Assessing Bias in Documentation of Alcohol Use Disorders in Primary Care Settings Across Intersections of Race or Ethnicity, Sex, and Socioeconomic Status: The Role of Symptoms and Stigma

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Abstract

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Alcohol use disorder (AUD) is harmful, with an 11.3% prevalence among adults living in the United States (U.S.), and is growing among key vulnerable demographics. Although there is effective AUD treatment available, only 4.6% of adults with AUD receive any alcohol-related treatment. Primary care has the potential to deliver evidence-based treatment and is accessible to most adults, making it an ideal setting for systematically improving both the diagnosis and treatment of AUD. However, in most clinical settings, including primary care, AUD is frequently underdiagnosed and undertreated. Part of this is likely due to a heavy reliance on clinicians' subjective assessments of AUD symptoms (i.e., typically without standardized assessment measures of AUD symptoms) and which likely results in inconsistent and incomplete information about AUD symptoms. Additionally, the disparities in clinically-documented AUD across race, ethnicity, and sex shown in prior research suggest that there are likely potential biases in diagnosing practices in clinical settings. Further, the stigmatizing language used to

describe mental health conditions, such as AUD, may reflect underlying biased beliefs held by clinicians making diagnoses, while also perpetuating stigma. These limitations imply that there is a need to develop, test, and adopt innovative approaches to assist clinicians in recognizing AUD symptoms in a systematic and standardized manner, which may help them accurately diagnose AUD in an unbiased manner. This dissertation describes the distribution of clinically-documented AUD and the proportion of AUD diagnoses reported in electronic health records (EHRs) using stigmatized language across intersecting identities, therefore providing foundational knowledge for whether bias occurs in the diagnosis of AUD in primary care settings. Specific aims of this dissertation were to: 1) describe patterns in the prevalence of clinically-documented AUD in EHRs in primary care patients across intersections of race or ethnicity, sex, and socioeconomic status (SES); 2) describe, among primary care patients who reported high-risk drinking, patterns in the prevalence of clinically-documented AUD in EHRs in primary care across intersections of race or ethnicity and sex, adjusting for patient-reported alcohol consumption and AUD symptoms; and 3) describe the proportion of AUD diagnoses documented in EHRs with stigmatized descriptors among primary care patients across intersections of race or ethnicity and sex. **Aim 1** used Kaiser Permanente Washington (KPWA) EHR data linked to a census tract neighborhood deprivation index, representing community-level SES, from 439,375 adult primary care patients who completed alcohol screenings from 3/1/2015-9/30/2020. We described the prevalence of clinically-documented AUD based across 36 subgroups defined by intersections of race or ethnicity, sex, and terciles of community-level SES based on documented EHR diagnostic codes for AUD. Among women, the prevalence was highest for AI/AN women with middle SES, 1.5% (95% CI:1.0-2.3), and lowest for Asian women with middle SES, 0.1% (95% CI:0.1-0.2). Among men, the prevalence was highest for

AI/AN men with high and middle SES, 2.0% (95% CI:1.1-3.4) and 2.0% (95% CI:1.2-3.2), respectively, and lowest for Asian men with high SES, 0.5% (95% CI:0.3-0.7). Black and Latine patients tended to have a lower prevalence of AUD than White patients, across all intersections of sex and SES except for Black women with high SES. The overall prevalence of clinically-documented AUD was 1.0% and varied across race or ethnicity and sex, but no consistent pattern emerged for SES. **Aim 2** used KPWA EHR data from 14,442 adult patients who self-reported high-risk drinking (AUDIT-C score 7-12), had primary care encounters from 3/1/2015-2/28/2022, were Asian, Black, Latine, or White, and completed a DSM-5 Alcohol Symptom Checklist (0-11). We described the prevalence of clinically-documented AUD across 8 intersections of race or ethnicity and sex. Rates of clinically-documented AUD diagnoses increased as alcohol consumption and AUD symptoms increased. The prevalence of clinically-documented AUD diagnoses differed across the 8 intersectional subgroups differed in unadjusted analyses ranging from 12.2% (95% CI: 9.8-15.0) to 21.7% (95% CI: 17.7-26.3) but did not differ after adjustment for both AUDIT-C score and AUD symptoms ranging from 11.0% (95% CI: 8.7-13.8) to 15.1% (95% CI: 14.3-16.0). This suggests that observed differences in the prevalence of clinically-documented AUD diagnoses across intersectional subgroups likely were due to differences in alcohol consumption and AUD symptom burden across subgroups. **Aim 3** used AUD text descriptors from adult primary care patients who were Asian, Black, Latine, and White and had AUD diagnoses documented in EHRs during primary care visits from 3/1/2015-5/31/2023. We described the proportion of AUD diagnoses documented with stigmatized descriptors across intersections of race or ethnicity and sex. The overall proportion of stigmatized AUD descriptors in the EHR was 18.6% or 88.5%, depending on whether stigmatized AUD descriptors excluded or included stigmatizing language from valid DSM-IV

diagnoses, respectively (i.e., alcohol abuse, alcohol dependence). There appeared to be no meaningful variation across race or ethnicity, or intersections based on race or ethnicity and sex, but men had AUD diagnoses documented with a significantly higher proportion of stigmatized text descriptors compared to women. Findings suggest that further efforts are needed to reduce the amount of stigmatized language associated with alcohol use disorder in the EHR. Overall, the findings of this dissertation support the use of intersectional approaches to describing disparities in AUD, the use of standardized tools for AUD symptom assessment alongside routine population-based alcohol screenings, and efforts to reduce stigmatized language associated with alcohol use.

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Dedication

To those struggling with mental health conditions, such as alcohol use disorder, whose voices have been silenced by the powers that be.

CHAPTER 1

Introduction

Alcohol use disorder (AUD) is common, debilitating, deadly, and increasing.

Alcohol use disorder (AUD) is a chronic relapsing brain condition in which the affected individual struggles to cease or regulate alcohol consumption despite negative social, occupational, or health consequences (NIAAA, 2013). Lower life expectancy and poor health outcomes are associated with AUD (NIAAA, 2020; Rehm et al., 2014; Rehm & Shield, 2019). Further, AUD affects 11.3% of adults living in the United States (U.S.) (C. f. B. H. S. a. Q. SAMHSA, 2021) and is increasing across many demographics, including women, older adults, persons with lower education and incomes, and minoritized racial and ethnic groups (Grant et al., 2017).

Accurate and equitable diagnosis of AUD is necessary for treating AUD in clinical settings.

Effective AUD treatment can be delivered in specialty or primary care settings (Bradley & Kivlahan, 2014; Reus et al., 2018). However, most people with AUD do not receive AUD treatment (CBHSQ, 2021b). Primary care is an ideal setting to both diagnose and treat AUD given most adults (80%) access primary care services and have the ability to receive effective treatments through primary care settings (e.g., medications for AUD) (NHIS, 2021). However, AUD is under-diagnosed and under-treated in clinical settings, including in primary care settings (Hallgren et al., 2020; McGlynn et al., 2003; Williams et al., 2014), suggesting that there is a need to develop, test, and implement new approaches for helping providers identify AUD symptoms and accurately diagnose AUD when it is present. Critically, diagnosis of AUD in primary care settings must be made in an unbiased manner, given that AUD is one of the most stigmatized mental health disorders (Schomerus et al., 2011), and clinical settings, including

primary care, largely depend on providers' assessment of AUD and potentially incomplete information from patients (Johnson et al., 2022). When presented with limited or ambiguous clinical information, providers may be more prone to assign stigmatized diagnoses to patients who are different from themselves or members of more marginalized groups (e.g., women and individuals from a minoritized race or ethnicity) (Park et al., 2021). However, it is not well established whether biases due to sexism or racism lead to inequitable diagnosing practices for AUD.

The prevalence of AUD varies across race, ethnicity, and sex when assessed in confidential national surveys.

Studies that assess AUD using standardized assessment tools in confidential, structured research interviews can provide a reference point for estimating the prevalence of AUD in the general population and in healthcare settings – including in subgroups of women and minoritized individuals. Such studies have found that the prevalence of AUD in the U.S. general population varies across subgroups based on race, ethnicity, and/or sex, and is highest among American Indian and Alaska Native (AI/AN) individuals, non-Latine White individuals, and men (Grant et al., 2015; C. f. B. H. S. a. Q. SAMHSA, 2021). These studies also found that Black and Latine individuals had lower rates of AUD compared to White individuals. Further, prior research has evaluated the association between community-level socioeconomic status (SES) and unhealthy alcohol use (Brenner et al., 2015; Cerdá et al., 2010; Rhew et al., 2018), with somewhat inconsistent findings. For instance, one study showed that neighborhood disadvantage was associated with lower unhealthy alcohol use among White individuals, but associated with higher unhealthy alcohol use among Black individuals (Karriker-Jaffe et al., 2012). Further, minoritized racial and ethnic groups, women, and individuals with lower SES experience greater social and

medical consequences associated with AUD compared to White individuals, men, and individuals with higher SES (Collins, 2016; Karriker-Jaffe et al., 2012; Mulia, 2020; Mulia et al., 2009).

There appears to be inequitable diagnosing of AUD in clinical settings across key subgroups.

To our awareness, the only studies examining systematic differences in clinically-documented AUD (i.e., AUD that is detected by a healthcare provider, diagnosed, and recorded in the patient's medical record) have been conducted in the Veterans Health Administration (VA). These studies showed that the prevalence of clinically-documented AUD diagnoses varied by race or ethnicity, within both women and men. However, counter to studies of the U.S. general population, Black and Latine patients had a higher prevalence of clinically-documented AUD than White patients (Williams et al., 2016), even after adjusting for levels of self-reported alcohol consumption on a routine alcohol screening measure (Vickers-Smith et al., 2023). Other VA research also suggests that unhealthy alcohol use, AUD, and alcohol-related medical conditions may be more prevalent for patients living in communities with lower SES (Edmonds et al., 2022). Moreover, the associations between community-level SES and these alcohol-related measures were larger for Black and American Indian/Alaska Native patients compared to White patients (Edmonds et al., 2022), suggesting the impact of SES may be further compounded by the impact of racism.

Experts in health disparities research recommend assessing disparities across intersections of identities (i.e., race or ethnicity, sex, and SES) as a proxy for the societal structures that maintain them (i.e., racism, sexism, and classism).

Intersectionality Theory (Patricia Hill Collins, 2012), Public Health Critical Race Praxis (Ford & Airhihenbuwa, 2010), and health disparities research (Glass et al., 2017; Griffith et al., 2021; Parthasarathy et al., 2023) all suggest that structural racism, sexism, and classism, derived from multiple intersecting structures (e.g., policies, laws, cultural practices), may overlap to contribute disparities in how AUD is recognized, diagnosed, and documented for individuals based on their lived experiences (e.g., socioeconomic status) and/or identity characteristics (e.g., race, ethnicity, and sex) (**Supplemental Figure 1**). In the context of healthcare, intersectionality influences various experiences for the individual seeking care, along with individual health behaviors (e.g., alcohol consumption), alcohol symptoms, employment, employment-based insurance coverage, and trust in the health system that could impact reporting of alcohol use and related symptoms. Individuals in minoritized subgroups with experience of racism, sexism and/or classism in health care settings may avoid the health system until medical concerns are severe, thus presenting with more severe medical problems, including AUD. Furthermore, intersectionality may have an effect on how healthcare institutions provide care, such as bias in who is diagnosed with AUD and the use of stigmatized language in the specific AUD diagnostic labels provided (e.g., "alcohol abuser" vs. "alcohol use disorder"). Understanding intersectional disparities and oppression often begins with describing patterns of health outcomes across subgroups based on the intersection of identities and lived experiences. However, to our knowledge, no research has examined patterns of clinically documented AUD across intersections of race, ethnicity, sex, and SES.

It is not well known whether members of marginalized or multiply marginalized groups are more likely to be clinically diagnosed with AUD described with stigmatizing labels for AUD when they are diagnosed.

Stigma is deeply ingrained in American society and culture (Pescosolido et al., 1999) and contributes significantly to healthcare inequalities (Kilian et al., 2021). It is important to acknowledge that AUD is a highly stigmatized condition, and that many people with AUD have intersecting identities that may further compound that stigma.

Stigma associated with receiving an AUD diagnosis is increasingly recognized, and the language used to describe AUD or people with AUD may reflect underlying stigmatized attitudes of the person making the diagnosis, while also further perpetuating stigma. Language used to describe AUD that implies that patients are to blame for or could control their condition, or is hopeless in recovering from their condition, carries greater stigma. For instance, terms such as "abuser" or "chronic alcoholic" is more stigmatized that "person with alcohol use disorder" (Kelly & Westerhoff, 2010).

Furthermore, recent literature has applied Intersectionality Theory (Crenshaw, 1989), rooted in Black Feminism, (Patricia Hill Collins, 2012; Crenshaw, 1989) to the concept of stigma, creating "intersectional stigma" (Berger, 2004). Intersectional stigma posits that multiple stigmatized identities or characteristics can intersect to create healthcare disparities (Turan et al., 2019), such as the ones seen in AUD diagnosis. For instance, prior studies have found that Black patients are more likely to have negative descriptors in their EHR compared to White patients (Michael Sun et al., 2022), and women are more likely than men to be blamed for their substance use disorder (Kelly et al., 2021). However, it is not well known whether intersectional stigma influences disparities in stigmatized AUD diagnoses across subgroups based on their racialized, ethnic, or gender identities.

Kaiser Permanente Washington (KPWA) is an ideal setting to conduct research on differences in clinically-documented AUD by race or ethnicity, sex, and SES for multiple reasons.

KPWA is a large integrated healthcare system in Washington state that provides both health insurance and medical care to over 700,000 patients, including about 350,000 who receive care in 35 internal primary care clinics that use an integrated EHR. Additionally, KPWA administers a validated (Bradley et al., 2007) routine screening questionnaire, the AUDIT-C, to about 90% of its adult primary care patients (Glass et al., 2018). KPWA also has data on clinically documented AUD and text descriptors used when making an AUD diagnosis, providing the opportunity to study differential rates of clinically documented AUD and potentially stigmatizing text descriptors used when diagnosing. Finally, KPWA has other critical measures, including a DSM-5 Alcohol Symptom Checklist (ASC) in the EHR (Hallgren et al., 2021), a Neighborhood Deprivation Index (Messer et al., 2006) that reflects community-level SES, outpatient and inpatient diagnoses, race, and sex from the data warehouse. KPWA also has a research institute with embedded researchers who know the health system and its data. This allowed us to characterize patterns of diagnosis in a real-world clinical setting with rigorous alcohol-related and SES measures.

Summary and specific aims

Collectively this work aims to understand disparities in diagnosing AUD in healthcare settings across the intersection of race or ethnicity, sex, and SES to better support initiatives that could improve accurate and equitable diagnosis of AUD and increase treatment of AUD. It examines AUD diagnosing for potential bias and applies intersectionality theory as a viable framework for examining bias and improving quality. This work was supported and funded by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) under a diversity supplement for award number R33AA028073 and the University of Washington Department of Psychiatry and Behavioral Sciences. The specific aims are:

1. **Describe patterns in the prevalence of clinically-documented AUD in electronic health records (EHRs) in primary care patients across intersections of race or ethnicity, sex, and socioeconomic status (SES)** among 439,375 KPWA primary care patients. Specifically, we estimate the prevalence and 95% confidence intervals (CIs) of clinically-documented AUD based on International Classification of Disease (ICD) codes across subgroups based on the intersections of race (Latine, Asian, Black, NH/PI, AI/AN, and White), terciles of neighborhood deprivation (low SES, Middle SES, and high SES), stratified by sex.
2. **Describe, among 14,442 primary care patients who reported high-risk drinking, patterns in the prevalence of clinically-documented AUD in EHRs in primary care across intersections of race or ethnicity and sex, adjusting for patient-reported alcohol consumption and AUD symptoms.** Specifically, we estimate the prevalence and 95% CIs of clinically-documented AUD across subgroups based on the intersections of race (Asian, Black, Latine, and White) and sex, after adjustment for validated alcohol screen (AUDIT-C) and validated measure of DSM-5 AUD (Alcohol Symptom Checklist) as measures of patient-reported alcohol consumption and AUD severity, respectively.
3. **Describe the proportion of AUD diagnoses documented in EHRS with stigmatized descriptors among primary care patients across intersections of race or ethnicity and sex.** Specifically, we coded EHR descriptors used in documenting AUD as stigmatized or not, based on 4 experts' independent coding, informed by guidelines for non-stigmatized language for addiction. We then estimated the proportions and 95% CIs of AUD diagnoses documented with stigmatized descriptors across subgroups based on the intersections of race (Asian, Black, Latine, and White) and sex**.**

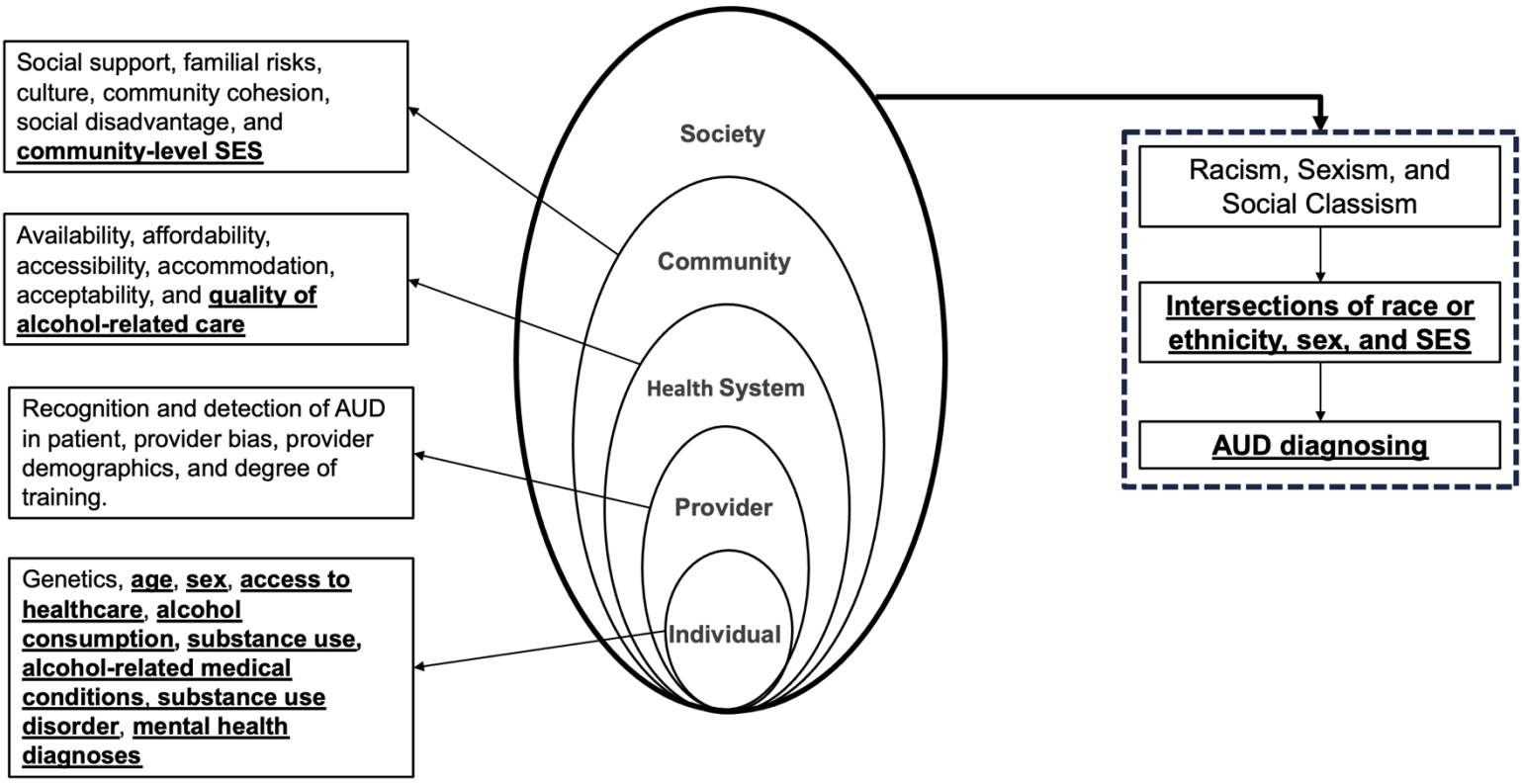

Figure 1. The conceptual model used in this study to describe patterns of clinically documented AUD across intersections of race or ethnicity, sex, and terciles of community-level SES.

Factors depicted in **bold** are those that could be measured using this study's dataset

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CHAPTER 2

Prevalence of Alcohol Use Disorders Documented in Electronic Health Records in Primary Care Across Intersections of Race or Ethnicity, Sex, and Socioeconomic Status

BACKGROUND

Alcohol use disorder (AUD) is a common, debilitating, and deadly (NIAAA, 2020; Rehm & Shield, 2019) yet treatable condition that affects 11.3% of adults living in the United States (C. f. B. H. S. a. Q. SAMHSA, 2021). The prevalence of AUD varies across subgroups, being highest among American Indian and Alaska Native (AI/AN) individuals, non-Latine White individuals, and men (Grant et al., 2015; SAMHSA, 2020). It is less clear whether or how the prevalence of AUD varies across levels of socioeconomic status (SES) (Calling et al., 2019; Karriker-Jaffe, 2011). However, minoritized racial groups, women, and individuals with lower SES experience greater social and medical consequences associated with AUD (Collins, 2016; Kelly et al., 2021; Mulia, 2020; Mulia et al., 2009). Further, persons with multiple overlapping identities that confer societal disadvantage given current and historical power structures (e.g., persons with intersections of race, gender, and lower access to resources), may experience co-formation of risks associated with AUD (Crenshaw, 1989; Glass et al., 2017).

Diagnosing AUD is a critical step in increasing access to AUD treatments. Primary care is an ideal setting to both diagnose and treat AUD, as most U.S. adults (80%) access primary care services (NHIS, 2021), and multiple evidence-based AUD treatment options can be delivered in primary care (Bradley & Kivlahan, 2014; Reus et al., 2018). However, AUD is under-diagnosed and under-treated, including in primary care settings (Hallgren et al., 2020; Rieckmann et al., 2016; Williams et al., 2022). Moreover, research in the Veterans Health

Administration (VA) (Williams et al., 2022; Williams et al., 2016) found that, among both women and men, the prevalence of clinically-documented AUD diagnoses varied across race and ethnicity. In a study of VA patients nationwide, Black and Latine patients had a higher prevalence of documented AUD than White patients. In contrast, in population-based interview studies of the US population, White patients have a higher AUD prevalence (Grant et al., 2015). However, these VA studies only assessed diagnoses across two identity characteristics (race or ethnicity, and sex), and findings may not generalize to non-VA settings.

Many studies have found that individuals with lower SES consistently experience a disproportionate burden due to alcohol (Collins, 2016; Mulia et al., 2008). Patients may be more likely to have an AUD diagnosis in the medical records if they live in highly disadvantaged neighborhoods where people are more likely to drink at high levels (Edmonds et al., 2022). However, prior studies of clinically-documented AUD diagnosis did not include measures of SES.

Intersectionality Theory (Patricia Hill Collins, 2012), Public Health Critical Race Praxis (Ford & Airhihenbuwa, 2010), and research on health disparities (Glass et al., 2017; Griffith et al., 2021; Parthasarathy et al., 2023) suggest that disparities, such as those seen in AUD, often result from multiple intersecting structures (e.g., policies, laws, cultural practices) that influence individuals in different ways based on their lived experiences (e.g., socioeconomic status) and/or identity characteristics (e.g., race, ethnicity, and sex) (**Supplemental Figure 1**). Describing patterns of health outcomes across subgroups based on the intersection of identities and lived experiences is often a first step in understanding intersectional oppression. However, no research to our knowledge has examined clinical documentation of AUD across intersections of race, ethnicity, sex, and SES.

The aim of this study was to describe patterns in the prevalence of clinically-documented AUD in primary care patients across intersections of race or ethnicity, sex, and SES. Complementing prior work conducted within the VA (Williams et al., 2016), this study was conducted in a large health system that has a greater representation of women and people of all ages, facilitating comparisons with the US general population.

METHODS

Study design and data source. This cross-sectional study was conducted in Kaiser Permanente Washington (KPWA), an integrated health system in Washington State. Patients were eligible if they: (1) were ≥ 18 years old, (2) had ≥ 1 primary care encounter in one of 35 KPWA primary care clinics 03/2015-09/2020, and (3) had alcohol screening documented in the EHR within the prior year. If more than one encounter was eligible for a patient, one was randomly selected as the index encounter. Patients were excluded if they did not have race or ethnicity documented as Latine, Asian, Black, Native Hawaiian/Pacific Islander (NH/PI), American Indian/Alaska Native (AI/AN), or White, or if their race or ethnicity were documented as "other" or "unknown" (**Figure 1**). This study was approved by KPWA Health Research Institute's Review Board with a waiver of consent and HIPAA authorization to use existing EHR data for research.

