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Are Cisgender Women and Transgender and Nonbinary People Drinking More During the COVID-19 Pandemic? It Depends.

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PURPOSE: This narrative review of research conducted during the first 2 years of the COVID-19 pandemic examines whether alcohol use among cisgender women and transgender and nonbinary people increased during the pandemic. The overarching goal of the review is to inform intervention and prevention efforts to halt the narrowing of gender-related differences in alcohol use.
SEARCH METHODS: Eight databases (PubMed, APA PsycInfo, CINAHL, Embase, Scopus, Gender Studies Database, GenderWatch, and Web of Science) were searched for peer-reviewed literature, published between March 2020 and July 2022, that reported gender differences or findings specific to women, transgender or nonbinary people, and alcohol use during the pandemic. The search focused on studies conducted in the United States and excluded qualitative research.
SEARCH RESULTS: A total 4,132 records were identified, including 400 duplicates. Of the remaining 3,732 unique records for consideration in the review, 51 were ultimately included. Overall, most studies found increases in alcohol use as well as gender differences in alcohol use, with cisgender women experiencing the most serious consequences. The findings for transgender and nonbinary people were equivocal due to the dearth of research and because many studies aggregated across gender.
DISCUSSION AND CONCLUSIONS: Alcohol use by cisgender women seems to have increased during the pandemic; however, sizable limitations need to be considered, particularly the low number of studies on alcohol use during the pandemic that analyzed gender differences. This is of concern as gender differences in alcohol use had been narrowing before the pandemic; and this review suggests the gap has narrowed even further. Cisgender women and transgender and nonbinary people have experienced sizable stressors during the pandemic; thus, understanding the health and health behavior impacts of these stressors is critical to preventing the worsening of problematic alcohol use.

KEYWORDS: alcohol; cisgender women; transgender persons and nonbinary populations; sexual and gender minorities; college students; COVID-19; pandemic; culturally responsive treatment

Although historically cisgender women (i.e., women whose sex assigned at birth is consonant with their gender) in the United States have had lower levels of alcohol consumption than cisgender men, recent analyses of historical and cohort data suggest that overall gender differences are narrowing.[1] This narrowing is largely due to substantial increases in cisgender women's alcohol use, binge drinking (operationalized as four or more drinks in 1 day for cisgender women; five or more drinks in 1 day for cisgender men)[1,2] and alcohol use disorder (AUD; meets criteria for past 12-month dependence or abuse as established in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders [DSM-V]*).[3] Cisgender women also report more barriers to treatment[4,5] and lower treatment utilization than cisgender men.[6-9] Given that cisgender women may experience more severe alcohol-related problems (e.g., problems in relationships or at work[10]) and health impacts than do cisgender men, even at lower levels of alcohol use,[11] understanding whether the pandemic has led to an increase in alcohol use among cisgender women is critically important.

Rates and risks for problematic alcohol use vary by sexual identity,[12-14] race/ethnicity,[15] and other factors, including socioeconomic status and relationship status.[16] These differences may be partially explained by differences in stress levels, including economic stressors and psychological distress[17] and may have been further modified by the coronavirus disease 2019 (COVID-19) pandemic. Research on mental health during the pandemic suggests that cisgender women experienced elevated rates of stress, anxiety, and depression compared to pre-pandemic rates,[18-20] at least in the early stages of the pandemic. In contrast, some research has suggested no gender differences in pandemic-related emotional distress.[21,22]

Stress is one of the strongest predictors of substance use, including alcohol use,[23] and higher levels of stressors increase risks for problematic alcohol use, including AUD.[24,25] The COVID-19 pandemic often has been described as a "perfect storm" of multiple sources of stress and has been linked to worsened mental health and health behaviors overall.[21,22,26-29] There is evidence of increased problematic alcohol use during previous pandemics;[30] however, the COVID-19 pandemic is unique among recent pandemics in the breadth and duration of its impacts and thus may have more substantial effects on health and well-being, including alcohol use. Cisgender women, compared to cisgender men, may be particularly affected by the pandemic due to higher levels of stressors.[31,32] These stressors may be related to negotiating working from home[28] while balancing remote schooling for children,[21,28] higher likelihood of working in frontline and/or caregiver jobs,[28,33] increased risks for intimate partner violence,[34-38] delays in accessing needed health care,[39] isolation,[40-42] and potentially higher risks for unintended pregnancies.[31] In a prospective study of families, cisgender women, compared to cisgender men, reported higher levels of stressors across four out of five domains. Specifically, cisgender women experienced higher levels of stressors in work/finances (31% increase), home disruptions (64%), social isolation (13%), and health care barriers (94%).[42] The burden of pandemic-related stressors, combined with chronic and cumulative stressors disproportionately impacting cisgender women (e.g., sexism and/or violence across the life span[43]), may result in allostatic overload, which heightens health risks.[44] When faced with higher levels of stressors during the pandemic, cisgender women may be at higher risk than cisgender men for alcohol consumption because cisgender women are more likely than cisgender men to use alcohol to cope with negative emotions.[24,45] Using alcohol to cope may have potentially disproportionate impacts on those experiencing the highest levels of stressors (e.g., frontline workers, parents).[42]

Transgender and nonbinary (TNB, i.e., people whose gender differs from their sex assigned at birth) individuals experience significant health disparities, and their health is negatively affected by high levels of stigma, discrimination, and violence, as well as low levels of support.[46-51] The COVID-19 pandemic may have been particularly stressful for TNB people compared to cisgender people due to elevated socioeconomic impacts such as job loss,[52] food[52] and housing insecurity,[53,54] as well as reductions in social and community support.[55-57] TNB people also have experienced disruptions to medical care (including gender-affirming services), which heightens stress.[53,56] Coping is a key motivation for alcohol use among TNB populations,[51,58,59] which might suggest increased use of alcohol to cope during a stressful event such as a global pandemic. Yet, research findings on rates of alcohol use among TNB populations are more mixed compared to cisgender people.[60-64] Problematic alcohol use is associated with increased risks for secondary harms that disproportionately affect TNB individuals, such as suicidal ideation, intimate partner violence, sexual violence, and the exacerbation of mental and physical health problems,[62,65,66] highlighting the importance of a deeper understanding of alcohol use among TNB individuals. Additionally, TNB people experience barriers to treatment,[67] including a lack of culturally responsive care options[68-73] and discrimination by providers.[68] Of note, the umbrella term "TNB" encompasses a diverse range of identities and experiences, but existing research often does not disentangle this diversity, instead aggregating across groups who fall outside of cis-normative gendered expectations and who then are compared with cisgender peers.

Understanding alcohol use among cisgender women and TNB people during the pandemic is particularly important due to risks for severe health outcomes. Not only are COVID-19 patients with AUD more likely to be hospitalized and to have higher all-cause mortality,[74] but alcohol-related mortality spiked with the onset of the COVID-19 pandemic.[75,76] Problematic alcohol use also is a major risk factor for COVID-19 infections and mortality.[77] Although the connections between COVID-19 and alcohol use have widespread effects, specific alcohol-related health impacts of the pandemic have been particularly harmful for cisgender women, as indicated by a 125% increase in alcohol-

associated hepatitis[78] and a stark increase in the proportion of patients screening positive for substance use (including alcohol use) in emergency departments.[79] To our knowledge, similar research has not been done among TNB populations.

This review aims to understand the unique experiences of cisgender women and TNB people, as well as among understudied groups of cisgender women such as women of color, sexual minority women (SMW, e.g., lesbian, bisexual, queer women), and older women to describe subgroup impacts of the COVID-19 pandemic on alcohol use. A recent scoping review of substance use during the pandemic noted the importance of examining substance use (including alcohol) during the pandemic among cisgender women and TNB populations.[80] Thus, this review aims to evaluate the extant literature testing whether cisgender women drank at similar or higher levels than cisgender men during the pandemic. The review further explores alcohol use among TNB populations during the pandemic, with a focus on gender differences in rates of alcohol use (e.g., binge drinking, alcohol dependence, quantity/frequency of drinking) in research conducted during the pandemic (since March 2020) in the United States.

Methods

Search Methods Employed

This narrative review of alcohol use during the pandemic was conducted to document whether alcohol use had increased among women—a population already experiencing inclines in alcohol use before the pandemic—and among TNB people in order to inform needed prevention and interventions, as well as to inform policy. The review process included seven steps:[81-83] (1) refining the topic and identifying the research question; (2) developing a protocol; (3) identifying relevant studies; (4) screening and selecting studies; (5) extracting the data; (6) critically appraising and synthesizing the data; and (7) reporting the results.

One author, a Health Sciences Library Informationist conducted the literature searches on July 15, 2022, in eight databases: PubMed (pubmed.gov); APA PsycInfo (EBSCO); CINAHL [Cumulative Index to Nursing and Allied Health Literature] (EBSCO); Embase (embase.com); Scopus (scopus.com); Gender Studies Database (EBSCO); GenderWatch (ProQuest); and Web of Science (webofscience.com). Because the review addresses two separate questions, two search strategies were used. The first strategy comprised a combination of search strings related to alcohol use, COVID-19, and women. The second strategy combined search strings for alcohol use, COVID-19, SMW, and TNB populations. No filters were applied to the search results.

All records found via the database searches were exported to an EndNote library (version X9). Duplicates were identified and removed in EndNote, and the remaining library was imported into the Covidence review software to facilitate identifying relevant articles for the narrative review. Articles were eligible for inclusion in this review if they met the following criteria hierarchically: (1) were published in peer-reviewed journals between March 2020 and July 2022; (2) were written in English; (3) used human participants in the United States (to reduce variability in responses to the pandemic); (4) included measurement of alcohol use (broadly defined); (5) collected data during the COVID-19 pandemic; and (6) included analyses of gender differences in rates of alcohol use or focused solely on cisgender women or TNB people and alcohol use during the pandemic. Articles were excluded if they were review papers or qualitative studies, if they did not conduct any gender differences analyses (unless the study focused on women or TNB samples only), and if alcohol was not an outcome.

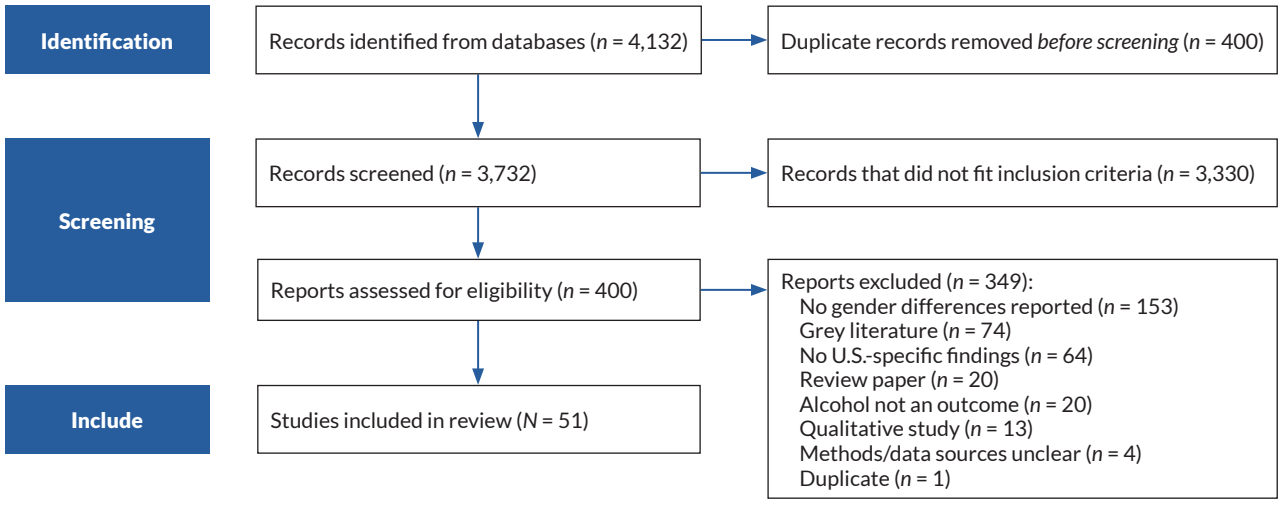

Figure 1. PRISMA flow diagram of search strategy used during the narrative review of women's alcohol use during the pandemic.
Note: PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Data Extraction

After conducting a title and abstract review of all articles, the authors reviewed the full text of the remaining papers to determine final inclusion. Differences were discussed amongst three authors until agreement was reached. The full texts of the 400 articles were assessed for relevance to the review's aims. When an article was excluded during the full review, authors documented the reason for its exclusion. (See Figure 1 for the search strategies for both questions combined.) Three authors critically reviewed and synthesized data from the 51 included articles.

Results

Results of the Literature Search

The literature search identified a total of 4,132 records. There were 400 duplicates, leaving 3,732 unique records for consideration in the review; of these, 51 articles ultimately were included.

Results of the Reviewed Studies

Appendices 1 and 2 (located after the references) list the 51 reviewed articles and include all data from the abstraction protocol. Consistent with the goals of a narrative review, potential methodological limitations of the research are highlighted to help the reader better evaluate the validity and generalizability of the findings. The results are broken into four sections: (1) prevalence; (2) specific populations and demographic differences (age, race/ethnicity) or life experiences (pregnancy, intimate relationships, frontline work); (3) linkages between alcohol and mental health, stress, or coping; and (4) TNB individuals and SMW.

Table 1 includes descriptive data of the studies reviewed. Of those, 24% included nationally representative samples, 36% included pre-pandemic data (as opposed to retrospective reporting or only having within-pandemic data), 51% had data collection that ended early in the pandemic (March–May 2020), and 16% had data collection that ended in 2021. Slightly more than one-quarter (26%) used the Alcohol Use Disorders Identification Test (AUDIT) or AUDIT-Consumption (AUDIT-C), with several studies using just one or two items from the AUDIT. In addition, 6% used another validated measure, and 29% examined quantity and frequency only. Of those studies that looked at gender differences (as opposed to having a sample of cisgender women only), 73% found gender differences in alcohol use.

Of the 51 studies that met inclusion criteria, 20 studies tested for trends over time in alcohol use, including the pandemic period. Table 2 summarizes the results of those 20 studies, including the number of studies that found increases, decreases, or no change in alcohol use. Overall, 12 of the 20 studies documented increases in alcohol use during the pandemic period. More studies documented increases among cisgender women than among cisgender men (8 and 6 out of 13, respectively), and the only study with sufficient data to test for trends among TNB individuals found increases in alcohol consumption.

The following sections present the results in more detail, organized by prevalence data; specific subpopulations; stress, coping, and mental health; and alcohol use among SMW and TNB people. Not all studies had mutually exclusive samples; thus, studies may be mentioned in more than one section.

Prevalence

Eighteen studies were primarily aimed at describing prevalence of alcohol use among adults during the pandemic and included analyses of gender differences. These studies were divided into two groups: cross-sectional studies (including repeated cross-sectional studies) of adults and longitudinal/prospective studies of adults.

Cross-sectional general population adult studies

Nine cross-sectional studies,[79,84-91] all conducted during the early pandemic, met inclusion criteria. All used convenience samples, with two samples recruited from social media. In three studies that asked participants to compare retrospectively their pre-pandemic AUD symptoms to current symptoms,[85-87] all found increased reports of AUD symptoms among cisgender women during the early pandemic compared with retrospective reports of pre-pandemic symptoms. In one study, cisgender men also reported increases;[85] in another, they did not;[86] and in the third study cisgender women reported increased drinking more often than did cisgender men.[87] A fourth study found no gender differences in self-defined "drinking behaviors" during the early pandemic.[88] Across these studies, the cross-sectional design—including retrospective reporting of pre-pandemic drinking behaviors and AUD symptoms as well as use of convenience samples based on volunteers from social media—limit the conclusions that can be drawn from these studies.

Three general population adult studies used repeated cross-sectional assessments (with different samples at each time point) before and during the pandemic to compare rates across time.[79,84,89] Using nationally representative samples, Kerr et al.[89] documented that daily drinking and alcohol volume were higher among cisgender women interviewed during the pandemic through 2021 compared to those interviewed pre-pandemic. AUD prevalence across the continuum from mild to severe was also higher during the pandemic. Sensitivity analyses indicated that results were robust to the timing of interviews and thus unlikely to be affected by pandemic-related social distancing policies. Electronic health record data of more than 100,000 patients visiting emergency departments showed higher alcohol admissions and evaluations for cisgender women during the pandemic compared with rates before the

Table 1. Descriptives of Studies Included in Review

	n	%
Data collection start		
Early pandemic (March–May 2020)	26	51.0%
Late 2020	7	13.7%
Pre-pandemic	18	35.3%
Data collection end		
Early pandemic	26	51.0%
Late 2020	17	33.3%
Early 2021	7	13.7%
Late 2021	1	2.0%
Study design		
Prospective	20	39.2%
More than one cross-sectional time point	7	13.7%
Cross-sectional	24	47.1%
Samples included		
Cisgender women only	4	7.8%
Cisgender women and men	33	64.7%
Cisgender women, men, and TNB people	4	7.8%
Cisgender women and TNB people	10	19.6%
Comparison groups		
Cisgender men	36	70.6%
TNB individuals	1	2.0%
Cisgender men and TNB individuals	9	17.6%
No comparison group	5	9.8%
Sample recruitment		
Nationally representative	12	23.5%
Convenience	8	15.7%
Convenience: Online/social media	20	39.2%
Clinic sample	5	9.8%
Undergraduates (various recruitment methods)	5	9.8%
Other	1	2.0%
Drinking measurement		
AUDIT or AUDIT-C	13	25.5%
Daily drinking questionnaire	3	5.9%
Quantity and frequency	15	29.4%
Quantity	3	5.9%
Frequency	7	13.7%
Perceptions	5	9.8%
Other validated scale	3	5.9%
Other	2	3.9%
How change was measured		
Pre- and post/during pandemic data	10	19.6%
Retrospective recall of pre-pandemic AUDIT	1	2.0%
Retrospective report of current drinking in past vs drinking now	4	7.8%
Self-perceived changes in alcohol use	14	27.5%
Self-report of current drinking at more than one time point	12	23.5%
Did not measure changes in drinking	10	19.6%

Note: AUDIT, Alcohol Use Disorders Identification Test; AUDIT-C, AUDIT-Consumption; TNB, transgender or nonbinary

Table 2. Summary of Results for Changes in Drinking After Onset of COVID-19 Pandemic

	Number of Possible Studies	Proportion With Finding*	
		n	%
Overall			
Alcohol use or problems increased	20	12	60.0%
Alcohol use or problems decreased	20	5	25.0%
Alcohol use or problems did not change	20	3	15.0%
Cisgender Women			
Alcohol use or problems increased	13	8	61.5%
Alcohol use or problems decreased	13	2	15.4%
Alcohol use or problems did not change	13	3	23.1%
Cisgender Men			
Alcohol use or problems increased	13	6	46.2%
Alcohol use or problems decreased	13	3	23.1%
Alcohol use or problems did not change	13	4	30.8%
Transgender and Nonbinary Individuals			
Alcohol use or problems increased	1	1	100%
Alcohol use or problems decreased	1	0	0%
Alcohol use or problems did not change	1	0	0%

*Percentages within each group may not total 100% due to rounding. *Note:* COVID-19, coronavirus 2019.

pandemic.[79] In contrast, expenditure data, as an indirect measure of alcohol consumption, indicated lower household alcohol expenses during the pandemic, compared with pre-pandemic levels, for both cisgender men and cisgender women. However, expenditures may not correlate precisely with volume sales—for example, if purchases moved from on-premise to off-premise.[84]

Repeated cross-sections of data provide sufficient rigor for assessing changes in time trends, and all three studies included pre-pandemic time points, a notable strength. Given that two of the three studies found that increases in relatively serious alcohol-related harm (e.g., AUD, alcohol-related emergency department admissions) are concentrated among cisgender women, these data indicate an emerging concern.

Longitudinal general population adult studies

Nine longitudinal studies of adults in the general population met inclusion criteria.[92-100] Three of these were based on a single data source, the Understanding America Study (UAS),[92,95,97] a nationally representative panel study conducted monthly, with published data through mid-2020. All three studies from UAS demonstrated increases in alcohol consumption during the pandemic using repeated-measures longitudinal analyses, including increases in drinking days and near-daily drinking among cisgender women. However, these increases generally were less than those seen in cisgender men and remained below drinking levels among cisgender men.[92,95,97] In a representative online sample of adults, among those who reported any alcohol use, cisgender men had higher levels of alcohol use (i.e., average number of drinks per day) than cisgender women at baseline (April–June 2019). However, alcohol use in cisgender men declined over time (last wave of data collection was in March 2021), whereas it stayed the same over time in cisgender women.[100] In an additional nationally representative study with data from 2019 through the early months of the pandemic, days consuming alcohol and heavy drinking days (defined as five or more drinks within "a couple of hours" for cisgender men and four or more drinks for cisgender women) increased among cisgender women.[99] Of note, however, no longitudinal studies of the general adult population included data beyond January 2021, and no studies published in 2022 met inclusion criteria for this review.

Given that surveys were completed by telephone both before and during the pandemic, it is unlikely that study methodology was substantially impacted by COVID-era research policies, although an impact on willingness to participate in research (either more or less willing) cannot be excluded and could be a limitation. However, taken together, the available research indicates that days consuming alcohol and heavy drinking days on average increased among cisgender women in the general population during the early and middle periods of the pandemic, but that for both variables, their consumption levels largely remained lower than, and did not change at the same rate as, those of cisgender men.

Specific Populations and Demographic Differences

Several studies focused on unique subpopulations of cisgender women and alcohol use during the pandemic. The following sections discuss unique impacts on different age groups, different racial/ethnic populations, cisgender women in couple relationships, those who are pregnant or who are parents, and those who are frontline workers.

Adolescents, young adults, and older adults

Five cross-sectional studies met inclusion criteria; four[101-104] were among young adult college undergraduates, and one was a nationally representative survey of high school students.[105] No study had pre-pandemic data, and data collection spanned from early in the pandemic through early 2021. In the only nationally representative study of high school students meeting inclusion criteria,[105] cisgender women students had higher rates of current alcohol consumption (defined as at least one drink in the past 30 days) than cisgender men students but did not report that they thought they drank more due to the pandemic. A cross-sectional survey of undergraduate college students conducted in fall 2020, with retrospectively reported pre-pandemic drinking, indicated increased consumption during the pandemic among all groups.[103] Moreover, consumption and increases in consumption were greater among cisgender men compared with cisgender women and TNB individuals. Sexual minority groups generally reported higher levels of alcohol consumption and greater increases compared with pre-pandemic levels in both the high school and college samples; however, none of the studies examined interactions between sexual identity and gender. When coupled with the use of convenience samples, the cross-sectional designs and retrospective reporting limit inference from studies among college students.

Two studies included repeated cross-sectional samples of college students,[103,104] one of which included pre-pandemic data collection.[103] AUD prevalence was higher during the pandemic compared with pre-pandemic, with increases concentrated among cisgender women compared with cisgender men. For example, 49.7% of cisgender women met criteria for AUD during the pandemic, compared with 34.4% before the pandemic.

Seven studies[106-112] included longitudinal data among young adults (two of the seven from the same data source[109,110]). All had pre-pandemic data points, a major strength of the evidence base. However, the span of pandemic data collection was limited to the early pandemic through late 2020. Two had nationally representative data (most used convenience samples).[108,112] Most of these studies only reported data through spring 2020, which provides a limited assessment of pandemic-era changes in alcohol consumption, and findings regarding gender differences were mixed. Five of seven studies reported no gender differences in drinking as indicated by average past 3-month drinking quantity;[108] self-assessment of changes in drinking during the pandemic; and binge drinking (i.e., five or more drinks in a row).[110,111] A sixth study reported higher odds of drinking (any drinking on previous day) among cisgender men compared with cisgender women but noted no changes during the pandemic period.[112]

The remaining studies of college students and young adults generally found either faster declines in drinking among cisgender men,[106] or faster increases,[109] compared with cisgender women. A study comparing alcohol consumption during college spring semester across 3 years (2018, 2019, and 2020) found that whereas alcohol consumption (operationalized as number of drinking days and drinks per day) generally increased during spring semesters pre-pandemic, alcohol consumption either did not increase or declined in 2020 depending on the measure;[107] no gender differences were found. The most robust studies (e.g., Jaffe et al. 2021[107]) indicate that college drinking largely declined in the early pandemic period, which is expected as students moved off campus, but there is little evidence for gender differences in these declines.

In sum, research among college students and young adults is mixed. Some studies found higher levels of alcohol use among cisgender men and some among cisgender women; however, overall, there were no increases in alcohol use among cisgender young women during the pandemic. Only one study identified for this review focused on older adults.[113] In this study, which included a nationwide sample of older adults, cisgender women accounted for 59% of those who reported drinking more than usual during the pandemic.

Demographic differences by race/ethnicity

Only two studies focused on race/ethnicity and alcohol consumption during the pandemic.[114,115] Among a sample of American Indian cisgender women followed prospectively through October 2021, approximately a quarter reported self-perceived increased consumption and half reported binge drinking (i.e., four or more "standard" drinks per day) during the pandemic.[114] Among Black, indigenous, and other people of color (BIPOC) undergraduate students prospectively followed from before the pandemic through spring 2020, declines in drinking frequency were reported, but cisgender women, compared with cisgender men, were less likely to show declines.[115] Overall, the sparse research is mixed on alcohol use among BIPOC cisgender women during the pandemic, suggesting that more research is needed.

Couple relationships and pregnancy

Three studies that met criteria for inclusion examined potential differences in alcohol use among cisgender women and their partners in heterosexual couple relationships and among cisgender pregnant women; one study also investigated how early parenthood might impact cisgender women's alcohol use during the pandemic.[116-118] The study of cisgender women and

their men partners during the pandemic detected no gender differences in drinking levels; however, cisgender men reported more alcohol problems than did cisgender women. Cisgender women's general stress and financial stress had no impacts on their partners' drinking (drinks per week); however, cisgender men's stress was associated with an increase in their partners' drinking and a 22% increase in their own and their partners' high-intensity drinking (defined as 10 or more drinks per day for men and eight or more drinks per day for women).[118]

There are mixed findings among pregnant cisgender women in reports of changes in alcohol use during the pandemic. Among a convenience sample of pregnant cisgender women, 11% reported perceived increases in their own and 28% in their partners' alcohol use since the pandemic's beginning. In contrast to these findings, none of the pregnant cisgender women in a study of centers for high-risk pregnancies reported self-perceived increases in alcohol use since the start of the pandemic.[116] Notably, in the same study, 10% of postpartum cisgender women reported increased alcohol use.[116]

Together these findings suggest that in couple relationships during the pandemic, cisgender men's stress levels and drinking may be associated with increased alcohol use and high intensity drinking among cisgender women. Findings among pregnant and postpartum women are mixed but suggest pregnancy and postpartum periods may heighten risk for some cisgender women. However, research was lacking on pregnant and postpartum TNB people during the pandemic, and further work should examine the impact of pregnancy more inclusively.

Frontline workers

Due to high levels of stress and risks for exposure to COVID-19 for health care and other frontline workers during the pandemic, research on health and health behaviors is important for understanding the broad impacts on this population. Yet, only two studies on frontline workers met inclusion criteria.[85,119] Among health care workers in New Orleans, there were no significant gender differences in AUDIT-C scores. However, cisgender men's rates of high-risk drinking (defined as a score of 4 or greater) stayed the same over time (45% at both time points), whereas cisgender women's rates of high-risk drinking were higher during the pandemic compared to pre-pandemic (48% vs. 45%, respectively).[85] In another study among health care workers at 25 hospitals, adjusted analyses found that cisgender women were no more likely than cisgender men to have symptoms consistent with probable AUD despite significantly higher likelihood of probable post-traumatic stress disorder (PTSD).[119]

Coping, Stress, and Mental Health

The literature search yielded 10 studies that analyzed gender differences in alcohol use and also tested associations between stress or mental health and alcohol use during the pandemic.[94,100,119-126] However, only five of these studies examined whether the associations between alcohol and stress or mental health differed by gender,[94,100,120,121,124] three of which included pre-pandemic data.[100,120,124] Two studies demonstrated mixed findings about drinking to cope early in the pandemic among cisgender women.[100,120] One study found significant associations between COVID-related stressors and drinking to cope, with stronger associations for cisgender men than cisgender women.[120] In the other study, stronger coping motives for drinking were associated with higher drinking levels at baseline for cisgender women, and loneliness and coping were related to changes in drinking levels over time.[100]

Analyses using data from a quasi-experimental study of a nationally representative sample determined that cisgender women interviewed during the pandemic (compared to cisgender women interviewed pre-pandemic) were nearly 1.5 times more likely to report that drinking helped them forget their worries.[124] Among cisgender women, single women (compared to married women) were more likely, and Black women (compared to white women) were less likely to report drinking to forget their worries. Cisgender women with moderate to severe symptoms of depression (compared to no depressive symptoms; adjusted odds ratio: 2.45) and mild symptoms of anxiety (compared to no anxiety symptoms; adjusted odds ratio: 1.62) were significantly more likely to say that drinking helped them cope with their worries.[124] There were no differences among cisgender men and no differences in comparisons between cisgender women and cisgender men. Depression and anxiety were associated with heightened risks for alcohol use[121] and drinking to cope[124] among cisgender women during the pandemic.

TNB Individuals and SMW

TNB populations

Seven studies documented how the COVID-19 pandemic has impacted TNB people's drinking.[101,115,127-131] These studies included five cross-sectional and two prospective analyses, primarily began data collection in early pandemic, and all had trans-specific sample sizes of 200 or less. Within the literature that examined the drinking behaviors and trajectories of TNB people following the onset of COVID-19, the referent group to which TNB people were compared varied across studies. In some studies, the comparison was between TNB people and cisgender (or specifically cisgender and heterosexual) peers.[128,130,131] In other studies, TNB people were aggregated and compared against cisgender women.[115,127,129] One study included solely TNB people and evaluated their current behaviors against their retrospectively reported pre-pandemic behaviors.[101]

These comparisons provide differing information on TNB people's drinking during the COVID-19 pandemic. Comparisons

between TNB people and cisgender women, which were assessed at a variety of pandemic time points, typically found no significant differences between these groups in terms of alcohol use frequency (e.g., number of drinks consumed in a given day), alcohol use changes (e.g., self-reported drinking frequency before and during the pandemic), and likelihood of drinking to cope.[115,127,129] For the literature comparing TNB populations to cisgender or cisgender/heterosexual peers more generally, TNB people and cisgender/heterosexual peers had comparable rates of increased drinking during the pandemic (TNB: 10.5%; cisgender/heterosexual: 13%) and were equally likely to exhibit problem drinking (based on PROMIS scores).[131]

Compared to cisgender men and SMW peers, TNB respondents reported a lower likelihood of problem drinking (using AUDIT),[130] even though they reported higher psychological distress during the early pandemic.[128] However, based on self-report, TNB respondents were more likely to report substantial increases in drinking during the pandemic. Notably, these results are drawn solely from college students.[130]

Other research on college students that drew from a more general sample addressed these substantial changes in drinking due to the pandemic, finding that mean number of drinks in the past 30 days among "non-cisgender" people, using the phrasing of that study, rose from 9.2 pre-pandemic (February 2020) to 16.8 during the pandemic (October 2020). However, these levels were lower than among either cisgender men or women peers.[101] Extant research on TNB people's drinking during the pandemic yielded conflicting results, with the most common result being null findings of differences between TNB people and cisgender peers across a number of drinking outcomes (though this varied based on the specific comparison being drawn). This small pool of research also lacked examinations of other TNB-specific factors that may influence drinking during the pandemic, such as transphobic experiences or sustained access to trans-related and trans-affirming health care as a preventive measure against psychological distress.

