitations should also be noted. The dataset allowed us to approximate need-for-treatment using variables including age of first use, use of other substances, frequency of alcohol use in month prior to admission, and prior substance use treatment, but it did not contain data on a clinical assessment of AUD severity. Due to a large amount of missing data, we could not include co-occurrence of psychiatric disorders in the need-for-treatment adjustment, which is associated with lower likelihood of treatment completion (Krawczyk et al., 2017; McCrady et al., 2020), nor insurance status as a covariate, which prior research has shown is related to treatment completion (Krawczyk et al., 2017; Mutter et al., 2015). The dataset also represents treatment episodes and not individual people, so some individuals may appear more than once in the data. As the analysis focused on the non-intensive outpatient setting, these results may not be generalizable to other treatment settings. Race and ethnicity were gathered from administrative records, which are fairly concordant with self-assessed race and ethnicity with the exception that Hispanic/Latinx and Native American individuals are more likely to be misclassified as White (West et al., 2005). This could result in a slight underestimate of disparities for those groups. An additional limitation is that some observations were eliminated from the sample due to missing data on race and/or ethnicity. However, the total number of treatment episodes missing such data was small (2.4%), and previous research by the Census Bureau suggests elimination of cases without data on race or ethnicity is unlikely to cause bias in estimates of health disparities (Limburg et al 2023).

### Implications and future research

The focus of the current study on completion of specialty alcohol treatment, a prognosticator of longer-term, successful recovery (Evans et al., 2009; Garnick et al., 2009; McKay, 2005; Moos and Moos, 2003), extends the scant literature on intersectional disparities in alcohol screening, brief intervention, referral to, and alcohol treatment entry (e.g., Parthasarathy et al. 2023, Zemore et al. 2014, Mulia and Bensley, 2020). Taken together, the research reveals a consistent pattern of disparities experienced by racially and ethnically minoritized women along the cascade of care for unhealthy alcohol use. Notably, this same pattern of disparities has been found in the persistence and recurrence of alcohol use disorder (Grant et al, 2012). This underscores the need for policy makers, health care insurers, and treatment providers to consider multi-level interventions that could increase equity in access, engagement, and completion of alcohol-related care.

We estimated alcohol treatment disparities at the intersection of gender and race and ethnicity. However, just as gender and racial and ethnic groups are not monoliths, neither are the intersections highlighted here. These groups contain individuals with multiple social identities based on socioeconomic status, sexual orientation, disability status and other characteristics. Future work could examine treatment completion disparities for these additional groups to further identify people who may benefit from tailored outreach and treatment programming to address barriers. Lastly, as a true intersectional approach requires examination of sociopolitical and sociocultural factors that contribute to the disparity (Poteat, 2021), additional research is needed to understand how these factors contribute to lower treatment completion rates for minoritized women. This is critical to inform development of interventions to increase equity in treatment completion and long-term recovery from AUD.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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**Table 1.**

Selected descriptive statistics of treatment episodes for adults ages 18+ who entered non-intensive outpatient treatment primarily for an alcohol problem (2017-2019 from 47 states and the District of Columbia, n=559,447)[1]

| | White | | Black | | Hispanic/Latinx | | American Indian/Alaska Native | | Asian-American/Pacific Islander | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women | Men | Women | Men | Women |
| n | 240,127 | 116,384 | 77,068 | 27,891 | 60,797 | 19,617 | 7,422 | 4,272 | 4,676 | 1,193 |
| n (row %) | 42.9 | 20.8 | 13.8 | 5.0 | 10.9 | 3.5 | 1.3 | 0.8 | 0.8 | 0.2 |
| 55 years and older (%) | 16.7 | 14.7 | 17.5 | 12.1 | 9.2 | 6.4 | 9.4 | 5.9 | 9.7 | 6.0 |
| Socioeconomic factors (%) | | | | | | | | | | |
| Experiencing homelessness[2,3] | 6.3 | 5.3 | 10.6 | 9.6 | 5.9 | 6.7 | 7.4 | 7.0 | 4.6 | 5.1 |
| Less than high school education[2,4] | 15.6 | 12.5 | 25.5 | 26.8 | 36.9 | 27.9 | 24.0 | 24.7 | 19.4 | 12.9 |
| Employed full-time[2,5] | 39.3 | 26.6 | 29.6 | 21.6 | 47.4 | 27.6 | 31.4 | 22.5 | 49.2 | 33.1 |
| Referral from criminal justice system (%)[2,6] | 44.6 | 33.1 | 46.1 | 29.9 | 58.6 | 38.1 | 56.0 | 43.0 | 60.0 | 41.2 |
| **Need for Treatment Variables** | | | | | | | | | | |
| First alcohol use at 14yrs old or younger (%) | 33.6 | 30.8 | 28.1 | 23.4 | 28.6 | 30.0 | 41.8 | 42.1 | 17.1 | 20.1 |
| Daily alcohol use in month prior to treatment entry[2,7] (%) | 20.5 | 20.0 | 21.4 | 20.8 | 9.7 | 10.9 | 12.4 | 13.0 | 10.4 | 9.0 |
| Prior Treatment[2,8] (%) | 53.1 | 50.7 | 52.0 | 48.1 | 40.4 | 40.6 | 55.2 | 51.4 | 32.9 | 38.2 |
| Other Drug Use (%) | | | | | | | | | | |
| Opioid | 7.9 | 9.3 | 3.4 | 3.4 | 3.1 | 3.6 | 4.4 | 5.0 | 1.8 | 2.8 |
| Cocaine | 9.6 | 9.4 | 21.0 | 21.2 | 12.1 | 10.3 | 6.4 | 6.6 | 4.7 | 7.0 |
| Stimulant | 6.9 | 8.3 | 2.1 | 2.3 | 5.8 | 9.8 | 11.3 | 16.4 | 4.9 | 8.1 |
| Cannabis | 27.5 | 22.3 | 35.6 | 32.4 | 24.6 | 23.7 | 35.9 | 31.0 | 19.4 | 19.1 |
| Other | 6.5 | 7.8 | 5.8 | 6.2 | 2.8 | 3.6 | 8.2 | 8.5 | 3.8 | 4.4 |