Measures

Predictor variables of interest

***Race or Ethnicity*.** Race and ethnicity were extracted from the EHR and categorized into 6 mutually exclusive groups (Latine, non-Latine Asian, non-Latine Black, non-Latine NH/PI, non-Latine AI/AN, and non-Latine White). KPWA collected data on race and ethnicity for the EHR using a voluntary demographic questionnaire sent by email (Kaiser-Permanente, 2018);

when patients did not complete the questionnaire, they were asked for this information at their next visit. Each member could select one of two ethnicity categories (Latine or non-Latine) and up to 7 racial categories (Asian, Black, Native Hawaiian/Pacific Islander (NH/PI), American Indian/Alaska Native (AI/AN), White, Other, and Unknown). Patients who reported multiple races (other than Latine) were assigned to their reported racial group with the smallest count within the study sample, consistent with other epidemiological studies (Grant et al., 2015; Parker, 2006; Parker et al., 2004).

Sex. Sex (male/man or female/woman) was extracted from the EHR and could represent either sex or gender.

***Community-level Socioeconomic status* (SES).** Messer's Neighborhood Deprivation Index (MNDI) was used to estimate patients' community-level SES (SES hereafter). The MNDI is a validated index (Doubeni et al., 2012; Laraia et al., 2012; Stoddard et al., 2013) providing census tract-level measures of SES based on measures of education, housing, income, employment, public assistance, and family structure from the American Community Survey (Messer et al., 2006). Principle component analysis (PCA) was used to standardize MDNI scores and to determine the weight of each variable (Messer et al., 2006) (**Supplemental Table 1**). For the current study, the MNDI was obtained based on patients' residential addresses recorded during the index visit and scores were categorized into low, middle, or high terciles of SES based on whether patients were in the lower, middle, or top third of the distribution of MNDI scores in the study sample.

Primary outcome

Clinically-documented AUD was defined as the presence of any active AUD diagnosis documented by a provider in the EHR on the day of an index primary care encounter or in the

following 365 days. Active AUD diagnoses were defined based on the International Classification of Diseases 9th and 10th Edition (ICD-9 and ICD-10; **Supplemental Table 2**) (Vickers-Smith et al., 2023; Williams et al., 2016). Diagnoses from KPWA insurance claims were not included in this study to allow a study of diagnoses made by providers who could view routine alcohol screening results.

Covariates

Age (continuous) at index visit was extracted from EHRs. *Days enrolled in the KPWA system in the two years prior to the index visit* and *days enrolled in the KPWA system over the one year after the index visit* were included to account for eligibility for KPWA care. *Clinics* where index visits occurred and *calendar years* of the visits were included to account for potential differences in AUD diagnosing practices across clinics and changes over time, respectively.

Alcohol use was measured with the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) questionnaire (**Supplemental Figure 2**) (Bradley et al., 2007; Frank et al., 2008; Johnson et al., 2013). The most recent AUDIT-C score (0-12) prior to the index visit was used to adjust for differences in alcohol use across intersections of race, ethnicity, sex, and SES and increased likelihood of receiving AUD diagnosis for higher levels of alcohol use (Vickers-Smith et al., 2023; Williams et al., 2022). All study clinics offered annual alcohol screening (Lee et al., 2023) during the study period, with 91% screened in February 2020 (Hallgren et al., 2022). The EHR automatically prompted medical assistants to ask patients to complete screening on paper if not completed within the past year; medical assistants entered responses into the EHR before visits. For descriptive purposes, AUDIT-C scores (0-12) are

categorized into 5 risk levels: no drinking (score of 0 points), low-level drinking (1-2 women/1-3 men), mild (3-6 women/4-6 men), moderate (7 to 8), and severe (9-12) unhealthy alcohol use.

Previous *EHR-documented alcohol and substance use disorders*, *medical conditions* that are highly attributable to alcohol (e.g., liver disease, pancreatitis, and cirrhosis), and *mental health diagnoses* (e.g., depression, anxiety, and bipolar disorder) required one relevant inpatient or two relevant outpatient ICD-9 or ICD-10 diagnostic codes in the EHR within two years prior to the index visit (**Supplemental Table 3**) (Jack et al., 2023).

Analyses

***Descriptive statistic*s.** Consistent with intersectionality theory, we described demographic and clinical characteristics overall and across racial and ethnic subgroups within women and men, separately, to account for sex-related differences in the prevalence of AUD (Erol & Karpyak, 2015). Within these subgroups, we used the chi-square test of independence to compare the proportions of terciles of SES (low SES, middle SES, and High SES), insurance types, days of enrollment in the KPWA system, previous alcohol and substance use, medical conditions attributable to alcohol use, mental health diagnosis, and alcohol use.

Primary Analyses. This study draws on recommendations from Public Health Critical Race Praxis and intersectionality theory to integrate conceptualization that centers minoritized and marginalized voices by examining patterns across subgroups based on the intersection of race, ethnicity, sex, and SES (Caldwell & Crenshaw, 1996; Ford & Airhihenbuwa, 2010, 2018), rather than simply comparing to a dominant referent group. The predicted prevalence and 95% confidence intervals (CIs) of clinically-documented AUD were estimated for each of the 18 subgroups reflecting the intersection of race or ethnicity, and tercile of SES, with separate models for women and men. Predicted prevalence estimates were obtained using generalized

linear models with marginal standardization, with a stepped approach to covariate adjustment. Model 1 was unadjusted. Model 2 adjusted for *age*, *days enrolled*, *calendar year*, and *clinic*. Model 3 added adjustment for AUDIT-C score. Model 4 added adjustments for *EHR-documented diagnoses of alcohol and substance use disorders*, *medical conditions* attributable to alcohol, and *mental health diagnoses in the past 2 years*. These models were specified *a priori* to determine whether patterns of clinical diagnosis changed when adjusting for different measures that could affect diagnosing practices. Additionally, a sensitivity analysis was performed that repeated Models 1-3 on a sample restricted to patients without any alcohol and substance use disorder diagnoses documented in the prior 2 years.

Prior to modeling, we conducted power analyses to estimate the precision of estimates based on anticipated 95% confidence limits (CIs), assuming an AUD prevalence rate of 5% (Williams et al., 2016) within the estimated size of the smallest minoritized subgroup (N=527, expected 95%:3.4-7.3) and largest minoritized group (N=10,798; expected 95% CI:4.6-5.4), which we judged to be an adequate level of precision. All analyses were performed using R Version 4.2.0.

RESULTS

Among 439,375 eligible primary care patients included in this study, 59% (N=259,008) were women (**Table 1a**), and 41% (N=180,367) were men (**Table 1b**). Among women, 7.0% were Latine, 11.7% Asian, 5.4% Black, 1.3% NH/PI, 1.6% AI/AN, and 73.0% White. Among men, 6.0% were Latine, 10.0% Asian, 5.5% Black, 1.3% NH/PI, 1.3% AI/AN, and 75.9% White. For both women and men, Latine, Black, NH/PI, and AI/AN, had a higher prevalence of patients with lower SES compared to high SES. Women were younger and had a higher proportion of Medicaid insurance compared to men of all racial or ethnic subgroups. Latine, Black, and NH/PI

patients tended to be younger than White patients, who had the highest proportion of patients insured through Medicare. Commercial or private insurance was the most common among all racial or ethnic groups for both women and men. Low-level drinking was the most common drinking category across all racial or ethnic groups except for Asian women, for whom non-drinking was most common. Patients with moderate to severe unhealthy alcohol use made up a small proportion of patients, but the proportion was higher in men than women.

Unadjusted Prevalence of clinically-documented AUD

The unadjusted prevalence of clinically-documented AUD in the overall sample was 1.0% and varied across intersections of race or ethnicity, sex, and terciles of SES (**Table 2: Model 1**). Results show inconsistent patterns across low, middle, and high terciles of SES across sex and race or ethnic groups (**Table 2: Model 1**). Asian patients had the lowest prevalence of AUD compared to other races or ethnicities; men tended to have a higher prevalence compared to women. Among men, the prevalence of AUD was highest for AI/AN men with high and middle SES, 2.0% (95% CI: 1.1-3.4) and 2.0% (95% CI: 1.2-3.2), respectively, and lowest among Asian men with high SES, 0.5% (95% CI: 0.3-0.7) (**Table 2: Model 1**). Among women, the prevalence of AUD was highest among AI/AN women with middle SES, 1.5% (95% CI: 1.0-2.3), and lowest among Asian women with middle SES, 0.1% (95% CI: 0.1-0.2) (**Table 2: Model 1**). Of note, point estimates of the prevalence of clinically-documented AUD in White patients were higher than in Black or Latine patients across all intersections of sex and SES terciles, except Black women with high SES.

Adjusted Prevalence of clinically-documented AUD

After adjusting for age, days enrolled, calendar year, and clinic, variation was consistent with patterns observed in the unadjusted model. The highest prevalence remained among AI/AN

men with middle and high SES, and lowest among Asian men with high SES (**Table 2: Model 2**). Among women, the highest prevalence remained among AI/AN women with middle SES and the lowest among Asian women with middle SES, although NH/PI women with high SES were now comparably low (**Table 2: Model 2**).

After additionally adjusting for AUDIT-C scores, observable patterns of the prevalence of AUD continued to vary across race or ethnicity, sex, and terciles of SES (**Table 2: Model 3**). However, differences in AUD prevalence across race, ethnicity, and sex were attenuated.

Adding adjustments for past alcohol and substance use disorders, alcohol-associated medical conditions, and mental health diagnoses, did not meaningfully change observable patterns (**Table 2: Model 4**).

Sensitivity analyses in a sample restricted by removing 9,252 patients with prior alcohol and substance use disorders, showed similar patterns as previous models (**Table 3**).

DISCUSSION

This is the first study to our knowledge to describe the prevalence of clinically-documented AUD across subgroups based on the intersection of race or ethnicity, sex, and SES among primary care patients, in a manner consistent with principles from Intersectionality Theory and Public Health Critical Race Praxis. Several patterns were observed across subgroups. First, the prevalence of AUD was very low in all racial or ethnic, sex, and SES groups compared to clinical estimates of AUD from prior studies in the VA (6.5%) and national estimates in the adult population (11.3%) (C. f. B. H. S. a. Q. SAMHSA, 2021; Williams et al., 2016). Second the prevalence of AUD appeared to vary across intersections of race or ethnicity, sex, and SES, but confidence intervals were wide and largely overlapping. Third, there were no consistent patterns across terciles of SES. Fourth, Asian patients had a lower prevalence compared to other

racial and ethnic groups. Fifth, women had a lower prevalence compared to men. Lastly, patterns remained consistent despite adjustment for several factors expected to account for differences in clinically-documented AUD, except for adjustment for alcohol use attenuating differences across some subgroups.

The low prevalence of clinically-documented AUD in this study, ranging from 0.1-2.0% from Asian middle SES women to AI/AN high SES men, was lower than in previous studies in clinical settings. For instance, a VA study reported a prevalence of clinically-diagnosed AUD at 6.5% overall in women and men combined: 5.7% for White, 7.1% for Latine, and 9.8% for Black (Williams et al., 2016). Differences in prevalence may be due to differences in the populations of patients who receive care in the VA and KPWA, or differences in the care setting. For example, VA patients are more often men (who have a higher prevalence of AUD than women) (Williams et al., 2016), have higher alcohol use compared to the general U.S. adult population (Teeters et al., 2017), and are at increased risk of developing AUD in part due to disproportionate exposure to violence and trauma (Williams et al., 2022; Dworkin et al., 2018). Additionally, the VA has accessible and affordable addiction services available to treat AUD (Anhang Price et al., 2018; VA-Healthcare, 2022, 2023; Washington et al., 2006), and VA patients may be more willing to disclose drinking behavior and seek addiction services compared to other settings (Williams et al., 2016). In contrast, during this study's observation period, KPWA provided addiction treatment almost entirely outside the integrated delivery system via providers in the community, which could have reduced AUD diagnoses documented in the EHR (Lee et al., 2023). This study contributed to the scientific literature by exploring clinically-documented AUD by race or ethnicity, sex, and SES in a non-veteran primary care setting with adequate representation of women.

The prevalence of AUD found in this study was lower than in studies using "gold-standard" interview-based diagnostic measures, suggesting that AUD may be underdiagnosed. For instance, the National Survey on Drug and Health (NSDUH) found a higher prevalence of AUD in U.S. adults in 2020: 11% overall, with a range from 4.8% for NH/PI, 7.9% for Asian, 10.1% for Latine, 10.8% for Black, 11.1% for White, and 14% for AI/AN adult respondents (SAMHSA, 2020). Differences in the observed prevalence of AUD found in NSDUH and KPWA may be due to several factors. NSDUH used detailed, semi-structured interviews that assessed 11 symptoms of AUD according to the AUD diagnosing criteria in DSM-5 (CBHSQ, 2021a). AUD diagnoses in a clinical setting were largely dependent on providers' assessment of AUD and potentially incomplete information from patients (Johnson et al., 2022). This unstructured approach to recognizing and diagnosing AUD in clinical settings may be more susceptible to bias given the stigma of AUD and may be particularly biased for groups with intersecting lived experiences of stigma and discrimination resulting from systems of power and oppression (Gopal et al., 2021; Khadilkar & Khadilkar, 2020).

We anticipated that patients may be more likely to have clinically-documented AUDs if they lived in communities with lower SES, given people who live in disadvantaged communities are more likely to drink at higher levels (Edmonds et al., 2022). However, this pattern across SES was only observed in White men, who made up 76% of the men in the sample, in whom lower SES tended to be associated with a higher prevalence of clinically-documented AUD (1.8% in low SES, 1.7% in middle SES, and 1.5% in high SES). The unexpected inconsistent patterns across terciles of community-level SES within race or ethnic subgroups might be due to inadequate sample sizes of minoritized racial and ethnic groups. Future studies with larger sample sizes for minoritized patients may be needed to detect SES-related differences with

greater precision. Further, the observation of inconsistent patterns across terciles of SES found in this study is consistent with a previous scientific literature (Karriker-Jaffe, 2011). Although some prior studies show that people living in higher SES areas engage in more frequent and heavier drinking (Collins, 2016), which may result in a higher prevalence of AUD, medical providers may not document stigmatized conditions, such as AUD, as often in those individuals.

In this study, Asian patients tended to have a lower prevalence of clinically-documented AUD compared to any other race or ethnic group. This is concordant with a previous U.S. population-based study (Grant et al., 2017) that showed AUD was generally lower among Asian respondents. However, although the prevalence of AUD diagnosis among Asian Americans is generally lower, Asians who have AUD appear to have disproportionately lower rates of alcohol treatment utilization (Haeny et al., 2021). Also consistent with patterns of AUD observed in the U.S. general population, White patients in this study had a higher prevalence compared to Black patients (SAMHSA, 2020). In contrast to this study and findings observed in the U.S. general population, previous VA studies evaluating AUD in clinical settings found that Black patients had a higher prevalence of AUD compared to White patients, even after adjusting for patient-reported alcohol consumption (Vickers-Smith et al., 2021; Williams et al., 2022). These differences may reflect VA's alcohol screening processes, which may have resulted in greater under-reporting of unhealthy alcohol use in Black compared to White patients (Bradley et al., 2011).

The prevalence of clinically-documented AUD was higher among men compared to women, consistent with previous clinical studies among veterans (Vickers-Smith et al., 2021; Williams et al., 2022; Williams et al., 2016) and in the U.S. general population (Grant et al., 2017; SAMHSA, 2020). This pattern remained despite adjustments for alcohol use via AUDIT-

C, suggesting that even after adjusting for higher reported alcohol use by men, men were still diagnosed with AUD at a higher rate than women. Of note, despite women being diagnosed with AUD at lower rates compared to men, prior studies suggest women experience a disproportionate amount of burden from alcohol use (Mulia, 2020) and stigma compared to men (Kelly et al., 2021).

Limitations

The use of EHR data from a large sample of 439,375 primary care patients made it feasible to conduct the first study to our knowledge that described clinically-documented AUD across intersections of race or ethnicity, sex, and SES. However, relying on EHR data presented several limitations. For instance, EHR-ascertained race, ethnicity, sex, and community-level SES cannot fully capture the multiple factors that influence how much a person is exposed to or experiences structural discrimination associated with intersecting identities. This may influence levels of alcohol consumption and/or likelihood of receiving a clinically-documented AUD diagnosis. Furthermore, the clinically-documented AUD in this study was limited to diagnoses made by primary care clinicians in KPWA's EHR. Excluding external claims data for AUD diagnoses provided by clinicians in the community may have reduced the prevalence of clinically-documented AUD observed in this study. Moreover, our sample was predominantly White, with smaller sample sizes for minoritized race and ethnic groups. This study was conducted in a single integrated health system in Washington State; findings may not generalize to other clinical settings. Additionally, this study had no measure of the true prevalence of AUD in KPWA patient subgroups.

The study also has important strengths. KPWA is a regional integrated healthcare system caring for large numbers of women and men that have implemented high-quality patient self-

report screening allowing assessment of the prevalence of documented AUD after adjusting for alcohol use. The study had access to patient addresses that were used to assess community-level SES. Finally, these factors were used in stepwise regression modeling, allowing for stepped adjustment of multiple important factors that could have impacted the interpretation of findings.

CONCLUSIONS

This study contributes foundational knowledge for understanding how patients' intersecting identities may be reflected in the documentation of AUD diagnoses in medical settings. The prevalence of clinically-documented AUD varied across intersections of race or ethnicity, sex, and SES. Unlike prior population-based studies using EHR data in VA, except for AI/AN patients, minoritized race or ethnic groups had a lower prevalence of AUD than white patients across sex and a spectrum of SES. There were no consistent patterns across terciles of SES within subgroups of intersections based on race or ethnicity, and sex. Further research using larger samples of minorized groups across a spectrum of SES is needed to understand differences in clinically-documented AUD across intersections of race, ethnicity, sex, and SES.

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FIGURES FOR CHAPTER 2

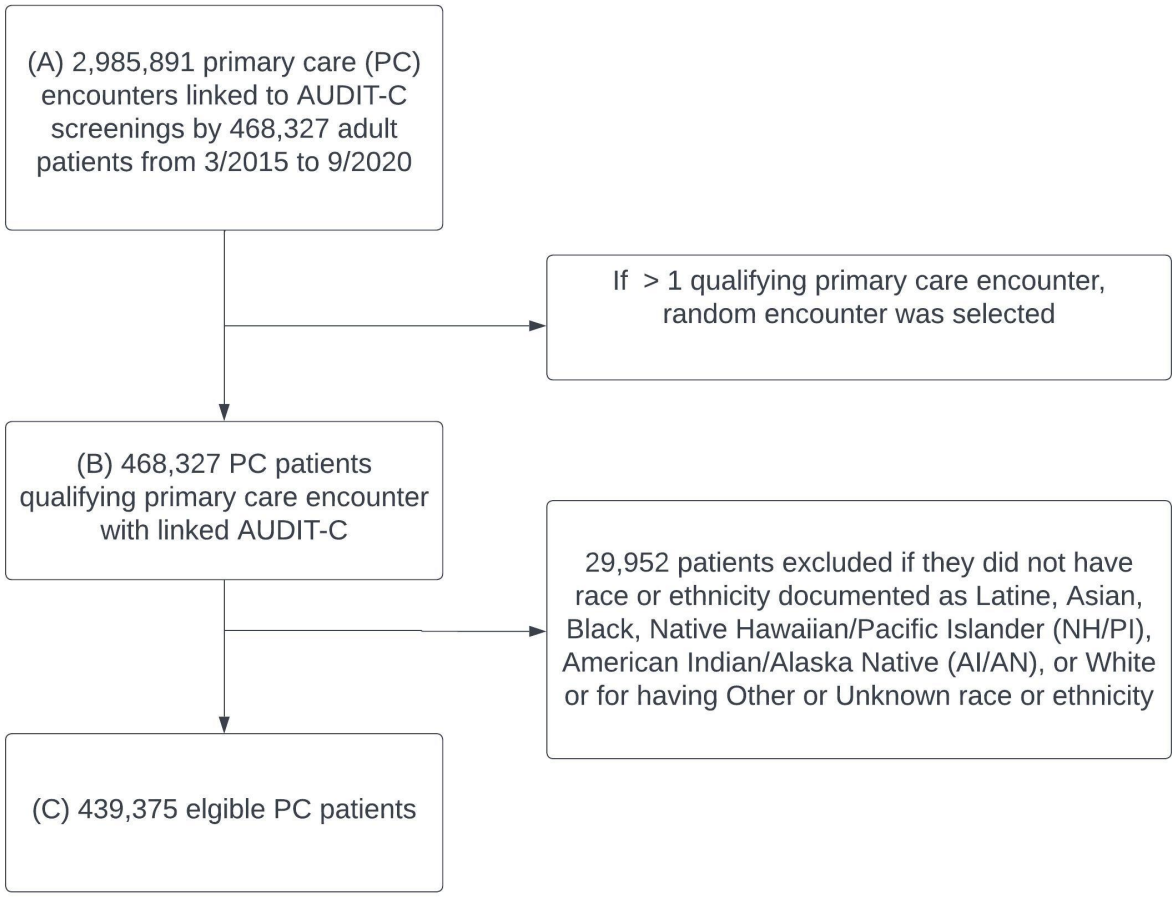


Figure 1. Study sample of primary care patients: inclusion and exclusions

TABLES FOR CHAPTER 2

(below)

Table 1a. Demographic and Clinical Characteristics of Women in Primary Care Sample Across Race or Ethnicity

Women N = 259,008	Latine N = 18,120	Asian N = 30,331	Black N = 13,929	NH/PI N = 3,496	AI/AN N = 4,046	White N = 189,086	P
Age (y) – Mean (SD)	42.9 (17.1)	45.2 (16.3)	43.3 (16.6)	40.2 (15.0)	47.5 (17.4)	50.7 (18.5)	
Terciles of Socioeconomic Status (SES), %							<0.001
Lowest SES	40.1	31.5	52.9	45.2	44.2	32.3	
Middle SES	31.7	31.9	30.6	36.9	33.7	33.7	
Highest SES	28.2	36.6	16.5	17.9	22.1	34.0	
Insurance Type, %							<0.001
Medicaid	4.2	3.0	7.7	5.2	5.9	3.1	
Medicare	12.5	11.5	12.0	7.1	19.0	24.2	
Commercial or Private	73.5	75.2	72.8	78.2	64.8	61.0	
State subsidized	4.1	7.0	2.3	3.5	5.1	4.7	
Other or Unknown	5.7	3.3	5.2	6.0	5.2	7.0	
Mean Percentage of Days of Enrolled in KPWA within 2 Years Pre-Index Visit and 1 Year Post-Index Visit, %							
Pre-Index Visit	69.4	71.0	72.6	69.4	75.3	74.1	<0.001
Post-Index Visit	79.3	83.0	80.7	79.1	80.2	81.8	<0.001
Alcohol and Substance Use Disorder Diagnoses in Past 2-years, %							
Any Prior Diagnoses	1.3	0.4	1.6	0.9	3.0	2.0	<0.001
Alcohol	0.8	0.2	0.8	0.5	1.6	1.2	<0.001
Opioid	0.3	0.1	0.4	0.2	0.9	0.5	<0.001
Stimulant	0.1	0.0	0.1	0.0	0.2	0.1	=0.006
Cannabis	0.2	0.1	0.3	0.1	0.4	0.2	<0.001
Other Drugs	0.2	0.0	0.2	0.1	0.4	0.2	<0.001
Any Alcohol-Attributable Conditions in Past 2-year, %							
Any Alcohol Condition	1.9	1.3	1.2	1.3	1.9	1.5	<0.001
Liver Disease[a]	1.6	1.2	1.0	1.0	1.4	1.2	<0.001
Pancreatitis[b]	0.3	0.1	0.3	0.3	0.5	0.3	<0.001
Other Conditions[c]	0.0	0.0	0.0	0.0	0.1	0.1	=0.005
Mental Health Diagnoses in Past 2-year, %							
Any Mental Diagnoses	22.1	10.6	19.6	15.3	31.6	27.9	<0.001
Depression	14.5	6.6	12.8	9.7	21.0	18.1	<0.001
Anxiety	13.4	6.1	11.4	8.8	19.1	16.1	<0.001
Bipolar	1.3	0.5	1.3	1.1	2.2	1.8	<0.001
ADHD	1.5	0.7	1.3	1.1	2.2	1.8	<0.001
PTSD	1.5	0.4	1.5	0.9	3.2	1.4	<0.001
Schizophrenia	0.2	0.1	0.3	0.2	0.2	0.1	<0.001
Eating Disorder	0.3	0.1	0.2	0.2	0.4	0.3	<0.001
Other Psychosis	0.1	0.1	0.2	0.1	0.1	0.1	=0.701
AUDIT-C Risk Levels – Score Range (0-12), %							<0.001
No drinking (0)	31.9	50.7	39.7	34.7	35.3	27.2	
Low-level drink (1-2)	44.3	35.0	40.3	41.0	40.9	41.6	
Mild UAU (3-6)	22.9	13.9	18.9	23.2	22.4	30.3	
Moderate UAU (7-8)	0.6	0.3	0.8	0.9	1.0	0.6	
Severe UAU (9-12)	0.3	0.1	0.3	0.2	0.4	0.3	

[a]Liver Disease includes liver disease, liver cirrhosis, portal hypertension, and esophageal varices. [b]Pancreatitis includes acute, alcohol-induced acute, chronic, and alcohol-induced chronic pancreatitis. [c]Other Conditions includes alcohol polyneuropathy, cardiomyopathy, alcoholic gastritis, alcoholic psychosis, generation of the nervous system due to alcohol, gastroesophageal hemorrhage, and alcoholic myopathy. UAU = unhealthy alcohol use.