Sexual minority women

Four studies included findings specific to cisgender SMW.[127,128,132,133] More SMW than any other group reported self-perceived increases in alcohol use since the start of the pandemic (39% vs. 33% of sexual minority men and 24.5% of cisgender heterosexual women).[133] Two of the studies used the same sample but reported on different time points in recruitment (earlier in recruitment[132] and after all participants had been recruited[127]). Among participants who were recruited earlier in the study/pandemic, most reported increased anxiety and depression since before the pandemic (more than 90%), but fewer reported increases in drinking (40% to 55% reported increases in drinking quantity, frequency, or both).[132] Increases in anxiety and depression were associated with more alcohol consequences and motivation to drink to cope. In the analysis of the entire sample, participants indicated drinking on 26% of days as compared to using cannabis on 32% of days. On drinking days, participants consumed an average of almost three drinks per day and endorsed coping motives on 57% of drinking days.[127] Overall, findings indicate higher incidence of increased alcohol use during the pandemic among sexual minority women compared to cisgender heterosexual women and sexual minority men; these increases were associated with higher risks for poor mental health. Notably, none of the studies reviewed included pre-pandemic data, and only one study was prospective.[127] Two studies including sexual identity difference analyses (e.g., bisexual compared to lesbian cisgender women) within sexual minority women found few to no differences.[127,128] Three studies included only young adults;[127,128,132] only one study included participants from a wider age range (anyone older than age 18 was eligible).[133]

Discussion

This review of the extant literature suggests that alcohol consumption, and especially reports of alcohol-related problems such as AUD symptoms, increased among adults in the United States during the pandemic. Although not all studies were entirely concordant, many increases in the most serious consequences of alcohol consumption seemed to be concentrated in cisgender women. That said, most studies, especially those representative of the U.S. population, indicate that alcohol consumption and alcohol-related harms remain higher among cisgender men. With respect to different subpopulations, data among young adults suggest that alcohol consumption in this age group declined in the early pandemic, with little evidence for gender differences in the decline. Too few studies have focused on cisgender BIPOC women, frontline workers, and older cisgender women to draw broader conclusions, suggesting a need for more research among these populations that have experienced stark disparities in the impacts of the pandemic.[33,42,134-138]

In the limited research that examined alcohol use among TNB populations, evidence suggests minimal differences in drinking frequency and other drinking outcomes (e.g., rates of increased drinking) between TNB and cisgender populations, at least when the comparison was between TNB people and either cisgender women or cisgender/heterosexual individuals.[115,127,129,131] When compared with sexual minority college students, TNB college students had a lower likelihood of problem drinking (as determined using AUDIT) and a higher likelihood of self-reporting substantial changes in drinking during the pandemic.[130] TNB college students exhibited increases in mean number of

drinks in the past 30 days over the pandemic, but baseline levels were lower than in cisgender men and women peers.[101] However, this body of research would benefit from clearer, more nuanced analyses that disentangle the rich diversity of TNB identities and stratify cisgender people by gender and sexual identity. Further research also is warranted on the specific experiences of TNB college students, as this population exhibited unique patterns. Additionally, research on pandemic drinking trajectories among TNB populations would benefit from a stronger emphasis on trans-specific experiences and stressors that may influence alcohol use; this research should be encouraged as an avenue of further inquiry.

Research among LGBTQ people during the pandemic broadly seems to suggest few to no differences compared with cisgender heterosexual populations.[104,139] Notably, however, alcohol use seems to have increased since before the pandemic among sexual minority women,[133] and these increases are associated with worsened mental health.[127,128] This is an alarming finding given large pre-pandemic disparities in both alcohol use and mental health between sexual minority women and heterosexual women.[14,140-145] More research is needed to understand the stressors and mechanisms underlying the higher rates of alcohol use among sexual minority women during the pandemic.

Efforts to combat elevated drinking must account for the complex reasons why people drink. Cisgender women were more likely to drink to help forget worries after (compared to before) the onset of the pandemic,[124] and economic stressors—such as pay decreases, difficulty paying bills, or losing one's job during the pandemic—have all been linked to increased drinking among cisgender women.[146] Using alcohol as a coping mechanism impacted both TNB populations and cisgender women, as drinking to cope during the pandemic occurred at similar levels for both groups[127] and was higher for TNB people and cisgender women than for cisgender heterosexual men.[147] Cisgender women also experienced greater levels of unpaid labor (e.g., taking care of family members) during the pandemic, which may have increased stress levels.[31,148] This may also be true for TNB people, who have faced distressing economic concerns and impacts[52,53,149] as well as reduced access to health care, housing, and social/community support.[53-55,150] Pandemic-related stressors may be particularly impactful for cisgender women's drinking,[151] but the potential impacts on TNB people's drinking is less clear. Further research is needed to fully articulate any stressors and coping practices unique to TNB populations during the pandemic, such as potential shifts in proximal stress (e.g., anticipated stigma, concealment, or internalized transphobia), which has been linked to problematic alcohol use and drinking to cope.[58]

Whether the associations between mental health concerns and alcohol use were heightened during the pandemic is under-researched; however, rates of depression and anxiety have increased,[22,26,27,152] which may put more people, particularly cisgender women, including SMW and TNB people, at higher risk of problematic alcohol use.

Limitations of the Review

One key limitation of this review is the focus on alcohol; different forms of substance use can co-occur, potentially amplifying associated health risks.[80] Research is limited on co-occurring substance use among cisgender women and TNB populations during the COVID-19 pandemic. Future research should address co-occurring substance use among cisgender women, sexual minority populations, and TNB populations to thoroughly examine its impact.

This review focuses solely on peer-reviewed publications, which may have led to a limitation of the research reviewed as only 16% of studies included time points in 2021 and none extended into 2022. Perhaps little research was conducted in 2021 that looked at the continued impacts of the pandemic on alcohol use; alternatively, findings may not yet be available in the peer-reviewed literature. Timing is important as different stages of the pandemic may have influenced population alcohol use heterogeneously; moreover, different geographic locations had discrete experiences of the pandemic. For example, the first case of COVID-19 in the United States was documented in January 2020 in Washington State, and cases were largely concentrated on the west coast until March 2020. Stay-at-home orders began in early to mid-March in some areas (e.g., Puerto Rico, California, New Jersey) whereas some states did not issue them until April (e.g., Iowa, South Carolina, Missouri).[153] Many cities and states temporarily suspended bar and restaurant operations in the initial stages of the pandemic, which may have made alcohol less accessible; however, countervailing alcohol policies in many states that eased restrictions on take-out and home delivery of alcohol may have counteracted restrictions on on-premise consumption.[154,155] Similarly, stressors associated with the initial stages of the pandemic could have contributed to higher rates of alcohol use compared with later stages of the pandemic. However, the extent to which stress eased as the pandemic continued remains understudied. Moreover, evidence suggests that boredom during the pandemic also may have been associated with increased alcohol use.[156,157]

Articles rarely mentioned when data collection occurred, much less with enough specificity to ensure it occurred during the pandemic, which made it difficult to screen out articles that collected data prior to 2020. To facilitate screening and identification of articles only looking at alcohol use during the pandemic, the authors made the decision to include "COVID" as part of the search strategy to capture relevant literature in the time available for the review and minimize the potential for not finding relevant studies. It would be beneficial to update this review in the future once more research has been published;

however, this review gives a preliminary look at the available evidence.

This review excluded studies conducted outside of the United States, given the great variance in how different countries responded to the pandemic. Indeed, a recent systematic review suggests sizable variance in alcohol use during the pandemic depending on the country.[158] This U.S.-centric review limited understanding of alcohol use by cisgender women and TNB people during the pandemic on a broader scale. Anecdotally, it was noted that many papers that examined gender differences or focused on cisgender women's alcohol use were conducted outside of the United States. Future reviews should broaden the search to be inclusive of these important studies. Finally, the review excluded qualitative research, as the focus was on rates of alcohol use rather than on more nuanced findings related to reasons for alcohol use or experiences during the pandemic.

Limitations of the Literature

Among the reviewed literature, the most robust designs were longitudinal, multi-cohort approaches and included pre-pandemic data (e.g., Jaffe et al.[107]). Pre-pandemic longitudinal data allow for assessment of pandemic-related deviations from existing patterns. For example, college students typically increase alcohol consumption during the spring semester; therefore, increases in alcohol use in spring 2020 during the pandemic period are not atypical and, in fact, might have been lower than expected.[107] Another limitation is that most studies did not test for gender-by-time interactions; as a result, there are limited data on whether or not gender differences existed in changes over time. Examination of gender differences was further complicated by a frequent lack of clarity as to whether studies were reporting on sex or gender, or simply reporting on "women" without specifying how many of these women were cisgender or TNB. Generally, if studies did not mention TNB people in their study population, it is likely that TNB status was either not measured or considered, or that TNB people were actively excluded. Thus, in this review, studies that did not discuss gender outside of cisgender women and men, or that only used the terms "women" and "men," were presumed to be not inclusive of TNB people.

Another limitation related to research design is measurement of alcohol use, changes in alcohol use, and other alcohol-related outcomes. Although many studies used validated measures of alcohol problems or commonly used measures of quantity and frequency, others relied on more subjective assessments. For example, 28% of the reviewed studies measured change in alcohol use by asking participants for their perceptions of change since the pandemic's start, and 8% of studies asked participants to retrospectively report drinking levels pre-pandemic and current drinking. Retrospective subjective comparisons of alcohol use before and during the pandemic with unvalidated measures were perhaps necessary given the lack of pre-pandemic data collection in many studies but may have resulted in substantial measurement error. Further, definitions of alcohol use (e.g., problems, binge drinking) varied, making comparisons across studies challenging. Finally, given the heterogeneity of measures employed and domains of alcohol use examined, the current literature is limited in its ability to allow for any kinds of conclusions about differential rates of drinking versus alcohol problems.

Very few studies focused on BIPOC populations, which is particularly troubling given the sizable racial/ethnic disparities in COVID-19 infections and deaths[159] and the compounding impacts of sociopolitical events, racism (including anti-Asian hate/attacks), xenophobia, and economic concerns on well-being.[160,161] The review also found few studies that included comparisons between cisgender and TNB populations, and those that did lacked sample sizes to conduct subgroup comparisons among TNB people (e.g., transgender men versus transgender women), despite discrete risks.[64] TNB populations are underrepresented in gender differences research; thus, more research on alcohol use among TNB people during the pandemic is needed to better understand rates of alcohol use and unique risk factors. Similarly, despite identified high risks among SMW, studies examining LGBTQ subgroups often had extremely small sample sizes for these groups, limiting the capacity for studies to identify significant differences. Few studies reported the intersections between gender and sexual identity (e.g., comparing bisexual men and bisexual women), thus limiting our understanding of gender differences.

No studies looked at gender differences in parenting and how that might be associated with potentially higher risk for alcohol use. Little research examined alcohol use among couples, despite ample research demonstrating partners' impacts on each other's drinking[162,163] and clear linkages between intimate partner violence and alcohol,[164,165] as well as the increased risks for intimate partner violence during the pandemic.[35,36,166]

One of the clearest limitations of the literature was the overall lack of research examining gender differences, which may be additionally related to the challenges of doing research during the height of the pandemic. The shift to working from home and the demands of social distancing made in-person research challenging, if not impossible, which had downstream implications for new research recruitment and data collection. Moreover, the pandemic had unequal impacts on the productivity of women and researchers from marginalized groups,[167-171] which may have had disproportionate impacts on rates of research focused on cisgender women, BIPOC women, and TNB populations during the pandemic.

Implications

The findings of this review point to a continued need for alcohol-reduction interventions. A discussion of the complexities of cisgender women's and TNB people's treatment utilization is beyond the scope of this review. However, there are unique pandemic-related considerations that may be worth attention. Although the extent to which pandemic-related increases in alcohol consumption will persist over the long term remains unknown, available research from disasters indicates that AUDs exacerbated by disaster exposures can persist over time for some individuals;[172] thus, considering alcohol treatment and service capacity and pre-pandemic disparities is warranted. Interventions to reduce alcohol consumption and treat symptoms of AUDs have well-documented efficacy. However, before the pandemic, cisgender women[5] and TNB individuals[62,67,173] already had diminished rates of service utilization that may have been exacerbated in the pandemic setting. Digitally delivered services may increase access across populations,[174,175] yet cisgender women, including SMW, and TNB people have more complex comorbidities that may require higher levels of care.[5,67,176,177] For BIPOC women, SMW, and TNB people, treatment also needs to address minority stressors such as discrimination and stigma[51,173,178-183] and needs to be intersectional to address the overlapping and compounding impacts of multiple sources of oppression and marginalization.[184-187] Thus, an urgent research priority stemming from these findings is to evaluate accessibility and acceptance of service modalities.

There have been calls not to treat mental health concerns or problematic health behaviors as individual-level issues, particularly during a ubiquitous stressful and public health crisis such as a global pandemic.[188,189] Instead, interventions should take a public health approach by modifying social and contextual factors to build resiliency.[160,190,191] People have multiple motives for drinking, such as cravings[192] or enhancing social situations.[112] Yet, the unique impacts of pandemic-related stressors warrant enhancing access to resources, both emotional and economic, that may, in turn, help decrease stress- and coping-related motivations to drink. Efforts aimed at reducing distress and lowering risks for problematic alcohol use thus need to focus on ensuring consistent population-level access to resources such as social support, childcare and elder care, sick leave, affordable and accessible health care (including mental health care), affordable and permanent housing, education, living wages, and access to accurate health information. Whether these alone would be sufficient during a pandemic to reduce barriers to accessing help and uniquely support cisgender women and TNB people is unknown.

Further, alcohol policies to reduce access are effective in reducing harm.[193] Alcohol policies generally became more permissive during the pandemic (e.g., "to-go" drinks, home delivery). Some of those pandemic-related changes are becoming permanent in some states.[194] Revisiting alcohol regulation, including increasing price, as a public health approach could have considerable public health benefits.

Summary of Conclusions

The gender gap in alcohol use is narrowing between cisgender men and women—and seems to have gotten even narrower during the pandemic. Additionally, cisgender women and TNB people are less likely to seek treatment, and there may be unique health risks related to COVID-19 and alcohol use at least for cisgender women. Thus, research, prevention, and intervention efforts are needed to address this public health issue. Halting this worrisome trend in alcohol use by cisgender women—across sexual identities—requires a public health approach that considers the unique needs and concerns of cisgender women. More research also is needed to understand alcohol use by TNB individuals during the pandemic and how to best build resilience and support for this underserved population. Ultimately, this paper is about both sex and gender, capturing the drinking-related experiences of cisgender women (for whom these align) and TNB populations (for whom they do not), as well as various subpopulations that may face unique risks (such as pregnant people). Thus, findings suggest that research on alcohol use and other mental health concerns needs to take both sex and gender (including gender-diverse individuals beyond just comparisons between cisgender men and women) into account to understand not only differences in rates and changes over time but also differences in predictors and outcomes.

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Appendix 1. Description of Studies Included in This Review (*N* = 51): Sample Sizes, Recruitment Methods, Study Design, and Timing of Start and Stop of Data Collection*

#	First Author	Year	*N*	Sample Sizes of Subgroups	Sample	Recruitment	Study Design	Data Collection†	
								Start	End
Prevalence: Single and Repeated Cross-Sectional Studies of General Population Adults									
1	Chandran[79]	2021	107,930	57% cisgender women	EHR data; no age restrictions	Electronic health records	More than one cross-sectional time point	Pre-pandemic	Early pandemic
2	Acharya[84]	2022	18,808	54% cisgender women	Adults	Consumer data	More than one cross-sectional time point	Pre-pandemic	Late 2020
3	Beiter[85]	2022	102	48% cisgender women	Adult health care workers	Convenience	Cross-sectional	Early pandemic	Early pandemic
4	Boschuetz[86]	2020	417	84% cisgender women	Adults	Convenience: Online/social media	Cross-sectional	Early pandemic	Early pandemic
5	Capasso[87]	2021	5,850	53% cisgender women	Adult social media users in U.S.	Convenience: Online/social media	Cross-sectional	Early pandemic	Early pandemic
6	Grossman[88]	2020	832	84% cisgender women	Adults	Convenience: Online/social media	Cross-sectional	Early pandemic	Early pandemic
7	Kerr[89]	2022	1,819	52% cisgender women	Adults	Nationally representative	More than one cross-sectional time point	Pre-pandemic	Early 2021
8	Knell[90]	2020	1,809	67% cisgender women	Adults living in U.S.	Convenience: Online/social media	Cross-sectional	Early pandemic	Early pandemic
9	Walia[91]	2021	3,865	50% cisgender women	Health Information National Trends Survey	Nationally representative	Cross-sectional	Early pandemic	Late 2020
Prevalence: Longitudinal/Prospective Studies of General Population Adults									
1	Chartier[92]	2021	5,874	51% cisgender women	Adults	Nationally representative	Prospective	Early pandemic	Early pandemic
2	French[93]	2022	2,040	58% of sample at both time points were cisgender women	Adults living in U.S.	Convenience: Online/social media	Prospective	Early pandemic	Early pandemic
3	Lannoy[94]	2022	86	47% cisgender women	People who are HIV+, people with AUD, people with both, and controls with neither	Clinical sample recruited from longitudinal study	Prospective	Early pandemic	Early 2021
4	Leventhal[95]	2022	8,130	52% cisgender women	Adults	Nationally representative	Prospective	Early pandemic	Early 2021
5	Meanley[96]	2022	2,121	58% cisgender women	Participants from two prospective observational cohort studies	Pulled from MACS and WIHS cohorts	Prospective	Pre-pandemic	Late 2020

Appendix 1. Description of Studies Included in This Review (*N* = 51): Sample Sizes, Recruitment Methods, Study Design, and Timing of Start and Stop of Data Collection* (Continued)

#	First Author	Year	*N*	Sample Sizes of Subgroups	Sample	Recruitment	Study Design	Data Collection†	
								Start	End
6	Nordeck[97]	2021	4,298	49% cisgender women	Adults	Nationally representative	Prospective	Early pandemic	Late 2020
7	Osaghae[98]	2021	267	72% cisgender women	Outpatient primary care clinic patients who had received a COVID-19 test	Clinic sample	Prospective	Early pandemic	Early pandemic
8	Pollard[99]	2020	1,540	57% cisgender women	Adults	Nationally representative	Prospective	Pre-pandemic	Early pandemic
9	Tucker[100]	2022	1,118	52% cisgender women	Participants from RAND ALP study had to report past-year alcohol use.	Nationally representative	Prospective	Pre-pandemic	Early 2021
Specific Populations and Demographic Differences: Adolescents, Young Adults, and Older Adults									
1	Coakley[101]	2021	777	62% women; 4% non-cisgender; 31% non-heterosexual	College students	Convenience sample of undergraduates	Cross-sectional	Late 2020	Late 2020
2	Hill[102]	2022	501	71% cisgender women; 0.6% nonbinary or transgender	College students living in U.S.	Undergraduate research pool	Cross-sectional	Late 2020	Early 2021
3	Kim[103]	2022	Pre-pandemic: 3,643; Pandemic: 4,970	Pre-pandemic survey: 70% cisgender women, 4% TNB Pandemic survey: 68% cisgender women, 2% TNB	College students	All first- and second-year undergraduates	More than one cross-sectional time point	Pre-pandemic	Early pandemic
4	Schwartz[104]	2022	526	74% cisgender women	College students	Convenience: Online/social media	More than one cross-sectional time point	Early pandemic	Late 2020
5	Brener[105]	2022	7,705	Not reported	Grades 9–12	Nationally representative	Cross-sectional	Early pandemic	Late 2021
6	Graupensperger[106]	2021	572	61% cisgender women	Young adults reporting at least one alcoholic beverage in past year	Convenience	Prospective	Pre-pandemic	Early pandemic
7	Jaffe[107]	2021	1,365	Not reported	College students	Undergraduate research pool	Prospective	Pre-pandemic	Early pandemic
8	Miech[108]	2021	582	51% adolescent girls	12th graders from Monitoring the Future survey	Nationally representative	Prospective	Pre-pandemic	Late 2020
9	Romm[109]	2022	1,084	51% cisgender women; 3% "other"	Young adults	Convenience: Online/social media	Prospective	Pre-pandemic	Late 2020
10	Romm[110]	2021	1,082	51% cisgender women; 3% "other"	Young adults	Convenience: Online/social media	Prospective	Pre-pandemic	Late 2020

Appendix 1. Description of Studies Included in This Review (*N* = 51): Sample Sizes, Recruitment Methods, Study Design, and Timing of Start and Stop of Data Collection* (Continued)

#	First Author	Year	*N*	Sample Sizes of Subgroups	Sample	Recruitment	Study Design	Data Collection†	
								Start	End
11	Ryerson[111]	2021	302	2019 survey: 64% cisgender women 2020 survey: 68% cisgender women	College students	Undergraduates in health classes	Prospective	Pre-pandemic	Early pandemic
12	Stevenson[112]	2021	633	43% cisgender women	Young adults	Nationally representative	Prospective/ daily diary	Pre-pandemic	Early pandemic
13	Eastman[113]	2021	6,938	54% cisgender women	U.S. adults age 55 and older	Nationally representative	Cross-sectional	Early pandemic	Early pandemic
Specific Populations and Demographic Differences: Race/Ethnicity									
1	Hanson[114]	2021	62	100% cisgender women	American Indian women	Sample from RCT	Prospective	Pre-pandemic	Early pandemic
2	Hicks[115]	2022	323	77% cisgender women; 4% TNB participants	Racial/ethnic minority undergraduate students	Convenience: Online/social media	Prospective	Pre-pandemic	Early pandemic
Specific Populations and Demographic Differences: Frontline Workers									
1	Beiter[85]	2022	102	48% cisgender women	Adult health care workers	Convenience	Cross-sectional	Early pandemic	Early pandemic
2	Hennein[119]	2021	1,092	72% cisgender women	Health care workers at teaching hospitals	Convenience	Cross-sectional	Early pandemic	Early pandemic
Specific Populations and Demographic Differences: Couple Relationships, Pregnancy, and Parenting									
1	Ahlers-Schmit[116]	2020	114	100% cisgender women	Convenience sample of pregnant women or mothers of infants	Convenience	Cross-sectional	Early pandemic	Early pandemic
2	McMillan[117]	2021	49	100% cisgender women	Women age 18 and older who were at least 12 weeks pregnant	Convenience: Online/social media	Cross-sectional	Late 2020	Late 2020
3	Rodriguez[118]	2021	118 couples	50% cisgender women	U.S. adults who consumed at least 12 alcoholic beverages in past year and live with partner	Convenience: Online/social media	Cross-sectional	Late 2020	Late 2020
Coping, Stress, and Mental Health									
1	Lannoy[94]	2022	86	47% cisgender women	People who are HIV+, people with AUD, people with both, and controls with neither	Clinical sample recruited from longitudinal study	Prospective	Early pandemic	Early 2021
2	Tucker[100]	2022	1,118	52% cisgender women	Participants from RAND ALP study who had to report past-year alcohol use	Nationally representative	Prospective	Pre-pandemic	Early 2021
3	Hennein[119]	2021	1,092	72% cisgender women	Health care workers at teaching hospitals	Convenience	Cross-sectional	Early pandemic	Early pandemic

Appendix 1. Description of Studies Included in This Review (*N* = 51): Sample Sizes, Recruitment Methods, Study Design, and Timing of Start and Stop of Data Collection* (Continued)

#	First Author	Year	*N*	Sample Sizes of Subgroups	Sample	Recruitment	Study Design	Data Collection†	
								Start	End
4	Cummings[120]	2021	2019: 247;2020: 868	February 2019: 45% cisgender women; 0% transgender; 2% gender fluid March 2020: 52% cisgender women; 0.3% transgender; 0.6% gender fluid	Adults living in U.S.	Convenience: Online/social media	More than one cross-sectional time point	Pre-pandemic	Early pandemic
5	Devoto[121]	2022	499	100% cisgender women	Adult women living in U.S. who agree to share Facebook data	Panel	Cross-sectional	Late 2020	Late 2020
6	Graupensperger[122]	2021	1,181	60% cisgender women	College students	Convenience	Cross-sectional	Early pandemic	Early pandemic
7	Helminen[123]	2021	68	100% cisgender women	Community sample of trauma-exposed adult women	Convenience	Cross-sectional	Early pandemic	Late 2020
8	Martinez[124]	2022	Pre-pandemic: 1,291; Early pandemic: 812	61% cisgender women at baseline	Two cross-sectional NAS samples	Nationally representative	More than one cross-sectional time point	Pre-pandemic	Early pandemic
9	Nesoff[125]	2021	2,175	85% cisgender women; 4% TNB people	Adults living in U.S.	Convenience: Online/social media	Cross-sectional	Early pandemic	Early pandemic
10	Vogel[126]	2021	180	65% cisgender women	Recruited through Qualtrics	Convenience: Online/social media	Cross-sectional	Early pandemic	Late 2020
					Transgender and Nonbinary Populations				
1	Coakley[101]	2021	777	62% women; 4% non-cisgender; 31% non-heterosexual	College students	Convenience sample of undergraduates	Cross-sectional	Late 2020	Late 2020
2	Hicks[115]	2022	323	77% cisgender women; 4% TNB participants	Racial/ethnic minority undergraduate students.	Convenience: Online/social media	Prospective	Pre-pandemic	Early pandemic
3	Dyar[127]	2022	429	73% cisgender women; 15% nonbinary; 5% genderqueer; 4% nonconforming; 3% "another identity"	Same criteria as Dyar 2021 study	Convenience: Online/social media	Prospective	Late 2020	Early 2021
4	Salerno[128]	2021	509	78% AFAB: 69% cisgender, 9% transgender, 1% nonbinary, 0.9% queer gender	Sexual and gender minority full-time college students	Convenience: Online/social media	Cross-sectional	Early pandemic	Late 2020

Appendix 1. Description of Studies Included in This Review (*N* = 51): Sample Sizes, Recruitment Methods, Study Design, and Timing of Start and Stop of Data Collection* (Continued)

#	First Author	Year	*N*	Sample Sizes of Subgroups	Sample	Recruitment	Study Design	Data Collection†	
								Start	End
5	Sumetsky[129]	2022	247	59% cisgender women, 15% TNB	Adults in Allegheny County, PA	Convenience: Online/social media	Cross-sectional	Early pandemic	Late 2020
6	Zhang[130]	2022	366	47% cisgender women, 4% trans women, 8% trans men, 15% nonbinary, 2% genderqueer, 3% another gender	LGBTQ+ college students	Convenience: Online/social media	Cross-sectional	Early pandemic	Early pandemic
7	Akré[131]	2021	3,245	84.9% cisgender straight; 3.7% cisgender gay or lesbian; 7.0% cisgender bisexual; 3.8% cisgender men who have sex with men and women who have sex with women but do not identify as LGBT; 0.6% transgender	Adults in Atlanta, GA; Chicago, IL; New Orleans, LA; New York, NY; and Los Angeles, CA	Panel	Cross-sectional	Early Pandemic	Late 2020
				Sexual Minority Women					
1	Dyar[127]	2022	429	73% cisgender women; 15% nonbinary; 5% genderqueer; 4% nonconforming; 3% "another identity"	Same criteria as Dyar 2021 study	Convenience: Online/social media	Prospective	Late 2020	Early 2021
2	Salerno[128]	2021	509	78% AFAB and 69% of sample was cisgender; 9% transgender; 1% nonbinary; 0.9% queer gender	Sexual and gender minority full-time college students	Convenience: Online/social media	Cross-sectional	Early pandemic	Late 2020
3	Dyar[132]	2021	212	74% cisgender women; 18% genderqueer or nonbinary; 9% another gender	Age 18–25; live in U.S.; lesbian, bisexual, pansexual, or queer; AFAB; reported four or more drinks at least twice and/or using cannabis in past month	Convenience: Online/social media	Prospective/EMA/daily diary study	Late 2020	Early 2021
4	Peterson[133]	2021	170	64% cisgender women	U.S. Adults	Convenience: Online/social media	Cross-sectional	Early pandemic	Early pandemic

*Articles are listed in the order in which they appear in the manuscript. Some studies are listed in more than one section of the table.
†Time periods for start and stop of research studies: Pre-pandemic (Before March 2020); Early pandemic (March–May 2020); Late 2020 (June–December 2020); Early 2021 (January–May 2021); Late 2021 (June–December 2021).
Note: AFAB, assigned female at birth; AUD, alcohol use disorder; COVID-19, coronavirus disease 2019; EHR, electronic health record; EMA, ecological momentary assessment; HIV+, human immunodeficiency virus–positive; LGBT, lesbian, gay, bisexual, transgender; LGBTQ+, lesbian, gay, bisexual, transgender, and queer or questioning; MACS, Multicenter AIDS Cohort Study; NAS, National Alcohol Survey; RAND ALP, RAND American Life Panel; RCT, randomized controlled trial; TNB, transgender and nonbinary; WIHS, Women's Interagency HIV Study.