[1] See supplemental table 1 for full descriptive statistics for all variables used in the models. Oregon and West Virginia did not provide data for the years analyzed. Discharges from Arizona were excluded due to concerns about accuracy of the outcome variable.

[2] Variable has missing values. Percentages were calculated excluding cases with missing values from the denominator.

[3] Data missing for 2.6% of cases, n=14,336

[4] Data missing for 1.7% of cases, n=9,744

[5] Data missing for 2.0% of cases, n=11,279

[6] Data missing for 1.3% of cases, n=7,045

[7] Data missing for 9.0% of cases, n=50,199

[8] Data missing for 6.5% of cases, n=46,581

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**Table 2.**

Estimated healthcare services disparities for non-intensive outpatient alcohol treatment episodes completion by race, ethnicity, and gender

| | Unadjusted Treatment Completion | | Need-Adjusted Completion[1] | | Health Services Disparity[3] | |
|---|---|---|---|---|---|---|
| | Rate (%) | 95% Confidence Interval | Rate (%) | 95% Confidence Interval[2] | Percentage Point Difference | 95% Confidence Interval[2] |
| **Gender model** | | | | | | |
| Men | 59.49 | (59.33, 59.64) | referent | | | |
| Women | 55.13 | (54.89, 55.36) | 55.12 | (55.10, 55.15) | −4.37 | (−4.38, −4.36) |
| **Race & ethnicity model** | | | | | | |
| White | 59.63 | (59.47, 59.79) | referent | | | |
| Black | 52.93 | (52.63, 53.23) | 53.21 | (53.17, 53.25) | −6.42 | (−6.43, −6.41) |
| Hispanic/Latinx | 58.79 | (58.44, 59.12) | 57.33 | (57.16, 57.50) | −2.30 | (−2.31, −2.29) |
| AIAN | 53.20 | (52.29, 54.10) | 53.27 | (53.18, 53.36) | −6.36 | (−6.39, −6.33) |
| AAPI | 64.58 | (63.34, 65.80) | 62.13 | (61.94, 62.31) | 2.50 | (2.46, 2.53) |
| **Gender-by-race model** | | | | | | |
| White men | 60.79 | (60.06, 60.98) | referent | | | |
| Black men | 54.56 | (54.20, 54.91) | 54.90 | (54.83, 54.96) | −5.89 | (−5.90, −5.88) |
| Hispanic/Latino | 60.66 | (60.27, 61.05) | 59.02 | (58.98, 59.06) | −1.77 | (−1.78, −1.75) |
| AIAN men | 54.88 | (53.75, 56.01) | 54.80 | (54.71, 54.89) | −5.99 | (−6.02, −5.95) |
| AAPI men | 66.23 | (64.88, 67.59) | 63.60 | (63.51, 63.69) | 2.81 | (2.77, 2.86) |
| White women | 57.24 | (56.96, 57.52) | 57.14 | (57.09, 57.18) | −3.65 | (−3.66, −3.64) |
| Black women | 48.43 | (47.85, 49.02) | 48.44 | (48.43, 48.45) | −12.35 | (−12.37, −12.33) |
| Hispanic/Latina | 52.98 | (52.28, 53.68) | 51.70 | (51.63, 51.77) | −9.08 | (−9.11, −9.06) |
| AIAN women | 50.28 | (48.88, 51.78) | 50.52 | (50.39, 50.64) | −10.27 | (−10.32, −10.22) |
| AAPI women | 58.09 | (55.28, 60.89) | 55.92 | (55.80, 56.04) | −4.87 | (−4.95, −4.78) |

[1]Need-adjusted completion rates were estimated by using regression coefficients to produce a counterfactual group that had the same need for treatment (other drug use reported at admission, age at first alcohol use, frequency of alcohol use in month prior to admission, and any prior substance use treatment) as the referent group.

[2]Bias-adjusted confidence intervals were estimated using the bootstrap method.

[3]The health services disparity is the difference between the unadjusted treatment rate for the referent group and the need-adjusted rate of the comparison group.