Table 1b. Demographic and Clinical Characteristics of Men in Primary Care Sample Across Race or Ethnicity

Men N = 180,367	Latine N = 10,812	Asian N = 18,022	Black N = 9,856	NH/PI N = 2,432	AI/AN N = 2,393	White N = 136,852	P
Age (y) – Mean (SD)	41.8 (15.7)	46.0 (16.7)	45.0 (16.2)	42.3 (14.9)	48.9 (17.9)	51.7 (18.1)	
Terciles of Socioeconomic Status (SES), %							<0.001
Lowest SES	39.3	30.1	49.1	43.3	40.7	30.1	
Middle SES	31.9	31.7	32.3	36.6	33.8	33.9	
Highest SES	28.8	38.2	18.6	20.1	25.5	36.0	
Insurance Type, %							<0.001
Medicaid	2.8	2.4	4.4	2.7	4.0	2.0	
Medicare	9.7	13.3	12.4	9.0	23.2	26.1	
Commercial or Private	77.8	73.9	75.5	79.4	63.7	60.9	
State subsidized	3.7	7.2	2.4	3.6	4.3	4.4	
Other or Unknown	6.0	3.2	5.3	5.3	4.8	6.5	
Mean Percentage of Days of Enrolled in KPWA within 2 Years Pre-Index Visit and 1 Year Post-Index Visit, %							
Pre-Index Visit	65.7	70.9	71.7	71.6	75.8	74.5	<0.001
Post-Index Visit	79.1	83.0	80.8	81.3	82.0	82.4	<0.001
Alcohol and Substance Use Disorder Diagnoses in Past 2-years, %							
Any Prior Diagnoses	2.3	0.8	2.4	1.6	3.8	3.0	<0.001
Alcohol	1.5	0.5	1.5	0.6	2.3	2.1	<0.001
Opioid	0.4	0.2	0.4	0.6	0.9	0.5	<0.001
Stimulant	0.2	0.1	0.2	0.3	0.3	0.1	<0.001
Cannabis	0.4	0.1	0.4	0.4	0.4	0.3	<0.001
Other Drugs	0.2	0.1	0.2	0.2	0.5	0.2	<0.001
Any Alcohol-Attributable Conditions in Past 2-year, %							
Any Alcohol Condition	2.1	2.0	1.6	2.1	3.0	1.8	<0.001
Liver Disease[a]	1.8	1.8	1.1	1.7	2.7	1.4	<0.001
Pancreatitis[b]	0.3	0.2	0.4	0.3	0.4	0.3	=0.005
Other Conditions[c]	0.1	0.0	0.1	0.1	0.1	0.1	=0.005
Mental Health Diagnoses in Past 2-year, %							
Any Mental Diagnoses	13.6	7.3	11.1	10.4	19.3	17.2	<0.001
Depression	7.7	4.2	6.4	5.7	11.8	10.1	<0.001
Anxiety	7.7	3.9	5.5	5.6	10.3	9.1	<0.001
Bipolar	0.7	0.3	0.7	0.7	1.5	1.1	<0.001
ADHD	1.9	0.9	1.4	1.5	2.2	2.1	<0.001
PTSD	0.7	0.2	0.6	0.7	1.6	0.6	<0.001
Schizophrenia	0.2	0.1	0.4	0.3	0.3	0.2	<0.001
Eating Disorder	0.1	0.0	0.0	0.0	0.0	0.0	=0.333
Other Psychosis	0.1	0.1	0.3	0.1	0.1	0.1	=0.002
AUDIT-C Risk Levels – Score Range (0-12), %							<0.001
No drinking (0)	24.0	33.5	34.6	28.7	33.4	24.4	
Low-level drink (1-3)	48.4	48.7	46.3	46.2	43.1	46.4	
Mild UAU (4-6)	23.8	16.5	16.5	21.6	20.3	26.0	
Moderate UAU (7-8)	2.6	1.3	1.7	2.4	2.0	2.2	
Severe UAU (9-12)	1.2	0.5	0.9	1.1	1.2	1.0	

[a]Liver Disease includes liver disease, liver cirrhosis, portal hypertension, and esophageal varices. [b]Pancreatitis includes acute, alcohol-induced acute, chronic, and alcohol-induced chronic pancreatitis. [c]Other Conditions includes alcohol polyneuropathy, cardiomyopathy, alcoholic gastritis, alcoholic psychosis, generation of the nervous system due to alcohol, gastroesophageal hemorrhage, and alcoholic myopathy. UAU = unhealthy alcohol use.

Table 2. Prevalence and 95% Confidence Intervals (CIs) of clinically-documented Alcohol Use Disorders Across Intersections of Race or Ethnicity, and Terciles of SES Among the Sample of Primary Care Patients, Stratified by Sex

	Prevalence of Clinically-Documented Alcohol Use Disorder, % and 95% CI					
	Women			Men		
	Low SES N = 88,268	**Mid SES N = 85,660**	**High SES N = 83,980**	**Low SES N = 57,559**	**Mid SES N = 60,167**	**High SES N = 61,847**
Model 1 (Main Model): Unadjusted						
Latine	0.6 (0.4-0.8)	0.5 (0.4-0.7)	0.6 (0.4-0.8)	1.4 (1.1-1.8)	1.4 (1.1-1.8)	1.3 (0.9-1.8)
Asian	0.2 (0.1-0.3)	0.1 (0.1-0.2)	0.2 (0.1-0.3)	0.6 (0.4-0.9)	0.8 (0.6-1.1)	0.5 (0.3-0.7)
Black	0.7 (0.5-0.9)	0.6 (0.4-0.9)	0.9 (0.6-1.3)	1.6 (1.3-2.0)	1.2 (0.9-1.6)	1.1 (0.7-1.7)
NH/PI	0.4 (0.2-0.8)	0.3 (0.1-0.8)	0.2 (0.0-1.1)	1.4 (0.9-2.4)	1.0 (0.5-1.9)	1.6 (0.8-3.2)
AI/AN	0.6 (0.3-1.1)	1.5 (1.0-2.3)	0.8 (0.4-1.6)	1.5 (0.9-2.5)	2.0 (1.2-3.2)	2.0 (1.1-3.4)
White	0.8 (0.8-0.9)	0.7 (0.7-0.8)	0.7 (0.7-0.8)	1.8 (1.7-2.0)	1.7 (1.6-1.8)	1.5 (1.4-1.6)
Model 2: Additionally adjusts for age, days enrolled, year of the index visit, and clinic						
Latine	0.5 (0.4-0.7)	0.5 (0.3-0.7)	0.5 (0.4-0.8)	1.3 (1.0-1.6)	1.3 (1.0-1.7)	1.1 (0.8-1.6)
Asian	0.2 (0.1-0.3)	0.1 (0.1-0.2)	0.2 (0.1-0.3)	0.6 (0.4-0.8)	0.8 (0.6-1.0)	0.5 (0.3-0.7)
Black	0.6 (0.4-0.8)	0.6 (0.4-0.8)	0.8 (0.5-1.2)	1.5 (1.2-1.8)	1.1 (0.8-1.5)	1.0 (0.6-1.5)
NH/PI	0.3 (0.2-0.8)	0.3 (0.1-0.8)	0.1 (0.0-1.1)	1.3 (0.8-2.2)	0.9 (0.5-1.8)	1.5 (0.8-3.0)
AI/AN	0.6 (0.3-1.0)	1.3 (0.8-2.0)	0.7 (0.3-1.5)	1.4 (0.9-2.3)	1.8 (1.1-2.9)	1.8 (1.0-3.2)
White	0.8 (0.7-0.9)	0.7 (0.6-0.8)	0.7 (0.6-0.8)	1.8 (1.6-1.9)	1.6 (1.5-1.7)	1.4 (1.3-1.5)
Model 3: Additionally adjusts for AUDIT-C (0-12)						
Latine	0.3 (0.2-0.4)	0.3 (0.2-0.4)	0.3 (0.2-0.4)	0.8 (0.6-1.1)	0.8 (0.6-1.0)	0.7 (0.5-1.0)
Asian	0.2 (0.1-0.3)	0.2 (0.1-0.3)	0.1 (0.1-0.2)	0.5 (0.3-0.7)	0.6 (0.5-0.8)	0.4 (0.3-0.5)
Black	0.4 (0.3-0.5)	0.3 (0.2-0.5)	0.4 (0.3-0.7)	1.0 (0.8-1.3)	0.9 (0.6-1.3)	0.7 (0.4-1.1)
NH/PI	0.2 (0.1-0.4)	0.2 (0.1-0.5)	0.1 (0.0-0.6)	0.8 (0.5-1.4)	0.6 (0.3-1.1)	1.1 (0.5-2.2)
AI/AN	0.3 (0.2-0.6)	0.6 (0.4-1.0)	0.4 (0.2-0.8)	0.9 (0.5-1.5)	1.2 (0.7-2.0)	1.0 (0.6-1.9)
White	0.4 (0.3-0.5)	0.3 (0.3-0.4)	0.3 (0.3-0.4)	1.0 (0.9-1.1)	1.0 (0.9-1.1)	0.8 (0.8-0.9)
Model 4: Additionally adjusts for alcohol and substance use disorders, alcohol-attributable conditions, and mental health (diagnoses from past 2 years of index visit)						
Latine	0.2 (0.2-0.3)	0.2 (0.1-0.3)	0.3 (0.2-0.4)	0.7 (0.5-1.0)	0.6 (0.5-0.9)	0.5 (0.4-0.7)
Asian	0.2 (0.1-0.3)	0.1 (0.0-0.2)	0.1 (0.1-0.2)	0.4 (0.3-0.6)	0.6 (0.4-0.8)	0.3 (0.2-0.5)
Black	0.3 (0.2-0.4)	0.3 (0.2-0.4)	0.4 (0.2-0.6)	0.8 (0.6-1.1)	0.8 (0.5-1.1)	0.6 (0.4-1.0)
NH/PI	0.2 (0.1-0.4)	0.2 (0.1-0.4)	0.1 (0.0-0.7)	0.7 (0.4-1.3)	0.6 (0.3-1.1)	1.0 (0.5-2.1)
AI/AN	0.2 (0.1-0.4)	0.5 (0.3-0.8)	0.3 (0.1-0.7)	0.8 (0.5-1.4)	1.0 (0.6-1.7)	0.9 (0.5-1.7)
White	0.3 (0.3-0.3)	0.3 (0.2-0.3)	0.2 (0.2-0.3)	0.8 (0.7-0.9)	0.8 (0.7-0.9)	0.7 (0.6-0.8)

Table 3. Sensitivity Analysis of Prevalence and 95% Confidence Intervals (CIs) of clinically-documented Alcohol Use Disorders Across Intersections of Race and Ethnicity, and Terciles of SES Among a Restricted Sample of Primary Care Patients with No Prior Alcohol or Substance Use Disorders, Stratified by Sex

	Prevalence of Clinically-Documented Alcohol Use Disorder, % and 95% CI					
	Women			Men		
	Low SES N = 86,542	**Mid SES N = 84,181**	**High SES N = 82,772**	**Low SES N = 55,846**	**Mid SES N = 58,548**	**High SES N = 60,376**
Model 1: Unadjusted						
Latine	0.6 (0.4-0.8)	0.5 (0.4-0.7)	0.6 (0.4-0.8)	1.4 (1.1-1.8)	1.4 (1.1-1.8)	1.3 (0.9-1.8)
Asian	0.2 (0.1-0.3)	0.1 (0.1-0.2)	0.2 (0.1-0.3)	0.6 (0.4-0.9)	0.8 (0.6-1.1)	0.5 (0.3-0.7)
Black	0.7 (0.5-0.9)	0.6 (0.4-0.9)	0.9 (0.6-1.3)	1.6 (1.3-2.0)	1.2 (0.9-1.6)	1.1 (0.7-1.7)
NH/PI	0.4 (0.2-0.8)	0.3 (0.1-0.8)	0.2 (0.0-1.1)	1.4 (0.9-2.4)	1.0 (0.5-1.9)	1.6 (0.8-3.2)
AI/AN	0.6 (0.3-1.1)	1.5 (1.0-2.3)	0.8 (0.4-1.6)	1.5 (0.9-2.5)	2.0 (1.2-3.2)	2.0 (1.1-3.4)
White	0.8 (0.8-0.9)	0.7 (0.7-0.8)	0.7 (0.7-0.8)	1.8 (1.7-2.0)	1.7 (1.6-1.8)	1.5 (1.4-1.6)
Model 2: Additionally adjusts for age, days enrolled, year of the index visit, and clinic						
Latine	0.3 (0.2-0.4)	0.3 (0.2-0.5)	0.4 (0.2-0.6)	0.9 (0.7-1.2)	0.8 (0.6-1.2)	0.7 (0.5-1.0)
Asian	0.1 (0.1-0.2)	0.0 (0.0-0.1)	0.1 (0.1-0.2)	0.4 (0.2-0.5)	0.5 (0.4-0.7)	0.3 (0.2-0.5)
Black	0.3 (0.2-0.5)	0.3 (0.2-0.5)	0.5 (0.3-0.9)	0.9 (0.7-1.2)	0.8 (0.6-1.2)	0.8 (0.5-1.3)
NH/PI	0.3 (0.1-0.6)	0.1 (0.0-0.5)	0.1 (0.0-1.0)	0.8 (0.4-1.5)	0.7 (0.3-1.5)	1.4 (0.7-2.9)
AI/AN	0.4 (0.2-0.8)	0.8 (0.5-1.5)	0.5 (0.2-1.3)	0.9 (0.4-1.6)	1.3 (0.7-2.3)	1.3 (0.6-2.5)
White	0.5 (0.4-0.5)	0.4 (0.3-0.5)	0.4 (0.3-0.5)	1.2 (1.1-1.3)	1.0 (0.9-1.1)	0.9 (0.8-1.0)
Model 3: Additionally adjusts for AUDIT-C (0-12)						
Latine	0.2 (0.1-0.3)	0.2 (0.1-0.3)	0.2 (0.1-0.3)	0.6 (0.4-0.8)	0.5 (0.3-0.7)	0.5 (0.3-0.7)
Asian	0.1 (0.1-0.2)	0.0 (0.0-0.1)	0.1 (0.1-0.2)	0.3 (0.2-0.4)	0.4 (0.3-0.6)	0.3 (0.2-0.4)
Black	0.2 (0.1-0.3)	0.2 (0.1-0.3)	0.3 (0.2-0.5)	0.7 (0.5-0.9)	0.7 (0.5-1.0)	0.6 (0.3-0.9)
NH/PI	0.1 (0.1-0.3)	0.1 (0.0-0.3)	0.1 (0.0-0.6)	0.5 (0.3-1.0)	0.4 (0.2-0.9)	1.0 (0.5-2.0)
AI/AN	0.2 (0.1-0.5)	0.4 (0.2-0.8)	0.3 (0.1-0.6)	0.5 (0.3-1.0)	0.9 (0.5-1.6)	0.7 (0.3-1.4)
White	0.3 (0.2-0.3)	0.2 (0.2-0.2)	0.2 (0.2-0.2)	0.7 (0.6-0.8)	0.7 (0.6-0.7)	0.5 (0.5-0.6)

SUPPLEMENTAL MATERIAL FOR CHAPTER 2

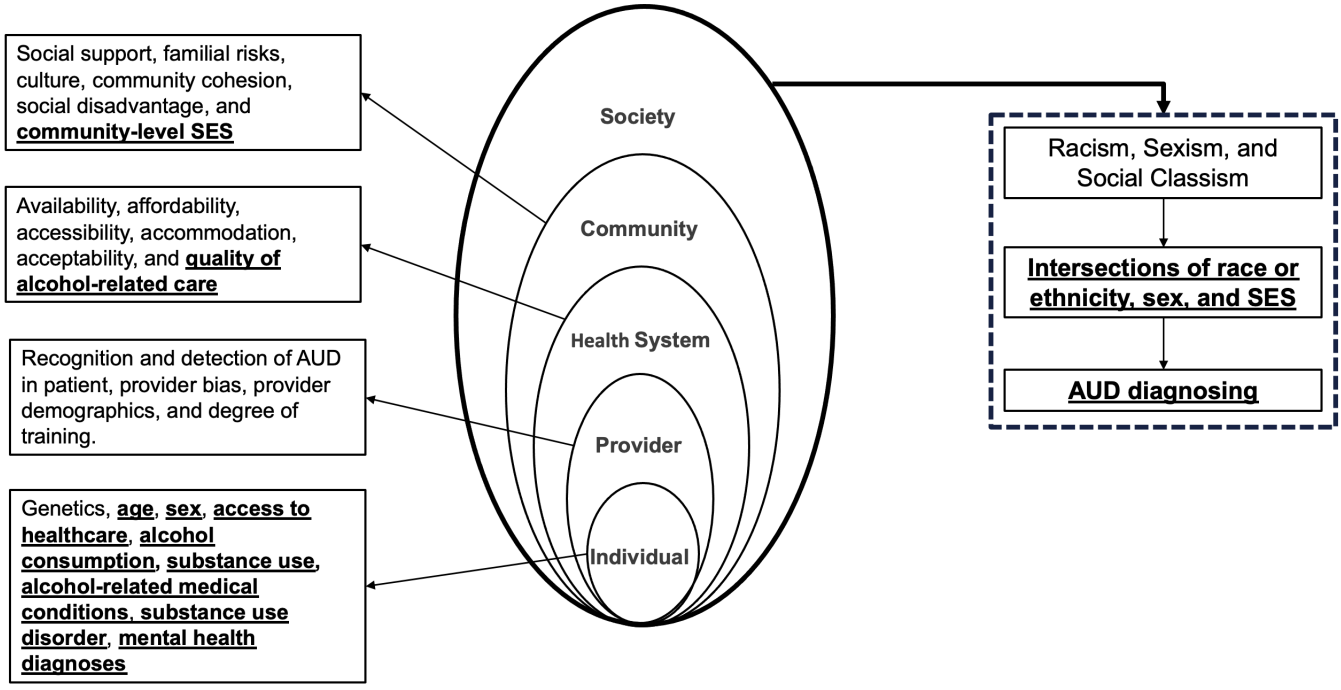
Supplemental Figure 1. Conceptual model used in this study to describe patterns of clinically-documented AUD across intersections of race or ethnicity, sex, and terciles of community-level SES.
Factors depicted in **bold** are those that could be measured using this study's dataset.

Supplemental Figure 2. Alcohol Use Disorders Identification Test-Consumption (AUDIT-C)

Supplemental Table 1. Messer Neighborhood Deprivation Index (MNDI)

Supplemental Table 2. ICD-9 and ICD-10 Active AUD Diagnosis Codes

Supplemental Table 3. Detailed list of alcohol-related medical conditions and mental health diagnoses.



Supplemental Figure 1 (above). Conceptual model used in this study to describe patterns of clinically-documented AUD across intersections of race or ethnicity, sex, and terciles of community-level SES.
Factors depicted in **bold** are those that could be measured using this study's dataset

Supplemental Figure 2. The text used for the AUDIT-C (Alcohol Use Disorders Identification Test-Consumption version)

In the past year…

3. How often did you have a drink containing alcohol in the past year?	**Never** 0	**Monthly or less** 1	**2 to 4 times a month** 2	**2 to 3 times a week** 3		**4 or more times a week** 4
4. How many drinks containing alcohol did you have on a typical day when you were drinking in the past year?	**None** 0	**1 or 2 drinks** 0	**3 or 4 drinks** 1	**5 or 6 drinks** 2	**7 to 9 drinks** 3	**10 or more drinks** 4
5. How often did you have 6 or more drinks on one occasion in the past year?	**Never** 0	**Less than monthly** 1	**Monthly** 2	**Weekly** 3		**Daily or almost daily** 4

Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) is a 3-item self-report screening questionnaire that measures the typical quantity and frequency of alcohol consumption and heavy episodic drinking. Items are answered on a 5-point scale (0–4 points) and then summed (total score 0–12 points). The AUDIT-C reflects average drinks per day with exponential increases above scores of 6 and increasing scores are associated with an increased likelihood of AUD (Rubinsky et al., 2013)

Supplemental Table 1. Messer Neighborhood Deprivation Index (MNDI)

8 Variables that make up Messer Neighborhood Deprivation Index (MNDI)
1) % of the adult population with less than a high school diploma
2) % of households earning less than $30,000 per year
3) % of households with below-poverty level income
4) proportion of the civilian non-institutionalized population between 18 and 64 who are unemployed
5) proportion of households on public assistance
6) % living in crowded housing
7) proportion of households headed by females (no male present) with dependent children
8) % of males in management or professional occupations

Principle component analysis (PCA) was used to standardize MDNI scores and to determine the weight of each variable (Messer et al., 2006)

Supplemental Table 2. ICD-9 and ICD-10 Active AUD Diagnosis Codes

ICD-9 and ICD-10 AUD Diagnosis Codes
291.2, 291.81, 291.89, 291.9, 303.90, 303.91, 303.92, 305.00, 305.01, 305.02, F10.10, F10.120, F10.121, F10.129, F10.13, F10.130, F10.131, F10.132, F10.139, F10.14, F10.15, F10.150, F10.151, F10.159, F10.18, F10.180, F10.181, F10.182, F10.188, F10.19, F10.20, F10.220, F10.221, F10.229, F10.230, F10.231, F10.232, F10.239, F10.24, F10.250, F10.251, F10.259, F10.26, F10.27, F10.280, F10.281, F10.282, F10.288, F10.29

Supplemental Table 3. Detailed list of alcohol-related medical conditions and mental health diagnoses.

Alcohol-related medical conditions:
alcoholic psychosis, polyneuropathy, alcohol cardiomyopathy, gastritis, liver disease, acute and chronic pancreatitis, portal hypertension, esophageal varices, gastroesophageal hemorrhage, degeneration of nervous system due to alcohol, alcohol myopathy, and liver cirrhosis unspecified
Mental health diagnoses:
anxiety disorders, attention deficit hyperactivity disorder (ADHD), bipolar disorder, depressive disorder, eating disorder, psychosis, post-traumatic stress disorder (PTSD), and schizophrenia

CHAPTER 3

Prevalence of Alcohol Use Disorders (AUD) Documented in Electronic Health Records in Primary Care Across Intersections of Race or Ethnicity and Sex Among Patients with Similar Patient-Reported Alcohol Consumption and AUD Symptoms

BACKGROUND

Alcohol use disorder (AUD) is a treatable yet stigmatized condition affecting over 14.5 million adults in the United States (Keyes et al., 2010; Rehm & Shield, 2019; C. f. B. H. S. a. Q. SAMHSA, 2021). Accurate and equitable clinical diagnosis of AUD is necessary for helping patients gain access to evidence-based treatment options and for improving population health (Jutel, 2009; Oslin et al., 2014). However, AUD is also often not diagnosed in a standard manner in clinical settings (Hallgren et al., 2020), and a study in the Veterans Health Administration (VA) found that the accuracy of diagnoses differed across race, ethnicity, and sex (Williams et al., 2022).

Research on potential inequities in diagnoses of AUD in clinical settings across race, ethnicity, and sex has been limited to the VA. One study of VA outpatients found that the prevalence of AUD diagnoses documented by clinicians using International Classification of Disease (ICD) codes ("clinically-documented AUD" hereafter) was higher in women and men who were Black or Latine compared to White (Williams et al., 2016). In contrast, epidemiological studies in the U.S. using standardized diagnostic interviews have shown that the prevalence of AUD is higher in White adults than in Black or Latine adults. A more recent VA study of 700,000 veterans also assessed for disparities in clinically-documented AUD diagnosis among VA patients, adjusting for, and then stratifying by, patient-reported levels of alcohol

consumption on screens completed in clinical care. Even at the same levels of alcohol consumption, Black, Latine, and male patients were more likely than White and female patients to be clinically diagnosed with AUD (Vickers-Smith et al., 2023). These findings suggest the possibility of racialized biases in which Black and Latine patients are more likely to be diagnosed with AUD by healthcare providers compared to White patients. However, these prior studies have not accounted for potential differences in the prevalence of AUD symptoms experienced by patients, and we are unaware of any prior study to have evaluated whether the prevalence of AUD diagnoses, documented as part of routine clinical care, differs across race, ethnicity, and sex, even when patients report comparable levels of AUD symptoms.