Appendix 2. Description of Studies Included in This Review (*N* = 51): Measurement of Alcohol Use and Changes in Alcohol Use and Brief Findings*

#	First Author	How was alcohol use measured?	How were changes in alcohol use measured?	Gender Differences	
				Gender differences?	Findings
Prevalence: Single and Repeated Cross-Sectional Studies of General Population Adults					
1	Chandran[79]	SBIRT and intoxication admissions; AUDIT	Pre- and post/during pandemic data	Yes	Weekly SBIRT screens similar across gender in the pre-pandemic wave, then increased more for cisgender women than cisgender men.
2	Acharya[84]	Bi-weekly alcohol expenditures	Pre- and post/during pandemic data	No	Both cisgender men and women had decreased in spending on alcohol during pandemic, gender differences in spending during pandemic were not significant.
3	Beiter[85]	AUDIT	Retrospective recall of pre-pandemic AUDIT	Yes	Cisgender men higher AUDIT than cisgender women; all reported increases in AUDIT compared with pre-pandemic; no gender by time interaction assessed.
4	Boschuetz[86]	AUDIT-C, quantity and frequency, binge drinking	Retrospective report of current drinking in past vs. drinking now	Yes	Cisgender women reported more AUDIT-C symptoms after start of pandemic, cisgender men did not; no changes in alcohol frequency.
5	Capasso[87]	Self-perceptions of change in alcohol use	Self-perceived changes in alcohol use	Yes	Among those who reported increased drinking, 61% were cisgender women compared to 39% who were cisgender men (statistically significant). Younger participants more likely to report increased drinking, but no interactions examined between age and gender.
6	Grossman[88]	Days consumed, drinks consumed, binge drinking	N/A	No	No gender differences in number of days consumed alcohol, total drinks, or binge drinking.
7	Kerr[89]	Graduated frequency series. *DSM-V* AUD criteria	Pre- and post/during pandemic data	Yes	Daily drinking increased for both cisgender men and women, as did AUD mild and moderate/severe; moderate/severe AUD increased more for cisgender women than for men; volume, especially wine and spirit volume, increased more for cisgender women than men.
8	Knell[90]	Ever use and current quantity and frequency from BRFSS	Self-perceived changes in alcohol use	No	No gender differences in self-perceptions of changes in alcohol use since start of pandemic.
9	Walia[91]	Quantity	N/A	Yes	Significant gender differences, but no pairwise differences reported. Cisgender men had double the rates of reporting 13 or more drinks in a week than did cisgender women; other drinking levels did not differ.
Prevalence: Longitudinal/Prospective Studies of General Population Adults					
1	Chartier[92]	Alcohol use frequency	Self-report of current drinking at more than one time point	Yes	June 2020: cisgender women drank less than cisgender men; in change models, increased drinking during the month was no different between cisgender men and women, but cisgender women less likely to decrease drinking.
2	French[93]	"In the past three months, has alcohol consumption increased, stayed the same, or decreased?"	Self-perceived changes in alcohol use	Yes	Cisgender women significantly less likely than cisgender men to say that alcohol consumption had increased.
3	Lannoy[94]	AUDIT	Pre- and post/during pandemic data	No	No sex differences, stable AUDIT scores between assessments
4	Leventhal[95]	Frequency and intensity of drinking	Self-report of current drinking at more than one time point	Yes	Cisgender women comprised higher percentage of minimal and moderate/late decreasing trajectory group; lower percentage in moderate/early increasing, and near daily/early increasing
5	Meanley[96]	Reported frequency with which they consumed at least five (cisgender women) or six (cisgender men) alcoholic beverages in one sitting.	Pre- and post/during pandemic data	Yes	Cisgender men significantly more likely to be in the 'any binge drinking' trajectory group. Significant gender by time interaction; both cisgender men and women exhibited significant binge drinking decreases at time three compared to time one; decrease larger in cisgender men.

Appendix 2. Description of Studies Included in This Review (*N* = 51): Measurement of Alcohol Use and Changes in Alcohol Use and Brief Findings* (Continued)

#	First Author	How was alcohol use measured?	How were changes in alcohol use measured?	Gender Differences	
				Gender differences?	Findings
6	Nordeck[97]	Number of drinking days per week	Self-report of current drinking at more than one time point	Yes	Cisgender women had lower number of drinking days overall; both cisgender women and men increased drinking days; cisgender men increased more.
7	Osaghae[98]	AUDIT-C	Self-report of current drinking at more than one time point	Yes	36.1% of cisgender women and 32.9% of cisgender men reported hazardous drinking at baseline. Did not test gender by time interaction.
8	Pollard[99]	Days drank, number of drinks, heavy drinking days	Self-report of current drinking at more than one time point	Yes	Days consumed increased more for cisgender women; number of drinks increased more for cisgender men; heavy drinking days increased more for cisgender women; SIP scale not different
9	Tucker[100]	Quantity and frequency; Alcohol problems assessed with the Short Inventory of Problems[195]	Pre- and post/during pandemic data	Yes	Analyses were stratified by gender. Cisgender men's alcohol use started out higher than cisgender women but declined whereas cisgender women's stayed static. By time 3, drinking levels were about the same. Both cisgender men and cisgender women had increased alcohol problems over time. Coping and social reasons for drinking and loneliness had distinct associations with alcohol use, alcohol problems, and change over time and these varied by gender.
Specific Populations and Demographic Differences: Adolescents, Young Adults, Older Adults					
1	Coakley[101]	Quantity and frequency	Self-report of current drinking at more than one time point	Yes	Pre-pandemic (retrospectively reported), cisgender men drank more than cisgender women who drank more than TNB participants; during pandemic, consumption increased across groups, but remained cisgender men > cisgender women > TNB; cisgender men and TNB participants had greatest percent change during pandemic.
2	Hill[102]	AUDIT	N/A	Yes	Cisgender men had higher AUD symptoms than cisgender women. No pre-pandemic data and no time by gender interaction tested.
3	Kim[103]	AUDIT	N/A	Yes	Increases in AUD more concentrated among cisgender women
4	Schwartz[104]	"During the last two months, how often have you engaged in alcohol use?"	Retrospective report of current drinking in past vs drinking now	No	Gender differences tested but not significant. Alcohol use worsened between spring and fall 2020.
5	Brener[105]	Quantity and frequency, current binge drinking	Self-perceived changes in alcohol use	Yes	Cisgender women higher than cisgender men for current and binge drinking; no differences in perceived changes since pandemic. Sexual minority students reported higher current alcohol use, binge drinking, and drinking during the pandemic than did heterosexual students.
6	Graupensperger[106]	Quantity/frequency; Drinks per occasion	Self-report of current drinking at more than one time point	Yes	At baseline, cisgender women lower drinking than cisgender men; drinking declined at follow-up; declines were greater for cisgender men than cisgender women (significant interaction).
7	Jaffe[107]	Quantity and frequency	Self-report of current drinking at more than one time point	Yes	Cisgender men greater drinking days, greater drinks per day (both across years and within 2020); college students did not increase drinking in spring 2020 as was typical in previous years; no gender by time interaction reported.
8	Miech[108]	"Think back over the last 2 weeks. How many times have you had five or more drinks in a row?"	Pre- and post/during pandemic data	No	Study found that past 2-week binge declined from spring to summer 2020 overall; no overall gender differences; did not test time by gender interaction.
9	Romm[109]	Past 30-day quantity and frequency	Self-report of current drinking at more than one time point	Yes	Baseline drinking was lower for cisgender men than cisgender women; increases in alcohol use during pandemic greater for cisgender men than cisgender women

Appendix 2. Description of Studies Included in This Review (*N* = 51): Measurement of Alcohol Use and Changes in Alcohol Use and Brief Findings* (Continued)

#	First Author	How was alcohol use measured?	How were changes in alcohol use measured?	Gender Differences	
				Gender differences?	Findings
10	Romm[110]	"Compared to before COVID-19, are you doing more or less of the following: drinking alcohol?"	Self-perceived changes in alcohol use	No	41.3% of participants reported increased alcohol use; no gender difference in self-reported increased alcohol use
11	Ryerson[111]	Typical total weekly volume of alcohol consumption	Self-report of current drinking at more than one time point	No	No gender differences in alcohol consumption; 2020 cohort decreased alcohol consumption compared with 2019 cohort, especially those > 21; gender interaction with time was statistically significant, but direction not reported.
12	Stevenson[112]	Any drinking; drinking intensity on drinking days	Self-report of current drinking at more than one time point	Yes	Cisgender men more likely to report any drinking; no change in drinking during COVID; no gender interaction reported.
13	Eastman[113]	"Over the past week, have any of your usual daily activities or behaviors changed?"	Self-perceived changes in alcohol use	Yes	Of those who said they were drinking more than usual, 58.9% were cisgender women.
Specific Populations and Demographic Differences: Demographic Differences by Race/Ethnicity					
1	Hanson[114]	Quantity/frequency	Retrospective report of current drinking in past vs. drinking now	N/A	24.2% of cisgender women reported drinking more now and 50% reported binge drinking since pandemic started; 54.8% had 8+ drinks per week.
2	Hicks[115]	Alcohol use frequency from AUDIT	Pre- and post/during pandemic data	Yes	No differences by sexual identity; cisgender men more likely to decrease alcohol use during pandemic compared to cisgender women. No significant gender differences between cisgender and TNB participants.
Specific Populations and Demographic Differences: Frontline Workers					
1	Beiter[85]	AUDIT	Retrospective recall of pre-pandemic AUDIT	Yes	Cisgender men higher AUDIT than cisgender women; all reported increases in AUDIT compared with pre-pandemic; no gender by time interaction assessed.
2	Hennein[119]	AUDIT-C	N/A	No	Cisgender women were no more likely than men to report AUD symptoms despite higher rates of PTSD.
Specific Populations and Demographic Differences: Couple Relationships, Pregnancy, and Parenting					
1	Ahlers-Schmit[116]	Unclear measurement	Self-perceived changes in alcohol use	N/A	Increases in alcohol use significantly higher postpartum than during pregnancy.
2	McMillan[117]	Epidemic Pandemic Impact Inventory (EPII)[196]	Self-perceived changes in alcohol use	N/A	Almost one-third (28%) reported that they or their partner's alcohol consumption had increased since the start of the pandemic.
3	Rodriguez[118]	Daily Drinking Questionnaire;[197] Shortened Inventory of Problems-Alcohol and Drugs scale;[198] Drinking to cope using two visual analog scales	N/A	Yes	Cisgender men reported significantly more alcohol-related problems than did cisgender women, but drinking levels did not differ by gender. Cisgender women's drinking was significantly associated with their partner's drinking and stress; cisgender men's drinking was unrelated to their partner's drinking or stress. Cisgender women's levels of stress were unrelated to their drinking.

Appendix 2. Description of Studies Included in This Review (*N* = 51): Measurement of Alcohol Use and Changes in Alcohol Use and Brief Findings* (Continued)

#	First Author	How was alcohol use measured?	How were changes in alcohol use measured?	Gender Differences	
				Gender differences?	Findings
			Coping, Stress, and Mental Health		
1	Lannoy[94]	AUDIT	Pre- and post/during pandemic data	No	No sex differences, stable AUDIT scores between assessments
2	Tucker[100]	Quantity and frequency; Alcohol problems assessed with the Short Inventory of Problems[195]	Pre- and post/during pandemic data	Yes	Analyses were stratified by gender. Cisgender men's alcohol use started out higher than cisgender women but declined whereas cisgender women's stayed static. By time 3, drinking levels were about the same. Both cisgender men and cisgender women had increased alcohol problems over time. Coping and social reasons for drinking and loneliness had distinct associations with alcohol use, alcohol problems, and change over time and these varied by gender.
3	Hennein[119]	AUDIT-C	N/A	No	Cisgender women were no more likely than cisgender men to report AUD symptoms, despite higher rates of PTSD.
4	Cummings[120]	Quantity, frequency, and two items adapted from Drinking Motives Questionnaire[199]	Pre- and post/during pandemic data	Yes	No differences in drinking to cope comparing pre- and during pandemic samples (did not look at gender differences). Significant associations between COVID-19 stress and drinking to cope for cisgender men and women but associations were stronger for men.
5	Devoto[121]	AUDIT-C; Alcohol, Smoking, and Substance Involvement Screening Test[200]	N/A	N/A	Among cisgender women, high-risk alcohol associated with significantly higher levels of depression and anxiety than lower risk use. Cisgender women with moderate drinking risks reported higher levels of social support than cisgender women with high-risk drinking. Almost 17% said that they increased their drug or alcohol use to cope with relationship problems.
6	Graupensperger[122]	Daily Drinking Questionnaire,[197] binge drinking item from Monitoring the Future questionnaire[201]	N/A	No	No gender differences in rates of binge drinking or number of drinks per week.
7	Helminen[123]	AUDIT-C	N/A	N/A	Nearly half (47.1%) of the sample reported alcohol use consistent with probable AUD.
8	Martinez[124]	Two drinking to cope questions adapted from the Drinking Motives Questionnaire[199]	Pre- and post/during pandemic data	Yes	Among cisgender women, 13.8% reported drinking to cope prior to the pandemic and 15.6% reported drinking to cope during the pandemic, compared to 10.7% before and 17% during the pandemic for cisgender men. These rates were not statistically different. Among cisgender women, those with moderate to severe symptoms of depression or mild symptoms of anxiety were significantly more likely to report drinking to cope. No significant associations were identified for cisgender men.
9	Nesoff[125]	Adapted quantity and frequency items from NSDUH	Self-perceived changes in alcohol use	Yes	Odds of high-risk drinking were significantly elevated for cisgender women when controlling for stress, depressive symptoms, and household job loss. Cisgender men had lower odds of high-risk drinking than cisgender women.
10	Vogel[126]	Short Inventory of Problems—Alcohol and Drugs (SIP-AD)[198]	N/A	No	Sex, race/ethnicity, marital status, and other pandemic-related variables were not associated with SIP-AD scores.
			Transgender and Nonbinary Populations		
1	Coakley[101]	Quantity and frequency	Self-report of current drinking at more than one time point	Yes	Pre-pandemic (retrospectively reported), cisgender men drank more than cisgender women who drank more than TNB people. During pandemic, consumption increased across groups, but cisgender men still drank more than cisgender women, who drank more than TNB people. Cisgender men and TNB people had greatest percentage change during pandemic.

Appendix 2. Description of Studies Included in This Review (*N* = 51): Measurement of Alcohol Use and Changes in Alcohol Use and Brief Findings* (Continued)

#	First Author	How was alcohol use measured?	How were changes in alcohol use measured?	Gender Differences	
				Gender differences?	Findings
2	Hicks[115]	Alcohol use frequency from AUDIT	Pre- and post/during pandemic data	Yes	No differences by sexual identity; cisgender men were more likely than cisgender women to decrease alcohol use during pandemic. No significant gender differences between cisgender and TNB participants.
3	Dyar[127]	Daily drinking questionnaire,[197] quantity	Self-report of current drinking at more than one time point	No	No significant differences between cisgender women and TNB participants for alcohol use or drinking to cope.
4	Salerno[128]	Indicated if alcohol use had changed since the start of pandemic.	Self-perceived changes in alcohol use	Yes	The effect of increased alcohol use on psychological distress since the start of COVID-19 was nonsignificant for AMAB but was significant for AFAB people.
5	Sumetsky[129]	Quantity and frequency of drinking and number of days of intoxication	Retrospective report of past drinking vs. current drinking	Yes	Compared to cisgender women, cisgender men had more drinks on drinking days during pandemic, and more days intoxicated pre-pandemic. There were no significant differences for TNB people.
6	Zhang[130]	AUDIT	Self-perceived changes in alcohol use	Yes	Transgender and GNC people had lower problem drinking, and were less likely to have perceived increase in their drinking during COVID-19 than cisgender participants.
7	Akré[131]	PROMIS Alcohol Use Negative Consequences 7-item short-form scale	Self-report of changes in alcohol consumption due to the pandemic	Yes	No substantial difference in rates of increased alcohol use between transgender and cisgender, straight respondents, but some elevated use among cisgender, sexual minority respondents.
Sexual Minority Women					
1	Dyar[127]	Daily drinking questionnaire,[197] quantity	Self-report of current drinking at more than one time point	No	No significant differences between cisgender women and TNB participants for alcohol use or drinking to cope.
2	Salerno[128]	Indicated if alcohol use had changed since the start of pandemic.	Self-perceived changes in alcohol use	Yes	The effect of increased alcohol use on psychological distress since the start of COVID-19 was non-significant for AMAB but significant for AFAB people.
3	Dyar[132]	AUDIT, Drinking motives, Brief Young Adult Alcohol Consequences Questionnaire[202]	Self-perceived changes in alcohol use	N/A	Nearly all participants reported more anxiety and depression in the past month compared to before the pandemic; approximately half also reported increases in alcohol and cannabis use.
4	Peterson[133]	AUDIT	Self-perceived changes in alcohol use	Yes	SMW more likely to report alcohol use increased since beginning of pandemic than SMM and cisgender heterosexual women

*Within each section, studies are listed in the order in which they are cited. Some studies are listed in more than one section.
Note: AFAB, assigned female at birth; AMAB, assigned male at birth; AUD, alcohol use disorder; AUDIT, Alcohol Use Disorders Identification Test; AUDIT-C, Alcohol Use Disorders Identification Test-Consumption; BRFSS, Behavioral Risk Factor Surveillance System; COVID-19, coronavirus disease 2019; *DSM-V, Diagnostic and Statistical Manual of Mental Disorders*, fifth edition; GNC, gender nonconforming; N/A, not applicable (in the Gender Differences column, N/A indicates that the sample includes cisgender women only); NSDUH, National Survey on Drug Use and Health; PROMIS, Patient-Reported Outcomes Measurement Information System; PTSD, post-traumatic stress disorder; SBIRT, screening, brief intervention, and referral to treatment; SIP-AD, Short Inventory of Problems–Alcohol and Drugs; SMM, sexual minority men; SMW, sexual minority women; TNB, transgender and nonbinary.

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Racial/Ethnic Disparities in Mutual Help Group Participation for Substance Use Problems

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Mutual help groups are a ubiquitous component of the substance abuse treatment system in the United States, showing demonstrated effectiveness as a treatment adjunct; so, it is paramount to understand whether they are as appealing to, and as effective for, racial or ethnic minority groups as they are for Whites. Nonetheless, no known comprehensive reviews have examined whether there are racial/ethnic disparities in mutual help group participation. Accordingly, this study comprehensively reviewed the U.S. literature on racial/ethnic disparities in mutual help participation among adults and adolescents with substance use disorder treatment need. The study identified 19 articles comparing mutual help participation across specific racial/ethnic minority groups and Whites, including eight national epidemiological studies and 11 treatment/community studies. Most compared Latinx and/or Black adults to White adults, and all but two analyzed 12-step participation, with others examining "self-help" attendance. Across studies, racial/ethnic comparisons yielded mostly null (*N* = 17) and mixed (*N* = 9) effects, though some findings were consistent with a racial/ethnic disparity (*N* = 6) or minority advantage (*N* = 3). Findings were weakly suggestive of disparities for Latinx populations (especially immigrants, women, and adolescents) as well as for Black women and adolescents. Overall, data were sparse, inconsistent, and dated, highlighting the need for additional studies in this area.

KEY WORDS: race/ethnicity; African American; Hispanic; Native American; mutual help; self-help; alcohol

INTRODUCTION

Racial/ethnic minority groups comprise a large proportion of the U.S. population and evidence a substantial need for treatment of substance use disorder (SUD). Analysis of the most recent, reliable data available—the 2018 National Survey on Drug Use and Health (NSDUH)[1]—found that the prevalence of past-year SUD among those age 12 and older was higher among some racial/ethnic minority groups than Whites. Compared to Whites (with a prevalence rate of 7.7%), the prevalence of past-year SUD was 31% higher among American Indians or Alaska Natives (10.1%), 21% higher among Native Hawaiians or Other Pacific Islanders (9.3%), and 16% higher among multiracial U.S. residents (8.9%). The prevalence rate for Whites was similar to those for Hispanic or Latino populations (7.1%) and Black or African American populations (6.9%). Prevalence among Asians was low overall (4.8%), though other studies suggest that substance use problems may be elevated in some ethnic subgroups (e.g., Koreans) and in Asian American young adults.[2-4] Parallel patterns emerged for alcohol and illicit drug use disorders, revealing elevated rates among American Indians or Alaska Natives, Native Hawaiians or Other Pacific Islanders, and multiracial respondents in both cases.

Participation in mutual help groups (also known as self-help groups), including 12-step groups such as Alcoholics Anonymous (AA), is an integral and nearly ubiquitous component of the U.S. SUD treatment system[5-7] and a typical constituent of mandated treatment.[8] Moreover, 12-step participation—in conjunction with specialty SUD treatment (i.e., formal SUD treatment, such as that delivered in outpatient or residential treatment programs)—is also highly effective in treating SUD for typical treatment populations overall.[9-14] Indeed, 12-step facilitation (TSF) interventions, which are designed to enhance involvement by (for example) explaining 12-step principles and culture, have repeatedly, if not universally, achieved better substance use outcomes than both usual treatment alone and gold standard treatments, such as cognitive behavioral therapy.[15] Emerging studies also have examined, and found support for, the effectiveness of abstinence-based, secular mutual help alternatives to the 12-step approach.[16-18] For instance, one recent study compared the effectiveness of 12-step groups and several abstinence-based alternatives—namely, Women for Sobriety, Self-Management and Recovery Training (SMART Recovery), and LifeRing Secular Recovery (LifeRing)—among current attendees with alcohol use disorder (AUD) over 1 year. Results indicated equally strong relationships between higher involvement and better substance use outcomes regardless of mutual help group choice and, unexpectedly, higher group cohesion and satisfaction in Women for Sobriety, SMART Recovery, and LifeRing versus 12-step groups.[17,18]

Together, the prevalence and effectiveness of mutual help groups highlight a critical need to understand the nature and extent of racial/ethnic disparities in mutual help group participation for substance use problems. Given that mutual help groups are a key resource for supporting recovery, any racial/ethnic disparity in mutual help participation connotes a potential health disadvantage for racial/ethnic minority groups that is worthy of investigation.[19] Investigation of disparities in mutual help group participation is particularly valuable because there are reasons to believe that racial/ethnic minority groups (and especially immigrants) experience unique barriers to mutual help participation (e.g., racial/ethnic discrimination) as well as more barriers to help-seeking generally, described below. Accordingly, the present study offers a comprehensive review of empirical research on racial/ethnic disparities in mutual help group participation, addressing research on individuals with alcohol and/or drug problems. Although others have summarized the literature on racial/ethnic disparities related to mutual help groups,[10,20,21] this study is the first known comprehensive review. Attention is focused predominantly on racial/ethnic disparities related to 12-step groups (and especially AA) because these groups have been the dominant focus of existing literature; however, the review also discusses alternatives to 12-step groups. Results will inform attempts to maximize SUD treatment effectiveness among racial/ethnic minority groups as well as future research aiming to understand

recovery and pathways for recovery among racial/ethnic minority populations.

UNIQUE BARRIERS TO PARTICIPATION IN MUTUAL HELP GROUPS

Several qualitative studies on the experiences of racial/ethnic minority individuals in 12-step groups/AA have concluded that these individuals may face unique barriers to full mutual help group participation and benefit. For example, Jilek-Aall suggested that AA can be off-putting to American Indians because attending AA may be equated with rejection of one's Indian identity and culture; because AA's worldview and practices (e.g., focus on confession-like speeches and Christian religiosity) are not consistent with those of American Indians; and because of miscommunication, barriers to trust, and discrimination by Whites.[22,23] Venner and colleagues' more recent, qualitative study likewise concluded that American Indians may avoid AA because they see it as "for White men," because aspects of the program are not consistent with their beliefs and preferences, and because they feel scrutinized in AA.[24] For some of the same reasons, others have argued that mainstream AA can be a poor fit for Black[25-27] and Latinx[28] people with substance use problems.

This literature broadly illuminates three distinct mechanisms that may create discomfort for racial/ethnic minority individuals in the context of mutual help groups. Racial/ethnic minority individuals may (a) perceive that their people and culture are not well represented within a given mutual help group's founding, history, membership, and/or leadership, generating concern and mistrust; (b) perceive that a given mutual help group's philosophy, values, and practices run counter to those of their own culture; and (c) experience challenging, current social contexts within a given mutual help group, such as heightened scrutiny, prejudice, and discrimination. These barriers could influence racial/ethnic minority individuals to avoid meetings and/or to participate in circumscribed ways that limit the benefits of participation, such as avoiding talking, avoiding sensitive disclosures, and failing to seek a 12-step sponsor. Although not a focus of the above studies, language barriers also could diminish or preclude participation for racial/ethnic minority groups, especially recent immigrants and those with low acculturation to U.S. society.

Counter to these arguments, some evidence suggests that such differences can be at least partially overcome. In principle, 12-step groups are open to adaptation,[29,30] and they have proliferated (in sometimes adapted form) in many countries throughout the world, suggesting the potential for wide if not universal appeal.[31] Furthermore, 12-step groups have been culturally adapted specifically for American Indian and Alaska Native,[22,23,32,33] Black,[26,27] and Latinx[28,34,35] populations. For American Indians and Alaska Natives, the Medicine Wheel and 12 Steps program blends Native American traditional teachings with the 12 Steps of Alcoholics Anonymous to provide culture-specific recovery assistance for Native Americans.[32] In this program, each step may be worded differently from its AA wording, and the steps are presented in a circle rather than as a straight-line listing to ensure cultural appropriateness. Also, this program states that being "in recovery" requires a further journey to wellness by going beyond "clean and sober," by pursuing a journey of healing and balance—mentally, physically, emotionally, and spiritually. This highlights that racial/ethnic minority individuals may have distinct concepts of recovery that should (and can) be addressed in cultural adaption.

Nonetheless, appropriately adapted meetings may not be available and accessible to all racial/ethnic minority groups and subgroups. For example, Asian Americans may face especially serious barriers to 12-step participation given the prohibitions common to many Asian cultures against publicly acknowledging addiction[36,37] and given the heterogeneous composition and small number of Asian Americans in the United States, which may inhibit the growth of culturally adapted meetings. Racial/ethnic minority individuals living outside of major metropolitan areas or ethnic enclaves also may be at a disadvantage, due to their restricted access to culturally adapted meetings;[29] and recent immigrants and others low on acculturation may

struggle with cultural mismatch regardless of the availability of culturally adapted meetings, as adapted meetings in the United States still may fail to adequately reflect their cultures of origin.[28]

GENERAL BARRIERS TO HELP SEEKING

Quantitative and qualitative studies also suggest that racial/ethnic minority groups face greater barriers to seeking help for SUD more generally, which likewise could influence mutual help group participation and benefits. Multiple studies conducted with U.S. national samples have reported lower rates of specialty SUD treatment utilization among Latinx (vs. White) individuals with SUD,[38-44] with studies suggesting particularly limited utilization among foreign-born and Spanish-speaking Latinx subgroups.[45-47] National studies in the United States also have reported disparities in specialty SUD treatment utilization among Asian Americans (vs. Whites)[4,48] and lower SUD treatment retention among both Black and Latinx (vs. White) individuals.[49,50] These studies provide compelling evidence of racial/ethnic disparities in treatment utilization and retention because they used nationally representative samples, restricted analysis to those with an SUD, and often controlled for problem severity.

A parallel evidence base has addressed general barriers to seeking help for an SUD, focusing mostly on Latinx and Black populations.[42,47,51-55] Studies (most addressing multiple barriers simultaneously) have described increased barriers facing Latinx and Black populations in several categories, including logistic barriers (e.g., difficulties with finding treatment, paying/qualifying for treatment, obtaining transportation, handling family and work responsibilities), attitudinal barriers (e.g., lack of perceived treatment need, lack of perceived treatment effectiveness), social and legal barriers (e.g., lack of social support/pressure for treatment seeking, stigma, concerns about deportation, concerns about retaining child custody), and cultural barriers (e.g., lack of culturally adapted treatments, lack of racial/ethnic minority group representation among clients and staff).

Although parallel studies have not been conducted to explore barriers to mutual help group participation per se, many of the above barriers could plausibly affect mutual help group participation. Logistic barriers may be especially salient for recent immigrants and economically disadvantaged groups. For example, recent immigrants and impoverished members of racial/ethnic minority groups may face particular challenges in locating appropriate meetings, obtaining transportation to meetings, and handling competing responsibilities. That said, impacts of certain logistic and legal barriers to help seeking in general terms may be somewhat mitigated when considering mutual help group participation specifically. This is because 12-step meetings are widely available (i.e., located in accessible community settings), free, and independent of governmental institutions.

A last point worthy of attention is that disparities in treatment utilization and retention among Latinx, Black, and Asian populations may themselves constitute barriers to mutual help group participation among affected groups because specialty treatment constitutes a major route to mutual help group involvement (and especially 12-step involvement). Referral to meetings by treatment staff is perhaps the predominant route to 12-step participation, so those who do not attend (or attend less) treatment may be less likely to participate in 12-step groups. Toward this point, 32% of respondents to the 2014 AA Membership Survey reported direct referral from a treatment facility, and 59% reported receiving some treatment/counseling related to their drinking before coming to AA; among the latter, 74% said this experience played an important part in directing them to AA.[8] Referral to 12-step by medical and mental health professionals is also common,[8] which may similarly disadvantage Latinx and Black individuals because they are less likely than Whites to regularly access primary care and mental health care.[56-59]

The discussion above paints a complex picture of the potential for racial/ethnic disparities related

to mutual help groups. It suggests that, although any racial/ethnic minority individual could experience multiple barriers to mutual help group participation, mitigating factors may alter the impacts of these barriers. In lieu of study hypotheses, this review therefore offers two questions:

1. What is the extent and nature of quantitative research on racial/ethnic disparities in mutual help group participation?
2. Do existing studies suggest racial/ethnic disparities in mutual help group participation, and for whom?

In addressing the second question, the review initially examines national studies and treatment/community studies separately, given their differences in rigor and sampling strategies. However, in view of the limited evidence base, results from both study types are synthesized to formulate overarching conclusions.

METHODS

Approach and Search Strategy

The current review employed a narrative review strategy strengthened by incorporation of key aspects of systematic reviews, including systematic search procedures and study coding. To locate relevant publications, PubMed and PsycINFO were searched using the following search terms and combinations thereof: mutual help, self-help, mutual aid, Alcoholics Anonymous, Narcotics Anonymous, Cocaine Anonymous, Marijuana Anonymous, 12-step, twelve-step, SMART Recovery, LifeRing, Women for Sobriety, alcohol, substance, drug, Black, African American, Latino, Hispanic, Asian American, American Indian, Native American, Alaska Native, race, and ethnicity. Reference lists of relevant articles and related-citation links also were examined.

Focal Variables and Study Inclusion and Exclusion Criteria

This review examined associations between racial/ethnic self-identification (the independent variable) and mutual help participation (the outcome), defined as meeting attendance and/or participation in key activities. The review included only original, quantitative articles describing the results of U.S. studies; published in English-language, peer-reviewed journals; and analyzing the presence or extent of mutual help participation across two or more specific racial/ethnic groups with SUD treatment need—as indicated by the presence of an alcohol problem and/or drug use/a drug problem. The review included studies on both adults and adolescents, using no publication date restrictions. Studies were excluded from review if they (1) analyzed only one racial/ethnic group; (2) compared Whites to a combined sample of racial/ethnic minority groups; (3) omitted statistical tests of racial/ethnic differences in mutual help group participation or data sufficient for such tests; or (4) presented results for subsamples of racial/ethnic minority groups where data for the larger racial/ethnic populations were published elsewhere.

Analysis and Summary of Findings

Where statistical comparisons were not provided, this review's lead author conducted bivariate comparisons (i.e., Pearson chi-square tests) using raw, published data. Study characteristics and relevant results were summarized in two descriptive tables. A third table was used to summarize the main results for each racial/ethnic subgroup separately. This table coded results for racial/ethnic comparisons across all mutual help participation outcomes for a given study, but relative only to a specific racial/ethnic group (e.g., coding results for Latinx-White comparisons on all study measures of mutual help group participation at all time points). Results were coded as null, mixed, entirely consistent with lower minority-group participation (a disparity), or entirely consistent with higher minority-group participation (a minority advantage); results were coded as "mixed" when they differed across outcomes, data sources, and/or subgroups (e.g., genders). Marginally significant results (i.e., $.05 < p < .10$) were coded as significant, not null, for this purpose.