Further, prior research on potential inequalities in AUD diagnoses in clinical settings has not taken into account the intersection of race, ethnicity, and sex, as currently recommended for health disparities research (Glass et al., 2017; Griffith et al., 2021; Parthasarathy et al., 2023). Intersectionality theory, originating from Black feminism (Patricia Hill Collins, 2012; Crenshaw, 1989), is helpful in addressing disparities-related research questions, such as inquiries into diagnosis patterns of AUD and other stigmatized conditions, because disparities often result from multiple intersecting structures (e.g., policies, laws, cultural practices) that influence individuals in different ways based on their lived experiences and/or identity characteristics. These disparities may create a unique set of adverse health outcomes for individuals living at the intersection of two or more marginalized groups that would otherwise be overlooked if one solely examined a single marginalized status (e.g., women).

Clinical measures used in Kaiser Permanente Washington (KPWA) offer a unique opportunity to explore disparities in clinically-documented AUD across subgroups based on the intersection of race, ethnicity, and sex while accounting for patient-level factors that were not

accounted for in prior studies. KPWA routinely screens primary care patients for alcohol consumption using the Alcohol Use Disorder Identification Test (AUDIT-C), similar to the VA, and additionally routinely asks patients with high-risking drinking (AUDIT-C scores 7-12) to complete a validated Alcohol Symptom Checklist based on DSM-5 criteria (Hallgren et al., 2022). Additionally, KPWA covers a large patient population with broader representation of women and patients in younger age groups, relative to the VA. As a result, KPWA data can be utilized to explore potential differences in the prevalence of clinically-documented AUD across intersections of race or ethnicity and sex, within a non-VA health system while accounting for both patient-reported alcohol consumption and AUD symptoms.

The primary aim of this study was to describe patterns in the prevalence of clinically documented AUD in 14,442 primary care patients who reported high-risk drinking and completed an Alcohol Symptom Checklist from 2015 to 2022 across intersections based on race or ethnicity and sex, after accounting for both alcohol consumption and patient-reported DSM-5 symptoms of AUD.

METHODS

Data source and study sample. This cross-sectional study used secondary electronic health records (EHR) data from Kaiser Permanente Washington (KPWA), an integrated health system in Washington State. As part of integrated behavioral health care within primary care, all 35 KPWA primary care clinics in this sample had implemented annual population-based alcohol screening using the Alcohol Use Disorders Identification Test Consumption (AUDIT-C) questionnaire (**Supplemental Figure 1**) (Bobb et al., 2017; Glass et al., 2018; Lee et al., 2023). If the AUDIT-C score was 7-12 indicating high-risk drinking, the EHR prompted the medical assistant to ask the patient to complete a paper-based Alcohol Symptom Checklist (ASC)

(**Supplemental Figure 2**; (Hallgren et al., 2021)). Providers could use the Alcohol Symptom Checklist responses to engage patients in discussions about their AUD symptoms, support diagnosis of AUD, and assess the severity of AUD.

Patients were eligible for this study if they (1) were 18 years or older, (2) had ≥ 1 primary care encounter in one of 35 KPWA primary care clinics between 03/2015 and 02/2022, (3) reported high-risk drinking (AUDIT-C ≥ 7), (4) completed a DSM-5 Alcohol Symptom Checklist that was documented in their EHRs within a year prior to the primary care encounter (including the day of the encounter), and (5) were documented to be Asian, Black, Latine, and/or White in the EHR. If more than one encounter was eligible for a patient, one was randomly selected as the index encounter to create a cross-sectional dataset with one encounter per patient. KPWA collected data on race and ethnicity using a voluntary demographic questionnaire sent by email (Kaiser-Permanente, 2018); when patients did not complete the questionnaire, they were asked for this information at their next visit. Each member could select one of two ethnicity categories (Latine or non-Latine) and up to 7 racial categories (Asian, Black, Native Hawaiian/Pacific Islander (NH/PI), American Indian/Alaska Native (AI/AN), White, Other, and Unknown). Patients who reported multiple races (other than Latine) were assigned to their reported racial group with the smallest count within the study sample, consistent with other epidemiological studies (Grant et al., 2015; Parker, 2006; Parker et al., 2004). Patients reporting races of NH/PI and AI/AN were excluded due to low cell count. This study was approved by KPWA Health Research Institute's Review Board with a waiver of consent and HIPAA authorization to use existing EHR data for research.

Measures

Predictor variables of interest

Race or Ethnicity. For this study, race and ethnicity were extracted from the EHR and categorized into 4 mutually exclusive groups (Latine, non-Latine Asian, non-Latine Black, and non-Latine White; hereafter referred to as Asian, Black, Latine, and White).

Sex. In this study, sex (male/man or female/woman) was extracted from the EHR and could represent either sex or gender.

Primary outcome

Clinically-documented AUD was defined as the presence of any active AUD diagnosis documented by a provider in the EHR on the day of the index primary care encounter or in the following 365 days. Active AUD diagnoses were defined based on the International Classification of Diseases 9th and 10th Edition (ICD-9 and ICD-10; **Supplemental Table 1**). Diagnoses from KPWA insurance claims (i.e., reflecting diagnoses that were made in other health care systems, such as a non-KPWA hospital) were not included in this study to allow a study of diagnoses made by clinicians who could view patient-reported results of AUDIT-C screens and DSM-5 symptoms of AUD reported on the Alcohol Symptom Checklist completed in KPWA.

Patient-reported Measures of Alcohol Consumption and AUD Symptoms

AUDIT-C scores were used as a measure of alcohol use to account for differences in alcohol use across intersections of race or ethnicity and sex, and increased likelihood of receiving AUD diagnosis for higher levels of alcohol consumption (Rubinsky et al., 2013; Vickers-Smith et al., 2023). For the present study, eligible patients had AUDIT-C scores ranging from 7-12, indicating high-risk drinking. AUDIT-C scores (7-12) were categorized into 3 risk levels: AUDIT-C score 7, AUDIT-C score 8, and AUDIT-C score 9-12.

The Alcohol Symptom Checklist is an 11-item self-report questionnaire that assesses AUD criteria defined in the Diagnostic and Statistical Manual for Mental Disorder, 5th edition (DSM-5). Scores range from 0-11 and the checklist has demonstrated psychometric validity and reliability across race, ethnicity, sex, and age in these primary care settings (Hallgren et al., 2022). Alcohol Symptom Scores (0-11) were categorized into 5 DSM-5 AUD symptom severity levels: 0 AUD symptoms, 1 AUD symptom, 2-3 AUD symptoms, 4-5 AUD symptoms, and 6-11 AUD symptoms.

Additional covariates

Age (continuous) at the index encounter was extracted from EHRs. The calendar year of a patient's index encounter and the clinic where the patient was seen during the index encounter were included to account for potential changes over time and potential differences in AUD diagnosing practices based on clinic characteristics. Previously documented alcohol and substance use disorders, medical conditions that are highly attributable to alcohol (e.g., liver disease, pancreatitis, cirrhosis), and mental health diagnoses (e.g., depression, anxiety, bipolar disorder) were used to describe the sample and as covariates in secondary analyses. Patients were considered to have one of these conditions if they had 1 or more relevant inpatient or two or more relevant outpatient ICD-9 or ICD-10 diagnostic codes documented in their EHR in the two years prior to the index encounter (**Supplemental Table 2**) (Jack et al., 2023).

Analyses

***Descriptive statistic*s.** We described demographic and clinical characteristics overall and across racial or ethnic subgroups. We used the chi-square test of independence to compare race and ethnic groups regarding age, sex, insurance types, risk levels of alcohol consumption self-reported on the AUDIT-C, self-reported DSM-5 AUD symptoms reported on the Alcohol

Symptom Checklist, previously documented diagnoses, including alcohol and substance use disorders, medical conditions attributable to alcohol, and mental health diagnoses. Additionally, we used the chi-square test of independence to compare demographic and clinical characteristics across racial or ethnic subgroups that were first stratified by sex to explore sex-related differences.

Primary Analyses. To address the primary aim, we estimated the prevalence and 95% confidence intervals (CIs) of clinically-documented AUD for subgroups of patients with high-risk drinking across intersections of race or ethnicity and sex. To do this, we used a series of generalized linear models with logit link and marginal standardization to evaluate patterns of the prevalence of clinically-documented AUD. The analysis included models that were (1) unadjusted, (2) adjusted for alcohol consumption (AUDIT-C 7-12) alone, (3) adjusted for DSM-5 AUD symptoms (0-11) alone, and (4) adjusted for both alcohol consumption and DSM-5 AUD symptoms (primary model).

Secondary Analyses. Secondary analyses were additionally adjusted for variables that differed across subgroups based on race or ethnicity, or sex, and to account for clustering by clinic and calendar year, using a stepped approach to add adjustments to the primary analysis (Model 4 above). These models additionally adjusted for (5) age, year of the index visit, and the clinic where the index visit occurred; and (6) previously-documented diagnoses including alcohol and substance use disorder, medical conditions attributable to alcohol, and mental health diagnoses.

Additional secondary analyses were planned *a priori* to evaluate whether the association of the intersection of race or ethnicity and sex with documented AUD diagnoses was modified by alcohol use reported on the AUDIT-C or DSM-5 AUD symptoms reported on Alcohol

Symptom Checklist. These secondary analyses evaluated patterns of prevalence and 95% CIs of clinically-documented AUD across intersections of race or ethnicity and sex, stratified by (1) levels of reported alcohol consumption based on AUDIT-C categories (7, 8, 9-12) and (2) levels of DSM-5 AUD symptoms reported on the Alcohol Symptom Checklist (0, 1, 2-3, 4-5, 6-11). Results were evaluated descriptively using graphical methods, as we did not expect to have statistical power to test interactions.

All analyses were performed using R Version 4.2.0.

RESULTS

Demographic and Clinical Characteristics

Demographic and clinical characteristics across the four race or ethnicity subgroups are shown in **Table 1**. Among 14,442 eligible primary care patients who reported high-risk drinking, 32.1% were women and 67.9% were men, though sex distribution was more balanced in Black patients (41.9% women). White patients were older and had a higher proportion of Medicare insurance on average. Further, a greater proportion of Black and Latine patients were insured through Medicaid compared to Asian and White patients.

Black patients more often reported drinking at the highest levels (AUDIT-C: 9-12) and reported experiencing DSM-5 AUD symptoms at the highest levels (Alcohol Symptom Checklist: 6-11) compared to all other racial and ethnic subgroups. White patients had the highest prevalence of previously documented alcohol and substance use disorders, medical conditions attributable to alcohol use, and mental health diagnoses.

Results of demographic and clinical characteristics across race or ethnicity, stratified by sex are shown in **Supplemental Tables 3a and 3b**. Among Black women, the prevalence of severe unhealthy alcohol use (AUDIT-C 9-12) appeared to be higher compared to other racial or

ethnic groups (e.g., Black women: 39.9% vs Asian women: 24.3% and White women: 29.4%). However, the differences in the proportion of patients with severe AUD symptoms (AUD symptoms 6-11) among Black women compared to other racial and ethnic subgroups appeared to attenuate, (e.g., Black women: 34.2% vs Asian women: 20.3% and White women: 31.2%). With the exception of Asian men having a lower proportion of severe unhealthy alcohol use and severe AUD symptoms compared to other racial and ethnic groups, there were no distinctive differences in alcohol consumption and AUD symptoms among men.

Primary Analyses: intersectional prevalence of clinically-documented AUD

Results of models assessing the prevalence of clinically-documented AUD accounting for alcohol consumption and AUD symptoms are presented in **Table 2**. The unadjusted overall prevalence of clinically-documented AUD diagnoses was 18.7% (95% CI: 18.0-19.3) in the total sample of patients with high-risk drinking (AUDIT-C ≥ 7) (**Table 2: Model 1**), with variation across gender (women: 20.9% (95% CI: 19.8-22.1) vs. men: 17.6% (95% CI: 16.8-18.4) and race and ethnicity (Asian women and men had a consistently lower prevalence, 13.5% (95% CI: 9.8-18.4) and 12.2% (95% CI: 9.8-15.0) respectively, compared to all other racial and ethnic subgroups). The prevalence of clinically-documented AUD varied across subgroups reflecting intersections of race or ethnicity and sex. Asian men, 12.2% (95% CI: 9.8-15.0), had the lowest prevalence of unadjusted AUD compared to Black women, 21.7% (95% CI: 17.7-26.3), who had the highest prevalence of AUD.

Adjustment for alcohol consumption. In the model reflecting adjustment for alcohol use (alone), women continued to have a higher prevalence compared to men, and Asian men and women continued to have a lower prevalence compared to all other racial and ethnic groups (**Table 2: Model 2**). However, results showed slight overall attenuation of differences across

race and ethnic groups, especially among men in the sample, and appeared to slightly reduce the estimated prevalence of clinically-documented AUD within all intersectional subgroups compared to the unadjusted Model 1.

Adjustment for AUD symptoms. After adjustment for AUD symptoms, the prevalence of clinically-documented AUD was slightly higher in men than women, 15.0% (95% CI: 14.2-15.8) vs. 14.4 (95% CI: 13.4-15.5) (**Table 2: Model 3**). Moreover, adjusting for DSM-5 AUD symptoms (alone) demonstrated further attenuation of differences across race and ethnic groups and differences between men and women.

Adjustment for alcohol consumption and AUD symptoms. The primary model (**Table 2: Model 4**), with adjustment for both alcohol consumption and DSM-5 AUD symptoms, had a similar estimated prevalence of documented AUD diagnoses among men and women.

Additional adjustments. Additional adjustments for age, year of the index encounter, clinic where the patient was seen, documented diagnoses for alcohol and substance use disorders, medical conditions attributable to alcohol use, and mental health had minimal impact on patterns of the prevalence of clinically-documented AUD across intersecting identities (see Table 3).

Stratified Analyses by AUDIT-C score or DSM-5 AUD symptoms

For all intersections of race or ethnicity and sex, the prevalence of clinically-documented AUD increased as AUDIT-C and Alcohol Symptom Checklist scores increased but substantial variation across subgroups was not evident in stratified models. In women, the unadjusted prevalence of clinically-documented AUD across race or ethnicity groups ranged from 8.0-17.2%, 11.7-22.5%, and 24.6-33.1% for AUDIT-C categories 7, 8, and 9-12, respectively. In men, the prevalence ranged from 8.3-11.2%, 8.4-18.1%, and 22.3-32.3% across the same AUDIT-C categories (**Supplemental Figure 3**). In women, the unadjusted prevalence of

clinically-documented AUD across race or ethnicity groups ranged from 1.2-5.6%, 3.9-9.1%, 6.7-18.0%, 18.0-25.6%, and 39.2-42.8% for Alcohol Symptom Checklist categories 0, 1, 2-3, 4-5, and 6-11, respectively. In men, the prevalence ranged from 2.7-6.7%, 8.4-9.3%, 10.0-18.6%, 12.8-26.6%, and 36.7-41.8% for the same categories (**Supplemental Figure 4**).

Among patients with AUDIT-C scores of 7 or 8, White women appeared to be significantly more likely to be diagnosed with AUD in the following year than White or Asian men, while this pattern was not observed among those with AUDIT-C scores 9-12. In contrast, no meaningful differences were observed within categories based on the Alcohol Symptom Checklist score. There were no consistent patterns of clinically-documented AUD across intersections of race or ethnicity and sex among patients with similar AUDIT-C and Alcohol Symptom Checklist scores.

DISCUSSION

This study described the prevalence of clinically-documented AUD across intersections of race or ethnicity and sex for among 14,442 primary care patients who reported high-risk drinking (AUDIT-C score 7-12), accounting for both alcohol consumption and patient-reported DSM-5 symptoms of AUD. Findings showed that regardless of race and ethnicity, the prevalence of clinically-documented AUD was higher in women than men in models that were unadjusted as well as models that only adjusted for alcohol consumption reported on AUDIT-C. However, in models that adjusted for DSM-5 AUD symptoms alone and both alcohol consumption and DSM-5 symptoms, this discrepancy diminished. The prevalence of AUD was only slightly higher in men than women when adjusting for DSM-5 AUD Symptoms alone, though confidence intervals largely overlapped, and was similar among women and men when adjusting for both alcohol consumption and symptoms. Adjustment for patient-reported AUD symptoms markedly

attenuated differences across race or ethnicity, but the prevalence of clinically-documented AUD was lower in Asian patients than in Black, Latine, or White patients, even after adjustment for AUD symptoms. Additional adjustments for variables that differed across subgroups based on race or ethnicity, or sex (e.g., age, year of the index encounter, previously documented alcohol and substance use disorders) had minimal impact on patterns of the prevalence of clinically-documented AUD across intersecting identities. In *a priori* secondary analyses that stratified by the level of DSM-5 AUD symptoms reported, the prevalence of AUD diagnosis across intersections of race or ethnicity and sex appeared similar within subgroups reporting similar AUD severity (symptoms).

This study builds on prior research that raised important questions about whether provider bias or other factors lead to potentially inequitable clinical diagnosis of AUD. For instance, Vickers-Smith et al. observed disparities in the diagnosis of AUD in clinical settings across subgroups based on race, ethnicity, and sex despite adjusting for patient-reported alcohol consumption on the AUDIT-C (Vickers-Smith et al., 2023). However, the present study is the first to our knowledge to evaluate clinical diagnoses of AUD after adjustment for both patient-reported alcohol consumption and DSM-5 symptoms of AUD, which is important given primary care patients reporting similar levels of alcohol consumption can experience different AUD symptoms and different levels of AUD severity (Bradley et al., 2004). Moreover, in marked contrast to the VA, which found a lower prevalence of clinically-documented AUD in women compared to men, the prevalence of AUD documented in the EHRs of women in this population was consistently higher for women than men, until reported AUD symptoms were added to the model. We suspect that this reflects differences in the severity of AUD symptoms across sex in the present study restricted to patients with high-risk drinking, as shown in Supplemental Tables

3a and 3b. Women in this high-risk sample had a higher prevalence of the highest-risk drinking (AUDIT-C 9-12) and of severe AUD symptoms (6-11). In addition, women had a higher proportion of previous AUD documented in their EHRs, as well as substance use disorders and mental health conditions, often associated with severe AUD. Additionally, this is the first study to our knowledge to include Asian patients in any similar study of differences in clinically-documented AUD. Both male and female Asian patients in our study had a much lower prevalence of clinically-documented AUD compared to other racial or ethnic groups, even after adjustment for AUD symptoms. Of note, as shown in Table 1, even when meeting the eligibility criteria of high-risk unhealthy alcohol use (AUDIT-C: 7-12), Asian patients had lower levels of alcohol consumption and DSM-5 symptoms as well as lower levels of prior alcohol and substance use disorders documented in their EHR. This may explain why differences in the prevalence of AUD between Asian patients and patients in other racial or ethnic groups were attenuated after adjusting for AUD symptoms.

There may be many reasons why AUD might be inequitably diagnosed, such as differences in help-seeking (Schomerus et al., 2010), clinician biases and educational gaps (Kelly & Westerhoff, 2010; Renner, 2019; Williams et al., 2018), non-standardized and incomplete assessment (Johnson et al., 2022), structural racism and sexism (Kelly et al., 2021; Moskowitz et al., 2012; Pinedo et al., 2022), and societal biases in justice-involved treatment. Taken together, findings from the present study suggest that differences in the severity of AUD symptoms accounted for some differences in the prevalence of clinically-documented AUD diagnoses across intersections of identity, at least among patients receiving care in KPWA. Further research is needed to assess other potential mechanisms—particularly structural mechanisms that

cause increased symptoms at similar levels of alcohol consumption (e.g., racism and discrimination) that may account for remaining differences.

One additional interesting aspect of the present study was the sex-specific findings. Women of all racial and ethnic groups had higher prevalence of AUD (but not high consumption levels) than men prior to adjustment for AUD symptoms. These findings may reflect that women more often had symptoms reflecting severe AUD (Alcohol Symptom Checklist scores 6-11) but may underreport consumption on the AUDIT-C or may have greater sensitivity to alcohol use (and higher symptoms burden at any consumption level (White, 2020). Findings among Black women and men add more complexity to these possibilities with regard to alcohol consumption and AUD symptoms (Supplemental Tables 3a and 3b). Specifically, the prevalence of severe unhealthy alcohol use (AUDIT-C 9-12) among Black women appeared to be higher compared to other race or ethnic groups (e.g., ~15% higher than Asian women) while the proportion of Black women endorsing severe AUD symptoms (6-11) appeared lower relative to other groups of women (e.g., White women). Differences in alcohol consumption and AUD symptoms between Black men and men from other racial or ethnic groups were not as clear. Prior VA research has found that Black patients may be more likely than White patients to underreport alcohol consumption on the AUDIT-C (Bradley et al., 2011), perhaps due to racism and discrimination and current findings suggest there may be intersectional variation in underreporting. Future studies are needed to explore potential differences in self-reported alcohol consumption and AUD symptoms across intersections of identity, and studies focused only on Black women and men to "center in the margins" as recommended by the Public Health Critical Race Praxis (Ford & Airhihenbuwa, 2010).

Limitations

This study has important strengths and limitations. First, our sample had mostly White primary care patients; therefore, our ability to detect potential inequalities in AUD diagnosing could have been limited by small sample sizes in minoritized groups. Additionally, the application of quantitative methods to questions of how intersectional advantages and disadvantages influence health outcomes is an evolving field and, though we applied multiple methods to describing differences (e.g., stratum-specific, generalized linear models with marginal standardization, methodologies for optimizing precision in estimates in smaller samples are emerging (Mahendran et al., 2022). Further research with new methodologies may be needed, and future studies with alcohol screenings and AUD symptom assessment tools with larger sample sizes may further inform our understanding of observed disparities. Second, our sample received care in a single integrated health system in Washington State. Therefore, findings may not be generalizable to other primary care populations and settings. Third, relying solely on data from the EHR presented several challenges. EHR data for sex, race, or ethnicity cannot fully capture the multiple factors that impact how much a person is exposed to or experiences structural discrimination associated with intersecting identities. Fourth, patients are only asked to complete Alcohol Symptom Checklist if they reported high-risk drinking, and thus we were unable to include patients who did not report high-risk drinking in the study sample. Although the expected prevalence of AUD in patients without high-risk drinking is expected to be low, some may nonetheless endorse AUD symptoms or be diagnosed by a provider. This might have excluded a higher percentage of women with AUD, given that women are more likely to experience AUD symptoms at lower levels of AUDIT-C compared to men (Rubinsky et al., 2013). Despite this limitation, KPWA uses tools to assess AUD that are not used anywhere else in the U.S., making this study extremely unique. Finally, this study included patients with a

prior AUD or SUD diagnosis, some of whom have received alcohol treatment. Future research is needed in patients with no prior AUD or SUD diagnoses, to see if results differ in those with and without treatment.

Conclusions

In this study of a large population of patients receiving care at a single health system, there were marked differences in the prevalence of clinically-documented AUD across race or ethnicity and sex, that persisted despite adjustment for alcohol consumption, as in prior studies. However, adjustment for AUD symptoms markedly attenuated the differences and, when stratified on levels of alcohol symptoms, there were no meaningful differences across sub-groups of patients. Findings suggest that AUD symptom severity is likely to be one factor accounting for previously-identified disparities in clinical diagnosis of AUD. Having standardized tools for AUD symptoms assessment, in addition to routine population-based alcohol screening would support systematic identification of AUD—a substantially underdiagnosed condition—and may help address racial and sex-based disparities in AUD diagnosis in clinical settings.

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FIGURES FOR CHAPTER 3

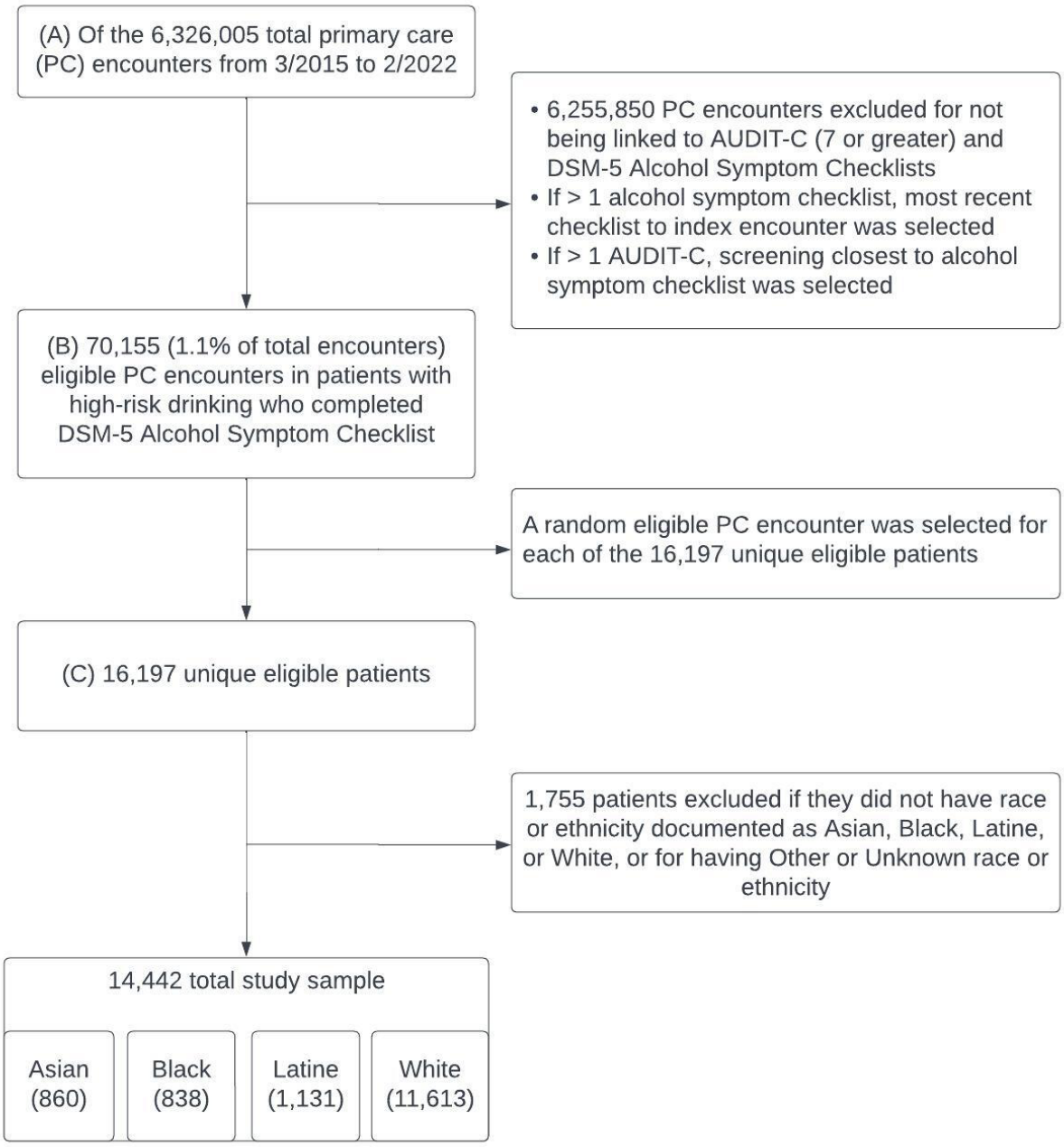


Figure 1. The study sample of primary care patients who engage in high-risk drinking: inclusion and exclusions.

TABLES FOR CHAPTER 3

Table 1. Demographic and Clinical Characteristics of Primary Care Patients Who Report High-Risk Drinking (AUDIT-C score 7-12) by Race or Ethnicity (14,442)

Characteristics	Asian N = 860	Black N = 838	Latine N = 1,131	White N = 11,613	P
Age (y) – Mean (SD)	39.0 (14.3)	39.8 (13.9)	38.5 (12.8)	44.9 (15.3)	<0.001
Sex/Gender, %					<0.001
Women	29.2	41.9	35.8	31.2	
Men	70.8	58.1	64.2	68.8	
Insurance Type, %					<0.001
Medicaid	2.3	7.6	4.6	3.1	
Medicare	5.7	5.6	3.4	12.0	
Commercial or Private	78.9	77.6	81.7	72.5	
State subsidized, Other, Unknown	13.1	9.2	10.3	12.4	
AUDIT-C Risk Levels Among High-Risk Drinkers – Score Range (7-12), %					<0.001
AUDIT-C score 7	46.7	39.1	42.3	45.4	
AUDIT-C score 8	26.9	24.7	27.8	24.2	
AUDIT-C score 9-12	26.4	36.2	29.9	30.4	
DSM-5 Alcohol Use Disorder Symptom Checklist Severity – Score (Range 0-11), %					<0.001
0 AUD symptoms	35.7	25.7	27.5	31.1	
1 AUD symptom	16.7	15.2	16.5	14.6	
2-3 AUD symptoms	20.3	20.5	20.3	19.0	
4-5 AUD symptoms	10.8	10.7	12.2	12.0	
6-11 AUD symptoms	16.5	27.9	23.5	23.3	
Past 2-years Alcohol and Substance Use Disorder Diagnoses, %					<0.001
Any Prior Diagnoses	9.9	17.8	14.5	18.2	
Alcohol	9.2	15.9	13.4	17.3	
Substance[a]	1.5	3.9	2.7	2.2	
Past 2-year Alcohol-Attributable Conditions, %					=0.486
Any Alcohol Conditions	3.5	3.5	3.5	4.1	
Liver Disease[b]	2.7	1.9	2.8	3.0	
Pancreatitis[c]	0.6	1.1	0.6	0.6	
Other Alcohol Conditions[d]	0.8	0.8	0.4	1.0	
Past 2-year Mental Health Diagnoses, %					<0.001
Any Mental Diagnoses	20.5	32.3	25.9	31.7	
Depression	13.8	21.0	16.3	19.7	
Anxiety	12.1	19.5	18.8	20.7	
Other Mental Diagnoses[e]	4.3	7.0	6.3	6.3	

[a]Substance includes opioid, stimulant, cannabis, and other drugs. [b]Liver Disease includes liver disease, liver cirrhosis, portal hypertension, and esophageal varices. [c]Pancreatitis includes acute, alcohol-induced acute, chronic, and alcohol-induced chronic pancreatitis. [d]Other Alcohol Conditions includes alcohol polyneuropathy, cardiomyopathy, alcoholic gastritis, alcoholic psychosis, generation of the nervous system due to alcohol, gastroesophageal hemorrhage, and alcoholic myopathy. [e]Other Mental Diagnoses includes Bipolar, ADHD, PTSD, Schizophrenia, Eating Disorder, and Other Psychosis Disorders.

Table 2. Prevalence and 95% Confidence Intervals (CIs) of clinically-documented Alcohol Use Disorders (AUD) Across Intersections of Race or Ethnicity and Sex Among a Sample of Primary Care Patients Who Drink at Risky Levels, Adjusting for Alcohol Use and DSM-5 AUD Symptoms.

	Prevalence of Clinically-Documented AUD, % and 95% CI	
	Women	**Men**
Model 1: Unadjusted		
Total	20.9 (19.8-22.1)	17.6 (16.8-18.4)
Asian	13.5 (9.8-18.4)	12.2 (9.8-15.0)
Black	21.7 (17.7-26.3)	18.1 (14.9-21.7)
Latine	19.5 (15.9-23.7)	15.2 (12.7-17.9)
White	21.5 (20.2-22.9)	18.2 (17.4-19.1)
Model 2: Adjusts for Alcohol Use (AUDIT-C score 7-12)		
Total	19.5 (18.4-20.7)	16.0 (15.3-16.8)
Asian	12.9 (9.3-17.7)	11.6 (9.3-14.4)
Black	18.5 (14.9-22.8)	15.9 (13.0-19.4)
Latine	19.5 (15.9-23.7)	13.2 (11.0-15.8)
White	20.2 (18.9-21.5)	16.6 (15.8-17.5)
Model 3: Adjusts for DSM-5 AUD Symptoms (0-11 symptoms)		
Total	14.4 (13.4-15.5)	15.0 (14.2-15.8)
Asian	11.1 (7.9-15.5)	11.2 (8.9-14.0)
Black	13.9 (11.0-17.6)	14.6 (11.8-18.0)
Latine	13.3 (10.5-16.7)	12.3 (10.1-14.8)
White	14.8 (13.7-16.0)	15.5 (14.7-16.4)
Model 4 (Main Model): Adjusts for Alcohol Use and AUD Symptoms		
Total	14.6 (13.6-15.7)	14.5 (13.8-15.3)
Asian	11.2 (7.9-15.6)	11.0 (8.7-13.8)
Black	13.7 (10.7-17.3)	14.2 (11.4-17.5)
Latine	13.8 (10.9-17.3)	11.7 (9.7-14.2)
White	15.0 (13.9-16.3)	15.1 (14.3-16.0)

Table 3. Prevalence and 95% Confidence Intervals (CI) of clinically-documented Alcohol Use Disorders (AUD) Across Intersections of Race or Ethnicity and Sex Among a Sample of Primary Care Patients Who Drink at Risky Levels with Adjustment for Alcohol Consumption and DSM-5 AUD Symptoms, and additionally adjusting for 1) age, year of the index visit, and clinic; 2) substance use disorder, alcohol-attributable conditions, and mental health diagnosis made within 2 years prior to index visit.

	Prevalence of Clinically-Documented AUD, % and 95% CI	
	Women	**Men**
Model 4 (Main Model): Adjusts for Alcohol Use and AUD Symptoms		
Total	14.6 (13.6-15.7)	14.5 (13.8-15.3)
Asian	11.2 (7.9-15.6)	11.0 (8.7-13.8)
Black	13.7 (10.7-17.3)	14.2 (11.4-17.5)
Latine	13.8 (10.9-17.3)	11.7 (9.7-14.2)
White	15.0 (13.9-16.3)	15.1 (14.3-16.0)
Model 5: Additionally adjusts for age, year of the index visit, and clinic		
Total	14.0 (13.0-15.1)	13.5 (12.8-14.3)
Asian	12.1 (8.5-16.9)	11.2 (8.8-14.1)
Black	14.9 (11.6-18.8)	13.9 (11.1-17.2)
Latine	14.7 (11.6-18.4)	12.2 (10.0-14.8)
White	14.0 (12.9-15.2)	13.8 (13.0-14.6)
Model 6: Additionally adjusts for substance use disorders, alcohol-attributable conditions, and mental health diagnoses made within 2 years prior to index visit		
Total	13.8 (12.8-14.9)	13.6 (12.9-14.4)
Asian	13.1 (9.3-18.3)	11.2 (8.8-14.1)
Black	14.8 (11.5-18.7)	14.2 (11.4-17.7)
Latine	14.9 (11.7-18.8)	12.2 (10.0-14.8)
White	13.6 (12.5-14.9)	13.9 (13.1-14.7)

SUPPLEMENTAL MATERIAL FOR CHAPTER 3

Supplemental Figure 1: Alcohol Use Disorders Identification Test-Consumption (AUDIT-C)

Supplemental Figure 2: Alcohol Symptom Checklist (ASC)

Supplemental Table 1: ICD-9 and ICD-10 Active AUD Diagnosis Codes

Supplemental Table 2: Detailed list of alcohol-related medical conditions and mental health diagnoses

Supplemental Table 3a. Demographics and Clinical Characteristics Among Women in Primary Care Who Report High-Risk Drinking (AUDIT-C score 7-12) Across Racial and Ethnic Groups

Supplemental Table 3b. Demographics and Clinical Characteristics Among Men in Primary Care Who Report High-Risk Drinking (AUDIT-C score 7-12) Across Racial and Ethnic Groups

Supplemental Figure 3. Unadjusted prevalence and 95% CIs of clinically-documented AUD among primary care patients who report high-risk drinking (AUDIT-C score 7-12) across intersections of race or ethnicity and sex, stratified by levels of reported alcohol consumption based on AUDIT-C categories (N = 14,442)

Supplemental Figure 4. Unadjusted prevalence and 95% CIs of clinically-documented AUD among primary care patients who report high-risk drinking (AUDIT-C score 7-12) across intersections of race or ethnicity and sex, stratified by levels of DSM-5 AUD symptoms reported on the Alcohol Symptom Checklist (N = 14,442)

Supplemental Figure 1. The text used for the AUDIT-C (Alcohol Use Disorders Identification Test-Consumption version)

In the past year…

3. How often did you have a drink containing alcohol in the past year?	**Never** 0	**Monthly or less** 1	**2 to 4 times a month** 2	**2 to 3 times a week** 3		**4 or more times a week** 4
4. How many drinks containing alcohol did you have on a typical day when you were drinking in the past year?	**None** 0	**1 or 2 drinks** 0	**3 or 4 drinks** 1	**5 or 6 drinks** 2	**7 to 9 drinks** 3	**10 or more drinks** 4
5. How often did you have 6 or more drinks on one occasion in the past year?	**Never** 0	**Less than monthly** 1	**Monthly** 2	**Weekly** 3		**Daily or almost daily** 4

Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) is a 3-item self-report screening questionnaire that measures the typical quantity and frequency of alcohol consumption and heavy episodic drinking. Items are answered on a 5-point scale (0–4 points) and then summed (total score 0–12 points). The AUDIT-C reflects average drinks per day with exponential increases above scores of 6 and increasing scores are associated with an increased likelihood of AUD (Rubinsky et al., 2013)

Supplemental Figure 2: Alcohol Symptom Checklist (ASC)

The text used in the alcohol symptom checklist is provided below.

To help you and your provider understand how your alcohol use might be affecting your health, please complete the following questions.

In the past 12 months…

1. Did you find that drinking the same amount of alcohol has less effect than it used to or did you have to drink more alcohol to get intoxicated?	No	Yes
2. When you cut down or stop drinking did you get sweaty, nervous, have upset stomach or shaky hands? Did you drink alcohol or take other substances to avoid these symptoms?	No	Yes
3. When you drank, did you drink more or for longer than you planned to?	No	Yes
4. Have you wanted to or tried to cut back or stop drinking alcohol, but been unable to do so?	No	Yes
5. Did you spend a lot of time obtaining alcohol, drinking alcohol, or recovering from drinking?	No	Yes
6. Have you continued to drink even though you knew or suspected it creates or worsens mental or physical problems?	No	Yes
7. Has drinking interfered with your responsibilities at work, school, or home?	No	Yes
8. Have you been intoxicated more than once in situations where it was dangerous, such as driving a car or operating machinery?	No	Yes
9. Did you drink alcohol even though you knew or suspected it causes problems with your family or other people?	No	Yes
10. Did you experience strong desires or craving to drink alcohol?	No	Yes
11. Did you spend less time working, enjoying hobbies, or being with others because of your drinking?	No	Yes

Supplemental Table 1: ICD-9 and ICD-10 Active AUD Diagnosis Codes

ICD-9 and ICD-10 AUD Diagnosis Codes
291.2, 291.81, 291.89, 291.9, 303.90, 303.91, 303.92, 305.00, 305.01, 305.02, F10.10, F10.120, F10.121, F10.129, F10.13, F10.130, F10.131, F10.132, F10.139, F10.14, F10.15, F10.150, F10.151, F10.159, F10.18, F10.180, F10.181, F10.182, F10.188, F10.19, F10.20, F10.220, F10.221, F10.229, F10.230, F10.231, F10.232, F10.239, F10.24, F10.250, F10.251, F10.259, F10.26, F10.27, F10.280, F10.281, F10.282, F10.288, F10.29

Supplemental Table 2: Detailed list of alcohol-related medical conditions and mental health diagnoses.

Alcohol-related medical conditions:
alcoholic psychosis, polyneuropathy, alcohol cardiomyopathy, gastritis, liver disease, acute and chronic pancreatitis, portal hypertension, esophageal varices, gastroesophageal hemorrhage, degeneration of nervous system due to alcohol, alcohol myopathy, and liver cirrhosis unspecified
Mental health diagnoses:
anxiety disorders, attention deficit hyperactivity disorder (ADHD), bipolar disorder, depressive disorder, eating disorder, psychosis, post-traumatic stress disorder (PTSD), and schizophrenia

Supplemental Table 3a. Demographics and Clinical Characteristics Among Women in Primary Care Who Report High-Risk Drinking (AUDIT-C score 7-12) Across Racial and Ethnic Groups

Women **N = 4,633**	**Asian** **N = 251**	**Black** **N = 351**	**Latine** **N = 405**	**White** **N = 3,626**	**P**
Age (y) – Mean (SD)	35.7 (13.7)	37.3 (13.9)	36.9 (13.2)	43.7 (15.5)	
Insurance Type, %					<0.001
Medicaid	2.8	10.8	7.7	5.2	
Medicare	6.0	5.7	2.5	11.1	
Commercial or Private	78.1	72.9	79.5	70.9	
State subsidized, Other, Unknown	13.1	10.6	10.3	12.8	
AUDIT-C Risk Levels Among High-Risk Drinkers – Score Range (7-12), %					<0.001
AUDIT-C score 7	45.0	37.3	45.9	47.4	
AUDIT-C score 8	30.7	22.8	25.9	23.2	
AUDIT-C score 9-12	24.3	39.9	28.1	29.4	
DSM-5 Alcohol Use Disorder Symptom Checklist Severity – Score (Range 0-11), %					<0.001
0 AUD symptoms	34.3	18.8	23.0	27.2	
1 AUD symptom	14.7	14.8	16.3	11.8	
2-3 AUD symptoms	17.9	19.9	19.3	17.3	
4-5 AUD symptoms	12.8	12.3	12.3	12.5	
6-11 AUD symptoms	20.3	34.2	29.1	31.2	
Past 2-years Alcohol and Substance Use Disorder Diagnoses, %					<0.001
Any Prior Diagnoses	10.0	23.1	16.5	24.6	
Alcohol	9.6	20.1	15.8	23.7	
Substance[a]	0.4	3.0	0.7	0.9	
Past 2-year Alcohol-Attributable Conditions, %					=0.321
Any Alcohol Conditions	2.0	4.3	4.4	4.5	
Liver Disease[b]	0.8	2.3	3.2	3.4	
Pancreatitis[c]	0.4	1.1	0.2	0.6	
Other Alcohol Conditions[d]	0.8	0.9	1.0	0.5	
Past 2-year Mental Health Diagnoses, %					<0.001
Any Mental Diagnoses	32.3	47.9	36.8	49.6	
Depression	22.3	31.9	25.4	32.1	
Anxiety	21.5	30.2	28.1	33.9	
Other Mental Diagnoses[e]	7.2	9.7	10.1	10.9	

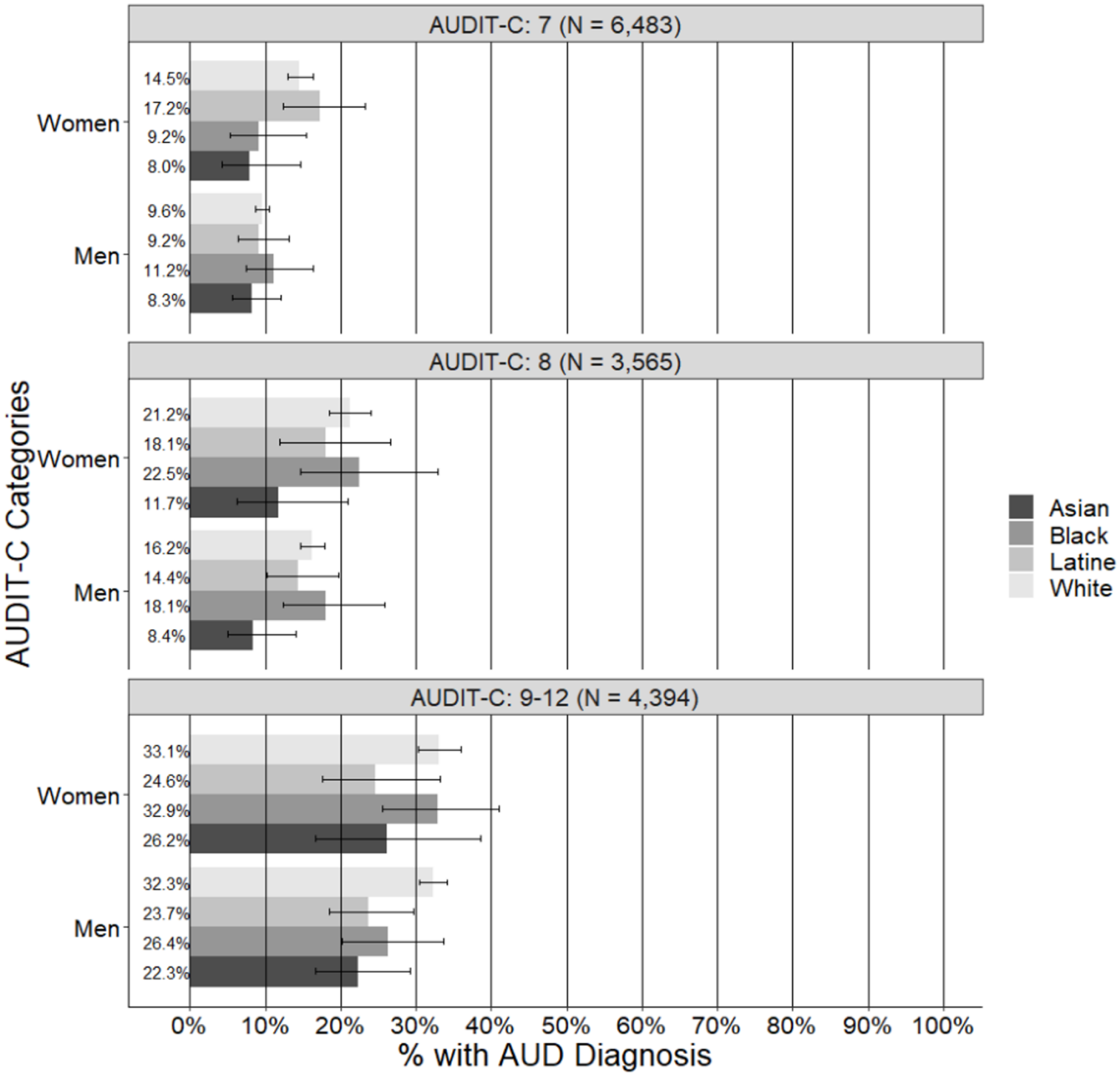
[a]Substance includes opioid, stimulant, cannabis, and other drugs. [b]Liver Disease includes liver disease, liver cirrhosis, portal hypertension, and esophageal varices. [c]Pancreatitis includes acute, alcohol-induced acute, chronic, and alcohol-induced chronic pancreatitis. [d]Other Alcohol Conditions includes alcohol polyneuropathy, cardiomyopathy, alcoholic gastritis, alcoholic psychosis, generation of the nervous system due to alcohol, gastroesophageal hemorrhage, and alcoholic myopathy. [e]Other Mental Diagnoses includes Bipolar, ADHD, PTSD, Schizophrenia, Eating Disorder, and Other Psychosis Disorders.

Supplemental Table 3b. Demographics and Clinical Characteristics Among Men in Primary Care Who Report High-Risk Drinking (AUDIT-C score 7-12) Across Racial and Ethnic Groups

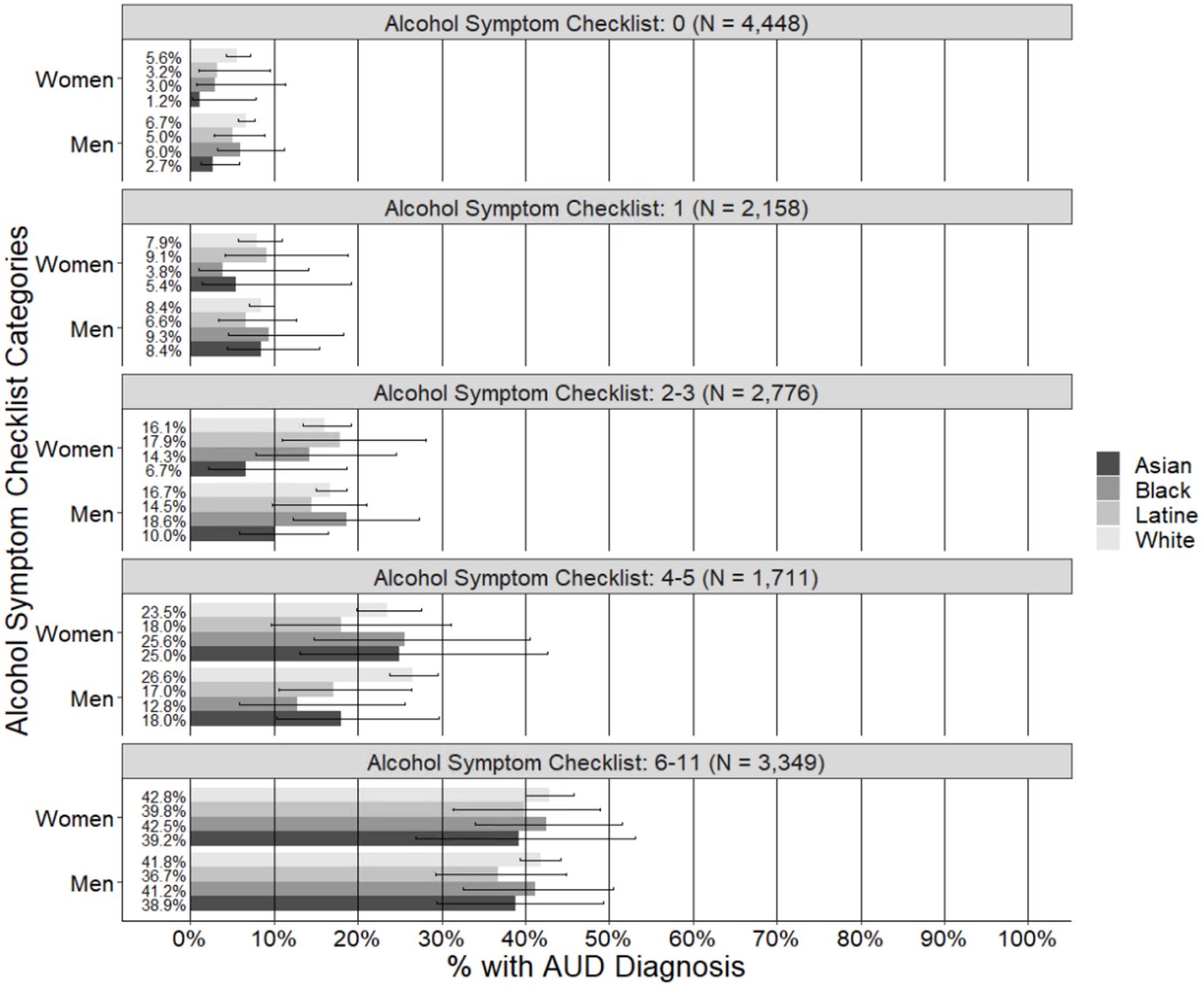
Men **N = 9,809**	**Asian** **N = 609**	**Black** **N = 487**	**Latine** **N = 726**	**White** **N = 7,987**	**P**
Age (y) – Mean (SD)	40.3 (14.3)	41.7 (13.6)	39.4 (12.4)	45.4 (15.2)	
Insurance Type, %					<0.001
Medicaid	2.1	5.3	2.9	2.2	
Medicare	5.6	5.6	3.9	12.4	
Commercial or Private	79.2	80.9	82.9	73.3	
State subsidized, Other, Unknown	13.1	8.2	10.3	12.1	
AUDIT-C Risk Levels Among High-Risk Drinkers – Score Range (7-12), %					=0.032
AUDIT-C score 7	47.5	40.5	40.4	44.5	
AUDIT-C score 8	25.3	26.1	28.8	24.7	
AUDIT-C score 9-12	27.3	33.5	30.9	30.8	
DSM-5 Alcohol Use Disorder Symptom Checklist Severity – Score Range (0-11), %					=0.042
0 AUD symptoms	36.3	30.6	30.0	32.9	
1 AUD symptom	17.6	15.4	16.7	15.9	
2-3 AUD symptoms	21.3	20.9	20.9	19.7	
4-5 AUD symptoms	10.0	9.7	12.1	11.7	
6-11 AUD symptoms	14.8	23.4	20.3	19.8	
Past 2-years Alcohol and Substance Use Disorder Diagnoses, %					=0.002
Any Prior Diagnoses	9.9	14.0	13.4	15.2	
Alcohol	9.0	12.3	12.1	14.4	
Substance[a]	0.9	1.7	1.3	0.8	
Past 2-year Alcohol-Attributable Conditions, %					=0.378
Any Alcohol Conditions	4.1	2.9	3.2	4.0	
Liver Disease[b]	3.4	1.6	2.6	2.8	
Pancreatitis[c]	0.7	1.0	0.8	0.6	
Other Alcohol Conditions[d]	0.0	0.3	0.0	0.6	
Past 2-year Mental Health Diagnoses, %					<0.001
Any Mental Diagnoses	15.6	21.1	19.8	23.6	
Depression	10.3	13.1	11.2	14.1	
Anxiety	8.2	11.7	13.6	14.7	
Other Mental Diagnoses[e]	3.1	5.1	4.1	4.3	

[a]Substance includes opioid, stimulant, cannabis, and other drugs. [b]Liver Disease includes liver disease, liver cirrhosis, portal hypertension, and esophageal varices. [c]Pancreatitis includes acute, alcohol-induced acute, chronic, and alcohol-induced chronic pancreatitis. [d]Other Alcohol Conditions includes alcohol polyneuropathy, cardiomyopathy, alcoholic gastritis, alcoholic psychosis, generation of the nervous system due to alcohol, gastroesophageal hemorrhage, and alcoholic myopathy. [e]Other Mental Diagnoses includes Bipolar, ADHD, PTSD, Schizophrenia, Eating Disorder, and Other Psychosis Disorders.