RESULTS

National, Epidemiological, Cross-Sectional Studies

Table 1 presents the characteristics and key results of identified national epidemiological studies examining racial/ethnic differences in mutual help group participation; all were cross-sectional ($N = 8$ studies).[38-42,60-62] Data sources were the 1995–2010 National Alcohol Survey (NAS) series, the 1991–1992 National Longitudinal Alcohol Epidemiologic Survey (NLAES), the 2001–2002 and 2004–2005 National Epidemiologic Surveys on Alcohol and Related Conditions (NESARC), and the 2001–2013 NSDUH series, yielding six unique data sets. No studies addressed adults over the past decade. As shown in Table 1, key racial/ethnic subgroups were relatively large (all $N > 100$), excepting those for Asian American/Native Hawaiian/Pacific Islander ($N = 99$) and Native Hawaiian/Pacific Islander ($N = 68$) groups. All but two studies targeted Latinx and/or Black populations, and only one targeted adolescents. All but two studies[40,42] aggregated across nativity and gender when examining racial/ethnic differences. However, all studies including Latinx respondents, excepting the NLAES, reported providing Spanish-language interviews, allowing participation of those not fluent in English. Half targeted those with AUD only, with the others targeting other drug use disorders also or exclusively. All eight studies analyzed AA/12-step or "self-help" attendance and were limited to a measure of any versus no attendance, most using a lifetime time frame. Five conducted multivariate analyses.

Results were quite mixed, with three studies providing at least some evidence of disparities (i.e., Cummings et al., 2011;[39] Mancini et al., 2015;[40] Zemore et al., 2014[42]); three showing at least some evidence of a minority advantage (i.e., Chartier et al., 2011;[38] Perron et al., 2009;[61] Wu et al., 2016[62]); and two reporting entirely null results (i.e., Schmidt et al., 2007;[41] Kaskutas et al., 2008[60]) for racial/ethnic differences in mutual help group participation. (See also Table 3.)

Treatment and Community Studies

Table 2 presents the characteristics and key results of identified treatment- and community-based studies examining racial/ethnic differences in mutual help group participation ($N = 11$ studies).[29,63-72] Studies represent 10 unique data sources, many dated—especially for Latinx-White and Black-White comparisons. Seven of the 11 reported total *samples* of less than 100 for key racial/ethnic subgroups. All but two studies targeted Latinx and/or Black populations exclusively, and all but one targeted adults. All 11 studies aggregated across nativity and gender groups for analysis, and no studies sampling Latinx respondents reported the use of Spanish-language interviews. Five targeted individuals seeking alcohol-related services (the remainder studying populations seeking SUD services), and all studied AA/12-step participation. Contrasting with the epidemiological studies, most (six) captured level of (vs. any/no) participation, at least in addition to any/no participation, and several examined activity participation as well as attendance at meetings. Most (eight) conducted only bivariate analyses or analyses controlling for treatment condition or time alone.

Results were again mixed, with three studies providing at least some evidence of disparities (i.e., Arroyo et al., 1998;[65] Tonigan et al., 1998;[66] Tonigan, 2003[69]); three showing at least some evidence of one or more minority advantages (i.e., Humphreys et al., 1991;[63] Kingree et al., 1997;[64] Tonigan et al., 2013[72]), one reporting countervailing results (i.e., Kaskutas et al., 1999[67]), and four reporting entirely null results (i.e., Humphreys and Woods, 1993;[29] Hillhouse and Fiorentine, 2001;[68] Goebert and Nishimura, 2011;[70] Krentzman et al., 2012[71]). (See also Table 3.)

Overall Summary of Results

Table 3 summarizes the findings of Tables 1 and 2 separately for comparisons involving Latinx; Black; American Indian or Alaska Native; Asian American, Native Hawaiian, or Other Pacific Islander; and multiracial respondents. As noted in the Methods, this summary table simultaneously codes results for comparisons across all mutual

Table 1 National, Epidemiological, Cross-Sectional Studies of Racial/Ethnic Differences in Mutual Help Group Participation ($N = 8$)

Authors	Analytic Sample (All Mixed-Gender)	Data Source	Use of Spanish Interviews	Mutual Help Group Participation Outcome	Analysis	Results
Schmidt et al., 2007[41]	1,885 White, 704 Latinx, and 627 Black respondents	Adults with a lifetime AUD in the combined 1995 and 2000 NAS	Yes	AA attendance (yes vs. no) in one's lifetime	Bivariate only	In the total sample, analyses showed no racial/ethnic differences.
Kaskutas et al., 2008[60]	1,029 White, 103 Latinx, 120 Black, and 73 Other respondents	Adults who attended a 12-step group in their lifetime (and prior to the past year) for an alcohol problem in the 2001–2002 NESARC	Yes	12-step attendance (yes vs. no) in the past year	Bivariate only	In the total sample, analyses showed no racial/ethnic differences.
Perron et al., 2009[61]	2,682 White, 595 Latinx, and 610 Black respondents	Adults with a lifetime DUD in the 2001–2002 NESARC	Yes	12-step attendance (yes vs. no) in one's lifetime	Bivariate and multivariate; controls were demographics and presence of other lifetime psychiatric disorders	Among those reporting any lifetime help seeking for a drug problem, both bivariate and multivariate analyses showed a significantly higher rate of 12-step attendance among Black vs. White respondents; Latinx and White respondents were equivalent. Among the total sample, bivariate analyses* similarly revealed a significantly higher rate of 12-step attendance among Black vs. White respondents.
Chartier et al., 2011[38]	For the NLAES, 6,016 White, 395 Latinx, and 598 Black respondents; for the NESARC, 8,011 White, 1,677 Latinx, and 1,579 Black respondents	Adults with a lifetime AUD in the 1991–1992 NLAES and the 2001–2002 NESARC	Yes for the NESARC, not stated for NLAES	12-step attendance (yes vs. no) in one's lifetime	Bivariate and multivariate; controls were survey, demographics, insurance status, and alcohol severity	In the NLAES, bivariate analyses* showed no racial/ethnic differences. In NESARC, bivariate analyses* showed a significantly higher rate of 12-step attendance among Black vs. White respondents; Latinx and White respondents were equivalent. In pooled survey data, multivariate analyses showed a significantly higher rate of 12-step attendance among Latinx vs. White respondents; Black and White respondents were equivalent. A significant interaction indicated that the Latinx-White difference was diminished or reversed at higher levels of AUD severity.

Authors	Analytic Sample (All Mixed-Gender)	Data Source	Use of Spanish Interviews	Mutual Help Group Participation Outcome	Analysis	Results
Cummings et al., 2011[39]	8,506 White, 2,004 Latinx, 1,051 Black, 325 American Indian/Alaska Native, 181 Asian American, 68 Native Hawaiian/Pacific Islander, and 499 Multiracial respondents	Adolescents with past-year SUD in the combined 2001–2008 NSDUH	Yes	Self-help attendance (yes vs. no) in one's lifetime	Bivariate and multivariate; controls were demographics, insurance status, any mental health treatment, type of SUD, and self-rated health	In the total sample, both bivariate and multivariate analyses showed significantly lower rates of self-help attendance among both Latinx and Black vs. White respondents; no other differences emerged.
Zemore et al., 2014[42]	3,788 White, 949 Latinx, and 738 Black respondents	Adults with lifetime AUD in combined 2000, 2005, and 2010 NAS	Yes	12-step attendance (yes vs. no) in one's lifetime	Bivariate and multivariate; controls were survey, demographics, and dependence severity (as in Model 3)	Among men, both bivariate and multivariate analyses showed a lower rate of 12-step attendance among Latinx vs. White respondents (though the difference was marginally significant in bivariate analyses); Black and White respondents were equivalent. Among women, both bivariate and multivariate analyses showed lower rates of 12-step attendance among Latinx and Black vs. White respondents.
Mancini et al., 2015[40]	5,754 White, 743 U.S.-born Latinx, and 280 Latinx immigrant respondents	Adults with lifetime drug use in the 2001–2002 and 2004–2005 NESARC (using variables from both)	Yes	12-step attendance (yes vs. no) in one's lifetime	Bivariate and multivariate; controls were demographics, parental drug use history, and lifetime mood and anxiety disorders	In the total sample, both bivariate* and multivariate analyses showed a significantly lower rate of 12-step attendance among Latinx immigrant vs. White respondents; U.S.-born Latinx and White respondents were equivalent.
Wu et al., 2016[62]	4,361 White, 799 Hispanic, 459 Black, 141 American Indian/Alaska Native, 99 Native Hawaiian/Pacific-Islander/Asian American, 266 Multiracial respondents	Respondents age 12 and older reporting past-year OUD in the combined 2005–2013 NSDUH	Yes	Self-help attendance in the past year	Bivariate only	Among those reporting past-year use of any alcohol/drug services, analyses showed a significantly higher rate of self-help attendance among American Indian vs. White respondents; no other differences emerged.

Note: AA, Alcoholics Anonymous; AUD, alcohol use disorder; DUD, drug use disorder; NAS, National Alcohol Survey; NESARC, National Epidemiologic Survey on Alcohol and Related Conditions; NLAES, National Longitudinal Alcohol Epidemiologic Survey; NSDUH, National Survey on Drug Use and Health; OUD, opiate use disorder; SUD, substance use disorder.*Analyses conducted on raw data by this review's lead author.

help participation outcomes for a given study, but relative only to a specific racial/ethnic group. This table reveals a lack of strong support for broad racial/ethnic differences in mutual help group participation. Of 35 comparisons between specific racial/ethnic minority groups and Whites on measures of mutual help group participation in a given study, nearly half ($N = 17$) yielded null results; only six comparisons yielded unequivocal support for racial/ethnic disparities, whereas nine yielded mixed results and three yielded unequivocal support for a minority advantage in mutual help group participation.

Nonetheless, it may be possible that results signify disparities for particular Latinx subgroups, as no results indicated a Latinx-White minority advantage and four results indicated Latinx-White disparities. Also, two of the three results coded as "mixed" reveal some disparities: Mancini et al. (2015) reported disparities in lifetime 12-step attendance among immigrant (but not U.S.-born) Latinx adults with lifetime drug use in a national sample,[40] and Tonigan et al. (1998) reported disparities in AA attendance at the 12-month follow-up exclusively among Latinx adults with AUD in Project MATCH (with Latinx-White differences being nonsignificant at prior follow-ups).[66] Black-White comparisons seem more consistent with null effects, with exceptions, as they yielded a range of results including many null results and several results suggesting a minority advantage. Data were very sparse for other racial/ethnic groups, with no evidence of disparities emerging.

DISCUSSION

Question 1: Extent and Type of Research on Disparities

The present review identified 19 studies addressing racial/ethnic disparities in mutual help group participation among those with SUD treatment need. This set includes eight national, epidemiological, cross-sectional studies that were generally well powered, incorporated Spanish-language interviews (allowing inclusion of Spanish speakers), and incorporated multivariate analyses with some adjustment for potential confounds. Also in this set were 11 treatment/community studies, strengths of which included consideration of level of mutual help group participation, as well as any or none, and analysis of multiple outcomes (including participation over time). Almost all studies used strong measures of SUD treatment need (i.e., SUD/AUD status), and rigorously conducted studies were included among both types.

Despite some strengths, the reviewed studies evidenced multiple design limitations, as follows.

- **Studies were generally dated and not optimally designed to assess racial/ethnic differences, with many studies showing inadequate power.** All but four studies analyzed data collected partially or entirely more than a decade ago. U.S. demographics are in constant flux—for example, recent years have witnessed rapid growth of racial/ethnic minority populations and shifts in Latinx settlement patterns[73,74]—so older findings may not represent current conditions in the United States. Existing analyses also seemed to be largely secondary analyses, and most treatment/community studies were underpowered for detecting differences in mutual help group participation across racial/ethnic groups. Even assuming bivariate analysis and a continuous outcome, tests require at least 99 participants per group to detect a small-to-medium effect size (Cohen's $d = .40$) with adequate power ($\beta = .80$);[75] power is even more limited given multivariate analysis and a dichotomous outcome.
- **Studies provided limited data on racial/ethnic minority groups other than Latinx and Black populations, and on important racial/ethnic subgroups including immigrants, women, and adolescents.** Identified studies included just two or three studies each on American Indian or Alaska Native, Asian American, and Native Hawaiian and Other Pacific Islander populations. One study examined immigrants (Mancini et al., 2015),[40] one study examined women separately (Zemore et al., 2014),[42] and two studies examined adolescents (Cummings et al., 2011;[39] Krentzman et al., 2012[71]). Yet, all of the studies focusing on

Table 2 Treatment and Community Studies of Racial/Ethnic Differences in Mutual Help Group Participation ($N = 11$)

Authors	Analytic Sample (All Mixed-Gender)	Data Source and Analytic Design	Use of Spanish Interviews	Mutual Help Group Participation Outcome	Analysis	Results
Humphreys et al., 1991[63]	201 total with 115 Black respondents at follow-up; precise breakdown not provided	Adults with SUD recruited from 19 public SUD treatment programs (11 outpatient, 8 residential) in Michigan; longitudinal (follow-up rate 63%)	N/A	12-step attendance (any vs. no) between treatment end and 6-month follow-up	Bivariate only	In the total sample, analyses showed a significantly higher rate of 12-step attendance among Black vs. White respondents.
Humphreys & Woods, 1993[29]	267 White and 233 Black respondents at follow-up	Adult "substance abusers" (SUD status unclear) recruited from 22 SUD treatment programs in Michigan; longitudinal (follow-up rate 71%)	N/A	12-step attendance (any vs. no) in the prior 30 days at 12-month follow-up	Bivariate only	In the total sample, analyses* showed no racial/ethnic differences.
Kingree et al., 1997[64]	22 White and 78 Black respondents at follow-up	Adults with SUD recruited from a 120-day, 12-step–oriented addiction treatment program serving indigent poly-drug users, most with cocaine as drug of choice; longitudinal (follow-up rate 56%)	N/A	Scores on the AAAS and endorsement of specific AA-related behaviors and experiences, assessed 60 days post-baseline	Bivariate only	In the total sample, analyses showed marginally higher scores on the AAAS and a significantly higher rate of "sharing in meetings" among Black vs. White respondents; no other differences emerged.
Arroyo et al., 1998[65]	62 White and 46 Latinx respondents at baseline	Adults with AUD recruited from intake at the University of New Mexico's outpatient, publicly funded SUD treatment program; longitudinal (follow-up rates 91% to 97%)	None described	Proportion days AA meeting attendance over the follow-up interval at 2, 4, and 6 months post-baseline	Multivariate only; controls were gender, education, and baseline AA attendance	In the total sample, analyses showed significantly fewer days of AA attendance among Latinx vs. White respondents collapsing across follow-ups.
Tonigan et al., 1998[66]	For outpatient sample, 735 White, 111 Latinx, and 52 Black respondents; for aftercare sample, 592 White, 27 Latinx, and 112 Black respondents at baseline	Project MATCH: Adults with AUD recruited from a broad range of SUD outpatient and residential treatment sites, assigned to one of three interventions; longitudinal (follow-up rates > 90%)	None described	AA attendance (yes vs. no) over the prior 3 months at 3, 6, 9, and 12 months post-baseline	Multivariate only; control was intervention condition	Among outpatients, analyses showed no racial/ethnic differences. Among aftercare patients, analyses showed significantly fewer days of AA attendance among both Latinx and Black vs. White respondents at the 12-month follow-up only; no other differences emerged.

Authors	Analytic Sample (All Mixed-Gender)	Data Source and Analytic Design	Use of Spanish Interviews	Mutual Help Group Participation Outcome	Analysis	Results
Kaskutas et al., 1999[67]	538 White and 253 Black respondents at baseline	Epidemiological Laboratory (EpiLab) Study: Adults recruited from (a) 10 alcohol programs representative of public, HMO, and for-profit programs in northern California ($N = 926$) and (b) the general population of alcohol-dependent and problem drinkers ($N = 672$); analysis uses only sample (a); baseline analysis	N/A	AA and NA/CA attendance (yes vs. no); scores on a composite measure of AA involvement; and endorsement of specific AA-related behaviors/experiences, all for the pretreatment period and assessed at baseline	Bivariate and multivariate (the latter conducted only for AA attendance); controls were demographics, ASI Alcohol Severity, ASI Drug Severity, prior SUD treatment, and any prior NA/CA attendance	In the total sample, bivariate analyses showed significantly higher rates of both AA and NA/CA attendance among Black vs. White respondents. However, multivariate analyses showed no racial/ethnic differences in AA attendance. Among those reporting any AA attendance, there were no racial/ethnic differences in overall AA involvement, but significant differences emerged for specific AA-related behaviors/statuses: Black respondents were more likely to report that they were AA members, had had a spiritual awakening, and did service/volunteer work in the last year (vs. White respondents); White respondents were more likely to currently have a sponsor and to have read the AA literature (vs. Black respondents).
Hillhouse and Fiorentine, 2001[68]	76 White, 72 Latinx, and 110 Black respondents at follow-up	Adults (SUD status not specified) recruited from 26 outpatient SUD treatment programs in the Los Angeles area; only those in treatment for at least 8 weeks included; longitudinal (follow-up rate 74%)	None described	Pattern of 12-step participation (i.e., classification as persister, initiate, dropout, or nonattender) 24 months post-baseline	Bivariate only	In the total sample, analyses showed no racial/ethnic differences.
Tonigan, 2003[69]	1,380 White, 141 Latinx, and 168 Black respondents at baseline	Project MATCH: Adults with AUD recruited from a broad range of SUD outpatient and residential treatment sites, assigned to one of three interventions; baseline analysis	None described	Proportion days AA meeting attendance prior to treatment (period undefined), assessed at baseline	Bivariate only	In the total sample, analyses showed significantly fewer days of AA meeting attendance among both Latinx and Black vs. White respondents.

Authors	Analytic Sample (All Mixed-Gender)	Data Source and Analytic Design	Use of Spanish Interviews	Mutual Help Group Participation Outcome	Analysis	Results
Goebert and Nishimura, 2011[70]	71 "Euro" American, 31 Asian American, and 90 Native Hawaiian respondents at baseline	Adults (SUD status not specified) recruited from intake at two major residential SUD treatment programs in Hawaii; baseline analysis	N/A	AA attendance (yes vs. no) prior to treatment (period undefined), assessed at baseline	Bivariate only	In the total sample, analyses showed no racial/ethnic differences.
Krentzman et al., 2012[71]	124 White and 41 Black respondents at baseline	Adolescents with SUD recruited from intake at the largest adolescent residential treatment provider in a central Midwestern region; longitudinal (follow-up rate 90%)	N/A	12-step helping behaviors and 12-step work in past month/90 days, as measured by Service to Others in Sobriety and General AA Tools of Recovery (GAATOR) scales, assessed 2 months post-baseline	Bivariate and multivariate; controls were baseline value of the outcome, demographics, total number of substance use diagnoses, prior SUD treatment, religiousness, readiness for change, and sexual abuse history	In the total sample, both bivariate and multivariate analyses showed no racial/ethnic differences.
Tonigan et al., 2013[72]	133 White and 63 American Indian respondents	Data merged from two studies recruiting adult participants in early AA affiliation and residing in large southwestern city; longitudinal (follow-up rates not specified)	N/A	Proportion days AA meeting attendance (period undefined), AA meeting attendance (yes vs. no), and 12-step work (assessed using GAATOR) at baseline and at 3, 6, and 9 months post-baseline	Multivariate only with time as the only covariate	In the total sample, analyses showed no racial/ethnic differences in AA attendance or 12-step work from baseline through follow-ups. However, analyses showed a significantly lower decline in any AA attendance over time among American Indian vs. White respondents.

Note: AA, Alcoholics Anonymous; AAAS, AA Affiliation Scale; ASI, Addiction Severity Index; AUD, alcohol use disorder; CA, Cocaine Anonymous; GAATOR, General AA Tools of Recovery; HMO, health maintenance organization; NA, Narcotics Anonymous; N/A, not applicable; SUD, substance use disorder. *Analyses conducted on raw data by this review's lead author.

immigrants, women, and adolescents reported disparities, underlining the importance of studying these populations.

- **Regardless of racial/ethnic group focus, treatment/community studies sampled a restricted range of populations, further limiting generalizability.** Although most national studies provided Spanish-language interviews, none of the treatment/community studies did so. Hence, these studies presumably excluded all those not fluent in English, who differ widely from English speakers on substance use and help-seeking patterns.[58-60,76] Treatment/community studies also focused on a small set of predominantly urban samples. This is an important limitation because, as discussed, geography may moderate racial/ethnic disparities in mutual help group participation and benefits, with those living outside of ethnic enclaves likely to show increased disparities.
- **Studies focused predominantly on respondents with AUD, and all studies examined AA/12-step participation or global "self-help" participation.** Very few studies focused on populations with a drug use disorder (DUD), and none examined 12-step alternatives such as SMART Recovery, a rapidly growing recovery resource. Consequently, findings cannot be confidently generalized to populations with DUD—comprising large proportions of those with SUD treatment need[77,78]—or to 12-step alternatives.

Studies also showed limitations associated with their measures and analysis.

- **Studies often relied on crude, dichotomous measures of 12-step participation (especially in national samples).** Most problematic, national studies relied completely on any/no (usually lifetime) measures of mutual help participation. Although power considerations may preclude use of more detailed measures, this means that national data cannot speak to potential disparities in involvement patterns, such as a tendency for Latinx people to discontinue 12-step involvement more frequently than Whites. Most studies also neglected to measure activity participation, though much of the effectiveness of 12-step participation can be attributed to activity involvement, such as obtaining a sponsor.[79]
- **Studies relied quite heavily on bivariate analyses, and they neglected potential confounds.** Even where multivariate analyses were conducted, very few controlled for differences in SUD severity. Neglect of SUD severity is particularly concerning: Where SUD severity is not controlled, any findings may be distorted by an association between race/ethnicity and problem severity, as higher SUD severity has been consistently associated with greater 12-step participation[80 83] (and indeed implies greater treatment need). These limitations should be addressed in future research.

Question 2: Findings for Racial/Ethnic Disparities

As a whole, studies did not provide strong evidence of racial/ethnic disparities for any racial/ethnic group. Still, six studies revealed some evidence of Latinx-White disparities in mutual help group participation, including national, epidemiological studies using NSDUH, NESARC, and NAS data (Cummings et al., 2011;[39] Mancini et al., 2015;[40] Zemore et al., 2014[42]) and treatment/community studies analyzing data from a New Mexico outpatient SUD treatment program and Project MATCH (Arroyo et al., 1998;[65] Tonigan et al., 1998;[66] Tonigan et al., 2003[69]). Results of a NESARC analysis by Mancini et al. (2015) are particularly notable, showing a sizeable disparity among Latinx immigrants (vs. Whites) reporting drug use across bivariate and multivariate analyses; analyses revealed significantly lower odds of lifetime 12-step attendance among Latinx immigrants vs. Whites (multivariate $OR = 0.39$).[40] Results call for cautious interpretation because, in addition to targeting any/no participation, analyses considered all those with any drug use and did not control for drug use severity. Still, similar results emerged in a within-group (noncomparative) study of Latinx respondents with lifetime AUD interviewed for the 2000–2010 NAS,[60] which reported significantly greater lifetime

Table 3 Summary of Results for Racial/Ethnic Disparities in Mutual Help Group Participation Across Studies

Comparison	Null Results	Mixed Results	Lower Minority Participation (Disparity)	Higher Minority Participation (Advantage)
Latinx vs. White	5 studies *Table 1*: Schmidt et al., 2007;[41] Kaskutas et al., 2008;[60] Perron et al., 2009;[61] Wu et al., 2016;[62] *Table 2:* Hillhouse and Fiorentine, 2001[68]	3 studies *Table 1:* Chartier et al., 2011;[38] Mancini et al., 2015;[40] *Table 2:* Tonigan et al., 1998[66]	4 studies *Table 1:* Cummings et al., 2011;[39] Zemore et al., 2014;[42] *Table 2:* Arroyo et al., 1998;[65] Tonigan et al., 2003[69]	0 studies
Black vs. White	6 studies *Table 1:* Schmidt et al., 2007;[41] Kaskutas et al., 2008;[60] Wu et al., 2016;[62] *Table 2:* Humphreys and Woods, 1993;[29] Hillhouse and Fiorentine, 2001;[68] Krentzman et al., 2012[71]	5 studies *Table 1:* Chartier et al., 2011;[38] Zemore et al., 2014;[42] *Table 2:* Kingree et al., 1997;[64] Tonigan et al., 1998;[66] Kaskutas et al., 1999[67]	2 studies *Table 1:* Cummings et al., 2011;[39] *Table 2:* Tonigan et al., 2003[69]	2 studies *Table 1:* Perron et al., 2009;[61] *Table 2:* Humphreys et al., 1991[63]
American Indian or Alaska Native vs. White	2 studies *Table 1:* Cummings et al., 2011;[39] *Table 2:* Goebert and Nishimura, 2011[70]	1 study *Table 2:* Tonigan et al., 2013[72]	0 studies	1 study *Table 1:* Wu et al., 2016[62]
Asian American, Native Hawaiian or Other Pacific Islander vs. White*	2 studies *Table 1:* Cummings et al., 2011;[39] Wu et al., 2016[62]	0 studies	0 studies	0 studies
Multiracial vs. White	2 studies *Table 1:* Cummings et al., 2011;[39] Wu et al., 2016[62]	0 studies	0 studies	0 studies
Total Results	17 studies	9 studies	6 studies	3 studies

Note: Results coded as "mixed" when differing across outcomes, data sources, and/or subgroups (e.g., genders); marginally significant results coded as significant and not null.
*Comparisons were between Asian Americans vs. Whites and Native Hawaiians/Pacific Islanders vs. Whites[39] and between Native Hawaiians/Pacific Islanders/Asian Americans vs. Whites.[62]

12-step attendance among those interviewed in English vs. Spanish (multivariate *OR* = 3.20) despite comprehensively controlling for severity. As this review's Introduction suggests, multiple studies[58-60] likewise have found diminished use of specialty treatment (and AUD services broadly) among Latinx immigrants and those speaking predominantly Spanish. In general, Latinx immigrants may tend to use fewer services, including mutual help groups, and/or prefer services not fully captured in the literature, such as services in their countries of origin and/or nontraditional services in the United States. For example, literature has documented some use among Latinx populations of *anexos,* which are community-based recovery homes that draw on AA principles and provide care to primarily male Latinx migrants and immigrants.[84,85] Regardless, these disparities raise questions as to whether existing recovery-related services are sufficient to support recovery for Latinx populations.

Also notable, studies reported substantial Latinx-White disparities in analyses targeting women (Zemore et al., 2014)[42] and adolescents (Cummings et al., 2011),[39] again across bivariate and multivariate analyses. These studies are notable because they analyzed large, national data sets and employed multivariate analyses. Moreover, the pattern of effects in each was similar across multiple outcomes, and results were not undermined by findings for null or contrary results in other studies. Using NAS data, Zemore et al. (2014) reported significantly lower odds of lifetime 12-step attendance among Latinx versus White women with lifetime AUD (multivariate *OR,* Model 3 = 0.30).[42] Findings also revealed large disparities in 12-step attendance among Latinx versus White men and Black versus White women, along with the same pattern of disparities for specialty treatment, perhaps implying general obstacles to help seeking among all Latinx individuals and Black women. Using NSDUH data, Cummings et al. (2011) reported substantially lower rates of 12-step attendance among both Latinx and Black (vs. White) adolescents, again in both bivariate and multivariate models; they also found the same pattern of disparities for any SUD treatment and treatment in medical settings.[39] Cummings et al. speculated that these disparities may be explained by lack of SUD services in Latinx and Black neighborhoods; low acculturation among Latinx adolescents; and racial/ethnic differences in stigma, attitudes, and cultural beliefs concerning behavioral health problems and treatment.[39] It is also possible that there are detrimental, cumulative effects of being both young and belonging to a racial/ethnic minority group, such as intensified stigma and difficulties with "fitting in" in treatment and mutual help group settings.

Otherwise, findings for Latinx-White disparities in the general population and among treatment/community samples were quite mixed. Existing data are not sufficient to confidently establish those factors driving variation in results across studies, but variation across national epidemiological studies may at least partially reflect differences in how studies obtained respondents from racial/ethnic minority groups. For example, at the time data relevant to this review were collected, the NSDUH did not oversample racial/ethnic minority groups; the NESARC oversampled racial/ethnic minority groups, although information on oversampling methods could not be located; and the NAS targeted high-minority-density areas. The NAS approach apparently yielded the strongest representation of Latinx respondents low on acculturation, with 45% of Latinx respondents interviewed in Spanish across the pooled 1995–2005 NAS[60] (vs. 16% in the 2001–2002 NESARC[86] and a weighted 23% in the 2001–2013 NSDUH[87]). If disparities are strongest for Latinx populations low on acculturation, as seems evident, this may explain why Zemore et al. (2014) reported Latinx-White disparities for both men and women,[42] and other national studies did not.

Meanwhile, respondents' geographic context—and specifically, access to racial/ethnic minority–inclusive and culturally adapted meetings in the community—may have contributed to variation in results for the treatment/community studies. Humphreys and Woods (1993) have argued that geography and race/ethnicity interact to affect mutual help group participation, and specifically that people with SUD may prefer to attend meetings

in areas where their own race/ethnicity is well represented.[29] In fact, their study of treatment seekers with SUD found that Black participants were more likely to attend a mutual-help group if they resided in a predominantly Black area; similarly, White participants were more likely to attend a mutual help group if they resided in a predominantly White area. Accordingly, the inconsistent results for treatment/community studies may reflect differences in the samples' access to minority-inclusive and culturally adapted meetings. This seems a plausible explanation for the null findings reported for Latinx-White differences in mutual help group participation in the diverse Los Angeles metropolitan area (i.e., Hillhouse & Fiorentine, 2001),[68] versus other studies reporting Latinx-White disparities with samples drawn from less metropolitan areas (i.e., the Arroyo[65] and Tonigan[66,69] studies). Future studies of racial/ethnic disparities that explicitly consider the acculturation status of respondents and access to minority-inclusive and culturally tailored meetings will be needed to better evaluate these possibilities.

Regarding Black populations, studies produced little evidence for disparities in mutual help group participation, and several studies reported evidence of greater mutual help group participation among Blacks than Whites (i.e., Perron et al., 2009;[61] Humphreys et al., 1991;[63] Kingree et al., 1997;[64] Kaskutas et al., 1999[67]). (Exceptions are the notable studies targeting women and adolescents described above.) Several factors could explain the relatively strong participation rates among Black people with SUD treatment need overall. As noted above, studies generally did not control for SUD severity, so they may have missed disparities that would arise when accounting for intensity of treatment need. Another possibility is that prevalent religiosity/spirituality among Black populations[88,89] may make 12-step groups particularly appealing, counteracting any obstacles to participation. Other explanatory factors may include the higher rate of SUD treatment coercion among Black versus White populations,[90] which can include coercion to 12-step group participation, and differences in program emphasis on 12-step principles and participation within programs serving predominantly Blacks vs. Whites.[29] The mixed findings for Black-White differences may reflect chance, geographic factors, and sample characteristics (e.g., proportion with DUD, as those with DUD may be more likely than those with AUD to experience coercion). Findings from the few studies of American Indian, Alaska Native, Asian American, Native Hawaiian, and Other Pacific Islander populations provided no indication of disparities, but the sparse data preclude strong conclusions.