Supplemental Figure 3. Unadjusted prevalence and 95% CIs of clinically-documented AUD among primary care patients who report high-risk drinking (AUDIT-C score 7-12) across intersections of race or ethnicity and sex, stratified by levels of reported alcohol consumption based on AUDIT-C categories (N = 14,442).



Supplemental Figure 4. Unadjusted prevalence and 95% CIs of clinically-documented AUD among primary care patients who report high-risk drinking (AUDIT-C score 7-12) across intersections of race or ethnicity and sex, stratified by levels of DSM-5 AUD symptoms reported on the Alcohol Symptom Checklist (N = 14,442).



CHAPTER 4

THE PROPORTION OF ALCOHOL USE DISORDER DIAGNOSES DOCUMENTED IN ELECTRONIC HEALTH RECORDS WITH STIGMATIZED DESCRIPTORS AMONG PRIMARY CARE PATIENTS: COMPARISON ACROSS INTERSECTIONS OF RACE OR ETHNICITY, AND SEX

BACKGROUND

Alcohol use disorder (AUD) is one of the most prevalent (SAMHSA, 2021) and stigmatized mental health disorders in the United States (Schomerus et al., 2011). Research in the U.S. general population (Grant et al., 2015) and in the Veterans Health Administration (VA) has found variation in diagnoses across race, ethnicity, and sex (Vickers-Smith et al., 2023; Williams et al., 2016). While AUD is treatable, ensuring access to evidence-based treatment options requires both accurate and equitable clinical diagnosis of AUD (Jutel, 2009).

Stigma is deeply rooted in American society and culture (Pescosolido et al., 1999) and is a major contributor to healthcare inequalities (Kilian et al., 2021). Multiple definitions of stigma have been offered in the literature but share the idea that stigma is embedded within and generated from a societal context, generally stemming from structural factors (e.g., laws or policies) that advantage or disadvantage people based on personal (e.g., racialized identity) or clinical characteristics (e.g., AUD), which leads to both interpersonal and intrapersonal stigma (e.g., negative perceptions and stereotypes toward others or oneself (Corrigan et al., 2014; Link & Phelan, 2006)).

Studies have shown that both the diagnosis and treatment of AUD and other substance use disorders are greatly impacted by stigma. Patients consistently report components of stigma

(e.g., concern about others having negative opinions) as a reason for not receiving treatment for AUD (Cohen et al., 2007; Finn et al., 2023; Keyes et al., 2010; Stringer & Baker, 2018). Studies also demonstrate that stigma consciously or unconsciously can manifest in clinical decision-making and is often perpetuated by the use of stigmatized language. One randomized study asked 516 mental health clinicians were asked to read a vignette containing stigmatizing language (e.g., "substance abuser") vs. a vignette with less stigmatizing language (e.g., "having a substance use disorder"). The vignette with stigmatizing language was associated with a greater perceived need for punishment (Kelly & Westerhoff, 2010) suggesting that stigmatizing language may elicit more punitive approaches to treatment by clinicians. Stigmatizing language, such as "abuser" and "habit" often perpetuates notions that individuals with alcohol or substance use disorders are solely to blame for their addiction and can fully recover if their willpower is strong enough (Broyles et al., 2014; Olsen & Sharfstein, 2014).

Intersectionality Theory (Patricia Hill Collins, 2012; Crenshaw, 1989), rooted in Black Feminism, proposes that disparities are frequently caused by multiple intersecting structures (e.g., laws, cultural practices, societal norms) that influence individuals differently depending on their lived experiences and/or identity characteristics. Recent literature has applied Intersectionality Theory to the concept of "intersectional stigma" (Berger MT, 2004) to explain how multiple stigmatized identities or characteristics can converge to create compounding effects on health and healthcare (Turan et al., 2019). Intersectional stigma – prejudicial attitudes, beliefs, and values that then lead to discriminatory behaviors and practices across multiple identity characteristics – may influence inequities or inequalities in the diagnosis and treatment of AUD across groups based on their racialized, ethnic, or gender identities (Weiss & Ramakrishna,

2006). To our knowledge, no research has applied the concept of intersectional stigma to describe AUD diagnosis.

In real-world medical settings, unstructured and non-standardized assessment of AUD is the norm. Medical providers often do not have structured tools to guide AUD assessment. Further, documentation can use varied terms with differing stigmas. Intersectional stigma is likely to contribute to variation in both diagnosis and documentation. Specifically, the use of stigmatized labels for AUD during AUD diagnosis may be more pronounced when diagnosing AUD among marginalized and minoritized patients based on race, ethnicity, or sex. This is supported by recent research demonstrating that Black patients, compared to White, had a 2.5 higher odds of having at least one negative descriptor in the history and physical section of progress notes in the EHR (e.g., aggressive, challenging, noncompliant, confrontational, exaggerate, hysterical, and unpleasant) (Michael Sun et al., 2022). However, this study was not specific to AUD diagnoses, and, to our knowledge, the proportion of AUD diagnosis documented with stigmatized AUD descriptors across intersections of identity has not been described.

This study used a data source from EHRs that have not been previously used in health services research to our knowledge: text descriptors selected by providers when documenting a diagnosis. We studied text descriptors selected at the time AUD was diagnosed in a large regional health system, to 1) identify stigmatized AUD descriptors (e.g., “alcoholism”) and 2) describe the proportion of AUD diagnosis documented in the EHR with stigmatized AUD descriptors, overall and patterns of across subgroups based on intersections of race, ethnicity, and sex.

METHODS

This cross-sectional study used secondary EHRs data from Kaiser Permanente Washington (KPWA), an integrated health system in Washington State. The sample for this study

includes AUD diagnoses documented during primary care visits of patients who were (1) 18 years or older at the time the AUD diagnosis was documented in the EHR (3/1/2015-5/31/2023) and (2) documented to be Asian, Black, Latine, or White in the EHR (**Figure 1**). KPWA collected data on race and ethnicity using a voluntary demographic questionnaire sent by email (Kaiser-Permanente, 2018); when patients did not complete the questionnaire, they were asked for this information at their next visit. Each member could select one of two ethnicity categories (Latine or non-Latine) and up to 7 racial categories (Asian, Black, Native Hawaiian/Pacific Islander (NH/PI), American Indian/Alaska Native (AI/AN), White, Other, and Unknown). Patients who reported multiple races (other than Latine) were assigned to their reported racial group with the smallest count within the study sample, consistent with other epidemiological studies (Grant et al., 2015; Parker, 2006; Parker et al., 2004). Patients reporting races of NH/PI and AI/AN were excluded due to small numbers and patients reporting Other or Unknown were excluded to ensure the interpretability of distinct intersectional subgroups (e.g., Black women). This study was approved by KPWA Health Research Institute's Review Board with a waiver of consent and HIPAA authorization to use existing EHR data for research.

Measures

Predictor variables of interest

Race or Ethnicity. For this study, race or ethnicity was extracted from the EHR and categorized into 4 mutually exclusive groups (Latine, non-Latine Asian, non-Latine Black, and non-Latine White; hereafter referred to as Asian, Black, Latine, and White).

Sex. In this study, sex (male/man or female/woman) was extracted from the EHR and could represent either sex or gender.

Outcome variables

Primary outcome: stigmatized AUD descriptors. Stigmatized text descriptors of AUD diagnoses selected by medical providers when documenting an AUD diagnosis were the primary outcome of this study. In KPWA primary care providers document diagnoses in the EHR by typing keywords (e.g., "alcohol") into a search window, which then yields a "pick list" of text descriptors that may be selected to enter a diagnosis. The EHR then links the descriptor to an ICD code in the background. There are multiple text descriptors linked to each International Classification of Diseases 9th and 10th Edition (ICD-9 and ICD-10) diagnosis code for AUD (**Supplemental Table 1**), some of which reflect DSM-IV and DSM-5 diagnostic labels (e.g., "alcohol use disorder", "alcohol abuse") and some of which do not reflect current diagnostic labels (e.g., "alcoholism"). Text descriptors that clinicians selected when documenting AUD diagnoses, as well as their associated ICD diagnosis codes, were obtained from the KPWA EHR.

Language norms, including current stigmatizing descriptors, continuously change over time and are often not agreed upon by all people. However, scientifically accurate language, that is person-centered, and communicates self-worth while reducing blame attribution and controllability, may positively impact how patients experience healthcare (Kelly et al., 2015; Volkow et al., 2021). With this in mind, we used a three-step process to code all AUD diagnosis text descriptors used in KPWA at the time AUD is diagnosed, to define stigmatized AUD descriptor codes for this study (**Supplemental Table 2**). First, 4 experts (Drs. Kevin A. Hallgren, Ph.D., Emily C. Williams, Ph.D., Joseph E. Glass, Ph.D., and Katharine A. Bradley, MD) independently coded the 25 most commonly-used diagnostic text descriptors as either a stigmatized or non-stigmatized AUD descriptor, guided by recommendations of the (National Institute on Drug Abuse, 2021) and Shatterproof, a national non-profit organization aimed at ending addiction stigma (Shatterproof, 2021). Of note, both included the term "abuse," and the

latter included "dependence," used in DSM-IV and ICD diagnostic codes, as stigmatized terms. Second, the lead author summarized coding results for all 4 experts, reviewed them with the senior author, and made rules for coding based on the majority and guiding documents (**Supplemental Table 3**). Rules were as follows: 1) AUD descriptor was stigmatized if they used terms such as abuse, alcoholic/ism, slang, and dependence; "Alcohol abuse" and "alcohol dependence" were stigmatized descriptors despite being used in ICD-10 and DSM-IV definitions (Bell, 1994); 2) "Alcoholic" or other similar labels were considered stigmatized if labeling a person; however, when referring to organ damage (e.g., "alcoholic cirrhosis of the liver" or "alcoholic polyneuropathy") it was deemed non-stigmatized; 3) descriptors indicating excessive consumption were considered stigmatized because AUD diagnosis does not depend on the level of alcohol use. Third, 3 of the 4 experts (Drs. Kevin A. Hallgren, Ph.D., Emily C. Williams, Ph.D., and Katharine A. Bradley, MD) independently coded all remaining diagnostic labels following the 5 rules. Any discrepancies were resolved by the first and senior author after a review of masked coding, resulting in a final dichotomous outcome measure (stigmatized versus non-stigmatized).

Secondary outcome: Restricted stigmatized AUD descriptors. A restricted measure of stigmatized AUD descriptors was created by recoding stigmatized text descriptors that were diagnostically accurate according to DSM-IV (i.e., alcohol abuse, alcohol dependence) as non-stigmatizing.

Additional covariates

Age (continuous) at the index AUD diagnosis was extracted from EHRs. Insurance type at the time of the index diagnosis was derived from EHRs and is a proxy variable for individual-level socioeconomic status; it is correlated with age.

Analyses

***Descriptive statistic*s.** We described the demographic and clinical characteristics of eligible patients with a documented AUD, overall and across racial or ethnic subgroups. We used the chi-square test of independence to compare race and ethnic groups regarding age, sex, and insurance types.

Primary analyses. To address the primary aim, we estimated the unadjusted proportion of AUD diagnoses that were documented with stigmatized AUD descriptors using a generalized estimating equation model. We report the proportion (95% CIs) of AUD diagnoses with stigmatized AUD descriptors in the full sample and across subgroups based on intersections of race or ethnicity and sex. We used two generalized estimating equation models with a logit link and robust "sandwich" standard error estimation to account for repeated diagnoses nested within patients. Model 1 was unadjusted. Model 2 added adjustment for age – hypothesized to be a potential confounder due to the normalization of heavy drinking in younger adults in the U.S. Both models utilized marginal standardization to obtain point estimates and 95% CIs for the proportions of AUD diagnoses that contained stigmatized descriptors. Statistical comparisons across race or ethnicity, sex, and intersections of race or ethnicity were performed with Wald tests.

Secondary analysis. A secondary analysis estimated the unadjusted proportion and 95% CIs of AUD diagnoses that were documented with restricted stigmatized AUD descriptors, overall and across subgroups based on intersections of race or ethnicity and sex using similar methods as above. The secondary analysis allowed us to explore variations in stigmatized AUD descriptors that were stigmatizing and not included in the DSM-IV.

RESULTS

Demographic and Clinical Characteristics

Among 18,068 eligible primary care patients with documented AUD, 3.5% were Asian, 5.0% were Black, 5.9% were Latine, 85.6% were White; 40.5% were women and 59.5% were men. Gender distributions differed across the race or ethnicity subgroups, but all subgroups had a higher proportion of men than women. White patients were older and had a much higher proportion of Medicare insurance on average (26.9% for White compared to 16.8% for Black patients, the next highest proportion). Further, a greater proportion of Black (8.5%) and Latine patients (6.1%) were insured through Medicaid compared to Asian (5.2%) and White patients (4.7%).

Primary Analysis: intersectional prevalence of stigmatized AUD descriptors

Of 61,886 documented AUD diagnoses, 88.5% (95% CI: 88.2-88.8) were documented with stigmatized AUD descriptors. Although the magnitude of the difference was small, the proportion of AUD documented with stigmatized AUD was significantly higher among men, 88.9% (95% CI: 88.5-89.3), compared to women, 88.0% (95% CI: 87.5-88.4) ($p<0.001$) (**Table 2: Model 1**). There were no significant differences across race or ethnicity. Moreover, the proportion of AUD documented with stigmatized AUD descriptors did not statistically vary across subgroups reflecting intersections of race or ethnicity and sex in the unadjusted model. However, regarding the patterns of stigmatized descriptors, the proportion of stigmatized AUD descriptors appeared to be lowest among Asian women, Asian men, and Black women, 87.1% (95% CI: 83.7-89.9), 87.3% (95% CI: 85.1-89.2), and 87.7% (95% CI: 85.4-89.7) respectively, with the highest in Black men, 90.5% (95% CI: 88.7-92.0). In the model that adjusts for age, there continues to be a significant slight difference across sex, with men, 89.3% (95% CI: 89.0-

89.7) ($p<0.01$), continuing to have a higher proportion than women 88.5% (95% CI: 88.1-89.0) (**Table 2: Model 2**). There was still no significant or apparent difference in proportions of stigmatized AUD descriptors across race or ethnicity, alone, or across subgroups of intersections of race or ethnicity and sex.

Secondary Analysis: intersectional prevalence of restricted stigmatized AUD descriptors

In secondary analyses that considered the terms 'abuse' and 'dependence' to be non-stigmatizing, 18.6% (95% CI: 18.2-19.0) of the 61,886 documented AUD diagnoses were documented with a stigmatized AUD descriptor. Men, 19.2% (95% CI: 18.7-19.7) had a higher proportion compared to women, 17.8% (95% CI: 17.3-18.4) (**Table 3: Model 1**), consistent with unadjusted and adjusted models in primary analysis. There were also no significant differences across race or ethnicity, alone, and intersections of race or ethnicity and sex. **Table 3: Model 2**, which adjusts for age when stigmatized AUD descriptors were restricted showed the same patterns as previous models.

DISCUSSION

This study identified stigmatized AUD descriptors used to document AUD in EHRs in primary care and described the proportions of AUD diagnoses documented with stigmatized AUD descriptors, overall and across intersections of race or ethnicity and sex. Of 61,886 AUD diagnoses in this study, findings show that 88.5% were documented with stigmatized AUD descriptors, when including the terms, "alcohol abuse" and "alcohol dependence" in the stigmatized category. In models that recode "alcohol abuse" and "alcohol dependence" as non-stigmatizing, findings show that 18.6% of 61,886 AUD diagnoses were documented with stigmatized AUD descriptors. The proportion of AUD diagnoses documented with stigmatized descriptors was higher in men than women irrespective of how stigmatized

AUD descriptors were defined, but there was no significant difference in proportions across race or ethnicity, or subgroups based on intersections of race or ethnicity and sex. Adjustment for age made minimal impact on results. Although the proportions of stigmatized AUD descriptors did not vary across intersectional subgroups, the proportions of stigmatized AUD descriptors found in EHRs—18.6% or 88.5%, depending on how stigmatized AUD descriptors were defined—are concerning and may be particularly concerning for persons experiencing other types of intersectional stigma.

There has been an ongoing push to reduce alcohol-related stigma in an effort to better diagnose and treat individuals with AUD by the National Institute on Alcohol Abuse and Alcoholism (NIAAA, 2022). The high proportion of AUD diagnoses documented with stigmatized AUD descriptors found in this current study may underscore the importance of this effort. Prior studies have suggested that stigma, like the kind described in this study, exacerbates barriers to alcohol-related treatment by causing those who have high levels of perceived stigma to be reluctant to seek professional help (Finn et al., 2023) and clinical-decision making may be associated with more punitive approaches to treatment by clinicians when stigmatized language is used (Kelly & Westerhoff, 2010).

We observed no significant or apparent differences across racial or ethnic groups. This is inconsistent with findings in prior a study that found Black patients had higher odds of having negative descriptors in the EHRs when studying non-alcohol related disorders (M. Sun et al., 2022). Further, applying concepts of intersectional stigma to documented stigmatized AUD, we found no significant difference across subgroups representing intersections of race or ethnicity and sex. However, the point estimate of the proportion of stigmatized AUD descriptors appeared to be highest among Black men in the primary model (**Table 2**). This may suggest a need for

future studies that consider additional factors that modify intersections (i.e., the severity of AUD symptoms and/or socioeconomic status). Further, prior research suggests that more severe AUD symptoms (Grant et al., 2015; Hallgren et al., 2021; Probst et al., 2015) increases the likelihood that AUD will be recognized and documented. Therefore, future studies might evaluate disparities of stigmatized AUD descriptors among patients with severe unhealthy alcohol use.

Inconsistent with prior studies that found that women are more likely to be stigmatized by being blamed for their substance use disorders than men (Kelly et al., 2021), findings from this study found that the proportion of stigmatized AUD diagnoses was higher in men compared to women. While inconsistent with expectations, several factors may influence why men have a higher proportion of stigmatized AUD descriptors than women. Women and men diagnosed with AUD may differ in important unmeasured ways. For example, patients who are actively seeking alcohol-related treatment may be more likely to have stigmatized descriptors documented in the EHR at the time of AUD diagnoses (Williams et al., 2016), and men may be more likely to be seeking treatment for AUD (Alvanzo et al., 2014; Gilbert et al., 2019), therefore making them more likely to have AUD diagnosis documented as a stigmatized descriptor. Additionally, a study has shown that providers are less likely to have conversations with women regarding alcohol use, even if they report unhealthy alcohol use (Parthasarathy et al., 2023). Similarly, providers may be more careful not to use documentation that might offend women. Finally, given the small magnitude of the difference in the proportions of stigmatized AUD descriptors documented for women and men, and the fact that findings were counter to prior research (Kelly et al., 2021), the significant findings could be due to chance.

Although the current study did not find variation in the proportions of AUD diagnoses documented with stigmatized AUD descriptors across intersectional groups, some groups are

disproportionately impacted by stigmatized labels. For instance, a prior study found that Black and Latine groups compared to White are more likely to report experiencing stigma associated with AUD and are less likely to seek services (Keyes et al., 2010). Additionally, prior research has found that women with substance use disorder experience more stigma due to social and cultural norms (El-Bassel et al., 2012). Further, a qualitative study of service barriers in mental health and substance use disorder treatment found that intersectional stigma is among the highest barriers to service for Black women (Jones et al., 2015; Turan et al., 2019).

Limitations

This study has several noteworthy limitations. First, around 85% of the documented AUD diagnoses in our sample were linked to White patients. Our ability to detect potential differences in the proportion of stigmatized AUD descriptors may have been limited by relatively smaller sample sizes of documented AUD diagnoses from minoritized groups. Furthermore, the current study sample excluded 3 minoritized racial groups (HP/PI, AI/AN, and people with multiple races), preventing the exploration of stigmatized AUD descriptors among these vulnerable populations. Second, this study defined stigmatized AUD descriptors based on coding by four alcohol researchers that used two U.S. organizations' guidance on stigmatized terms relating to AUD. Further, 69.9% of stigmatized descriptors documented were terms used in DSM-IV diagnoses ("alcohol abuse" and "alcohol dependence"). However, findings were not different when those terms were excluded. Third, the AUD text descriptors that providers selected when documenting AUD diagnosis in the EHR are derived from pick lists in the EHR. The pick list is curated in alphabetical order or a provider's self-created preference list. This might create scenarios where a provider's AUD text descriptor may not accurately represent their preference if they simply choose the top descriptor for efficiency. Finally, the stigma of documented AUD

descriptors may not reflect the broader stigma that a patient experiences during a primary care visit when they are diagnosed with AUD.

Despite these limitations, this study had several strengths. This study was the first to our knowledge to evaluate potential stigma within EHR text descriptors selected by providers in the course of routine AUD diagnosis inside a real-world large healthcare setting. Second, while the majority of the patients in this sample were White women and men, this study's smallest racial sample was 631 (Asian), providing reliable results. Third, findings from this study suggest that EHRs might guide providers to use stigmatized labels, thereby sustaining stigmatized language. If so, EHRs might be useful for guiding providers to decrease their use of stigmatized language.

Conclusions

This study examined text descriptors selected by primary care providers when documenting AUD diagnoses in EHRs to determine whether those descriptors that reflected greater stigma were used more often in women and minoritized patients. The overall proportion of AUD diagnoses documented with stigmatized AUD descriptors in EHRs was 18.6% or 88.5%, depending on how stigmatized AUD descriptors were defined, emphasizing the need to reduce stigmatized language associated with alcohol use across all races, ethnicities, and genders. Although there were no meaningful differences among subgroups based on intersections of race or ethnicity and sex, men were significantly more likely than women to have AUD documented with stigmatized descriptors. Taken together, findings suggest EHRs may provide an opportunity to overcome stigmatized language.