Future Research Needs and Clinical Implications

The sparse and inconsistent evidence base described above highlights a need for additional research on racial/ethnic disparities in mutual help group participation. In particular, current epidemiological studies are needed to better investigate potential disparities, ideally using sophisticated measures of mutual help involvement and accounting for potential differences in clinical severity. NSDUH data would be especially well suited for examination of current disparities in rates of mutual help group participation. Well-powered treatment/community studies are also important to address the potential for racial/ethnic disparities in mutual help group involvement patterns over time, including involvement in key activities such as sponsoring relationships. Both epidemiological and treatment/community studies should pay particular heed to individual and contextual factors—such as gender, age, acculturation level, and access to minority-inclusive and culturally tailored meetings—that may affect participation in mutual help groups. Meanwhile, qualitative studies would be useful to capture the self-perceived needs and barriers of racial/ethnic minorities regarding mutual help groups. Studies might focus particularly on Latinx, American Indian, Alaska Native, Asian American, Native Hawaiian, and other Pacific Islander populations as well as racial/ethnic minority immigrants, women, and adolescents.

Studies also might address a wider range of mutual help groups as recovery resources for racial/ethnic minority individuals, such as SMART Recovery. SMART is the largest known alternative to 12-step groups with more than 2,200 meetings in the United States. SMART's philosophical

focus on empowerment (vs. surrender) may be especially appealing and appropriate for racial/ethnic minority individuals, who are likely to face disenfranchisement by the majority culture. Similarly, research is needed to examine the use of online mutual help meetings and resources among racial/ethnic minority groups. Many mutual help options, including 12-step groups, have online meetings and forums,[17,91] and aspects of these resources (e.g., their greater anonymity and ease of access) may be particularly appealing to racial/ethnic minority individuals. Importantly, online meetings have the potential for substantial cultural tailoring because they are geographically unlimited: A given meeting might be tailored to a very specific subgroup and draw attendees from around the globe. Online recovery resources have become an especially salient target for research in recent times because they offer ongoing, peer-based support during periods of social distancing.

Finally, studies are needed to address racial/ethnic disparities in the relationship between mutual help group participation and benefits. Few studies have addressed whether mutual help group participation is equally beneficial for racial/ethnic minority groups, with existing studies relying on a limited set of data sources.[65,69,72,92,93] A key question is whether Spanish-language 12-step groups are effective among Spanish-speaking Latinx individuals, as 12-step participation may be a more accessible form of treatment than specialty care for disadvantaged Latinx populations, with Spanish meetings available in many urban centers (though the extent of foreign-language meetings in the United States has not been well documented).[94,95] Broadly, it would be valuable to address the effectiveness of all prevalent mutual help group options and participation modes (i.e., in-person, online) for sustaining recovery among racial/ethnic minority individuals.

Together, the directions discussed above have the potential to advance the field not only by better describing existing disparities, but also by improving referral practices and interventions. Ultimately, studies might support the development and dissemination of new mutual help resources for racial/ethnic minority groups (e.g., culturally adapted meetings), which may be particularly important for those who underutilize specialty treatment and/or experience the heaviest burden of problems.

Limitations of This Review

The current review may have omitted relevant studies because inclusion criteria were limited to published studies indexed in PubMed and PsycINFO. The review's search strategy assumed that the vast majority of relevant studies would be indexed in these databases, but other databases may have yielded additional articles. Further, to be expeditious, this review drew upon, but did not fully adopt, guidelines from the PRISMA Group (Preferred Reporting Items for Systematic Reviews and Meta-Analyses).[96] Future reviews may benefit from more formalized review procedures. Last, because the review was limited to U.S. studies, results cannot be generalized to other countries. (For international studies of AA, see Makela, 1996.[97])

FINAL CONCLUSIONS

Mutual help groups are a foundational and an effective component of the SUD treatment system in the United States, so it is critical to understand whether they are as appealing and effective for racial/ethnic minority groups as they are for Whites. Further, there are reasons to believe that racial/ethnic minorities (and especially immigrants) experience elevated barriers to participation in such groups, including barriers to mutual help group participation specifically and help seeking generally. Nonetheless, this comprehensive review found existing data to be insufficient to fully evaluate racial/ethnic disparities in mutual help group participation. Findings provided very tentative evidence for Latinx-White disparities, particularly among certain subgroups (i.e., immigrants, women, adolescents), as well as for disparities among Black women and adolescents. However, identified studies showed numerous limitations. Conclusions emphasize the need for additional research addressing the limitations of existing studies and targeting new and understudied questions, such as widening the lens to examine neglected mutual help group options and modes of participation.

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Recovery in Special Emphasis Populations

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Special emphasis populations in the current context can be defined as groups experiencing health disparities resulting in elevated risk to health, safety, and well-being from drinking alcohol. Individuals from marginalized minority populations often encounter barriers to accessing and receiving effective alcohol treatment due to social inequities and disadvantaged life contexts, which also may adversely affect recovery from alcohol use disorder (AUD). Recovery from AUD often involves the adoption of a stable non-drinking lifestyle (sobriety), increased health and well-being, and increased social connection. Although there has been considerable work on AUD epidemiology among special emphasis populations, little research exists directly examining recovery among racial/ethnic minority populations and/or sexual and gender minority populations. The current narrative review hopes to spark scholarly interest in this critically neglected area. This article opens with a review of special emphasis populations and their alcohol-related risks. Next, definitions of recovery, Alcoholics Anonymous, and culturally adapted recovery models for racial/ethnic minority populations are explored. This is followed by a discussion of factors that may particularly influence recovery among marginalized minority populations. This narrative review concludes with a discussion of research priorities for promoting health equity through studies focused on understanding and supporting recovery from AUD among marginalized minority populations.

KEY WORDS: alcohol-related disorders; alcoholism; minority health; health status disparities; Alcoholics Anonymous; social justice; alcohol; sexual and gender minorities

INTRODUCTION

The National Institute on Alcohol Abuse and Alcoholism (NIAAA) defines special emphasis populations as "groups who face particular risks from drinking alcohol based on personal characteristics such as age or gender."[1] Underage youth, emerging adults (ages 18 to 28), older adults (age 65 and older), women, individuals experiencing co-occurring disorders, and ethnic and racial minorities are special emphasis populations highlighted by NIAAA. Additional

special emphasis populations at heightened risk for AUD include sexual minorities,[2-4] individuals with justice system involvement,[5-10] homeless persons,[11] and former foster care emerging adults.[12]

Underage Youth

Underage youth are a special emphasis population given the ubiquity and inherent danger of underage drinking, as well as the status illegality of drinking among minors. By 12th grade, most Americans will have consumed alcohol, half will have consumed alcohol in the past year, and 1 out of 7 will have had five or more drinks in a row in the past 2 weeks.[13] Underage drinking is remarkably dangerous, carrying with it substantial risk to the health, safety, and well-being of teenagers and those around them.

Emerging Adults

Emerging adults are distinguished by the highest risk for alcohol and drug use problems of any age group.[14] More than a third of emerging adults report binge drinking during the past 2 weeks; those attending college are at higher risk for drinking problems than those not attending college, and collegians who participate in Greek letter organizations ("Greek life") are at especially high risk.[15]

Older Adults

NIAAA considers older adults (age 65 and older) a special emphasis population because many drink despite (1) age-related increases in sensitivity to alcohol, (2) health problems complicated by drinking, and (3) using medications that interact poorly with alcohol.[16] Moreover, drinking problems among older adults often are associated with factors unique to senior adulthood, such as aging-related health worries, boredom after retirement, the death of friends and loved ones, shame about drinking, and the justification that drinking is harmless to others.

Individuals With Co-Occurring Disorders

Co-occurring disorders alongside AUD are common, and individuals with co-occurring disorders are a special emphasis population given the complexities associated with treating AUD alongside other disorders. People with drinking problems are at heightened risk for psychiatric problems (i.e., anxiety disorders, depressive disorders, bipolar disorders, attention-deficit/hyperactivity disorder, borderline personality disorder, antisocial personality disorder, schizophrenia); problems with the use of other drugs in addition to alcohol; and physical problems and conditions (e.g., liver disease, HIV/AIDS, alcohol-related cancers). This comorbidity is a product of genetic vulnerabilities, epigenetics, neurobiology, environment, exposure to stress, and trauma. As highlighted by NIAAA, having co-occurring disorders is associated with greater alcohol problem severity;[17] moreover, it complicates the treatment of AUD, which for optimal effectiveness must be integrated with treatment(s) for co-occurring disorders.

Women

NIAAA regards women as a special emphasis population given the higher risk of certain alcohol-related negative consequences compared to men, such as liver damage, heart disease, brain damage, and breast cancer.[18] Moreover, women are a special emphasis group due to the issues of drinking during pregnancy and fetal alcohol exposure. In general, women report more problems related to physical and mental health as well as more past trauma and abuse (physical and sexual). Notably, women are more likely than men to begin using alcohol and drugs after a specific traumatic event and to suffer from post-traumatic stress disorder.[19] Key principles in women's recovery include addressing any experiences of trauma, including incest and rape, fears of losing their children, and parenting challenges and efficacy.[20-23]

Racial and Ethnic Minorities

NIAAA[24] points out "certain ethnic and racial minorities as well as other underserved populations experience more negative consequences of illness and premature death than other groups," noting disparities affecting (1) Hispanics/Latinx, (2) Blacks, and (3) Native Americans. The life contexts of racial and ethnic minority individuals with AUD are likely to include more economic hardship, stress, systemic discrimination and prejudice, and compounded disadvantage, as well as fewer recovery resources and supports, compared to the life contexts of non-Hispanic White individuals with AUD. The marginalization associated with racial/ethnic minority status produces enduring and significant challenges to recovery for such individuals.

The remainder of this narrative review focuses on individuals from marginalized minority groups in the recovery phase of their drinking careers, with particular attention to what may distinguish recovery challenges experienced by minority populations from those experienced by majority populations. It should be noted that rigorous empirical studies directly investigating recovery among any marginalized minority population(s) are absent from the literature; in contrast, considerable research has been conducted on the epidemiology of AUD and alcohol-related negative consequences among minority populations. The current narrative review draws heavily on that epidemiological work and extends it to recovery by: (1) examining what is known about recovery among minority populations; (2) identifying factors and mechanisms that especially may impact recovery among minority populations; and (3) suggesting avenues for additional research.

DEFINING RECOVERY AMONG SPECIAL EMPHASIS POPULATIONS

Despite widespread common usage of the term "recovery," obtaining expert consensus on the essential elements for defining recovery from AUD has proved challenging. The Substance Abuse and Mental Health Services Administration (SAMHSA) defines recovery as "a process of change through which individuals improve their health and wellness, live a self-directed life, and strive to reach their full potential."[25] Moreover, SAMHSA conceptualizes recovery along four dimensions: health, home, purpose, and community relationships/social networks. The Betty Ford Institute Consensus Panel defines recovery as "a voluntarily maintained lifestyle" characterized by sobriety (abstinence from alcohol and nonprescribed drugs), personal health (improved quality of personal life), and citizenship (respect for others).[26] William White defines recovery as "the experience (a process and a sustained status) through which individuals, families, and communities impacted by severe alcohol and other drug (AOD) problems utilize internal and external resources to voluntarily resolve these problems, heal the wounds inflicted by AOD-related problems, actively manage their continued vulnerability to such problems, and develop a healthy, productive, and meaningful life."[27] Despite considerable overlap among these three influential recovery definitions, they differ in meaningful ways with one another (e.g., whether recovery is voluntary; whether recovery means enduring vulnerability).

Kaskutas et al. reached out to adults in recovery (n = 9,341) and asked them how they defined recovery.[28] Responses revealed three factors: (1) "abstinence" (no use of alcohol); (2) "essential recovery" (being honest with oneself, handling negative feelings without drinking or using, enjoying life without drinking or using); and (3) "enriched recovery" (ongoing growth and development, reacting to life in a more balanced way, taking responsibility). In post hoc analyses, Kaskutas et al. examined possible variation by race/ethnicity and education in definitions of recovery, and found almost none. Notably, adults in recovery with less than a college degree or

from racial/ethnic minorities were less likely than their counterparts to emphasize abstinence in defining recovery, and more likely to emphasize the essential recovery and enriched recovery factors. Overall, these differences were slight, suggesting considerable overlap in definitions of recovery among and across minority and majority populations in recovery.

PARTICIPATION IN ALCOHOLICS ANONYMOUS BY MINORITY POPULATIONS

Participation in formal alcohol treatment typically precedes entering recovery. Kaskutas et al. found that 96% of adults self-identifying as being in recovery had received treatment for AUD.[28] The overwhelming majority of alcohol treatment programs in the United States incorporate 12-step elements and promote participation in Alcoholics Anonymous (AA) as an aid to recovery. AA was founded by non-Hispanic White men in the 1930s, and historically most AA members in the United States have been non-Hispanic White; over time, AA members have become much more diverse, reflecting the increasing demographic diversity of the U.S. population.

Concerned that AA's non-Hispanic White origins might be a barrier to AA participation for minority populations, Tonnigan, Connors, and Miller reviewed the literature and concluded: (1) AA is well known and well liked among minority populations; (2) minority populations are less likely to avail themselves of AA compared to nonminority populations; and, (3) minority populations are as likely to benefit from AA as nonminority populations.[29] In the 2 decades since the published review by Tonnigan et al., AA has grown substantially in the number of interest groups, meetings, conventions, and program resources designed especially for minority populations in recovery from AUD (e.g., http://gal-aa.org/ for gays and lesbians; https://naigso-aa.org/ for Native Americans).

AA Special Emphasis Group Adaptation: The Native American Wellbriety Movement

Some minority populations have adapted AA literature, rituals, and materials to increase AA's appeal, as well as cultural and linguistic appropriateness, for members of their communities. Beginning in the 1960s, AA has been steadily adapted by American Indian communities, culminating in the Wellbriety movement.[30] Wellbriety frames AUD from an American Indian perspective, where all things are holistically connected, and there is no separation between the individual, family, and tribe. Moreover, the fourth edition of the Big Book of Alcoholics Anonymous[31] has revised and updated its depictions of Native American culture, and a growing number of Native American meetings are registering with the AA General Services Office (https://naigso-aa.org/).

Despite the advances of the Wellbriety Movement, the relative dearth of AUD treatment and aftercare approaches congruent with Native American cultural values, beliefs, and traditions remains a major barrier to recovery from AUD for Native Americans.[32,33] Tradition-based Native American practices that may be incorporated into AUD treatment and recovery include: Sweat ceremonies, a cultural practice usually performed in a lodge that uses heat and steam to cleanse toxins from the mind, body, and spirit; smudging or the burning of sacred herbs to purify people and places; the use of ceremonial drums and songs; Talking Circles; traditional healers; and Elder teachings.[34] Additionally, historical trauma impinges upon Native Americans' successful recovery from AUD. Brave Heart notes: "Historical trauma, also referred to as a cumulative trauma, soul wound, and intergeneration trauma, refers to the cumulative emotional and psychological harm experienced throughout an individual's life span and through subsequent generations."[35] Historical trauma is the cumulative result of centuries of subjugation, racism and discrimination, genocidal violence, segregation, and systemic oppression inflicted

upon Native Americans. Incorporating tradition-based practices, and holistic concepts of wellness and community-based recovery support, can help contextualize and ameliorate the impact of historical trauma on recovery from AUD among Native Americans.[32,33]

AA Special Emphasis Group Adaptations: African American and Hispanic

In African American communities, local church-based drug ministries and mutual aid groups often are indigenous sources of services for recovery initiation, stabilization, and maintenance.[36] Given AA's Episcopalian roots and its emphasis on congregation and mutual aid, AA integrates relatively easily with church-based recovery support initiatives in African American communities. In immigrant urban Hispanic/Latinx communities in California, *anexos* are an indigenous adaptation of AA, typically catering to male, lower-income, Spanish-speaking immigrants and migrants.[37,38] Residences literally annexed to AA meeting sites, *anexos* originated in Mexico in 1975 as part of the recovery support "24 Hour Movement" (*Movimiento 24 Horas*), and since have spread to Hispanic/Latinx communities in the United States. Although strides have been made toward the cultural and linguistic adaptation of AA by minority groups, these advances have been limited by an emphasis on heterosexual men; thus, a critical next step is the adaptation of AA for minority women and for intersectional individuals with both racial/ethnic and sexual minority status.

CHALLENGES TO RECOVERY AMONG MINORITY POPULATIONS

Marginalized minority groups possess limited economic and social capital. Such limitations typically result from social and environmental injustices, and often reflect de jure and de facto discrimination.[39] Both before and during recovery from AUD, the life contexts of minority populations are likely to include more pervasive and enduring hardships, stresses, and disadvantages compared to the life contexts of majority populations.[40-47] Among marginalized minority groups, disadvantaged life contexts are (1) socially determined, (2) a function of social injustices, and (3) the primary causes of health inequities and disparities.[41,42] This means that the long-term elimination of health disparities, including those associated with recovery from AUD, is dependent on social change.

Research has identified a range of socially determined disadvantaged life contexts that significantly impact the course of AUD among minority populations;[40-47] it is very likely that these same social determinants significantly impact recovery from AUD. Key social determinants that may influence recovery among minority populations include:

- Material hardship
- Residential segregation
- Neighborhood crime and disorder
- Alcohol access through nearby alcohol outlets including bars and liquor stores
- Stigma about having problems with alcohol use or having AUD
- Unfair treatment, prejudice, and discrimination
- Disparities in medical care, resulting in more untreated or undertreated medical conditions
- Housing instability
- Unemployment and underemployment
- Personal demoralization
- Lack of culturally and linguistically appropriate recovery support services nearby
- Stress, from multiple and interacting sources

Such inequity in exposure to economically disadvantaged and health-compromising life contexts is a pressing environmental justice issue. Racial/ethnic minority populations are marginalized groups living in lower-income areas; residential segregation by income and race/ethnicity is considered "the most critical distinctive social exposure" driving health disparities.[49] Research has shown that the associations between environmental risks and AUD are

stronger in poorer neighborhoods, suggesting that environmental challenges are a particular threat to recovery among individuals with AUD from low-income communities.[50] Although successful recovery from AUD can be difficult and tortuous for anyone, successful recovery for someone from a marginalized minority population includes an added layer of socially determined challenges and environmental injustices. Moreover, a sizable number of people in recovery have more than one minority identity (e.g., a Latinx lesbian, a person of color who is incarcerated); individuals with intersectional identities may be especially likely to encounter socially determined challenges to recovery from AUD.

RECOMMENDATIONS

NIAAA[51] has identified four research priorities for investigations regarding the dynamics of posttreatment recovery. Two of these priorities speak directly to decreasing health inequities and enhancing knowledge related to recovery from AUD among minority populations. NIAAA notes that studies are needed on (1) "the neurobiological, psychological, environmental, and social factors that influence post-treatment recovery" and (2) "trajectories of recovery in subgroups of people with different cultural and socioeconomic backgrounds, cognitive abilities, and medical histories." Keeping these two priorities in mind, the following recommendations are offered for future research on recovery from AUD among minority populations:

- Identify modifiable drivers of recovery among vulnerable populations.
- Estimate the contributions of various life context hardships, stresses, and disadvantages to recovery trajectories among minority populations.
- Explore the intersections of various minority identities (e.g., race, ethnicity, socioeconomic status, sex), alongside experiences of discrimination and injustice, vis-à-vis recovery trajectories.
- Examine how (1) minority populations use or adapt AA, (2) AA practices vary among minority populations, and (3) characteristics of minority populations influence the likelihood of benefitting from AA.
- Investigate the critical transition from treatment completion to community-based recovery, and how that affects long-term recovery trajectories among minority populations.
- Compare the utilization and impact of AA versus other recovery support services (e.g., Wellbriety; SMART [Self-Management and Recovery Training], Celebrate Recovery) among minority populations.

CONCLUSIONS

Rigorous empirical studies of recovery from AUD among minority populations are absent from the literature. Although many individuals from minority populations respond well to alcohol intervention—successfully completing treatment, ending drinking, and starting recovery—minority populations experience numerous challenges and barriers to recovery from AUD. It is very likely social determinants of health disparities significantly impact recovery from AUD among marginalized minority populations (e.g., racial/ethnic minorities, sexual minorities), but this has yet to be directly examined. Thus, there is an urgent need for investigations of recovery among minority populations. Such research is essential for making progress in eliminating alcohol-related health disparities impacting minority populations.

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Alcohol-Related Disparities Among Women: Evidence and Potential Explanations

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Although research on alcohol-related disparities among women is a highly understudied area, evidence shows that racial/ethnic minority women, sexual minority women, and women of low socioeconomic status (based on education, income, or residence in disadvantaged neighborhoods) are more likely to experience alcohol-related problems. These problems include alcohol use disorder, particularly after young adulthood, and certain alcohol-related health, morbidity, and mortality outcomes. In some cases, disparities may reflect differences in alcohol consumption, but in other cases such disparities appear to occur despite similar and possibly lower levels of consumption among the affected groups. To understand alcohol-related disparities among women, several factors should be considered. These include age; the duration of heavy drinking over the life course; the widening disparity in cumulative socioeconomic disadvantage and health in middle adulthood; social status; sociocultural context; genetic factors that affect alcohol metabolism; and access to and quality of alcohol treatment services and health care. To inform the development of interventions that might mitigate disparities among women, research is needed to identify the factors and mechanisms that contribute most to a group's elevated risk for a given alcohol-related problem.

KEY WORDS: alcohol problems; health disparities; minorities; cumulative disadvantage; life course; alcohol

INTRODUCTION

Although women consume less alcohol and drink less often than men,[1] women's drinking warrants serious attention from alcohol researchers and health care providers, in part because women are more susceptible to certain alcohol-related problems at a given level of consumption[2] and because women are less likely to receive help for problems with alcohol use.[3] While women may share many experiences and risk factors relevant to their alcohol use and associated problems, women are not a monolithic group. Multiple dimensions of social location (e.g., race/ethnicity, socioeconomic status, and sexual identity) profoundly shape women's lived experiences.[4] These can affect health and a wide range of health-related factors over the life course, such as social and environmental risk and health-promoting exposures, health behavior, resources that enhance health and help to manage disease, care-seeking, and the quality of health care received. Thus, unsurprisingly, among women there is heterogeneity of risk for problems related to drinking.

This article briefly reviews what is known about alcohol-related disparities among women and discusses mechanisms that could give rise to inequities in alcohol outcomes. In this article, disparity refers to social group differences in which groups that have greater social or economic advantages have more desirable health outcomes than groups without those advantages.[5] Research on alcohol-related disparities has focused on racial/ethnic and socioeconomic groups[6-8] and often has not been stratified by gender to examine disparities among women or men separately, as doing so would require very large samples for low-prevalence outcomes. Thus, this review reflects a predominant focus in the extant literature on race/ethnicity (often White, Black, and Latinx groups, with rare analysis of Latinx subgroups), socioeconomic status, and the limited study of disparities among women. Far less research has been conducted on sexual minority groups (defined by sexual orientation). Reflecting the work to date, unless otherwise stated, this review defines women based on physiological sex. Finally, this review focuses on problems associated with personal alcohol consumption and does not include the many secondary harms experienced because of other people's drinking.

DISPARITIES IN ALCOHOL-RELATED PROBLEMS

Identifying racial/ethnic and socioeconomic disparities in alcohol-related problems is not always a straightforward task, partly because of differential abstinence rates across racial/ethnic and socioeconomic groups. For example, in the National Epidemiologic Survey on Alcohol and Related Conditions-III (NESARC-III), the percentage of people who drank alcohol in the past year ranged from 62% to 75% across racial/ethnic groups and 56% to 81% across levels of education.[1] The National Alcohol Survey (NAS) reported 64% of heterosexual women and 78% of bisexual women drank alcohol in the past year.[9] In addition, race, ethnicity, and socioeconomic status are deeply intertwined in the United States.[10] In light of the above, the detection of alcohol-related disparities can be affected by the inclusion of abstainers in analyses and also by how investigators handle socioeconomic status when analyzing racial/ethnic differences. Although analytic decisions depend on research objectives (e.g., to establish general population rates, understand risk relationships, estimate residual racial/ethnic differences, or recognize the role of socioeconomic status in racial/ethnic differences), sensitivity analyses are always a useful option to gauge the effects of such decisions on study results and enhance

interpretation. Effort was made in this review to be attentive to such decisions.

Alcohol Use Disorder and Negative Consequences of Drinking

The following section provides a review of research on the prevalence and risk of alcohol-related problems in different subgroups of women defined by race/ethnicity, socioeconomic status, and sexual minority status. Problems examined in this literature include alcohol use disorder (AUD) and negative consequences of drinking. In nearly all of the studies reviewed, AUD was defined according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV),*[11] which includes and distinguishes alcohol abuse and alcohol dependence. In 2013, the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)*[12] was released, which replaces DSM-IV alcohol abuse and dependence diagnoses with a single AUD diagnosis that is classified as mild, moderate, and severe.

Race and ethnicity

National survey data show greater prevalence of DSM-IV AUD among White women compared to other racial/ethnic groups. For example, in Wave 1 of the NESARC, which was conducted from 2001 to 2002, age group–specific rates of DSM-IV alcohol abuse and dependence among women (including abstainers) were consistently higher in White women compared to Black, Latina, and Asian/Pacific Islander women in nearly all of four age groups examined.[13] The exceptions were American Indian/Alaska Native (AIAN) women, whose prevalence of DSM-IV alcohol abuse and dependence was greater than that of White women in three of four age groups, and Black women, whose DSM-IV alcohol dependence prevalence was higher than that of White women at midlife (ages 45 to 64) and older (ages 65 and older). However, many of these differences did not appear to be statistically significant. Taking into account standard error, the clearest differences were observed among White, Black, and Latina women, the three largest groups. DSM-IV alcohol abuse prevalence was higher in White women compared to Black women before midlife (younger than age 45), and higher than DSM-IV alcohol abuse prevalence of Latinas in all but the oldest age group (ages 65 and older).

In the same NESARC survey, the prevalence of DSM-IV alcohol dependence was significantly higher only in young-adult, White women (ages 18 to 29) at 6% vs. 4% in young Black women and 4% in young Latina women.[13] At 9%, the prevalence of DSM-IV alcohol dependence among young AIAN women was highest of all, but it had a wide confidence interval. By contrast, in 2000, 2005, and 2010 NAS data, White, Black, and Latina women (including abstainers and not stratified by age) showed statistically nondistinguishable prevalence and odds of having DSM-IV alcohol dependence and two or more negative consequences of drinking.[14]

Because these studies were based on older data that, in some cases, were collected nearly 20 years ago, data from the 2017 National Survey on Drug Use and Health (NSDUH)[15] were analyzed to provide updated national estimates for women. As shown in Table 1, most of the significant racial/ethnic differences in DSM-IV alcohol dependence prevalence were no longer apparent when abstainers were excluded. When compared with White women who drink alcohol, only Asian women who drink had significantly lower rates of DSM-IV AUD, and AIAN women who drink had higher rates of DSM-IV AUD.

Table 1 2017 NSDUH 12-Month Prevalence of DSM-IV Alcohol Dependence and AUD Among Women

Category	Alcohol Dependence, % (Standard Error)		Alcohol Dependence or Abuse, % (Standard Error)	
	All Women (*N* = 22,567)	Drank in Past Year (*N* = 16,042)	All Women (*N* = 22,567)	Drank in Past Year (*N* = 16,042)
Race/Ethnicity				
White†	2.70 (0.14)	3.70 (0.20)	4.44 (0.15)	6.07 (0.22)
Black	1.86 (0.24)*	3.11 (0.41)	3.12 (0.31)**	5.21 (0.50)
AIAN	8.04 (1.26)**	16.21 (2.64)**	9.10 (1.32)**	18.35 (2.75)**
Native Hawaiian/Pacific Islander	2.11 (1.54)	4.46 (3.27)	2.90 (1.71)	6.11 (3.62)
Asian	1.29 (0.42)*	2.68 (0.85)	1.79 (0.46)**	3.71 (0.88)*
More Than One Race	4.91 (1.70)	7.44 (2.63)	6.70 (1.76)	10.15 (2.75)
Latina	1.72 (0.23)**	2.93 (0.42)	3.20 (0.28)**	5.46 (0.52)
Education				
Less Than High School	1.58 (0.24)**	3.92 (0.61)	2.11 (0.32)**	5.24 (0.79)
High School Graduate	1.60 (0.15)**	2.80 (0.27)	2.63 (0.19)**	4.61 (0.34)*
Some College	3.05 (0.27)	4.23 (0.39)	4.84 (0.32)	6.72 (0.45)
College Graduate†	2.69 (0.22)	3.38 (0.27)	4.74 (0.27)	5.96 (0.33)
Sexual Identity				
Heterosexual†	2.14 (0.11)	3.18 (0.17)	3.61 (0.12)	5.36 (0.19)
Lesbian	5.12 (1.33)**	6.31 (1.62)*	8.21 (1.69)*	10.12 (2.10)**
Bisexual	8.63 (1.02)**	10.68 (1.25)**	12.23 (1.11)**	15.12 (1.35)**

Note: Data are for women ages 18 and older. Percentages are weighted for sampling, and sample size (*N*) represents unweighted totals. Pairwise significance tests involve comparisons to the reference category using Pearson's chi-square test. *$p < 0.05$, **$p < 0.01$, † = reference category. *Source:* Data from Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, October 2018.[15]

In studies excluding lifetime abstainers, there is some evidence of greater alcohol problems among racial/ethnic minority women who drink compared with White women who drink. For example, Grant and colleagues conducted a longitudinal analysis of NESARC Waves 1 and 2 from the early 2000s and found that at Wave 2, young White women had the greatest risk for DSM-IV alcohol dependence onset compared with young Black and Latina women.[16] However, the risk for young White women was lower than that for older minority women. Both Black and U.S.-born Latina women ages 40 and older had greater risk of DSM-IV alcohol dependence onset than young White women (adjusted *OR* = 1.71 and 2.08, respectively).[16] In addition, older Black and U.S.-born Latina women had more persistent alcohol dependence (adjusted *OR* = 2.73 and 1.36, respectively), and older U.S.-born Latina women had greater recurrence of dependence (among those with lifetime dependence prior to Wave 1). This elevated risk among older minority women was in marked contrast to similarly aged, White peers, whose risk for alcohol dependence onset, persistence, and recurrence was much lower than that of young White women. The racial/ethnic patterning of risk was the same when DSM-IV AUD was the outcome, except that disparities were also evident among younger minority women ages 30 to 39. In this age group, Black women had greater AUD onset, and U.S.-born Latinas had greater AUD persistence than young White women.

Notably, this NESARC study did not control for socioeconomic status indicators.[16] In a 2005 and 2010 combined NAS study of women who drink, which adjusted for demographics, education, and income and also rigorously controlled for heavy drinking, the only disparities found between Black and White women were in DSM-IV alcohol dependence (adjusted *OR* = 3.3), and this disparity held across the range of heavy drinking.[17] There was no significant disparity between Latina and White women in either negative consequences of drinking (an outcome similar to alcohol abuse) or DSM-IV alcohol dependence. (Due to sample size limitations of the study,[17] U.S.-born Latina women were not analyzed separately as they were in the NESARC study by Grant and colleagues.[16])

As noted, all of the research on AUD in demographic subgroups reviewed above, including the 2017 NSDUH data on AUD,[15] is based on the DSM-IV diagnostic criteria rather than the DSM-5 criteria. Thus, it is not clear whether these findings (especially those based on data collected from the early 2000s) accurately reflect DSM-5 AUD patterns among women, as the latter have not yet been examined. However, results from two recent NESARC-III studies of women and men combined suggest that the patterning of AUD prevalence across racial/ethnic, socioeconomic, and other demographic subgroups may be similar across DSM-IV and DSM-5 criteria.[18,19] For instance, AUD prevalence among White, Black, and Latinx study participants based on DSM-IV criteria was 13%, 13%, and 12%, respectively,[18] and the prevalence based on DSM-5 criteria was 14%, 14%, and 14%, respectively.[19] Similarly, for educational levels, the DSM-IV AUD prevalence was 10% for less than high school, 13% for high school, and 13% for some college or more,[18] and the prevalence based on DSM-5 criteria was 12%, 15%, and 14%, respectively.[19] These results suggest that the presence or absence of disparities in women's prevalence of DSM-5 AUD might reasonably be gauged by recent research that uses DSM-IV AUD criteria (for instance, as captured by the 2017 NSDUH). But confirmation is needed, as the NESARC-III analyses were not restricted to women.

Socioeconomic status

Similar to the findings for race/ethnicity, the 2017 NSDUH data show significant differences in DSM-IV alcohol dependence and AUD by educational attainment, but when abstainers are excluded, nearly all differences become nonsignificant (see Table 1).[15] Importantly, in a recent systematic review, Collins concluded that although groups with greater socioeconomic advantages (defined by income, education, and other indicators at the individual, family, or neighborhood levels) had similar or greater levels of alcohol consumption than those with fewer advantages, the groups with fewer socioeconomic advantages were at greater risk for alcohol-related problems.[8] This finding has been referred to as the "alcohol harm paradox"[20] and is similar to the phenomenon among some U.S. racial/ethnic minority groups, particularly Black persons, of having greater risk for alcohol-related problems than White persons despite drinking less.[21]

This socioeconomic status paradox has been studied mostly outside of the United States and has been observed for a variety of alcohol outcomes. A meta-analysis by Grittner and colleagues, drawing upon survey data from 25 countries, found that in several high-income countries, women who drink alcohol and who have less education were at greater risk for external drinking consequences (e.g., consequences affecting finances; work, school, or employment; close relationships; and risk of injury/fights).[22] In the full sample of countries, an inverse educational gradient was found when controlling for age and drinking pattern, as well as country-level, socioeconomic development factors.

The socioeconomic conditions of residential neighborhoods also are relevant. Analysis of the 2000 and 2005 combined NAS data found that women who drink alcohol and live in disadvantaged neighborhoods have twofold greater risk for alcohol problems (adjusted *OR* = 2.07 for two or more drinking consequences or DSM-IV alcohol dependence) than women who drink and live in more advantaged neighborhoods.[23]

This study controlled for individuals' education, income, unemployment status, and demographics.

A different study that used 2000 and 2005 combined NAS data further showed that among White women who drink alcohol, neighborhood disadvantage was associated with increased risk for negative consequences of drinking.[24] The authors noted that White women who drink and reside in disadvantaged (as compared to more advantaged) neighborhoods were challenged by greater family histories of alcohol problems, co-occurring drug use, and drinking to cope with stress, which are risk factors for alcohol problems.

Providing a context for such findings, a longitudinal study of women in poverty highlighted the distinctive stressors faced by women who drink and have low incomes.[25] Stressful life events and neighborhood stressors (e.g., crime, drug trafficking, and shootings) were common, and these in addition to economic stress, contributed to psychological distress and increased women's risk for developing problematic alcohol use.

Sexual minority women

In this article, sexual minority women, including bisexual women and lesbians, are defined based on sexual orientation. In a study by Wilsnack and colleagues, the investigators compared data collected from sexual minority women in the 2001 to 2002 Chicago Study of Health and Life Experience of Women (CHLEW) study with data collected from exclusively heterosexual women in the 2001 National Study of Health and Life Experiences of Women.[26] The investigators found higher prevalence of lifetime alcohol-related problems, alcohol dependence symptoms, and hazardous drinking among sexual minority women. Bisexual women were most likely to report alcohol problems, with 70% reporting lifetime problems in contrast to 29% of heterosexual women.

Similar disparities in hazardous drinking were found in a more recent wave of the CHLEW study (2010 to 2012) and in a 2000 to 2015 NAS analysis.[9] Additionally, a separate study by Drabble and colleagues that used 2000 NAS data found that lesbians had 7.1 times higher risk of meeting criteria for DSM-IV alcohol dependence (bisexual women had 6.4 times higher risk) than heterosexual women.[27] A recent study that used 2015 to 2017 NSDUH data indicated disparities in DSM-IV AUD rates as well.[28] In that study, bisexual women had 2.2 times higher odds than heterosexual women and 1.5 times higher odds than lesbian women of having past-year AUD after adjusting for demographic characteristics.[28]

Although this review focuses on sexual minority women, the newly emerging literature on alcohol use among gender minority women (i.e., noncisgender and nonbinary women) should be noted. A systematic review of transgender individuals (including gender minority women) by Gilbert and colleagues found estimates of binge drinking among transgender individuals ranging from 7% to 65%, with estimates of lifetime and past-year DSM-IV AUD prevalence at 26% and 11%, respectively.[29] More research is needed on these groups. As noted by Gilbert and colleagues, to facilitate research on alcohol use disparities among gender minority women and transgender individuals, new methods will be needed, as many of the current alcohol use measures to assess unsafe drinking rely on physiological sex-specific cut points.

Health, Morbidity, and Mortality

Disparities in alcohol-related health outcomes, morbidity, and mortality are studied less commonly than disparities in AUD and the negative consequences of drinking alcohol. Few studies focus on women; instead, studies typically include women and men and control for gender. Nonetheless, in analyses restricted to women, racial/ethnic and socioeconomic disparities in risk have been reported for some alcohol-related health conditions and outcomes. For example, based on suicide decedent data from the National Violent Death Reporting System, AIAN women had approximately twice the odds of acute alcohol intoxication relative to White women at the time of death.[30] Also, increased alcohol use is known to be associated with

mortality among people with HIV.[31] This risk disproportionately affects Black women, whose incidence rate for HIV far exceeds that of White women (estimated at 783.7 and 43.6 per 100,000 for Black and White women, respectively).[32]

Research also indicates socioeconomic differentials in alcohol-related morbidity and mortality. An English study of hospital admissions from 2010 to 2013 that examined wholly and partially alcohol-attributable conditions found the greatest socioeconomic disparities among women with wholly alcohol-attributable chronic and acute conditions.[33] These results suggest that socioeconomic status differences in harmful drinking patterns contribute to differential morbidity.

Applying a similar comparative approach, Probst and colleagues conducted a meta-analysis of 15 studies from 7 countries and found greater socioeconomic disparities in women's alcohol-attributable mortality than in their all-cause mortality.[34] Across different measures of socioeconomic status (e.g., individual-level education, occupation, employment status, or income), socioeconomically disadvantaged women had 1.8 times the relative risk of alcohol-attributable vs. all-cause mortality when compared to more advantaged women. Similarly, a Scottish study of women and men combined found that socioeconomically disadvantaged participants who drink moderately had much greater risk for alcohol-attributable harms (i.e., hospital admissions or deaths) compared to socioeconomically advantaged participants who drink moderately or even heavily, regardless of the socioeconomic status measure used and even after controlling for differences in binge drinking, obesity, smoking, and other risk factors.[20]

Other research has investigated disparities in the protective health effects of moderate drinking. Although protective effects for cardiovascular disease mortality and for diabetes onset have been found,[35,36] some studies indicate health benefits for Whites but not for racial/ethnic minorities.[37-39] Race/ethnicity differences in the protective effects of alcohol have also been observed in two studies of all-cause mortality. One study used NAS data[40] and the other was a gender-stratified study based on data from the National Health Interview Survey.[41] The latter study found that moderate drinking was associated with the lowest mortality among White women (a mortality rate of 40.1 per 1,000 person-years). In Black women, moderate drinking was associated with a mortality rate of 93.8 per 1,000 person-years), more than double the rate of White women with a similar drinking level and also higher than the mortality rate associated with high-risk drinking among Black women (67.6 per 1,000 person-years), although confidence intervals for Black women's rates were widely overlapping.[41]

In contrast to these disparities, the United States has seen a racial/ethnic crossover in liver cirrhosis mortality rates for women. Although rates for Black women were highest in 2000, they have since dropped, and rates for White, non-Latina women and for White, Latina women have risen, exceeding the rates for Black women.[42] These results are consistent with reports of increased consumption and alcohol problems among White women based on the 2000 and 2010 NAS survey series.[14,43]

POSSIBLE EXPLANATIONS FOR DISPARITIES

An obvious potential explanation for these disparities is that they reflect population differences in harmful drinking patterns. Sexual minority women, for instance, are more likely to drink alcohol, to drink to intoxication, and to drink heavily compared to exclusively heterosexual women (adjusted *OR* = 1.8 and 2.0 for intoxication and heavy drinking, respectively).[27] Yet, it is unlikely that consumption patterns alone account for disparities. Indeed, the finding of greater harm despite lower or similar levels of drinking lies at the heart of the alcohol harm paradox. As noted, the latter refers to socioeconomic disparities in alcohol outcomes but is similar to the phenomenon observed for some racial/ethnic minority groups of disparities in alcohol problems at the same level

of heavy drinking among both women and men. Related to this, it is important to note that previous research finding elevated alcohol consumption among AIAN relative to White individuals has been based on specific AIAN tribes or geographic-area subgroups, whose prevalence of alcohol use varies.[44] Recent analyses of the 2009 to 2013 NSDUH and the 2011 to 2013 Behavioral Risk Factor Surveillance System indicate that, nationally, AIAN and White participants had similar odds of binge drinking and heavy drinking (i.e., drinking five or more drinks on 5 or more days). Moreover, White participants had lower abstinence relative to AIAN participants, with an adjusted odds ratio for abstinence among White participants relative to AIAN participants of 0.64 (95% CI: 0.56, 0.73).[45]

Thus, consideration of other ways that disparities in alcohol-related problems can arise is needed. Recent research calls attention to potential explanations involving the life course, differential vulnerability, and access to care. As noted earlier, this review reflects a predominant focus in the literature on racial/ethnic and socioeconomic disparities. Future studies are needed to assess relevance to other disadvantaged social groups.

Harmful Drinking Patterns Over the Life Course

Reflecting core concepts of life-course developmental theory,[46] both the age at which heavy drinking occurs and the duration of heavy drinking across the life course are relevant to disparities in alcohol-related problems. This makes sense intuitively, as the longer a person engages in health risk behaviors, the greater the chances of experiencing related problems. Also, certain age periods are likely to pose more or less risk for different kinds of alcohol-related problems. Bouts of heavy drinking, for instance, are likely to be tolerated less and to have more consequences when coupled with greater responsibilities to others, such as family and employers.

Notably, three recent studies based on National Longitudinal Study of Adolescent to Adult Health data examined racial/ethnic differences in the heavy-drinking trajectories of young women, with somewhat mixed results (possibly reflecting methodological differences, such as adjustments for socioeconomic status).[47-49] Two studies showed that heavy drinking of young White women consistently exceeded that of Black women.[47,48] One study indicated that the rapidly declining trajectory of White women converged with the trajectory of Latina women by age 30,[47] and another showed a convergence of White, Latina, and Black women's trajectories by their early 30s.[49]

A fourth study based on the 1979 cohort of the National Longitudinal Study of Youth (NLSY) examined women's heavy-drinking trajectories from ages 21 to 51.[50] This study also found that heavy drinking among White women exceeded that of Black and Latina women in their early and mid-20s, but the trajectories of all 3 groups declined thereafter, with no significant racial/ethnic differences in heavy drinking between ages 30 to 51. However, sensitivity analyses excluding lifetime abstainers and women who never drank heavily showed a crossover in the heavy-drinking trajectories of Black and White women.[50] The trajectory for Black women rose during their early 20s, a period when White women's trajectory declined, thus causing a crossover at age 30. Thereafter, Black women's trajectory declined and reconverged with the flattening trajectory for White women at age 40. Consistent with these results, a 2010 NAS analysis of heavy drinking trajectories among women who reported ever drinking in their lifetime found that Black women, compared to White women, had twofold greater odds of persistent, frequent, heavy drinking (vs. declining heavy drinking) beyond their 20s and into their 40s (adjusted $OR = 2.65$, $p < .01$).[51]

Taken together, these life-course drinking studies highlight racial/ethnic differences in the heavy-drinking trajectories of women in their early and mid-20s, which are consistent with the greater DSM-IV AUD risk observed during this period among young White women. Importantly, early adulthood is a time when health is relatively robust, and many women have yet to take on large, adult responsibilities. Drinking trajectory studies

that extend beyond the 20s are rare, but there is some evidence of Black–White disparities in the age and duration of heavy drinking among women who reported ever drinking in their lifetime. These disparities were found for women in their 30s, possibly extending to their 40s.

Prospective studies beyond young adulthood are needed, especially for younger cohorts, as racial/ethnic differences in heavy drinking may be changing.[1,52] Nonetheless, the observed Black–White disparity in heavy drinking after young adulthood is consistent with the findings from a NESARC study of women who drink (described earlier), showing greater DSM-IV AUD onset among Black women in their 30s and 40s, as well as greater AUD persistence among Black women in their 40s and older, compared to White women in these same age groups as well as younger (ages 18 to 29).[16] These disparities are particularly significant when juxtaposed with other life-course findings. Namely, by midlife, there are striking racial differences in cumulative lifetime exposure to socioeconomic disadvantage,[53] and disparities in health become more pronounced.[5,54]

Cumulative Disadvantage

Population differences in exposure to health risk factors and their cumulative effects are an important mechanism in health disparities.[5] Cumulative disadvantage refers to the notion that social status positions such as race/ethnicity and socioeconomic status profoundly influence opportunities and resources over the life course and, thus, also affect exposures to health risk factors.[55]

Growing up in poverty in neighborhoods with inferior schools, greater crime and violence, and limited economic opportunities can lead to poor quality and low-paying jobs, a lack of health insurance, and ongoing exposure to stressors. Black women and men with low incomes are particularly affected by these factors due, in part, to racial residential segregation[56] and geographic inequalities of opportunity.[57] Consistent with this, research has indicated that a large majority of Black children who were raised in poor neighborhoods continue to reside in similar neighborhoods as adults.[58]

In an early articulation of the effects of cumulative disadvantage and its relationship to health disparities, Geronimus proposed the "weathering hypothesis" to account for the accelerated health deterioration of Black persons relative to White persons.[59] This is exemplified by high rates of chronic disease found in young and middle-aged Black women residing in low-income, urban areas, which contribute to their early mortality rates. According to the hypothesis, the widening racial health disparity seen through middle adulthood reflects the cumulative effect of adverse exposures from conception onward. These adverse exposures include chronic social stressors (e.g., discrimination), environmental hazards, inadequate health care access and treatment, and unhealthy behaviors. Notably, greater alcohol availability, targeted advertising, and less access to healthy food in low-income and minority neighborhoods can contribute to and aggravate unhealthy behaviors.[60-62]

Research has since shown that chronic, enduring stress affects the body's physiological stress response, with adverse effects on the cardiovascular, metabolic, and immune systems.[63] Moreover, the physiological consequences of chronic stress, which are referred to as allostatic load and assessed via biomarkers, have been found to be greater among poor and non-poor Black women than White women, and have been associated with accelerated aging.[64,65] Consistent with these findings, data from the 2017 National Health Interview Survey showed that 14% of Black women (and 13% of Latina women) reported fair or poor health, in contrast to 8% of White women.[66] Even when the sample was stratified by poverty status (i.e., poor, near poor, and not poor, with poor defined as having income below the federal poverty threshold), Black women and men tended to report worse health than White women and men.

As suggested, cumulative disadvantage can also affect health indirectly through risky health behaviors that people use to cope with stressors.[67]

A longitudinal study based on NESARC data found that the effect of poverty on heavy drinking incidence was worse for Black women who drink than for their Latina and White counterparts.[68] A different longitudinal study based on the 1979 NLSY cohort data reported that cumulative poverty across the life span was positively associated with onset and persistence of alcohol dependence symptoms after young adulthood (in a combined sample of women and men who drink).[69] Further, a study based on 2010 NAS data found that cumulative socioeconomic disadvantage partly explained the disparity in persistent heavy drinking until midlife between Black and White women.[51]

This confluence of disparities in cumulative disadvantage and health in middle adulthood provides an important backdrop for understanding disparities in alcohol problems after young adulthood. It raises the question of differential health vulnerability—the idea that certain social groups are more susceptible to health-related consequences when they are exposed to risk factors such as, in this case, heavy drinking.[70] To the extent that health "weathering" begins to accelerate after young adulthood and at a faster rate for demographic groups that have more enduring chronic stress, heavy drinking beyond young adulthood may contribute to alcohol-related health disparities at midlife and later. In keeping with this, a recent NLSY study by Kerr and colleagues found that among Black and Latina women, but not White women, diabetes onset was associated with a history of heavy drinking in the previous 10 years, even when controlling for health risk behaviors, socioeconomic status, and other demographics.[71]

Differential health vulnerability may reflect various mechanisms that require future study. It may be rooted in biological interactions with alcohol that affect health. For example, heavy drinking can exacerbate certain health conditions such as hypertension, type 2 diabetes, and chronic kidney disease, which are more prevalent among Black Americans. Also, as discussed by Jackson and colleagues, differential vulnerability may reflect unmeasured health risk behaviors like smoking and unhealthy eating, which may co-occur with heavy drinking and are thus potentially confounding variables.[41]

Alternatively, unhealthy behaviors could, in some instances, be effect modifiers that interact with alcohol to alter risk for health conditions. For instance, the aforementioned NLSY study by Kerr and colleagues found an interaction between alcohol and obesity for diabetes risk for women.[71] Bensley and colleagues' study of male, Veterans Health Administration patients who had HIV provides further illustration of this complexity.[31] Black patients with low-risk drinking (defined as a score of one to three on the Alcohol Use Disorders Identification Test consumption questions [AUDIT-C]) had greater mortality than White patients who had similar drinking levels, indicating differential vulnerability. The disparity was attenuated after adjusting for the greater presence of hypertension, hepatitis C, tobacco use, and other drug use among Black patients. To better understand alcohol-related disparities and the epidemiologic paradox of greater problems despite lower levels of drinking for some groups, research is needed to examine population differences in health and health behaviors and potential interactions with alcohol consumption patterns.

Other Social and Biological Factors

Studies have documented gene variants that are more prevalent among Black persons[21] that affect the metabolism of alcohol, leading to a buildup of acetaldehyde in the bloodstream. While the gene variants have been associated with lower rates of alcohol dependence and heavy drinking, experimental research by Pedersen and McCarthy has found that the variants also are associated with more intense subjective responses to alcohol.[72] Specifically, they found that Black participants experience greater stimulating effects from alcohol than White participants, even after controlling for differences in past-month alcohol use. Further, greater increases in stimulation are associated with more alcohol-related problems among Black participants. As the researchers suggested, this acute stimulation could contribute to disparities in

the negative consequences of drinking alcohol at a given level of consumption.[72]

In addition, Black women in this study experienced greater sedating effects from alcohol than White women. In view of the greater cumulative and chronic stress experienced by Black women compared with White women,[51,65] this finding of greater sedating effects of alcohol might be a factor in Black-White disparities in persistent heavy drinking and AUD among older women who drink.

Social position and sociocultural context also affect the likelihood of experiencing alcohol problems, particularly negative social consequences, at a given level of consumption. For years, researchers have called attention to the greater negative consequences of drinking borne by racial/ethnic minority groups who have less permissive drinking norms and are subject to greater societal scrutiny and stigmatization.[73,74] People with greater resources and higher status are better able to shield themselves from the negative consequences of drinking that others experience.[75] For example, negative consequences could be minimized at work (because of greater flexibility and autonomy and less scrutiny), in family duties (by paying for childcare or home-delivered meals and groceries), and when going out for the night (by hiring a driver).

These differential standards and consequences of drinking may be seen among women, perhaps more now than in the past when gendered roles and drinking norms were more similar across women. Reflecting on recent decades, Schmidt observed that social and economic changes resulting in greater freedoms for women have led to the "equal right to drink" only for women in the middle and upper classes.[76] By contrast, women with low incomes and women who receive welfare benefits, particularly racial/ethnic minority women, arguably have been more surveilled, stigmatized, and penalized for alcohol and other drug use.

Finally, stress experienced due to being a member of a stigmatized minority group may help to explain alcohol-related disparities between sexual minority women and exclusively heterosexual women. Minority stress theory applied to drinking behavior suggests that the heavy drinking patterns of sexual minority women (relative to heterosexual women) are related to the stress of holding one or more minority identities.[77,78]

Minority stress theory has been used in many studies. Research shows that sexual minority women experience stressors such as discrimination and harassment because of their sexual orientation, and that these women are more likely to report psychological distress than heterosexual women.[74] A study of sexual minority women and sexual minority stressors associated with substance use and mental health outcomes (e.g., unfair treatment, events of prejudice, and victimization) has provided further empirical support of this theory.[79] In this study, sexual minority stressors mediated the adverse effects of more masculine gender expression (i.e., a set of culturally assigned qualities to the category of masculine) on mental health and substance use outcomes. Other studies have found that sexual minority women experience additional stressors associated with increased alcohol use. In comparison to exclusively heterosexual women, sexual minority women are more likely to have experienced child sexual abuse, depression in their lifetime or in the past 12 months, and early onset of alcohol use.[26,80]

Together, this varied literature suggests that social and biological factors may contribute to alcohol-related disparities among women in several ways. These factors may increase exposure to high levels of stress and discrimination (and drinking in response), they may increase sensitivity to the physiological effects of alcohol, and they may increase exposure to punitive societal responses to an individual's own alcohol use.

Differential Access to and Quality of Care

Differences in access to care and in the quality of care received constitute another important explanation for disparities in alcohol-related problems. Although health care access and quality account for a relatively small percentage of the

variation in life expectancy in the United States—estimated at 10%[81]—health care is a valuable resource. Indeed, having a regular source of primary care has been associated with reduced racial/ethnic and socioeconomic disparities in health.[54]

The Institute of Medicine's report, *Unequal Treatment*, famously documented racial/ethnic disparities in the quality of health care received in the United States, even after accounting for differences in socioeconomic status, insurance, disease stage, comorbidities, and facility type.[82] Such findings have motivated the national goal of ensuring equitable access to high-quality care to mitigate disparities in early or delayed diagnosis, types of treatment, and care outcomes.[83] Part of the problem of health care disparities is structural, related to income, insurance, and the type and quality of care that is affordable and geographically accessible. Another part of the problem is social, related to implicit (unconscious) bias on the part of health care providers and how this bias affects patient-provider communication and interaction, treatment decisions, and health care outcomes.[84,85] Related to both structural and social factors, health care utilization also reflects patient perceptions, attitudes, and willingness to seek care. In the case of racial/ethnic disparities in alcohol-related care or treatment, cultural acceptability (including language compatibility) and perceived stigma toward people with AUD may be particularly relevant.[86,87]

Whereas considerable research has investigated racial/ethnic and gender disparities in the receipt of alcohol-related care, far less is known about disparities among women specifically. In a rare, gender-stratified analysis of alcohol treatment utilization, Zemore and colleagues' analysis of NAS data found racial/ethnic disparities in treatment use among women with a lifetime AUD.[88] When compared with White women, Latina and Black women were significantly less likely to obtain specialty alcohol treatment, even after controlling for survey year, age, socioeconomic status (i.e., education and income), and insurance status (adjusted $OR = 0.31$ and 0.38 among Latina and Black women, respectively; $p < .05$). Moreover, this disparity was also observed for Alcoholics Anonymous use (adjusted $OR = 0.38$ and 0.37 for Latina and Black women, respectively).[88] Other studies (using samples of women and men combined) have further shown disparities in treatment completion, which is an important predictor of post-treatment substance use and health outcomes.[89,90]

A variety of factors might contribute to racial/ethnic disparities in treatment use specifically among women. One factor is the stigma of AUD, which may be a particularly salient deterrent for social groups that have more conservative drinking norms and that might already be socially marginalized. Notably, there is evidence of more conservative drinking norms for Black women compared to those for White women[91] and less permissive attitudes toward Latina women's drinking, which tend to be held by less-acculturated Latina women.[92] The stigma of AUD could lead to concealment or denial of alcohol problems and to family concerns about privacy and pressure to not seek treatment. All of these issues may be magnified for women due to the more intense social control of women's drinking.

Other potential treatment barriers are a lack of childcare and concerns that children could be taken away. These concerns are not unfounded, given research showing that Black mothers who use alcohol or other drugs are reported to child protective services more often than similar White mothers.[93] In addition, women generally are more likely than men to experience treatment barriers because of transportation difficulties and inadequate insurance.[94] The latter may be particularly relevant to racial/ethnic minority women, as studies have found that Latinx and Black individuals are more likely than White individuals to report logistical and structural barriers.[95,96] Considering the pronounced racial/ethnic disparities in alcohol problems among women after young adulthood, additional disparities in alcohol-related care and treatment compound the problem. This large unmet need among minority women, which may reflect a variety of causes, must be addressed.

CONCLUSION

This review provides evidence of alcohol-related disparities among women. The research in this area is relatively sparse, but disparities in AUD prevalence, the negative consequences of drinking, and alcohol-related health, morbidity, and mortality outcomes are apparent. This review also highlights the importance of a life-course perspective for understanding disparities in alcohol problems. By examining what happens within and between social groups across the life span, the widening of social group differences in cumulative socioeconomic disadvantage, health, and alcohol-related problems—especially after young adulthood—becomes more noticeable. Future research is needed to examine how these various disparities may be interrelated.

Importantly, a life-course lens also requires attending to social roles and health as these change with age. Attention to such changes can help to advance understanding of how alcohol consumption results in negative consequences and why some groups are affected more than others. Finally, social position and sociocultural context remain important considerations because they can affect internal and external responses to drinking. Social position and sociocultural context also influence access to, use of, and the quality of alcohol-related and general health care. All these factors can affect the persistence of alcohol-related problems and the progression of disease.

In thinking about potential remedies, education emerges as one important factor. Some research has found that education, compared with income, is more strongly and negatively associated with the onset of disease (i.e., the likelihood that an individual will develop a chronic health condition). By contrast, income is a stronger predictor than education of how a disease progresses once an individual has the condition.[97] In light of the benefits of education for health and health behavior,[50,98] improving access to quality education at an early age and supporting higher educational attainment is an important strategy for improving health and addressing health disparities among racial/ethnic minorities and socioeconomically disadvantaged persons.

In addition, increasing insurance coverage and access to affordable, quality health care for underserved groups, a goal of the Patient Protection and Affordable Care Act, represents another crucial path to reducing health disparities. However, efforts devoted to improving health care access and quality will yield limited gains so long as stress and social stigmatization among minority populations persist, and profound differences in neighborhood conditions and available opportunities remain. These are the fundamental causes that need to be addressed to truly eliminate alcohol-related and general health disparities.

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Co-Occurring Post-Traumatic Stress Disorder and Alcohol Use Disorder in U.S. Military and Veteran Populations

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Co-occurring post-traumatic stress disorder (PTSD) and alcohol use disorder (AUD) are costly and consequential public health problems that negatively affect the health and well-being of U.S. military service members and veterans. The disproportionate burden of comorbid PTSD and AUD among U.S. military service members and veterans may be due to unique factors associated with military service, such as aspects of military culture, deployment, and trauma exposure. This review addresses the prevalence of co-occurring PTSD and AUD in military and veteran populations, population-specific factors that contribute to development of the comorbid conditions, and evidence-based treatments that have promise for addressing these conditions in military and veteran populations. Future directions for research and practice relevant to military and veteran populations are discussed.

KEY WORDS: addiction; alcohol use disorder; post-traumatic stress disorder; military; veteran

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Post-traumatic stress disorder (PTSD) and alcohol use disorder (AUD) are costly and consequential public health concerns that have disproportionately affected U.S. military service members and veterans.[1,2] Understanding the co-occurrence of PTSD and AUD is especially important because of the negative implications for the health and well-being of veterans and active-duty service members.

Prevalence of PTSD and AUD in Military and Veteran Populations

Examined separately, prevalences of PTSD and AUD are high in military and veteran populations when compared with the civilian population. Reports estimate current PTSD prevalence at 6% of predeployed and 13% of postdeployed service members, and from 5% to 13% among

veterans, compared to 5% of civilians.[2-8] Lifetime prevalence of PTSD ranges from 7% to 8% among veterans, compared with 6% of civilians.[2,8,9] With regard to high-risk drinking, a 2011 U.S. Department of Defense (DOD) survey found that 33% of service members, compared with 27% of civilians, endorsed past-month binge drinking.[10] Among Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) veterans, 10% had an AUD diagnosis in their U.S. Department of Veterans Affairs (VA) electronic medical records.[11]

PTSD and AUD often co-occur in military and veteran populations,[2] as they do in the general population,[12] and having PTSD or AUD increases the likelihood of experiencing the other.[1] In national studies, 55% to 68% of veterans with probable PTSD, compared with 40% to 55% of veterans without PTSD, showed evidence of having AUD as well.[2,9] Similarly, among service members and veterans who misuse alcohol, prevalence of PTSD is high. A review of VA electronic medical records indicated that 63% of veterans with AUD and 76% of veterans with comorbid AUD and drug use disorder also had a PTSD diagnosis.[11]

In the general civilian population[13] and in military and veteran populations, there is evidence that PTSD and AUD are functionally related. For example, in a sample of Vietnam veterans, increases in alcohol use corresponded to increases in PTSD symptom severity,[14] and veterans with PTSD and substance use disorder (SUD) reported that they perceived that the conditions were interrelated.[15] Longitudinal studies of veterans have supported the self-medication hypothesis,[16] which may explain why veterans with unresolved PTSD are more likely to relapse after treatment for substance misuse.[17]

Factors That Contribute to PTSD and AUD

Among military and veteran populations, the risk for both PTSD and alcohol misuse may vary because of differences in demographic factors, aspects of military culture, and trauma or stress exposure. Relatively little research has addressed risk factors for co-occurring PTSD and AUD. Therefore, we do not know the extent that risk factors may increase the risk for one disorder or both, or whether these risk factors may have additive or interactive effects.

Demographics

Gender is associated with differential risks for PTSD and AUD. Consistent with the literature on civilians, studies of veteran populations show that lifetime prevalence of PTSD is higher among female veterans (13% to 19%) than male veterans (6% to 7%).[2,9] Civilian men have a higher risk for alcohol misuse than women,[18] and men are overrepresented in military and veteran populations. Also, male service members report more past-month binge drinking than female service members.[7,10] Despite these gender differences, research on the experiences of women veterans and active-duty service members is limited, and more work is needed in this area.