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FIGURES FOR CHAPTER 4

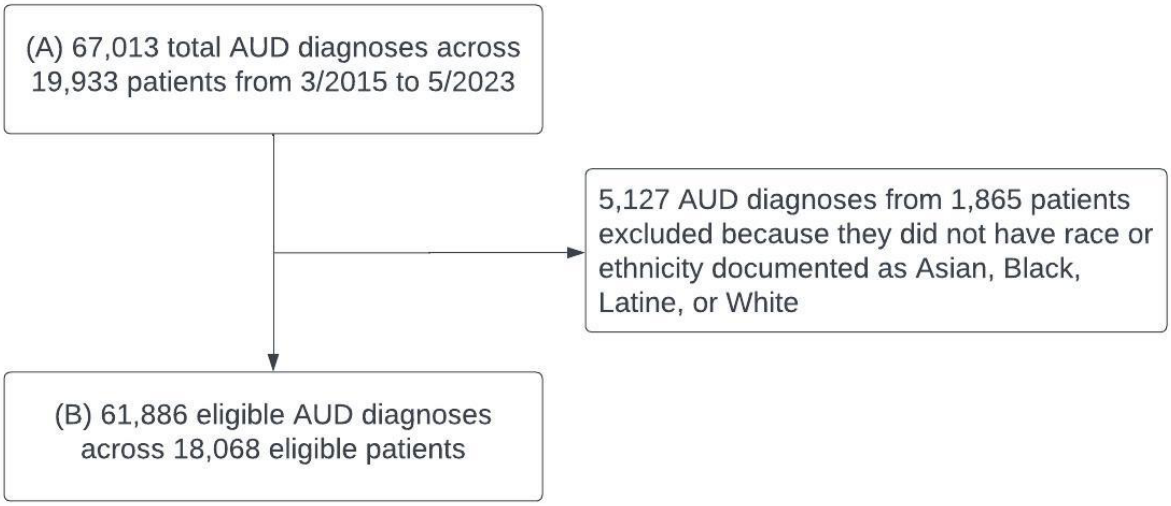

Figure 1. The study sample of primary care patients with alcohol use disorders: inclusion and exclusions

TABLES FOR CHAPTER 4

Table 1. Demographic and Clinical Characteristics of Primary Care Patients Who Were Diagnosed with AUD by Race or Ethnicity (18,068)

Characteristics	Full Sample	Asian N = 631	Black N = 908	Latine N = 1,060	White N = 15,469	P
Age (y) – Mean (SD)	51.4	44.6 (15.6)	46.9 (15.5)	44.4 (15.4)	52.5 (15.9)	<0.001
Sex/Gender, %						=0.012
Women	40.5	34.4	41.2	42.0	40.6	
Men	59.5	65.6	58.8	58.0	59.4	
Insurance Type, %						<0.001
Medicaid	5.0	5.2	8.5	6.1	4.7	
Medicare	25.1	10.9	16.8	13.2	26.9	
Commercial or Private	60.7	71.3	68.3	70.2	59.2	
State-subsidized, other, unknown	9.2	12.6	6.4	10.5	9.2	

Table 2. Unadjusted Prevalence and 95% Confidence Intervals (CIs) of Stigmatized AUD Descriptors Overall in the Total Sample and Within Subgroups Based on Intersections of Race or Ethnicity and Sex Among a Sample of Primary Care Patients

	Women	Men
Model 1: Unadjusted		
Total	88.0% (87.5-88.4)	88.9% (88.5-89.3)[a]
Asian	87.1% (83.7-89.9)	87.7% (85.4-89.7)
Black	87.3% (85.1-89.2)	90.5% (88.7-92.0)
Latine	88.5% (86.5-90.3)	88.2% (86.4-89.8)
White	88.0% (87.5-88.5)	88.9% (88.5-89.3)
Model 2: Adjusted for age		
Total	88.5% (88.1-89.0)	89.3% (89.0-89.7)[b]
Asian	89.2% (86.3-91.6)	89.1% (87.0-90.9)
Black	89.2% (87.3-90.9)	91.3% (89.7-92.7)
Latine	90.0% (88.2-91.5)	89.8% (88.2-91.2)
White	88.4% (87.9-88.9)	89.2% (88.8-89.6)

Men have significantly higher proportion than women: [a]p<0.001; [b]p<0.01

Table 3. Unadjusted Prevalence and 95% Confidence Intervals (CIs) of Restricted Stigmatized AUD Descriptors (excluding DSM-IV and ICD Diagnostic Terms from stigmatized descriptors) Overall in the Total Sample and Within Subgroups Based on Intersections of Race or Ethnicity and Sex Among a Sample of Primary Care Patients

	Women	Men
Model 1: Unadjusted		
Total	17.8% (17.3-18.4)	19.2% (18.7-19.7)[a]
Asian	17.9% (14.6-21.8)	15.8% (13.5-18.3)
Black	17.2% (15.0-19.7)	19.0% (16.8-21.3)
Latine	18.0% (15.8-20.4)	15.2% (13.4-17.2)
White	17.8% (17.3-18.4)	19.6% (19.1-20.1)
Model 2: Adjusted for age		
Total	17.8% (17.3-18.4)	19.1% (18.6-19.6)[b]
Asian	19.5% (16.0-23.5)	16.6% (14.2-19.2)
Black	18.6% (16.2-21.2)	19.5% (17.3-21.9)
Latine	18.9% (16.6-21.4)	16.2% (14.2-18.2)
White	17.6% (17.1-18.2)	19.3% (18.8-19.9)

Men have significantly higher proportion than women: [a]p<0.001; [b]p<0.01

SUPPLEMENTAL MATERIALS FOR CHAPTER 4

Supplemental Table 1: ICD-9 and ICD-10 Active AUD Diagnosis Codes

Supplemental Tables 2 (A-4): AUD Diagnostic Text Descriptors

Supplemental Table 3: Rubric for deciphering stigmatizing descriptors for Alcohol Use Disorder (AUD) – From National Institute on Drug Abuse (NIDA) and Addiction Language Guide (Shatter Proof)

Supplemental Table 1: ICD-9 and ICD-10 Active AUD Diagnosis Codes

ICD Code	ICD Text	Frequency
F10.21	Alcohol dependence, in remission	20098
F10.20	Alcohol dependence, uncomplicated	16363
F10.10	Alcohol abuse, uncomplicated	14957
F10.230	Alcohol dependence with withdrawal, uncomplicated	1808
F10.29	Alcohol dependence with unspecified alcohol-induced disorder	1446
303.93	Other and unspecified alcohol dependence – in remission	1398
303.9	Other and unspecified alcohol dependence – unspecified	1315
305	Alcohol abuse – unspecified	1232
F10.239	Alcohol dependence with withdrawal, unspecified	461
305.03	Alcohol abuse – in remission	420
F10.288	Alcohol dependence with other alcohol-induced disorder	309
F10.220	Alcohol dependence with intoxication, uncomplicated	297
F10.27	Alcohol dependence with alcohol-induced persisting dementia	282
F10.24	Alcohol dependence with alcohol-induced mood disorder	218
291.81	Alcohol withdrawal	194
F10.229	Alcohol dependence with intoxication, unspecified	167
303.91	Other and unspecified alcohol dependence – continuous	123
F10.280	Alcohol dependence with alcohol-induced anxiety disorder	120
F10.231	Alcohol dependence with withdrawal delirium	71
F10.282	Alcohol dependence with alcohol-induced sleep disorder	68
F10.232	Alcohol dependence with withdrawal with perceptual disturbance	59
291.9	Unspecified alcohol-induced mental disorders	58
F10.120	Alcohol abuse with intoxication, uncomplicated	49
291.89	Other alcohol-induced disorders	48
F10.19	Alcohol abuse with unspecified alcohol-induced disorder	46
303.92	Other and unspecified alcohol dependence – episodic	40
305.02	Alcohol abuse – episodic	36
305.01	Alcohol abuse – continuous	34
F10.129	Alcohol abuse with intoxication, unspecified	21

F10.14	Alcohol abuse with alcohol-induced mood disorder	21
291.2	Alcohol-induced persisting dementia	19
F10.188	Alcohol abuse with other alcohol-induced disorder	18
291.82	Alcohol-induced sleep disorders	14
303	Acute alcohol intoxication – unspecified	12
F10.259	Alcohol dependence with alcohol-induced psychotic disorder, unspecified	12
303.01	Acute alcoholic intoxication– continuous	8
F10.221	Alcohol dependence with intoxication delirium	8
F10.180	Alcohol abuse with alcohol-induced anxiety disorder	7
F10.121	Alcohol abuse with intoxication delirium	5
F10.26	Alcohol dependence with alcohol-induced persisting amnestic disorder	5
291	Alcohol withdrawal delirium	3
303.02	Acute alcoholic intoxication – episodic	3
291.1	Alcohol-induced persisting amnestic disorder	2
291.3	Alcohol-induced psychotic disorder with hallucinations	2
F10.182	Alcohol abuse with alcohol-induced sleep disorder	2
F10.250	Alcohol dependence with alcohol-induced psychotic disorder with delusions	2
F10.251	Alcohol dependence with alcohol-induced psychotic disorder with hallucinations	2
F10.151	Alcohol abuse with alcohol-induced psychotic disorder with hallucinations	1
F10.159	Alcohol abuse with alcohol-induced psychotic disorder, unspecified	1
F10.181	Alcohol abuse with alcohol-induced sexual dysfunction	1

Supplemental Tables 2(A-D): AUD Diagnostic Text Descriptors

2A. Stigmatized AUD Descriptors and Frequencies		
	AUD Text Descriptor	**Frequency**
1	Alcohol dependence in remission	9313
2	Alcohol abuse	8161
3	Uncomplicated alcohol dependence	4849
4	Alcoholism in remission	3000
5	Alcoholism	2790
6	Alcohol use disorder, moderate, dependence	2505
7	Alcohol use disorder, severe, dependence	2481
8	Alcohol dependence with unspecified alcohol-induced disorder	1502
9	Alcohol use disorder, mild, abuse	1432
10	Personal history of alcoholism	916
11	History of alcohol dependence	896
12	Excessive drinking alcohol	889
13	ETOH abuse	848
14	Alcohol abuse, in remission	830
15	History of alcoholism	822
16	Alcohol consumption binge drinking	711
17	Alcohol dependence with uncomplicated withdrawal	634
18	Alcohol dependence in early full remission	587

19	Alcohol dependence	444
20	Alcohol dependence, in remission	410
21	Excessive drinking of alcohol	399
22	Alcohol dependence in early, early partial, sustained full, or sustained partial remission	398
23	Alcohol dependence, daily use	372
24	Alcohol dependence with other alcohol-induced disorder	337
25	Alcohol dependence in sustained full remission	334
26	Alcohol abuse, daily use	332
27	Alcohol dependence with uncomplicated intoxication	300
28	Alcoholism /alcohol abuse	295
29	Alcohol dependence, uncomplicated	271
30	Nondependent alcohol abuse	267
31	Alcoholism in recovery	259
32	Habitual alcohol use	247
33	Alcohol abuse, unspecified	229
34	Alcohol dependence with alcohol-induced mood disorder	216
35	Alcohol dependence, continuous	204
36	Other and unspecified alcohol dependence, in remission	201
37	Alcohol dependence with intoxication with complication	160
38	Alcohol dependence with withdrawal with complication	154
39	Alcohol abuse, episodic	147
40	Alcohol dependence with alcohol-induced anxiety disorder	140
41	Other and unspecified alcohol dependence, unspecified drinking behavior	136
42	Dementia associated with alcoholism without behavioral disturbance	128
43	Chronic alcoholism in remission	113
44	Dementia associated with alcoholism with behavioral disturbance	113
45	Alcohol abuse, episodic drinking behavior	107
46	Alcohol use disorder, severe, in early remission, dependence	103
47	Severe alcohol dependence in early remission	98
48	Alcohol consumption heavy	96
49	Alcohol dependence, episodic	96
50	Recovering alcoholic in remission	96
51	Alcohol problem drinking	89
52	ETOHism	86
53	History of alcohol abuse	83
54	Other and unspecified alcohol dependence, continuous drinking behavior	78
55	Severe alcohol dependence	74
56	Alcohol abuse, continuous	69
57	Alcohol dependence with alcohol-induced sleep disorder	68
58	Alcohol use disorder, moderate, in early remission, dependence	67
59	H/O alcohol dependence	67
60	Nondependent alcohol abuse, episodic drinking behavior	65
61	Chronic alcoholism	61
62	Alcoholic	60

63	Moderate alcohol dependence in early remission	59
64	Alcoholism, chronic	52
65	Problem drinking	50
66	Alcohol dependence, binge pattern	47
67	Alcohol use disorder, severe, in sustained remission, dependence	47
68	Alcohol dependence with alcohol-induced persisting dementia	46
69	Alcohol abuse, continuous drinking behavior	45
70	Dysfunctional alcohol use	42
71	Engages in binge consumption of alcohol	42
72	Chronic alcohol abuse	37
73	EtOH dependence	37
74	Recovering alcoholic	37
75	Alcohol use disorder, moderate, in controlled environment, dependence	36
76	Alcohol dependence, episodic drinking behavior	33
77	Uncomplicated alcohol abuse	33
78	Alcohol dependence with alcohol-induced disorder	32
79	Alcohol abuse with alcohol-induced disorder	29
80	Alcohol dependence, continuous drinking behavior	27
81	Other and unspecified alcohol dependence, episodic drinking behavior	27
82	Nondependent alcohol abuse, continuous drinking behavior	23
83	Nondependent alcohol abuse, in remission	23
84	Alcohol intake above recommended sensible limits without complication	21
85	Alcohol dependence with withdrawal	20
86	Alcohol use disorder, moderate, in sustained remission, dependence	20
87	Moderate alcohol dependence	20
88	Thrombocytopenia concurrent with and due to alcoholism	20
89	Alcohol abuse with alcohol-induced mood disorder	19
90	Alcohol abuse with physiological dependence	19
91	History of heavy alcohol consumption	18
92	Alcohol abuse with other alcohol-induced disorder	17
93	Alcohol dependence with withdrawal delirium	17
94	Alcohol use disorder, mild, in early remission, abuse	17
95	Mild alcohol abuse	17
96	Continuous alcohol dependence	16
97	H/O alcohol abuse	15
98	History of ETOH abuse	15
99	Alcohol abuse, uncomplicated	14
100	Alcohol dependence with alcohol-induced psychotic disorder with complication	14
101	Alcohol use disorder, severe, in controlled environment, dependence	14
102	Continuous chronic alcoholism	13
103	Alcohol dependence in controlled environment	12
104	Alcohol intoxication in relapsed alcoholic	12
105	Alcohol use disorder, moderate, in early remission, in controlled environment, dependence	12
106	Disorder due to alcohol abuse	12

107	Nondependent alcohol abuse, episodic	12
108	Alcohol dependence with withdrawal, uncomplicated	11
109	Alcohol abuse with intoxication	10
110	H/O ETOH abuse	10
111	Mild alcohol abuse in early remission	10
112	Alcohol intake above recommended sensible limits, uncomplicated	9
113	Moderate alcohol dependence in sustained remission	9
114	Significant use of alcohol	9
115	Alcohol dependence with withdrawal with perceptual disturbance	8
116	Alcohol abuse with alcohol-induced anxiety disorder	7
117	Alcohol use disorder, mild, in controlled environment, abuse	7
118	Alcoholism syndrome	7
119	Moderate alcohol dependence in controlled environment	7
120	Alcohol abuse with intoxication with complication	6
121	Alcohol dependence with inpatient treatment	6
122	Alcohol dependence with physiological dependence	6
123	Alcohol intake above recommended sensible limits	6
124	Chronic alcohol dependence, continuous	6
125	Dementia associated with alcoholism	6
126	Alcohol abuse with intoxication, uncomplicated	5
127	Alcohol abuse with unspecified alcohol-induced disorder	5
128	Alcohol dependence with alcohol-induced persisting amnestic disorder	5
129	Alcohol dependence without physiological dependence	5
130	Alcohol dependency	5
131	Alcohol intoxication, uncomplicated	5
132	Anemia due to alcoholism	5
133	Cerebellar ataxia due to alcoholism	5
134	Drinking problem	5
135	AA (alcohol abuse)	4
136	Alcohol dependence with delirium	4
137	Acute alcohol intoxication, uncomplicated	3
138	Acute alcoholic intoxication in alcoholism without complication	3
139	Acute alcoholic intoxication in alcoholism, in remission	3
140	Acute alcoholism	3
141	Alcohol abuse with intoxication delirium	3
142	Alcohol addiction	3
143	Alcohol dependence syndrome	3
144	Alcohol dependence with intoxication delirium	3
145	Alcohol dependence with physiological dependence, in remission	3
146	Alcohol dependence with withdrawal, unspecified	3
147	Alcoholism with alcohol dependence	3
148	Hangover without complication	3
149	Mild alcohol dependence	3
150	Non megaloblastic anemia due to alcoholism	3
151	Acute alcohol abuse	2

152	Acute alcoholic intoxication in alcoholism, unspecified	2
153	Alcohol abuse with intoxication, unspecified	2
154	Alcohol abuse with uncomplicated intoxication	2
155	Alcohol dependence with acute alcoholic intoxication without complication	2
156	Alcohol dependence with alcohol-induced psychotic disorder	2
157	Alcohol dependence with alcohol-induced psychotic disorder, unspecified	2
158	Alcohol dependence with psychiatric treatment	2
159	Alcohol intoxication	2
160	Alcohol intoxication, episodic, uncomplicated	2
161	Alcohol intoxication, in remission	2
162	Alcohol intoxication, with unspecified complication	2
163	Alcohol use disorder, mild, in sustained remission, abuse	2
164	Mild alcohol abuse in sustained remission	2
165	Severe alcohol dependence in controlled environment	2
166	Severe alcohol dependence in sustained remission	2
167	Acute alcohol abuse, uncomplicated	1
168	Acute alcohol intoxication, with unspecified complication	1
169	Acute alcohol overingestion, with delirium	1
170	Acute alcoholic intoxication in alcoholism, with unspecified complication	1
171	Alcoh dep NEC/NOS, unspec	1
172	Alcohol abuse w alcoh-induce psychotic disorder w hallucin	1
173	Alcohol abuse with alcohol-induced mental disorder	1
174	Alcohol abuse with alcohol-induced psychotic disorder with complication	1
175	Alcohol abuse with alcohol-induced sleep disorder	1
176	Alcohol depend w alcoh-induce psychotic disorder w delusions	1
177	Alcohol dependence during childbirth	1
178	Alcohol dependence with acute alcoholic intoxication with complication	1
179	Alcohol dependence with acute alcoholic intoxication, uncomplicated	1
180	Alcohol dependence with alcohol-induced psychotic disorder with delusions	1
181	Alcohol dependence with alcohol-induced psychotic disorder with hallucinations	1
182	Alcohol dependence with hallucinations	1
183	Alcohol dependence with intoxication	1
184	Alcohol dependence, inpatient tx	1
185	Alcohol intoxication delirium	1
186	Alcohol intoxication delirium with moderate or severe use disorder	1
187	Alcohol intoxication in active alcoholic with complication	1
188	Alcohol intoxication in episodic drinker	1
189	Alcohol intoxication in episodic drinker, uncomplicated	1
190	Alcohol intoxication in episodic drinker, with unspecified complication	1
191	Alcohol use disorder, mild, in sustained remission, in controlled environment, abuse	1
192	Alcohol use with intoxication	1
193	Alcoholic dependence syndrome	1
194	Alcoholic intoxication	1
195	Alcoholic intoxication, chronic, uncomplicated	1

196	Alcoholism associated with dementia	1
197	Continuous alcohol dependence with acute intoxication with complication	1
198	Drunkenness, acute, in alcoholism, uncomplicated	1
199	Drunkenness, acute, in alcoholism, with unspecified complication	1
200	Episodic acute alcoholic intoxication, uncomplicated	1
201	Episodic acute alcoholic intoxication, with unspecified complication	1
202	Excessive consumption of ethanol	1
203	Hangover with complication	1
204	Hangover, uncomplicated	1
205	History of dementia associated with alcoholism	1

2B. Non-Stigmatized AUD Descriptors and Frequency		
	AUD Text Descriptor	**Frequency**
1	Moderate alcohol use disorder	1147
2	Severe alcohol use disorder	1140
3	Alcohol use disorder, severe, in early remission	1120
4	Alcohol use disorder, moderate, in early remission	1101
5	Alcohol withdrawal syndrome without complication	793
6	Mild alcohol use disorder	610
7	Alcohol use disorder, moderate, in sustained remission	494
8	Alcohol use disorder, severe, in sustained remission	453
9	Alcohol withdrawal, uncomplicated	365
10	Alcohol withdrawal syndrome with complication	213
11	Severe alcohol use disorder, in early remission	201
12	Alcohol use disorder, moderate, in controlled environment	154
13	Moderate alcohol use disorder, in sustained remission	146
14	Moderate alcohol use disorder, in early remission	139
15	Alcohol use disorder, mild, in controlled environment	120
16	Alcohol use disorder, mild, in early remission	96
17	Alcohol withdrawal	82
18	Alcohol withdrawal, with unspecified complication	81
19	Severe alcohol use disorder, in sustained remission	77
20	Alcohol withdrawal seizure without complication	64
21	Alcoholic encephalopathy	60
22	Alcohol use disorder, mild, in sustained remission	51
23	Alcohol use disorder, severe, in controlled environment	45
24	Alcohol withdrawal syndrome with perceptual disturbance	33
25	Alcohol withdrawal syndrome, with delirium	22
26	Mild alcohol use disorder, in early remission	21
27	Alcohol-induced depressive disorder with moderate or severe use disorder	18
28	Alcoholic cerebellar degeneration syndrome	17
29	Mild alcohol use disorder, in controlled environment	16
30	Alcoholic cerebellar degeneration	15
31	Alcohol withdrawal seizure with complication	13
32	Alcohol-induced sleep disorder	12

33	Alcohol withdrawal seizure, uncomplicated	12
34	Alcohol withdrawal delirium	11
35	Mild alcohol use disorder, in sustained remission	11
36	Uncomplicated alcohol withdrawal	11
37	Alcohol use disorder, severe, in early remission, in controlled environment	10
38	Chronic alcohol use	10
39	Alcohol use disorder, moderate, in early remission, in controlled environment	8
40	Alcohol withdrawal seizure with delirium	8
41	Alcohol withdrawal syndrome, uncomplicated	8
42	Alcohol withdrawal, with perceptual disturbance	8
43	Moderate alcohol use disorder in controlled environment	7
44	Withdrawal symptoms, alcohol, uncomplicated	7
45	Alcohol use disorder, severe, in sustained remission, in controlled environment	6
46	Alcohol withdrawal hallucinosis	5
47	Delirium tremens	5
48	Alcohol-induced anxiety disorder with mild use disorder with onset during withdrawal	4
49	Alcohol intoxication with moderate or severe use disorder with complication	4
50	Alcohol withdrawal with inpatient treatment without complication	4
51	Alcoholic dementia	4
52	History of alcohol use disorder	4
53	Alcohol use disorder, mild, in early remission, in controlled environment	3
54	Alcohol withdrawal seizure	3
55	Alcohol withdrawal seizure with perceptual disturbance	3
56	Alcohol withdrawal, with delirium	3
57	Cerebellar ataxia due to alcohol	3
58	DTs (delirium tremens)	3
59	Gait disorder, alcoholic	3
60	Moderate alcohol use disorder, in early remission, in controlled environment	3
61	Other specified alcohol-induced mental disorders(291.89)	3
62	Seizure due to alcohol withdrawal, uncomplicated	3
63	Alcohol-induced depressive disorder with mild use disorder	2
64	Alcohol-related disorder	2
65	Alcohol use disorder, moderate, in sustained remission, in controlled environment	2
66	Alcohol use with alcohol-induced disorder	2
67	Alcohol withdrawal seizure, with unspecified complication	2
68	Alcohol withdrawal syndrome with complication, with unspecified complication	2
69	Anemia secondary to alcohol	2
70	Moderate alcohol use disorder, in sustained remission, in controlled environment	2
71	Perceptual disturbances and seizures concurrent with and due to alcohol withdrawal	2
72	Seizure due to alcohol withdrawal, with unspecified complication	2
73	Severe alcohol use disorder, in early remission, in controlled environment	2
74	Severe alcohol use disorder, in sustained remission, in controlled environment	2

75	Uncomplicated moderate alcohol withdrawal without perceptual disturbances	2
76	Withdrawal symptoms, alcohol	2
77	Alcohol-induced amnesia	1
78	Alcohol-induced cognitive dysfunction	1
79	Alcohol-induced mild neurocognitive disorder with moderate or severe use disorder	1
80	Alcohol-induced sexual dysfunction with mild use disorder with onset after medication use	1
81	Alcohol-induced sleep disorder with mild use disorder, insomnia type	1
82	Alcohol intoxication with mild use disorder with complication	1
83	Alcohol related disorder	1
84	Alcohol use disorder, mild, in sustained remission, in controlled environment	1
85	Alcohol use with uncomplicated intoxication with mild use disorder	1
86	Alcohol use with uncomplicated intoxication with moderate or severe use disorder	1
87	Alcohol withdrawal delirium, acute, hyperactive	1
88	Alcohol withdrawal delirium, acute, mixed level of activity	1
89	Alcohol withdrawal syndrome with complication, with perceptual disturbance	1
90	Alcohol withdrawal syndrome, with unspecified complication	1
91	Alcohol withdrawal with complication with inpatient treatment, with unspecified complication	1
92	Alcohol withdrawal with delirium	1
93	Alcohol withdrawal with inpatient treatment, uncomplicated	1
94	Alcoholic delirium	1
95	Alcoholic Korsakoff syndrome	1
96	Cognitive dysfunction, alcohol-related	1
97	Delirium, alcoholic	1
98	Dementia due to alcohol	1
99	Impending delirium tremens	1
100	Insomnia due to alcohol	1
101	Mild alcohol use disorder, in sustained remission, in controlled environment	1
102	Seizure due to alcohol withdrawal	1
103	Seizure due to alcohol withdrawal, with delirium	1
104	Severe alcohol use disorder in controlled environment	1
105	Severe alcohol withdrawal with perceptual disturbances	1
106	Sleep disorder, alcohol-induced	1
107	Withdrawal symptoms, alcohol, with perceptual disturbance	1

2C. Restricted Stigmatized AUD Descriptors and Frequencies		
	AUD Text Descriptor	**Frequency**
1	Alcoholism in remission	3000
2	Alcoholism	2790
3	Personal history of alcoholism	916
4	Excessive drinking alcohol	889
5	ETOH abuse	848

6	History of alcoholism	822
7	Alcoholism in recovery	259
8	Habitual alcohol use	247
9	Dementia associated with alcoholism without behavioral disturbance	128
10	Chronic alcoholism in remission	113
11	Dementia associated with alcoholism with behavioral disturbance	113
12	Recovering alcoholic in remission	96
13	Alcohol problem drinking	89
14	ETOHism	86
15	Chronic alcoholism	61
16	Alcoholic	60
17	Alcoholism, chronic	52
18	Dysfunctional alcohol use	42
19	EtOH dependence	37
20	Recovering alcoholic	37
21	Alcohol intake above recommended sensible limits without complication	21
22	Thrombocytopenia concurrent with and due to alcoholism	20
23	History of heavy alcohol consumption	18
24	History of ETOH abuse	15
25	Continuous chronic alcoholism	13
26	Alcohol intoxication in relapsed alcoholic	12
27	H/O ETOH abuse	10
28	Alcohol intake above recommended sensible limits, uncomplicated	9
29	Significant use of alcohol	9
30	Alcoholism syndrome	7
31	Alcohol intake above recommended sensible limits	6
32	Dementia associated with alcoholism	6
33	Alcohol intoxication, uncomplicated	5
34	Anemia due to alcoholism	5
35	Cerebellar ataxia due to alcoholism	5
36	Drinking problem	5
37	Acute alcohol intoxication, uncomplicated	3
38	Acute alcoholic intoxication in alcoholism without complication	3
39	Acute alcoholic intoxication in alcoholism, in remission	3
40	Acute alcoholism	3
41	Alcohol addiction	3
42	Hangover without complication	3
43	Non megaloblastic anemia due to alcoholism	3
44	Acute alcoholic intoxication in alcoholism, unspecified	2
45	Alcohol intoxication	2
46	Alcohol intoxication, episodic, uncomplicated	2
47	Alcohol intoxication, in remission	2
48	Alcohol intoxication, with unspecified complication	2
49	Acute alcohol intoxication, with unspecified complication	1
50	Acute alcohol overingestion, with delirium	1

51	Acute alcoholic intoxication in alcoholism, with unspecified complication	1
52	Alcohol intoxication delirium	1
53	Alcohol intoxication in active alcoholic with complication	1
54	Alcohol intoxication in episodic drinker	1
55	Alcohol intoxication in episodic drinker, uncomplicated	1
56	Alcohol intoxication in episodic drinker, with unspecified complication	1
57	Alcohol use with intoxication	1
58	Alcoholic intoxication	1
59	Alcoholic intoxication, chronic, uncomplicated	1
60	Alcoholism associated with dementia	1
61	Drunkenness, acute, in alcoholism, uncomplicated	1
62	Drunkenness, acute, in alcoholism, with unspecified complication	1
63	Episodic acute alcoholic intoxication, uncomplicated	1
64	Episodic acute alcoholic intoxication, with unspecified complication	1
65	Excessive consumption of ethanol	1
66	Hangover with complication	1
67	Hangover, uncomplicated	1
68	History of dementia associated with alcoholism	1

2D. Restricted Non-Stigmatized AUD Descriptors and Frequencies		
	AUD Text Descriptor	**Frequency**
1	Alcohol dependence in remission	9313
2	Alcohol abuse	8161
3	Uncomplicated alcohol dependence	4849
4	Alcohol use disorder, moderate, dependence	2505
5	Alcohol use disorder, severe, dependence	2481
6	Alcohol dependence with unspecified alcohol-induced disorder	1502
7	Alcohol use disorder, mild, abuse	1432
8	Moderate alcohol use disorder	1147
9	Severe alcohol use disorder	1140
10	Alcohol use disorder, severe, in early remission	1120
11	Alcohol use disorder, moderate, in early remission	1101
12	History of alcohol dependence	896
13	Alcohol abuse, in remission	830
14	Alcohol withdrawal syndrome without complication	793
15	Alcohol consumption binge drinking	711
16	Alcohol dependence with uncomplicated withdrawal	634
17	Mild alcohol use disorder	610
18	Alcohol dependence in early full remission	587
19	Alcohol use disorder, moderate, in sustained remission	494
20	Alcohol use disorder, severe, in sustained remission	453
21	Alcohol dependence	444
22	Alcohol dependence, in remission	410
23	Excessive drinking of alcohol	399

24	Alcohol dependence in early, early partial, sustained full, or sustained partial remission	398
25	Alcohol dependence, daily use	372
26	Alcohol withdrawal, uncomplicated	365
27	Alcohol dependence with other alcohol-induced disorder	337
28	Alcohol dependence in sustained full remission	334
29	Alcohol abuse, daily use	332
30	Alcohol dependence with uncomplicated intoxication	300
31	Alcoholism /alcohol abuse	295
32	Alcohol dependence, uncomplicated	271
33	Nondependent alcohol abuse	267
34	Alcohol abuse, unspecified	229
35	Alcohol dependence with alcohol-induced mood disorder	216
36	Alcohol withdrawal syndrome with complication	213
37	Alcohol dependence, continuous	204
38	Other and unspecified alcohol dependence, in remission	201
39	Severe alcohol use disorder, in early remission	201
40	Alcohol dependence with intoxication with complication	160
41	Alcohol dependence with withdrawal with complication	154
42	Alcohol use disorder, moderate, in controlled environment	154
43	Alcohol abuse, episodic	147
44	Moderate alcohol use disorder, in sustained remission	146
45	Alcohol dependence with alcohol-induced anxiety disorder	140
46	Moderate alcohol use disorder, in early remission	139
47	Other and unspecified alcohol dependence, unspecified drinking behavior	136
48	Alcohol use disorder, mild, in controlled environment	120
49	Alcohol abuse, episodic drinking behavior	107
50	Alcohol use disorder, severe, in early remission, dependence	103
51	Severe alcohol dependence in early remission	98
52	Alcohol consumption heavy	96
53	Alcohol dependence, episodic	96
54	Alcohol use disorder, mild, in early remission	96
55	History of alcohol abuse	83
56	Alcohol withdrawal	82
57	Alcohol withdrawal, with unspecified complication	81
58	Other and unspecified alcohol dependence, continuous drinking behavior	78
59	Severe alcohol use disorder, in sustained remission	77
60	Severe alcohol dependence	74
61	Alcohol abuse, continuous	69
62	Alcohol dependence with alcohol-induced sleep disorder	68
63	Alcohol use disorder, moderate, in early remission, dependence	67
64	H/O alcohol dependence	67
65	Nondependent alcohol abuse, episodic drinking behavior	65
66	Alcohol withdrawal seizure without complication	64
67	Alcoholic encephalopathy	60

68	Moderate alcohol dependence in early remission	59
69	Alcohol use disorder, mild, in sustained remission	51
70	Problem drinking	50
71	Alcohol dependence, binge pattern	47
72	Alcohol use disorder, severe, in sustained remission, dependence	47
73	Alcohol dependence with alcohol-induced persisting dementia	46
74	Alcohol abuse, continuous drinking behavior	45
75	Alcohol use disorder, severe, in controlled environment	45
76	Engages in binge consumption of alcohol	42
77	Chronic alcohol abuse	37
78	Alcohol use disorder, moderate, in controlled environment, dependence	36
79	Alcohol dependence, episodic drinking behavior	33
80	Alcohol withdrawal syndrome with perceptual disturbance	33
81	Uncomplicated alcohol abuse	33
82	Alcohol dependence with alcohol-induced disorder	32
83	Alcohol abuse with alcohol-induced disorder	29
84	Alcohol dependence, continuous drinking behavior	27
85	Other and unspecified alcohol dependence, episodic drinking behavior	27
86	Nondependent alcohol abuse, continuous drinking behavior	23
87	Nondependent alcohol abuse, in remission	23
88	Alcohol withdrawal syndrome, with delirium	22
89	Mild alcohol use disorder, in early remission	21
90	Alcohol dependence with withdrawal	20
91	Alcohol use disorder, moderate, in sustained remission, dependence	20
92	Moderate alcohol dependence	20
93	Alcohol abuse with alcohol-induced mood disorder	19
94	Alcohol abuse with physiological dependence	19
95	Alcohol-induced depressive disorder with moderate or severe use disorder	18
96	Alcohol abuse with other alcohol-induced disorder	17
97	Alcohol dependence with withdrawal delirium	17
98	Alcohol use disorder, mild, in early remission, abuse	17
99	Alcoholic cerebellar degeneration syndrome	17
100	Mild alcohol abuse	17
101	Continuous alcohol dependence	16
102	Mild alcohol use disorder, in controlled environment	16
103	Alcoholic cerebellar degeneration	15
104	H/O alcohol abuse	15
105	Alcohol abuse, uncomplicated	14
106	Alcohol dependence with alcohol-induced psychotic disorder with complication	14
107	Alcohol use disorder, severe, in controlled environment, dependence	14
108	Alcohol withdrawal seizure with complication	13
109	Alcohol-induced sleep disorder	12
110	Alcohol dependence in controlled environment	12
111	Alcohol use disorder, moderate, in early remission, in controlled environment, dependence	12

112	Alcohol withdrawal seizure, uncomplicated	12
113	Disorder due to alcohol abuse	12
114	Nondependent alcohol abuse, episodic	12
115	Alcohol dependence with withdrawal, uncomplicated	11
116	Alcohol withdrawal delirium	11
117	Mild alcohol use disorder, in sustained remission	11
118	Uncomplicated alcohol withdrawal	11
119	Alcohol abuse with intoxication	10
120	Alcohol use disorder, severe, in early remission, in controlled environment	10
121	Chronic alcohol use	10
122	Mild alcohol abuse in early remission	10
123	Moderate alcohol dependence in sustained remission	9
124	Alcohol dependence with withdrawal with perceptual disturbance	8
125	Alcohol use disorder, moderate, in early remission, in controlled environment	8
126	Alcohol withdrawal seizure with delirium	8
127	Alcohol withdrawal syndrome, uncomplicated	8
128	Alcohol withdrawal, with perceptual disturbance	8
129	Alcohol abuse with alcohol-induced anxiety disorder	7
130	Alcohol use disorder, mild, in controlled environment, abuse	7
131	Moderate alcohol dependence in controlled environment	7
132	Moderate alcohol use disorder in controlled environment	7
133	Withdrawal symptoms, alcohol, uncomplicated	7
134	Alcohol abuse with intoxication with complication	6
135	Alcohol dependence with inpatient treatment	6
136	Alcohol dependence with physiological dependence	6
137	Alcohol use disorder, severe, in sustained remission, in controlled environment	6
138	Chronic alcohol dependence, continuous	6
139	Alcohol abuse with intoxication, uncomplicated	5
140	Alcohol abuse with unspecified alcohol-induced disorder	5
141	Alcohol dependence with alcohol-induced persisting amnestic disorder	5
142	Alcohol dependence without physiological dependence	5
143	Alcohol dependency	5
144	Alcohol withdrawal hallucinosis	5
145	Delirium tremens	5
146	AA (alcohol abuse)	4
147	Alcohol-induced anxiety disorder with mild use disorder with onset during withdrawal	4
148	Alcohol dependence with delirium	4
149	Alcohol intoxication with moderate or severe use disorder with complication	4
150	Alcohol withdrawal with inpatient treatment without complication	4
151	Alcoholic dementia	4
152	History of alcohol use disorder	4
153	Alcohol abuse with intoxication delirium	3
154	Alcohol dependence syndrome	3
155	Alcohol dependence with intoxication delirium	3

156	Alcohol dependence with physiological dependence, in remission	3
157	Alcohol dependence with withdrawal, unspecified	3
158	Alcohol use disorder, mild, in early remission, in controlled environment	3
159	Alcohol withdrawal seizure	3
160	Alcohol withdrawal seizure with perceptual disturbance	3
161	Alcohol withdrawal, with delirium	3
162	Alcoholism with alcohol dependence	3
163	Cerebellar ataxia due to alcohol	3
164	DTs (delirium tremens)	3
165	Gait disorder, alcoholic	3
166	Mild alcohol dependence	3
167	Moderate alcohol use disorder, in early remission, in controlled environment	3
168	Other specified alcohol-induced mental disorders(291.89)	3
169	Seizure due to alcohol withdrawal, uncomplicated	3
170	Acute alcohol abuse	2
171	Alcohol-induced depressive disorder with mild use disorder	2
172	Alcohol-related disorder	2
173	Alcohol abuse with intoxication, unspecified	2
174	Alcohol abuse with uncomplicated intoxication	2
175	Alcohol dependence with acute alcoholic intoxication without complication	2
176	Alcohol dependence with alcohol-induced psychotic disorder	2
177	Alcohol dependence with alcohol-induced psychotic disorder, unspecified	2
178	Alcohol dependence with psychiatric treatment	2
179	Alcohol use disorder, mild, in sustained remission, abuse	2
180	Alcohol use disorder, moderate, in sustained remission, in controlled environment	2
181	Alcohol use with alcohol-induced disorder	2
182	Alcohol withdrawal seizure, with unspecified complication	2
183	Alcohol withdrawal syndrome with complication, with unspecified complication	2
184	Anemia secondary to alcohol	2
185	Mild alcohol abuse in sustained remission	2
186	Moderate alcohol use disorder, in sustained remission, in controlled environment	2
187	Perceptual disturbances and seizures concurrent with and due to alcohol withdrawal	2
188	Seizure due to alcohol withdrawal, with unspecified complication	2
189	Severe alcohol dependence in controlled environment	2
190	Severe alcohol dependence in sustained remission	2
191	Severe alcohol use disorder, in early remission, in controlled environment	2
192	Severe alcohol use disorder, in sustained remission, in controlled environment	2
193	Uncomplicated moderate alcohol withdrawal without perceptual disturbances	2
194	Withdrawal symptoms, alcohol	2
195	Acute alcohol abuse, uncomplicated	1
196	Alcoh dep NEC/NOS, unspec	1
197	Alcohol-induced amnesia	1
198	Alcohol-induced cognitive dysfunction	1

199	Alcohol-induced mild neurocognitive disorder with moderate or severe use disorder	1
200	Alcohol-induced sexual dysfunction with mild use disorder with onset after medication use	1
201	Alcohol-induced sleep disorder with mild use disorder, insomnia type	1
202	Alcohol abuse w alcoh-induce psychotic disorder w hallucin	1
203	Alcohol abuse with alcohol-induced mental disorder	1
204	Alcohol abuse with alcohol-induced psychotic disorder with complication	1
205	Alcohol abuse with alcohol-induced sleep disorder	1
206	Alcohol depend w alcoh-induce psychotic disorder w delusions	1
207	Alcohol dependence during childbirth	1
208	Alcohol dependence with acute alcoholic intoxication with complication	1
209	Alcohol dependence with acute alcoholic intoxication, uncomplicated	1
210	Alcohol dependence with alcohol-induced psychotic disorder with delusions	1
211	Alcohol dependence with alcohol-induced psychotic disorder with hallucinations	1
212	Alcohol dependence with hallucinations	1
213	Alcohol dependence with intoxication	1
214	Alcohol dependence, inpatient tx	1
215	Alcohol intoxication delirium with moderate or severe use disorder	1
216	Alcohol intoxication with mild use disorder with complication	1
217	Alcohol related disorder	1
218	Alcohol use disorder, mild, in sustained remission, in controlled environment	1
219	Alcohol use disorder, mild, in sustained remission, in controlled environment, abuse	1
220	Alcohol use with uncomplicated intoxication with mild use disorder	1
221	Alcohol use with uncomplicated intoxication with moderate or severe use disorder	1
222	Alcohol withdrawal delirium, acute, hyperactive	1
223	Alcohol withdrawal delirium, acute, mixed level of activity	1
224	Alcohol withdrawal syndrome with complication, with perceptual disturbance	1
225	Alcohol withdrawal syndrome, with unspecified complication	1
226	Alcohol withdrawal with complication with inpatient treatment, with unspecified complication	1
227	Alcohol withdrawal with delirium	1
228	Alcohol withdrawal with inpatient treatment, uncomplicated	1
229	Alcoholic delirium	1
230	Alcoholic dependence syndrome	1
231	Alcoholic Korsakoff syndrome	1
232	Cognitive dysfunction, alcohol-related	1
233	Continuous alcohol dependence with acute intoxication with complication	1
234	Delirium, alcoholic	1
235	Dementia due to alcohol	1
236	Impending delirium tremens	1
237	Insomnia due to alcohol	1
238	Mild alcohol use disorder, in sustained remission, in controlled environment	1

239	Seizure due to alcohol withdrawal	1
240	Seizure due to alcohol withdrawal, with delirium	1
241	Severe alcohol use disorder in controlled environment	1
242	Severe alcohol withdrawal with perceptual disturbances	1
243	Sleep disorder, alcohol-induced	1
244	Withdrawal symptoms, alcohol, with perceptual disturbance	1

Supplemental Table 3. Rubric for deciphering stigmatizing descriptors for Alcohol Use Disorder (AUD) – From National Institute on Drug Abuse (NIDA) and Addiction Language Guide (Shatter Proof)

Stigmatizing Descriptor	**Non-Stigmatizing Descriptor**	**The rationale for using Non-Stigmatizing Descriptor**
Addict	Person with AUD	• Person-first language. • The change shows that a person "has" a problem, rather than "is" the problem. • The terms avoid eliciting negative associations, punitive attitudes, and individual blame.
User	Person with AUD or person with alcohol addiction	
alcohol, substance, or drug abuser	Patient	
Junkie	Person in active use	
Alcoholic	Person with alcohol use disorder	
Drunk	Person who misuses alcohol/ engages in unhealthy/ hazardous alcohol use	
Former addict	Person in recovery or long-term recovery	
Reformed addict	Person who previously used alcohol	
Habit	Alcohol use disorder; Alcohol addiction	• Inaccurately implies a person is choosing to use alcohol or can choose to stop.
Abuse	Use; Misuse	• Abuse is highly associated with negative judgments and punishments.
Clean	Not drinking or taking drugs	• Use clinically accurate, non-stigmatizing terminology.
Dirty	Person who drinks	
Alcohol or drug problem	Alcohol use disorder; substance use disorder; use; harmful hazardous; problematic; or risky use	• Neutral, non-judgmental language
Dependence		
Addicted to [X]	Has a [X] use disorder	• First-person language is less stigmatizing
Compliant	Adherent	

Non-compliant	Non-adherent	• Neutral, non-judgmental language
Detox	Withdrawal management	• Detox gives a connotation that a person needs to be cleansed from their use
Relapse, lapse, slip	Resumed or experience a recurrence alcohol use or alcohol use disorder symptoms	• Neutral, non-judgmental language
Sober	Well, healthy, in recovery	• Neutral, non-judgmental language

CHAPTER 5

Conclusion

Summary of findings

This dissertation leverages routinely collected EHR data from a large integrated health system in Washington State to better understand diagnosis of AUD, a stigmatized condition, across the intersection of race, ethnicity, sex, and community level SES. First, we found that the overall prevalence of clinically-documented AUD in adult primary care patients was lower than prior studies, and varied across race or ethnicity, and sex, but there were no consistent patterns across SES (**Chapter 2**). Second, we found that in a sample of primary care patients who reported high-risk drinking, differences in the prevalence of clinically-documented AUD across subgroups based on intersections of race or ethnicity and sex were no longer observed, indicating that differences across race or ethnicity or sex in prior studies may have reflected unmeasured confounding due to differences in the severity of AUD symptom burden across subgroups (**Chapter 3**). Lastly, we found that the proportion of AUD diagnoses documented with stigmatized AUD descriptors in EHRs in primary care was 18.6% or 88.5%, depending on how stigmatized AUD descriptor was defined. However, there was no meaningful variation across subgroups based on intersections of race or ethnicity and sex, but there were unexpected differences across sex (**Chapter 4**).

Implications

Alcohol use disorder (AUD) affects 11.3% of adults in the United States (U.S.) (C. f. B. H. S. a. Q. SAMHSA, 2021), and has disproportionate impacts – of increased prevalence and negative alcohol-related health outcomes and consequences – across key vulnerable subgroups (Grant et al., 2017; Kelly et al., 2021; Mulia, 2020; Mulia et al., 2009; Rehm et al., 2014).

However, despite the availability of evidence-based treatment, only 4.6% of adults with past-year AUD received alcohol-related treatment (Quality, 2021). Primary care is a great place for adults to initiate alcohol-related treatment, however, AUD is often underdiagnosed and under-treated in primary care (Hallgren et al., 2020). Accurate and equitable diagnosis of AUD in primary care is a critical step in increasing access to treatment of AUD. The findings of this dissertation, which describe clinically-documented AUD and the language used in EHRs to document AUD diagnoses across intersecting identities, have important implications for programs and research aimed at increasing the accuracy and equity of AUD diagnosis.

One implication was that findings from this dissertation were different from prior studies that evaluated AUD diagnosis across race, ethnicity, and sex in clinical settings. Prior VA studies showed that the prevalence of clinically-documented AUD was higher among Black and Latine patients compared to White patients (Williams et al., 2016). Contrastingly, chapter 2 of this dissertation found that the prevalence was higher among White patients, which is more consistent with studies that assessed AUD using confidential national surveys (Grant et al., 2015). Further, this dissertation was novel in that chapter 3 described the prevalence of clinically-documented AUD while accounting for DSM-5 AUD symptoms. Prior VA research found that disparities in clinically-documented AUD remained after adjustment for alcohol consumption (Vickers-Smith et al., 2023). This dissertation's findings were consistent with prior VA research when only adjusting for alcohol consumption, however, when adjusting for DSM-5 AUD symptoms there appeared to be no differences in clinically-documented AUD across race or ethnicity and sex. These differences between KPWA and the VA may be due to KPWA's use of high-quality self-report screening for alcohol consumption and routine assessment of DSM-5 AUD symptoms among patients who drink at unhealthy levels. The implementation of

systematic screening and assessment for DSM-5 AUD symptoms may have helped providers diagnose AUD in a more systematic way. Future research with larger samples of minoritized and marginalized individuals could evaluate whether differences are due to differences in health systems, including how care is delivered or the characteristics of the populations they serve.

Further, findings from chapter 4 of this dissertation showed that the proportion of stigmatized AUD descriptors in EHRs was high, ranging from 18.6% to 88.5% depending on how stigmatized AUD descriptors were defined (with or without terms—abuse and dependence—used in DSM-IV and ICD-10 diagnostic specifications), and appeared to be similar across race or ethnicity and intersections of race or ethnicity and sex. However, although the proportions of AUD diagnoses documented with stigmatized AUD descriptors was significantly higher among men compared to women, the difference was small. Findings have implications, such as the use of EHRs to study stigmatized language associated with alcohol and substance use. Understanding stigmatized language in real-world care settings is important because stigma has been documented as one of the primary barriers to seeking alcohol-related treatment (Glass et al., 2013; Probst et al., 2015; Wallhed Finn et al., 2014). Future studies might evaluate disparities in proportions of stigmatized AUD descriptors among patients with severe unhealthy alcohol use and/or AUD symptoms, to see whether differences persist when accounting for potential differences in severity of AUD symptoms.

Conclusion

Diagnosis of AUD in primary care is critical to increasing assess to evidence-based treatment. However, because AUD is a highly stigmatized medical condition and diagnosis in clinical settings is largely dependent on providers' assessment and potentially incomplete information from patients, accurate and equitable diagnosis of AUD is important. This dissertation addresses

gaps in research by describing clinically-documented AUD across intersecting identities, accounting for alcohol consumption and DSM-5 AUD symptoms. Further, this dissertation uses the EHR text descriptors used to select ICD diagnosis codes in a novel way to assess the stigma of documented AUD diagnoses.

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