Racial differences in the prevalence of PTSD have been identified, with higher prevalence occurring among non-White veterans and service members.[2] In a nationally representative sample of veterans, the lifetime prevalence of PTSD was significantly higher for Black (11%) and Native American veterans (24%), compared with the prevalence for White veterans (6%).[9] Across military branches, the percentage of service members who reported past-year heavy drinking was similar across Hispanic (9%), White (9%), and African American (8%) groups.[10]

Younger age is associated with higher prevalence of PTSD[9] and with alcohol misuse.[10,16] For example, a 2011 DOD survey found that among service members ages 18 to 25, 20% endorsed past-year heavy drinking, and 67% endorsed past-month binge drinking.[10] During a 12-month period, more than 20% of junior enlisted service members experienced serious consequences from alcohol use, including military punishment and arrest.[19] In a national sample, veterans ages 18 to 29 had the highest odds of a PTSD diagnosis in their lifetimes, and veterans age 65 or older had the lowest odds.[9] Therefore, the high prevalence of comorbid PTSD and AUD in the military may be due, in part, to the overrepresentation of younger adults in this population.

Military culture

The military as a whole and each of the military branches have their own distinct cultures, which may influence alcohol-related behaviors and ways to cope with post-traumatic stress. Drinking alcohol is part of military culture as a means for group bonding, recreation, and stress relief.[19] The drinking behavior of service members and veterans may be influenced by their perception of alcohol consumption norms. For example, in a study among service members who had SUD, the participants tended to overestimate both the average number of drinks consumed by service members and the percentage of service members who were heavy drinkers.[20]

Military trauma and stress exposure

Researchers have found that military service members and veterans are more likely than civilians to have been exposed to childhood traumatic events, such as physical and sexual abuse and sexual assault, which leads to the suggestion that some individuals enter the military to escape dangerous family environments.[21,22] In particular, one study reported that men with a history of military service had a higher prevalence of exposure to adverse childhood events, especially sexual abuse, than men who had not served in the military.[22] Childhood stressors also have been associated with high-risk drinking in military recruits,[23] which may increase vulnerability to stressors encountered during military service.

Veterans and service members report a higher prevalence of trauma exposure than the general population, and they may have a higher likelihood of exposure to specific traumas.[24] In cross-sectional[25] and longitudinal studies,[6] exposure to combat, specifically, has been associated with psychological distress and hazardous drinking. Military sexual assault is also associated with higher PTSD risk than other forms of military and civilian trauma.[26] According to VA data, about 22% of women and 1% of men report experiencing military sexual trauma, which, in part, may explain the gender differences in the prevalence of PTSD described earlier.[27]

In addition, deployment may expose service members to interpersonal stressors (e.g., separation from social supports and working in close proximity with other service members), mission-related hardship, and prolonged exposure to perceived threats.[25] Among demobilizing soldiers, 15% reported at least one alcohol-related consequence, and the soldiers' levels of perceived stress predicted these consequences,[28] illustrating possible relationships between deployment-related stressors and alcohol misuse.

Interventions for Prevention of PTSD and AUD

To our knowledge, no study has examined strategies that aim to prevent the development of comorbid PTSD and AUD in military and veteran populations. However, some research has examined the prevention of PTSD or AUD separately in this population, which could inform the prevention of comorbid PTSD and AUD.

Universal prevention strategies

Universal prevention strategies target all members of a population to prevent the onset of a condition.[29] According to the *VA/DOD Clinical Practice Guideline for the Management of Posttraumatic Stress Disorder and Acute Stress Disorder*,[30] no universal prevention strategies for PTSD are currently recommended. Indeed, we know of no research that has tested primary prevention efforts targeting PTSD, AUD, or the comorbid conditions in any population.

Selective prevention strategies

Selective prevention strategies target members of a population at high risk for developing a condition.[29] Selective prevention strategies for PTSD involving the use of psychotherapy or pharmacotherapy in the early aftermath of trauma exposure have received some empirical attention, with mixed results.[31] In general, psychological debriefing interventions have failed to demonstrate beneficial effects in civilian or military samples,[31,32] and in some cases these interventions have been associated with increased PTSD symptom severity.[33,34] In a review of pharmacological selective interventions for PTSD, researchers reported some evidence that hydrocortisone may be effective.[35] Overall, the VA/DOD practice guideline for PTSD indicates there is insufficient evidence to recommend psychotherapy or pharmacotherapy for selective

prevention.[30] We found no research that has tested selective prevention efforts targeting AUD or comorbid PTSD and AUD in trauma-exposed military populations.

Indicated prevention strategies

Indicated prevention strategies aim to prevent disorder onset or chronic expression among people already exhibiting symptoms.[29] Meta-analytic results indicate that trauma-focused psychotherapies involving exposure and/or cognitive restructuring may prevent PTSD among individuals who have acute stress disorder.[31] However, results are insufficient and mixed regarding the use of pharmacotherapy for the indicated prevention of PTSD.[30,36] For individuals who screen positive for risky alcohol use, providing a single, initial brief intervention about alcohol-related risks and a recommendation to abstain from or moderate drinking may reduce alcohol misuse.[37,38]

Treatment Interventions for PTSD and AUD

Evidence indicates that concurrent treatment of PTSD and AUD can be safe and effective.[30,39] Before reporting on concurrent treatment approaches, we describe evidence-based treatments targeting either PTSD or AUD. We also discuss the efficacy of these treatments for military and veteran populations.

Treatments for AUD

The *VA/DOD Clinical Practice Guideline for the Management of Substance Use Disorders* recommends using psychotherapy and pharmacotherapy treatments for AUD.[38] Recommended psychotherapies include cognitive behavioral therapy, behavioral couples therapy, community reinforcement, motivational enhancement therapy, and 12-step facilitation. Recommended pharmacotherapies include acamprosate, disulfiram, naltrexone, and topiramate. Treatment availability and patient preferences are considerations when selecting a treatment.

Treatments for PTSD

The VA/DOD practice guidelines for treating PTSD recommend using individual, trauma-focused psychotherapy.[30] Pharmacotherapy (i.e., sertraline, paroxetine, fluoxetine, and venlafaxine) and individual psychotherapy that is not trauma-focused are recommended only if trauma-focused psychotherapy is not available or if a patient has a preference. Recommended psychotherapies include prolonged exposure therapy, cognitive processing therapy, and eye movement desensitization and reprocessing. In a recent systematic review of randomized controlled trials, researchers examined the effectiveness of psychotherapy among individuals who had military-related PTSD.[40] The researchers reported that cognitive processing and prolonged exposure therapies produced large within-group effect sizes, and patients achieved meaningful symptom change, although dropout rates were a problem.

Concurrent treatments

Veterans with comorbid PTSD and SUD report a preference for integrated treatments that address both conditions simultaneously, and several protocols have been developed to accomplish this.[15] We found no randomized controlled trials of concurrent treatments for PTSD and AUD conducted in military and veteran populations, but several case studies and small, open or uncontrolled trials provide some preliminary information regarding concurrent treatment in these populations.

Psychotherapy

"Seeking safety," a cognitive behavioral psychotherapy, targets co-occurring PTSD and SUD but is not trauma-focused. Trials of this intervention have had small sample sizes, but the participants, including service members and male veterans, have demonstrated reductions in PTSD symptoms and alcohol misuse.[41,42] One test of this treatment was conducted with female veterans who were homeless.[43] The participants were not randomly assigned to study conditions, which makes it difficult to determine whether the results were attributable to participant characteristics or treatment effect. When compared

with women in the treatment-as-usual condition, women who received the treatment had a greater reduction in PTSD symptoms, but there were no group differences in alcohol use. However, a randomized controlled trial indicated no added benefit of this treatment among male veterans with comorbid PTSD and AUD.[44] Given that few tests of this treatment have used randomized controlled trials, and findings from other types of studies are mixed, the seeking safety method is not currently recommended for treatment of comorbid PTSD and AUD.[1,30]

In one case study of an OEF/OIF veteran, researchers examined the effectiveness of concurrent treatment of PTSD and SUD using prolonged exposure (COPE) therapy.[45] COPE involves 12, 90-minute sessions that integrate relapse prevention with prolonged exposure therapy. The veteran who received the therapy reported reduced alcohol use throughout treatment, scored in the nonclinical range for PTSD at the end of treatment, and maintained treatment gains at a 3-month follow-up.

Cognitive processing therapy has begun to be examined as a potential treatment for co-occurring PTSD and AUD. This therapy is a 12-session, predominantly cognitive, intervention developed for treatment of PTSD. In a case study, a veteran diagnosed with both PTSD and AUD received cognitive processing therapy that was enhanced to address alcohol use.[46] The veteran demonstrated clinically significant improvements in PTSD symptoms and alcohol-related problems at the end of treatment and maintained the improvements 12 weeks after treatment. In addition, a review of VA medical records of individuals who received cognitive processing therapy showed no differences for veterans with or without AUD diagnoses in the likelihood of dropping out of treatment, self-reported depression symptoms, or clinician-rated PTSD symptom severity.[47]

Interventions for couples show promise for treating co-occurring PTSD and AUD. Couple treatment for AUD and PTSD (CTAP) is a 15-session manual-guided (also known as "manualized") therapy that integrates behavioral couples therapy for AUD with cognitive behavioral conjoint therapy for PTSD.[48] In an uncontrolled trial, 13 male veterans and their female partners enrolled, and 9 couples completed the CTAP program. Eight of the veterans showed clinically reliable reductions in PTSD outcomes after treatment. Most of the veterans showed clinically reliable reductions in their percentage of days of heavy drinking.

A couples therapy called "project VALOR," which stands for "veterans and loved ones readjusting," involves 25 sessions of cognitive behavioral therapy for PTSD and alcohol misuse, enhanced for significant others. Two OEF/OIF veterans received VALOR therapy in two separate case studies.[49] These veterans greatly reduced their alcohol use at the start of treatment or shortly before beginning the treatment, and their PTSD symptoms substantially decreased over the course of treatment.

Pharmacotherapy

Overall, research on the use of pharmacotherapies for comorbid PTSD and AUD in military and veteran populations is insufficient, and the results are mixed.[30] For example, in a randomized controlled trial of 30 veterans with comorbid PTSD and AUD, treatment with topiramate, when compared with placebo, was not effective at reducing PTSD symptoms, but the treatment was associated with reduced drinking days.[50] Also, results from this study indicated that topiramate, when compared with placebo, had a trend-level effect for a reduction in hyperarousal symptoms.

In a double-blind, randomized controlled pilot trial of 9 veterans and 21 civilians, all with comorbid PTSD and AUD, prazosin (which is often used to treat PTSD-related sleep disturbances) did not effectively improve PTSD symptoms.[51] However, it did reduce the percentage of drinking days. In another double-blind, randomized clinical trial, 96 veterans with comorbid PTSD and AUD received either prazosin or placebo.[52] In this study, prazosin was not effective in treating PTSD symptoms or reducing alcohol consumption. Overall, prazosin was not effective in treating PTSD symptoms, and its effectiveness regarding alcohol use is unclear. It is possible that alcohol's effect on sleep interferes with prazosin's benefits.[51,52]

In a double-blind, randomized trial, 88 male veterans with comorbid PTSD and AUD received either paroxetine and naltrexone, paroxetine and a placebo, desipramine and naltrexone, or desipramine and a placebo.[53] Desipramine outperformed paroxetine in reducing drinking days, and both medications showed some benefit in reducing

drinking and core PTSD symptoms, but the addition of naltrexone had no effect on outcomes.

A recent pilot study of *N*-acetylcysteine among veterans with co-occurring PTSD and SUD indicated that *N*-acetylcysteine was associated with significant reductions in both PTSD symptoms and substance craving.[54] Veterans in this trial received concurrent cognitive behavioral therapy, providing initial evidence for the potential benefit of *N*-acetylcysteine as an adjunct to psychotherapy.

Combined psychotherapy and pharmacotherapy

A combination of psychotherapy and pharmacotherapy may be an effective treatment strategy for service members and veterans with comorbid PTSD and AUD. In a single-blind, randomized clinical trial of civilians and veterans with comorbid PTSD and AUD, participants were randomly assigned to receive prolonged exposure therapy and naltrexone, prolonged exposure and a placebo, supportive counseling and naltrexone, or supportive counseling and a placebo.[55] Participants in all conditions reported reductions in drinking days and PTSD symptoms, and those who received naltrexone had a lower percentage of drinking days than those who received a placebo. There was no statistically significant main effect for prolonged exposure therapy on PTSD symptoms and no observed differences in the number of dropouts across conditions. In the same sample, prolonged exposure was more beneficial for those with non–combat-related traumas and higher baseline PTSD severity.[39] Also, naltrexone was most beneficial for those with the longest duration of AUD.

Future Directions for Research and Practice

In research and practice, several notable gaps exist in addressing co-occurring PTSD and AUD in military and veteran populations. First, although military service appears to increase risk for the comorbid conditions, more research is needed to identify factors that contribute to the increased risk for the development of these disorders within the specific military context. In addition, military-specific barriers to accessing care need to be identified. For example, policies that have potential career consequences, such as requiring that treatment participation be recorded in a service member's military record, may inhibit voluntary participation in treatment. Also, there may be opportunities for prevention during predeployment and postdeployment periods, but research on such programs is scarce. More information about military-specific factors and barriers will help guide prevention and intervention efforts.

Second, although treatments for PTSD and SUD have been disseminated systemwide within the VA, there is a dearth of literature about the effectiveness of these treatments for those in this population who have both conditions. (See Table 1 for brief summaries of treatments that have preliminary reports.) Addressing whether cognitive processing therapy and prolonged exposure therapy can be used for those who have co-occurring PTSD and AUD is a high priority, as existing implementation efforts could be leveraged to address the needs of those with comorbidity.

Comparative efficacy studies also are lacking. Future research should explore which treatments work best for whom, and if matching treatment to patient characteristics improves outcomes. Research on personalized treatment could lead to the development of a menu of evidence-based treatments from which practitioners and patients could jointly tailor a treatment plan for the patient. This menu of treatments could be based on biomarkers, demographics, and other patient characteristics, and it could identify promising alternatives if first-line treatments fail.

Third, it is unclear whether SUD treatments help those who have PTSD. Implementing SUD treatments for individuals with co-occurring PTSD and AUD could be a way for providers to address clinical needs without learning another manual-guided treatment. Motivational enhancement therapy could be used for this purpose, as it has been used successfully to reduce drinking among soldiers with untreated AUD, most of whom also had severe symptoms of PTSD.[56] This therapy may be useful as an intervention for increasing treatment engagement and preventing treatment dropout. Motivational enhancement therapy also shows promise as a way to increase treatment initiation among veterans and military personnel who are reluctant to enter treatment or address their substance misuse during treatment for PTSD,

Table 1 Review of Literature on Treatments for Co-Occurring PTSD and AUD in U.S. Military and Veteran Populations

Treatment	Research Findings
Pharmacotherapies	
Desipramine	Reduced drinking and PTSD symptoms in randomized controlled trials.[53]
N-acetylcysteine	Observed PTSD symptom reductions in pilot study, as adjunct to psychotherapy.[54]
Paroxetine	Reduced drinking and PTSD symptoms in randomized controlled trials.[53]
Prazosin	Reduced drinking but not PTSD symptoms in pilot randomized controlled trial.[51] No effects in large randomized controlled trial.[52]
Topiramate	Reduced drinking but not PTSD symptoms in randomized controlled trial.[50]
Psychotherapies	
Cognitive Processing Therapy Enhanced for Alcohol Use	Reported symptom reductions in case study.[46]
Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure (COPE)	Reported symptom reductions in case study.[47]
Couple Treatment for AUD and PTSD (CTAP)	Observed symptom reductions in uncontrolled trial.[48]
Project Veterans and Loved Ones Readjusting (VALOR)	Observed symptom reductions in case studies.[49]
Seeking Safety	Observed symptom reductions in small trials[41,42] and pre-post trial.[43] No added benefit in randomized controlled trial.[44]

particularly if they perceive that substance use eases their PTSD symptoms.

Finally, more clinical trials are needed on the treatment and prevention of comorbid PTSD and AUD within military and veteran populations.[57] Several barriers interfere with the progress of this literature, including the exclusion of people with dual diagnoses, and difficulties recruiting and retaining participants.[50] Dropout rates for trials testing combined PTSD and AUD treatments tend to be higher than dropout rates for treatment of either disorder alone. Research on the factors leading to participant dropout and on ways of increasing treatment engagement and retention is critical.

Conclusion

Military and veteran populations have a critical need for interventions that aim to reduce the burden of co-occurring PTSD and AUD. Treating these conditions simultaneously has been challenging and complex in the general population, and military service adds additional risk factors for the likelihood of their onset and maintenance. Although promising interventions exist, more research is needed to assess the degree to which current interventions are effective for service members and veterans. Also, new interventions that target this population should be developed and tested.

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Nature and Treatment of Comorbid Alcohol Problems and Post-Traumatic Stress Disorder Among American Military Personnel and Veterans

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Many service members and veterans seeking treatment for alcohol problems also have post-traumatic stress disorder (PTSD). This article considers the effectiveness of treating alcohol problems and PTSD simultaneously. The authors begin by summarizing the extent of excessive alcohol use among military service members and veterans. They then explore the relationship between combat exposure and subsequent alcohol use; identify and briefly describe evidence-based treatments for alcohol problems and PTSD, separately; and review research on the effects of single treatments for both PTSD symptoms and alcohol use.

Key words: Alcohol use, abuse and dependence; problematic alcohol use; post-traumatic stress disorder; stress; military; veterans; combat exposure; treatment

Many service members and veterans seeking treatment for alcohol problems have experienced the life-threatening stress of combat, many have post-traumatic stress disorder (PTSD), and many service members and veterans seeking treatment for PTSD have alcohol or other substance problems. Sensitivity to these issues can influence how a therapist relates to the patient and also has possible implications for developing a treatment strategy (U.S. Department of Veterans Affairs [DVA] 2010). Historically, clinicians have been concerned that patients need to reduce or resolve substance abuse before PTSD treatment can be successful. But research is showing that both disorders can be treated simultaneously. Here, we assess the scope of the problem and examine treatments that can be effective for treating each disorder individually as well as in tandem.

Alcohol Problems in Active-Duty Military Personnel and Veterans

For more than 30 years the Department of Defense (DoD) has conducted recurrent surveys to determine rates of excessive alcohol use among active-duty personnel. The most recent of these (DoD 2013) revealed wide prevalence of "binge" drinking, defined as consuming 5 or more drinks for males or 4 or more drinks for females on a single occasion. An analysis of this survey by Bray and colleagues (2013) found that across the U.S. Armed Services 33 percent of personnel reported binge drinking during the 30 days preceding the survey, with considerable variation in rates across military departments (Army, 34 percent; Navy, 38 percent; Marines, 49 percent; and Air Force, 24 percent). Twenty percent of male and female active-duty personnel engaged in heavy drinking, which was defined as binge drinking at least once a week during the past 30 days (Bray et al. 2013).

Less is known about alcohol use problems among veterans. One analysis examined results from the National Survey on Drug Use and Health from 2004 through 2010 (Golub et al. 2013). The study compared veterans ages 21 to 34 with non-veteran peers matched on age and gender. The two groups were quite similar in their rates of alcohol use disorder (AUD) in the past year (15 percent); "binge" drinking (44

percent), defined as consuming 5 or more drinks on at least one occasion during the past 30 days; and heavy drinking (14 percent), defined as binge drinking on 5 or more days during the past 30 days (Golub et al. 2013).

Combat Stress and Alcohol Misuse

As of September 30, 2013, 2.6 million service members had been deployed to Operation Enduring Freedom, Operation Iraqi Freedom, and Operation New Dawn since 2001 (DVA 2013). Due to high rates of combat and blast exposure, healthcare providers within the DOD and the U.S. Departments of Veterans Affairs (VA) are offering services to increasing numbers of veterans and active-duty personnel returning with complex mental and physical health problems (Hoge et al. 2004, 2008).

PTSD is the most common mental health diagnosis for the nearly 1 million U.S. veterans who served in Iraq and Afghanistan between October 1, 2001, and September 30, 2013, and who accessed services through the Veterans Health Administration (VHA) (DVA 2013). Nineteen percent of those who have served in Iraq and Afghanistan develop PTSD within a year of their return to the United States (Tanielian and Jaycox 2008).

Symptom clusters for PTSD as defined by the *Diagnostic and Statistical Manual of Mental Disorders* (DSM–5) are illustrated in the accompanying textbox (American Psychiatric Association 2013). Based on the previous DSM–IV criteria (American Psychiatric Association 1994), rates of PTSD in returning service members vary somewhat as a function of the method for collecting data, with results from screening instruments suggesting a range of 10 to 20 percent (Milliken et al. 2007; Seal et al. 2007; Sundin et al. 2010). Structured clinical interviews yield a somewhat lower but still disconcerting PTSD rate of 7 to 10 percent (Erbes et al. 2007). Among individuals with a history of traumatic brain injury, rates of PTSD seem to escalate to 33 to 39 percent (Carlson et al. 2011). An analysis of VA healthcare statistics from October 7, 2001, to March 31, 2008, showed that PTSD was the most prevalent psychiatric diagnosis, affecting approximately 21.5 percent of patients (Cohen et al. 2010). As of 2014, VA public health data suggest that 30 percent of veterans of military service in Afghanistan and Iraq seeking VA care have PTSD.

Substance use disorders (SUDs) are another common reason for seeking mental health services. PTSD and substance use disorder frequently co-occur (McCauley et al. 2012). As illustrated by the figure, a consistently increasing percentage of veterans who have received VHA care, regardless of when they served in the military, have

DSM–5 Post-Traumatic Stress Disorder Symptom Clusters

Re-experiencing

- Recurrent, intrusive, and distressing memories, images, thoughts, and/or perceptions
- Recurrent distressing dreams
- Dissociative reactions (flashbacks)
- Marked psychological and/or physiological response to cues that symbolize or resemble the event

Avoidance

- Of memories, thoughts, or feelings about the event
- Of reminders of the event

Negative Alterations in Cognitions and Mood

- Inability to recall an important aspect of the event
- Persistent, exaggerated negative beliefs or expectations about self, others, or the world
- Persistent negative emotional state
- Diminished interest/participation in significant activities
- Detachment/estrangement
- Persistent inability to experience positive emotions

Marked Alterations in Arousal and Reactivity

- Irritability/outbursts or anger
- Reckless or self-destructive behavior
- Hypervigilance
- Exaggerated startle response
- Difficulty concentrating
- Difficulty falling or staying asleep or restless sleep

been diagnosed as having comorbid PTSD and SUD. In fiscal year 2013, 26.5 percent of VA patients with a diagnosis of PTSD also had SUDs. It is also worth noting that the number of veterans with both conditions has increased by 76 percent since fiscal year 2008, a rate exceeding the increase in prevalence for PTSD (52.3 percent) or for SUD (33.1 percent) alone (Program Evaluation and Resource Center, VA Medical Center, Palo Alto, CA. January 2014, personal correspondence).

Individuals with AUD and PTSD tend to have greater risks for other psychiatric disorders, respond less favorably to interventions for the AUD, and are at increased risk of relapse to problematic drinking (Torchalla et al. 2012).

Relationship between PTSD and Substance Misuse

Citing data from the National Comorbidity Survey (Kessler et al. 1995), Jacobsen and colleagues (2001) observed that, when they exclude nicotine dependence, the psychiatric condition most likely to co-occur among men with PTSD was alcohol abuse/dependence. Among women with PTSD, alcohol abuse/dependence was the second most common mental health combination, with depression or anxiety being the most common. Study investigators proposed two reasons for this association. For one, PTSD may follow alcohol misuse, because people who misuse alcohol may tend to place themselves in situations that involve increased risk for trauma and subsequent PTSD; alcohol may also sensitize them to developing a PTSD reaction in response to trauma. Second, alcohol misuse may follow PTSD by playing a "self-medication" role to dampen the hyperarousal component of PTSD. Interestingly, Jacobsen and colleagues further comment that the neuronal arousal associated with alcohol withdrawal may be augmented by PTSD-linked hyperarousal and may make individuals with PTSD more likely to return to drinking than those who need only cope with the arousal associated with acute drinking cessation.

A study of patients receiving treatment for SUD indicated that improvements in PTSD symptoms over 2-week periods during the 26-week study were associated with decreases in cocaine and opioid use and possibly reductions in alcohol use (p=.056) (Ouimette et al. 2010). These findings support the theory that people with PTSD use drugs and alcohol to self-medicate. However, the study sample was small and consisted solely of patients currently in treatment. Hence, the finding may not generalize well to a random sample of people with both conditions.

Combat and Subsequent Alcohol Misuse

Milliken and colleagues (2007) conducted the largest study of combat's influence on mental health

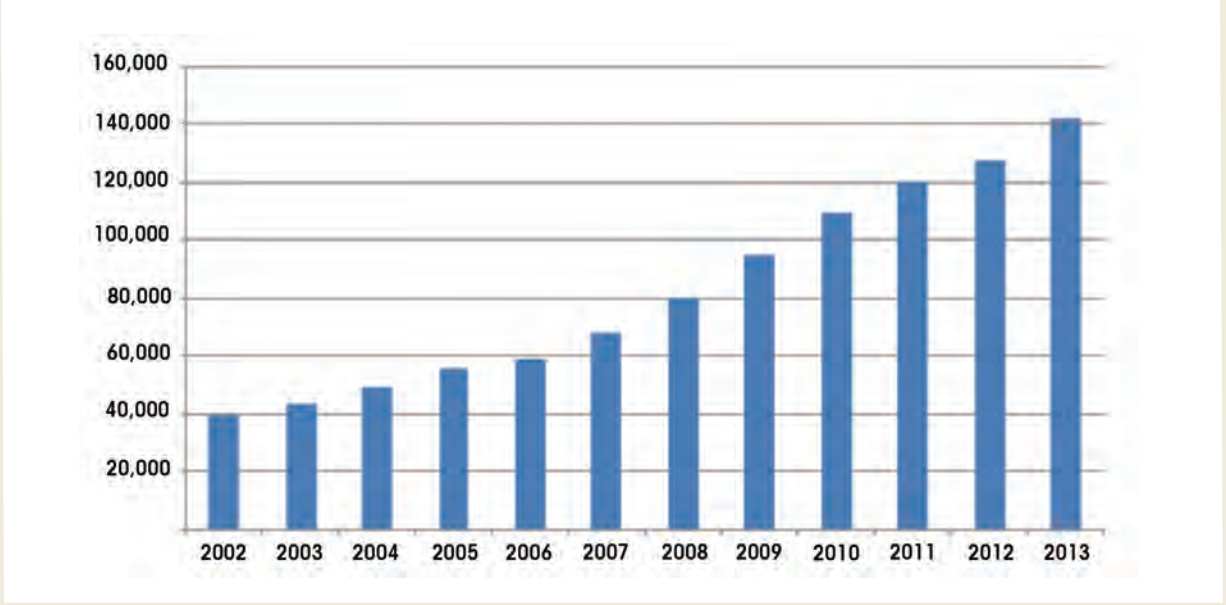

Figure Veterans receiving care in the Veterans Health Care Administration for comorbid PTSD and substance use disorder by year.

SOURCE: Program Evaluation and Resource Center, VA Medical Center, Palo Alto, CA. January 2014, personal correspondence.

functioning of service members. They analyzed responses on the Post Deployment Health Reassessment (PDHRA), a clinical and self-report measure that includes questions related to combat stress and alcohol problems. Soldiers completed the survey 3 to 6 months after redeployment to combat service in Iraq. More than 88,000 soldiers completed both this survey and a related-content survey administered to them at redeployment. Nearly 70 percent of respondents reported traumatic combat experiences, and around 50 percent of active personnel and reserve component personnel reported that at some time they feared that they would be killed. Nine percent of active-duty respondents and 14 percent of U.S. Army Reserve and National Guard soldiers endorsed at least three of four PTSD screening items. The PDHRA also included a two-item screen for alcohol problems; 12 percent and 15 percent, respectively, of the active duty and reserve component respondents endorsed at least one such item. Yet only 0.4 percent of the sample reported having been referred to substance abuse treatment.

Data from the large-scale Air Force Community Assessment Survey conducted in the spring of 2008 demonstrated a relationship between the total number of deployments and cumulative time deployed with the subsequent likelihood of an Air Force member becoming a problem drinker. Each additional year of deployment increased the risk of becoming a problem drinker by 23 percent, and each additional deployment period increased the risk by 14 percent. Interestingly, the risk of becoming a problem drinker was not associated with how recently a soldier was deployed (Spera et al. 2011).

Another survey (Santiago et al. 2010) given to soldiers 3 to 4 months after returning from deployment to Iraq found that 27 percent scored positive for alcohol misuse, as shown by endorsement of at least one of two screening items on the Two-Item Conjoint Screen. Soldiers exposed to more intense combat were also more likely to score positive on the alcohol misuse screen. Another study found that deployments involving combat exposure also were associated with post-deployment heavy weekly drinking, binge drinking, and alcohol-related problems among active duty and reserve component personnel (Jacobson et al. 2008).

Alcohol problems among military personnel exceed those of civilian populations in part because of demographic differences in age, gender balance, and education level among military populations. However, other factors contribute to the risk of alcohol misuse among service members, including deployment stress, combat exposure, and PTSD. Reflecting this, an increasing number of veterans are being treated by the VHA for comorbid SUDs and PTSD. The challenge is to implement treatments found to be effective for both conditions, as well as to continue to develop more effective interventions.

Effective Alcohol Treatments

Psychotherapies

Several psychosocial interventions for treating alcohol problems have shown strong evidence for effectiveness. The VHA's policy is that patients with alcohol problems have access to at least two of the following:

- *Cognitive–Behavioral Therapy for Relapse Prevention,* which assists patients in identifying internal and external stimuli that prompt drinking, and in learning skills and alternative ways of thinking to cope with these cues and avoid alcohol use.
- *12-Step Facilitation,* which promotes participation in Alcoholics Anonymous and working the steps of the program. It employs a treatment manual with activities and homework assignments and is conducted in a one-on-one counseling relationship.
- *Community Reinforcement Approach,* which helps patients establish a strong environmental support system to help sustain sobriety.
- *Substance Use Disorder–Focused Behavioral Couples Counseling/Family Therapy,* which emphasizes the participation of significant others in treatment. Sessions focus on improvements in communication and interactional patterns of the couple or family, especially as they relate to drinking.
- *Motivational Enhancement Therapy,* which builds on principles of motivational interviewing. It employs treatment processes that reflect the patient's level of readiness for change.

For detailed descriptions of these treatments, see Finney and Moos (2002).

Pharmacotherapies

The *VA/DoD Clinical Practice Guideline for Management of Substance Abuse Disorders* (DVA and DoD 2010) offers the following recommendations for the pharmacological management of alcohol dependence:

- Oral naltrexone should be routinely considered in conjunction with addiction counseling.
- Injectable naltrexone is effective in conjunction with addiction counseling when the patient is willing to accept monthly injections.
- Acamprosate should routinely be considered in conjunction with addiction counseling as an alternative to naltrexone.
- Disulfiram should only be used when the goal is abstinence.

A recent meta-analysis reinforces the value of pharmacological treatment for alcohol abuse (Jonas et al. 2014). The analysis found that both acamprosate and oral naltrexone were associated with reductions in how often patients returned to drinking with no significant differences between the two drugs in controlling alcohol consumption. The authors emphasize that less than one-third of people with AUD receive treatment, and only a small percentage of these patients (less than 10 percent) receive medications to assist in reducing alcohol consumption. A companion editorial by Bradley and Kivlahan (2014) emphasizes the importance of integrating psychopharmacological and psychosocial interventions in treating AUD and of integrating these treatments into primary care services.

Effective PTSD Treatments

Psychotherapies

In 2008, the Institute of Medicine conducted a comprehensive review of outcomes on existing PTSD treatments. The report determined that "evidence is sufficient to conclude the efficacy of exposure therapies in the treatment of PTSD" (chapter 4, p. 97). Shortly thereafter, the VHA began promoting the use of two trauma-focused, manualized cognitive–behavioral psychotherapies (Karlin et al. 2010): Prolonged Exposure (PE; Foa et al. 2007) and Cognitive Processing Therapy (CPT; Resick and Schnicke 1992). Both interventions demonstrated efficacy in randomized controlled trials with civilians (Foa et al. 1999, 2005; Resick et al. 2002) and veterans (Monson et al. 2006; Schnurr et al. 2007). Evidence for both psychotherapies for veterans and active duty service members has continued to accumulate (Chard et al. 2010; Goodson et al. 2013; Rauch et al. 2009; Tuerk et al. 2011; Walter et al. 2014). Treatment effectiveness seems to persist following treatment (Resick et al. 2012). The goals of both interventions are to reduce avoidant coping; purposefully confront traumatic memories; and modify maladaptive, trauma-related thoughts. Nevertheless, the rationales and procedures of the two treatments differ significantly.

PE includes four essential elements: psychoeducation, in-vivo exposure, imaginal exposure, and in-session discussion following imaginal exposures to facilitate emotional processing and corrective learning (Foa et al. 2007). In the initial phase of treatment, therapists present information about common reactions to trauma, factors that maintain PTSD symptoms, conceptual bases for interventions, and breathing retraining. They reinforce this information with standardized handouts. In-vivo exposure procedures require patients to progressively confront situations and stimuli (including sights and sounds) that they previously avoided, because they associated the situations and stimuli with their traumatic memory. Imaginal exposure asks patients to verbally revisit their traumatic memory and emotionally process the experience to bring about corrective learning and habituation in later treatment sessions. Imaginal exposure begins in the third session and is followed by a collaborative "processing" discussion, typically involving support, normalization of experience, and discussion about key perceptions linked with the traumatic experience. In the mid-to-later phases of PE, imaginal exposure focuses on the most distressing aspects of the index trauma, or "hotspots." Patients typically complete 90-minute sessions once a week, with most patients requiring 8 to 15 sessions for treatment completion. Clinicians audiotape sessions and require patients to review the tapes between appointments.

CPT (Resick 2001) consists of 12 treatment sessions that include cognitive interventions in either a group or individual format. During the initial sessions, patients receive psychoeducation about PTSD and underlying information processing frameworks, complete written assignments to clarify the personal significance of traumatic experiences, and identify problematic trauma-related beliefs or "stuck points." During the middle stages of CPT, patients learn to use a variety of worksheets to identify linkages between events, thoughts, and feelings; to produce and repeatedly read detailed accounts of their most traumatic experience(s), with an emphasis on experiences associated with traumatic events; and to begin challenging their stuck points with support and assistance from the therapist. Therapists use Socratic questioning to teach patients to examine and modify relevant maladaptive cognitions that maintain PTSD symptoms. They assign patients daily worksheets for home practice. In the final phases of the treatment, therapists aim to modify beliefs in five key domains: safety, trust, power/control, esteem, and intimacy. Patients consolidate their treatment gains in the concluding session.

Pharmacotherapies for PTSD

A wide range of psychotropic medications have been explored for treating PTSD. *VA/DoD Clinical Practice Guidelines for the Management of Post-Traumatic Stress* (DVA and DoD 2010) most strongly recommend selective serotonin reuptake inhibitors (SSRIs) and serotonin norepinephrine reuptake inhibitors (SNRIs). The high blood pressure medication, prazosin, has been increasingly used to treat PTSD, but the *VA/DoD Guidelines* only recommend this as an adjunctive therapy for nightmares associated with the disorder.

Treating Co-Occurring PTSD and AUD

Psychosocial Treatments

Few well-controlled studies have assessed the efficacy of trauma-focused, cognitive–behavioral treatments, such as PE or CPT, in patients dually

diagnosed with PTSD and SUD or AUD. This likely reflects a bias toward excluding patients with dual diagnosis from clinical trials because of traditional clinical concerns that concurrent misuse of substances could diminish the benefits of PTSD treatment (Riggs et al. 2003), or that exposure-based interventions might lead to relapse or to escalation of substance misuse (Hien et a. 2004; McGovern et al. 2009).

Taken in concert, the literature on treatments for co-occurring PTSD and AUD indicates that dually diagnosed patients can tolerate and benefit from psychotherapies specifically formulated to address trauma and PTSD. In fact, a forthcoming meta-analytic *Cochrane Review* that consolidates outcomes from over 1,400 participants (Roberts et al. 2012) concludes that combined, trauma-focused interventions meant to address both PTSD and AUD or SUD perform as well as or better than usual treatments in reducing symptoms of both disorders. Nonetheless, there is room for much improvement in this area, and debate continues about how best to engage and treat this complex population (Foa et al. 2013*b*; Najavits 2013). Additional research also is needed to determine optimal methods for assisting veterans or service members with co-occurring conditions and retaining them in treatment.

Several descriptions and reports also have been published on the use of present-focused, skills-based psychotherapies specifically targeted to the needs of dually diagnosed patients. Of these, Seeking Safety, a manualized cognitive–behavioral treatment that can be delivered to individuals or groups, has received the greatest attention (Najavits and Hein 2013; Najavits et al. 1998). Each session includes components for reducing the effects of trauma ("safety") and diminishing substance use and follows the same structure: a "check-in" where therapists gather information on maladaptive or "unsafe" behaviors and coping skills among patients; a review of a quotation that captures the essence of the current session's topic; a review of handouts to facilitate discussion and skills practice linked with the topic; and a "check-out" asking patients to commit to between-session skills implementation. The full protocol includes sessions dealing with 25 different topics, including promoting safety, taking back power from PTSD, healing from anger, creating meaning, and detaching from emotional pain or grounding. The protocol does not include any exposure-based exercises.

Although participants have generally accepted Seeking Safety and 22 reports have found mostly beneficial outcomes with PTSD-related symptoms and alcohol or substance use (Najavits and Hien 2013), the largest controlled trial evaluating this treatment found null results when contrasted with a health education control protocol. There is also a high rate of attrition among patients receiving Seeking Safety (Hien et al. 2009). The few studies of Seeking Safety conducted with veterans have included small sample sizes of not more than 25 patients each (Cook et al. 2006; Norman et al. 2010). Seeking Safety also has often failed to outperform control conditions on outcome measures for PTSD (Boden et al. 2012) or substance use (Desai et al. 2008). It thus remains uncertain whether this treatment should be considered a treatment of choice for veterans or military service members with co-occurring PTSD and AUD. However, for those who do not choose to begin trauma-focused therapy, Seeking Safety can be an effective engagement strategy that may be sufficient to reduce symptoms for some and to act as an effective preparation for trauma-focused treatment for others.

Psychopharmacologic Treatments

Less is known about the clinical value of combining pharmacological treatments with psychosocial treatments for co-occurring PTSD and alcohol dependence (Ravelski et al. 2014), but an article from Foa and colleagues (2013*a*) suggests that combining prolonged exposure therapy and oral naltrexone may be effective in reducing the percentage of drinking days in this population.

There are no direct contraindications to prescribing patients with PTSD any of the pharmacotherapeutic agents recommended in the *VA/DoD Clinical Practice Guidelines for the Management of Substance Use Disorders* (DVA and DoD 2009) for the treatment of AUD. However, certain other conditions commonly associated with PTSD and alcohol dependence may preclude use of some pharmaceuticals. For example, if patients have sustained significant liver damage subsequent to co-existing PTSD and alcohol dependence, they should avoid naltrexone and disulfiram. In addition, intravenous substance abuse may contribute to renal disease, which may complicate the use of naltrexone or acamprosate. Findings that PTSD itself may predispose patients to coronary artery disease (Edmondson et al. 2013) suggest that a careful cardiac evaluation be performed before prescribing disulfiram. Finally, chronic pain frequently co-occurs with both PTSD and substance abuse, and naltrexone may interfere with currently effective pain control regimens that rely on opioid agents.

Benzodiazepines are an effective treatment for relieving symptoms of alcohol withdrawal. However, the VA/DoD PTSD guidelines (DVA and DoD 2010) raise concerns about using benzodiazepines to treat PTSD, because these agents have not been shown to be effective as single-channel treatments for PTSD and might even complicate PTSD's course. Although this is not an absolute contraindication to the acute use of benzodiazepines for alcohol detoxification, it does call for careful monitoring of any ongoing benzodiazepine use. Along these same lines, clinicians should consider the severe physiological stress that can be associated with future states of intoxication and withdrawal when they choose a treatment for patients with

combined PTSD and alcohol dependence who are prone to withdrawal. For example, use of a tricyclic antidepressant to treat PTSD (not a top recommendation in the VA/DoD PTSD guidelines (DVA and DoD 2010), but a treatment that can be effective for PTSD) may lower seizure threshold in a patient prone to cycles of alcohol relapse and withdrawal. Also, prazosin, which was originally marketed as an antihypertensive, could cause hypotension in medically unstable patients, including during states of dehydration or in patients in alcohol withdrawal.

Although the 2010 VA/DoD Clinical Practice Guideline for the Management of Post-Traumatic Stress lists topiramate as having no demonstrated benefit for PTSD, a pilot study suggests that this anticonvulsant may have some value for treating both PTSD and AUD (Batki et al. 2014). However, topiramate cannot be recommended currently as a first- or second-line treatment for either disorder.

Conclusion

AUD and PTSD are common and severe problems in veterans and military service members and merit intervention. Fortunately, a number of psychological treatments and medications have been demonstrated as effective for each problem and should be incorporated into clinical practice whether the conditions occur independently or together. When AUD and PTSD occur in the same patient, they should generally be addressed simultaneously, either in closely coordinated or integrated care. Contrary to earlier clinical concerns that substance abuse should be reduced or resolved before treatment for PTSD, it seems that for most patients the treatments can be performed simultaneously with good results. In fact, clinical experience and emerging research suggests that it is best to combine modalities and targets within a comprehensive treatment plan. As in other areas of clinical practice, clinicians should systematically and frequently monitor patient progress to determine if some modification may be needed in the treatment protocol. It also is important to assess the patient's medical status before prescribing pharmacotherapies. In many cases, especially those involving alcohol dependence, adjunct medications will prove useful.

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The Influence of Gender and Sexual Orientation on Alcohol Use and Alcohol-Related Problems

Toward a Global Perspective

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Although there are wide differences in alcohol use patterns among countries, men are consistently more likely than women to be drinkers and to drink heavily. Studies of alcohol use among sexual minorities (SMs), however, reflect a more complex picture. Such research has found higher rates of alcohol use and alcohol-related problems among SM persons than among heterosexuals and greater differences between SM and heterosexual women than between SM and heterosexual men. A variety of factors may contribute to differences in alcohol use and alcohol-related problems between men and women and between SM and heterosexual people. An improved understanding of these factors is important to guide prevention and treatment efforts. Although there is a dearth of literature on use of alcohol by SMs in many parts of the world, especially lower- and middle-income countries, we attempt to review and integrate the sparse data that are available from these lower-resourced countries. The global perspective presented in this article is the first attempt to go beyond a general review of literature in the Western world to document the gender paradox in alcohol use among heterosexuals and SMs in diverse countries worldwide.

Key words: Alcohol consumption; alcohol use patterns; heavy drinking; alcohol-related problems; gender; sexual orientation; sexual minority; heterosexual; men; women; global perspective; literature review

The prevalence of alcohol use and the contrast between the drinking patterns of men and women vary widely across the globe. For instance, rates of current drinking ranged from 3 percent and 37 percent for women and men, respectively, in the Indian state of Karnataka to 94 percent and 97 percent for women and men in Denmark (Wilsnack et al. 2009). Overall, however, men have higher rates of alcohol use than women, both in the United States (Substance Abuse and Mental Health Services Administration [SAMHSA] 2013) and globally. In a multinational study of 35 countries (Gender, Alcohol, and Culture: An International Study [GENACIS]), Wilsnack and colleagues (2009) found that men were consistently more likely than women to be current drinkers and to engage in high-volume drinking, high-frequency drinking (5 or more days per week), and heavy episodic drinking. Women were more likely to be lifetime nondrinkers and to be former drinkers.

These patterns are quite different among sexual-minority women (SMW) and sexual-minority men (SMM). Although many large-scale surveys of alcohol and other drug (AOD) use have not included questions about sexual orientation, those that do show smaller gender differences in alcohol use and related problems among SMs than among heterosexuals. Notably, sexual-orientation–related disparities in AOD use are larger for women than for men. That is, SMW differ more in their rates of AOD use and related problems from heterosexual women than SMM differ from heterosexual men (Drabble et al. 2005; McCabe et al. 2009; Talley et al. 2014). This article examines the relationships that

gender and sexual orientation have to alcohol use and alcohol-related problems, using available literature in the United States and globally, and reviews some of the factors that seem to influence these relationships.

Sex versus Gender Differences in Alcohol Use and Related Problems

Sex differences refer to biological characteristics such as anatomy and physiology that distinguish female and male bodies. For example, differences in body composition partly explain why women consistently drink less than men. Because women's bodies generally contain less water than men's bodies, alcohol becomes less diluted, and women therefore reach higher blood alcohol levels than men even if both drink the same amount (Holmila and Raitasalo 2005).

Gender influences refer to the socially constructed roles, responsibilities, attitudes, behavioral norms, and relative power that a society differentially attributes to women and men. Research shows that countries or cultures with the largest differences in gender roles also have the largest differences between men's and women's drinking (Wilsnack et al. 2000). Therefore, social and cultural factors must be considered when attempting to understand gender differences in alcohol use across countries.

Gender Roles and Alcohol Use

Differences in men's and women's alcohol use often reflect gender roles and cultural expectations. Men may use drinking to demonstrate masculinity, facilitate aggression, exert power, and take risks. For these reasons, men may have greater motivation to drink than women. For example, research shows that risk taking is associated with heavy drinking among men but that women are more likely than men to use risk-reduction strategies when drinking (Iwamoto et al. 2011; Nguyen et al. 2011). In addition, a culture's acceptance of public drinking and intoxication for men but not women can serve to reinforce male superiority over women in status and authority in that culture. Whereas men have used drinking as a way to excuse themselves from responsibilities at work or home, women's drinking has traditionally been limited by their roles as mothers and caretakers and by the belief that drinking may have a more detrimental effect on their social behavior and their ability to fulfill responsibilities and to control their sexuality (Kuntsche et al. 2009, 2011). Women also are often expected to rein in the drinking of their male partners (Holmila and Raitasalo 2005).

Women who drink are more likely than men to stop drinking. This may be related to their generally lower levels of drinking, their social roles, and the fact that some women do not resume drinking (or return to pre-pregnancy levels) after pregnancy. However, a review of research examining birth cohorts and alcohol use across countries found high rates of heavy episodic drinking among women in younger cohorts in North America and Europe, suggesting a narrowing of the gender gap and a potential shift in social attitudes regarding gender and alcohol use (Keyes et al. 2011). In Finland, an examination of survey data collected over a period of 40 years suggests a cultural shift toward greater alcohol use, especially by women. Weekly drinking, frequency of moderate drinking, quantity of alcohol consumed per occasion, and intoxication increased among both genders over time but proportionately more among women. Drinking at home increased more than drinking in bars, and home drinking increasingly occurred only in the company of partners (Mäkelä et al. 2012). An analysis of survey data from Hispanics living in major U.S. cities found that high acculturation was associated with a higher volume of drinking and greater likelihood of binge drinking among women but not men (Vaeth et al. 2012), perhaps reflecting the greater tolerance of women's drinking in the United States.

Employment and other social roles are believed to be protective against drinking problems among heterosexual men and women. Jobs and social responsibilities tend to promote enhanced self-esteem and offer greater social support, and they entail responsibilities and more intensive social monitoring that may discourage excessive drinking. However, in part because of societal stigma and discrimination, fewer lesbian women and gay men engage in traditional roles such as marriage, childbearing, and childrearing or have responsibilities associated with social roles believed to limit alcohol use (especially among women) in the general population (Hughes 2005). Even SM couples in long-term relationships find less support for their relationships than do unmarried heterosexual cohabiting couples. For SM couples who do have children, the stressors associated with parenting may be exacerbated. For example, many lesbian and gay parents must deal with the realistic fear of custody battles over competency to raise children, homophobic remarks made to their children, and disclosing their sexual orientation to the children and others.

Efforts to reduce alcohol misuse and related problems among women and men (both heterosexual and sexual minority) should take into account cultural expectations regarding gender roles and alcohol use, as well as contemporary social and cultural changes that may be responsible for a narrowing gap between men's and women's drinking in some cultures.

Gender Differences in Alcohol Use Among Sexual Minorities

McCabe and colleagues (2009) analyzed data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a nationally representative survey of U.S. adults. They reported that, among those who identified themselves as SM based on sexual identity, behavior, or attraction,

lesbian women had more than 3 times greater odds of lifetime alcohol use disorders and of any lifetime substance use disorder than did heterosexual women. In contrast, the odds of lifetime alcohol use disorders for men with histories of only male sex partners were significantly lower than those for men who reported only female sex partners. Similarly, in a study based on data from the 2000 National Alcohol Survey, Drabble and colleagues (2005) reported that, among current drinkers, lesbians were approximately 7 times more likely and bisexual women nearly 6.5 times more likely than heterosexual women to meet *Diagnostic and Statistical Manual, 4th Edition* (American Psychiatric Association 1994) criteria for alcohol dependence. Lesbians were approximately 11 times more likely and bisexual women 8 times more likely to report 2 or more negative social consequences related to drinking compared with heterosexual women. Seeking treatment or other types of help for an alcohol problem was 8 times more likely among lesbians and 4 times more likely among bisexual women than among heterosexual women. There were no significant differences between SM and heterosexual men on any of these outcomes.

This gender-related pattern is similar among youth. In an analysis of data from the Youth Risk Behavior Surveillance System (YRBSS) survey, Talley and colleagues (2014) found that, among 13- to 18-year-olds surveyed, differences in alcohol use outcomes were greater between SM and heterosexual girls than between SM and heterosexual boys. Notably, SM girls reported higher rates of lifetime alcohol use and past-month heavy episodic drinking than did SM boys, heterosexual girls, or heterosexual boys. For instance, 30 percent of SM girls reported past-month heavy episodic drinking compared with 25.4 percent of SM boys, 16.4 percent of heterosexual girls, and 19.3 percent of heterosexual boys.

Studies of alcohol use among SMs outside the United States generally show smaller differences between SM and heterosexual populations, especially for men. For example, in a study examining sexual orientation differences in health risk behaviors among 1,725 15- to 21-year-old vocational school students in northern Thailand, van Griensven and colleagues (2004) found that AOD use patterns among SM females were similar to those of heterosexual males, whereas patterns of SM males were similar to those of heterosexual females. The authors speculate that one explanation for this pattern may be that SM males tend to socialize with heterosexual females who are less likely to use AODs and therefore are less likely to use substances themselves.

Using data from the GENACIS project, Bloomfield and colleagues (2011) analyzed alcohol use information from general-population surveys from 14 countries in Europe, Latin America, and North America. The researchers examined high-volume drinking (average daily consumption greater than 20 g of ethanol [pure alcohol] for women and greater than 30 g for men) and heavy single-occasion drinking (at least monthly consumption of large quantities of alcohol [in most countries, 60 g or more of ethanol in a day]) among heterosexual and SM respondents (defined on the basis of gender of romantic or cohabiting partner). In North America, SMW were significantly more likely than heterosexual women to report high-volume drinking and heavy single-occasion drinking, but no differences were found among men on these outcomes.[1] In the European countries, high-volume drinking was similar for SM and heterosexual women, and both drinking outcomes were similar for SM and heterosexual men.[2] Findings from the other regions examined either showed no significant differences between SM and heterosexual respondents or too few cases of high-volume or heavy single-occasion drinking to make comparisons.

In a meta-analysis of 25 studies from 8 countries in Europe, North America, Australia, and New Zealand, King and colleagues (2008) concluded that the risk of past-year AOD dependence was 50 percent higher among gay men, lesbian women, and bisexual men and women than among heterosexual men and women, with lesbian and bisexual women at especially high risk.

Nonadherence to traditional gender roles for women may influence drinking among SMW—especially in lower- and middle-income countries where the value placed on traditional gender roles remains strong. Using data from the 2005 National Youth Survey, a nationally representative sample of 12- to 29-year-olds in Mexico, Ortiz-Hernandez and colleagues (2009) found higher prevalence of alcohol use among lesbian and bisexual females, but not among gay and bisexual males, than among their heterosexual counterparts. The authors concluded that results support findings from previous studies of greater differences in the relationship between sexual orientation and alcohol use among women than among men. They further suggest that higher frequency and volume of drinking among SMW may be related to increased socialization in bars and more widespread adoption of masculine traits compared with heterosexual women. These findings are consistent with those from a study conducted in Taiwan, where the authors (Kuang et al. 2004) found adoption of nontraditional gender roles and higher rates of drinking among SMW than among heterosexual women.

Age Differences in Drinking

Rates of drinking generally decline with age for both men and women (World Health Organization 2014), although research with older adults suggests that men reduce their drinking later than women do (Brennan et al. 2011). In 2012, the

[1] The U.S. sample did not include men.

[2] There were too few cases of heavy single-occasion alcohol use among lesbians for comparison.

proportion of people in the United States reporting at least 1 drink in the previous 30 days (i.e., current drinkers) decreased from 69.2 percent among 21- to 25-year-olds to 60.1 percent among 40- to 44-year-olds and 53.1 percent among 60- to 64-year-olds (SAMHSA 2013). The same survey also found that 61.2 percent of men ages 26 and older were current drinkers, compared with 50.4 percent of women in the same age range. International surveys, however, show a somewhat different pattern. Based on GENACIS data, Wilsnack and colleagues (2009) reported that the prevalence of current drinking declined consistently with age in only a minority of the surveys for which 3 age groups were available. The prevalence of high-volume drinking declined with age among men in only 3 of the 34 surveys, and among women in only 11 of the 34 surveys. Most age-related declines in high-volume drinking occurred in high-income countries: Europe, the United States, Australia, and New Zealand.

Alcohol use among SM groups also decreases with age, but the declines tend to be smaller and to occur at later ages relative to heterosexuals. For example, in a community-based study of 447 women who identified as lesbian or bisexual, Hughes and colleagues (2006) found that, in contrast with the tendency for drinking among women in the general population to decline with age, there was relatively little variation in drinking rates among SMW across 4 age groups (≤30 years, 31–40 years, 41–50 years, >50 years). Using data from the 2003–2010 Washington State Behavioral Risk Factor Surveillance surveys, Fredriksen-Goldsen and colleagues (2013) found that lesbian and bisexual women ages 50 or older were significantly more likely than their age-matched heterosexual counterparts (adjusted odds ratio [AOR] = 1.43) to drink excessively, as were older (50 years or older) gay and bisexual men compared with older heterosexual men (AOR = 1.47). In an earlier study, McKirnan and Peterson (1989*a*) found similar rates of alcohol problems among 18- to 25-year-old gay men (26 percent) and heterosexual men (29 percent), but higher rates among gay men (19 percent) than heterosexual men (7 percent) who were ages 41–60. In the same study, lesbian women in the oldest age group (age 41–60) were 3 times as likely to report alcohol-related problems as were heterosexual women in that age group (15 percent vs. 4.5 percent).

Race/Ethnicity Differences in Drinking

Research examining alcohol-related problems across racial/ethnic groups in the United States suggests that gender and sexual orientation are important factors in this relationship. A recent analysis using pooled data from the 2005 and 2010 U.S. National Alcohol Surveys examined heavy drinking and alcohol-related consequences for White, Black, and Hispanic men and women (Witbrodt et al. 2014). The study found that, across all levels of heavy drinking, Black women drinkers had greater odds of alcohol dependence relative to White women drinkers, but no other significant differences were noted among the 3 groups of women.[3] Women showed low rates of alcohol dependence and alcohol-related consequences across ethnicities, except that Hispanic women were marginally more likely than White women to experience arguments and fights resulting from their drinking. Racial/ethnic differences were greater among men. Black men with no/low levels of heavy drinking had significantly greater odds than White men of having 3 or more alcohol-dependence symptoms and of having 2 or more negative drinking consequences. Compared with White men, Hispanic men who reported low or moderate heavy drinking also had significantly elevated odds of alcohol dependence. The authors suggest that the gender disparity may be partly explained by social norms that limit women's drinking across racial/ethnic boundaries.

Among SMs, there seem to be different associations among race/ethnicity, gender, and drinking. SMW who belong to racial/ethnic minorities seem to be at greater risk for AOD problems than heterosexual non-White women, whereas SM non-White men seem to be at comparable or less risk than heterosexual non-White men (Cochran et al. 2007*b*; Kim and Fredriksen-Goldsen 2012). In a race- and ethnicity-diverse community sample of SMW, Hughes and colleagues (2006) found that Black respondents were nearly four times more likely than White respondents to report heavy drinking. Mereish and Bradford (2014) found that Black and Hispanic SMW were more likely than Black and Hispanic heterosexual women and White SMW to report having had an alcohol- or other drug-use problem. Black and Hispanic SMM, however, did not differ in their risk compared with Black and Hispanic heterosexual men, and they had lower risk than White SMM.

Both White and non-White SM youth are at risk for alcohol problems. Talley and colleagues (2014) reported that, among 13- to 18-year-olds, White SMs were more likely than White heterosexuals to report ever drinking (79.9 percent vs. 69.1 percent), and Asian SMs were more likely than their heterosexual counterparts to report drinking (54.8 percent vs. 46.2 percent). Although bisexual White and racial/ethnic minorities initiated drinking at similar ages, heterosexual racial/ethnic minorities were significantly younger than their White counterparts when they had their first drink. For young women, there were fewer racial/ethnic differences in drinking among SMs than among heterosexual women.

Socioeconomic Status and Drinking

In the general population, higher levels of socioeconomic status (SES) are associated with more frequent

[3] Heavy drinking was defined by a gender-specific composite heavy-drinking variable based on five variables that are consistent determinants of alcohol-related health and social problems.

alcohol use, whereas lower SES often is associated with heavier drinking (Huckle et al. 2010), although these patterns vary somewhat across cultures (Bloomfield and Mäkelä 2010; Bloomfield et al. 2006). With regard to gender, analyses of survey data from the Netherlands showed that abstinence was inversely associated with educational level for both men and women. Among male drinkers, excessive drinking and very excessive drinking were more prevalent in the group with the lowest educational level. There was no significant relationship between educational level and prevalence of excessive drinking among women (van Oers et al. 1999).

Studies of adolescent alcohol use and SES in England (Melotti et al. 2013) and Brazil (Locatelli et al. 2012) suggest greater risk for higher-SES young people. In England, higher household income was associated with greater risk of alcohol use and problem use, especially among girls (Melotti et al. 2013). A study that compared alcohol use among Slovak adolescents in 1998 and 2006 found no socioeconomic differences among boys and greater likelihood for girls of high SES to be drinkers in 1998, but not in 2006 (Pitel et al. 2013).

Although scant research has examined the relationship between SES and alcohol use among SMs, studies of education and income are relevant. Some research has found that same-sex couples who live together earn less than heterosexual married couples, possibly because of workforce discrimination (Badgett and Lee 2001), whereas other studies find that cohabiting same-sex couples have more advantages in terms of education and income than opposite-sex cohabiting couples (Gates 2012, 2013; Kastanis and Wilson 2014; Krivickas 2010). In contrast, bisexual adults often show greater disadvantage in earnings than gay, lesbian, and heterosexual adults (Gates 2012). In terms of general health, same-sex cohabitors report poorer health than their heterosexual married counterparts at the same SES levels (Liu et al. 2013). In the only study we located that examined the relationship between educational level and substance use disorders (and other mental health problems) among SMs, Barnes and colleagues (2014) found that sexual-orientation disparities in substance use disorder rates were smaller among respondents with bachelor's degrees than among those with less education. These data were from the NESARC.

In addition to education and income, marital and parental status are likely associated with risk of heavy or problematic drinking. For example, in a nationally representative study of Australian women ages 25–30, Hughes and colleagues (2010*b*) found that, compared with married women, those in relationship categories more common among SMW (e.g., de facto, never married) reported significantly higher odds of AOD use. In addition, lower levels of education and not having children were each associated with significantly higher odds of at-risk drinking.

Using data from the U.S. National Health Interview Study, Denney and colleagues (2013) also found that same-sex cohabiting couples had both higher household incomes and higher educational levels than opposite-sex married couples and cohabiting couples. However, after adjusting for socioeconomic differences, same-sex cohabiting couples had worse health than opposite-sex married couples and similar health as opposite-sex cohabiting couples. These researchers also found a significant protective effect of having children in the household on partnered men's and women's self-assessed health (heterosexual and SMs alike), but the effect was significantly greater for heterosexual married women.

Factors Associated With Alcohol Use Among Sexual Minorities

Minority Stress

A variety of potential risk factors have been suggested to explain the higher prevalence of alcohol use and alcohol-related problems among SMs. The predominant theoretical explanation is minority stress (Meyer 2003). Underlying this perspective are the assumptions that minority stressors are unique (not experienced by nonstigmatized populations), chronic (related to social and cultural structures), and socially based (stemming from social processes, institutions, and structures). The minority stress perspective describes stress processes that include experiences of prejudice, expectations of such prejudice and of rejection (stigma consciousness), hiding, concealing, internalized homophobia, and ameliorative coping processes. Expectations of prejudice and discrimination and the vigilance that such expectations require vary based on individual and environmental contexts, but all SM persons are assumed to internalize society's negative attitudes toward homosexuality to some degree (internalized homophobia) (Meyer 2003).

In a large study using quantitative and qualitative methods to examine mental health and well-being among SMs in Ireland, more than 40 percent of 1,100 survey respondents reported that their drinking made them "feel bad or guilty," and almost 60 percent indicated feeling that they should reduce their alcohol consumption. Qualitative findings strongly suggested that self-medication to cope with minority stress was a primary motive for regular or heavy alcohol consumption (Mayock et al. 2008).

Analyses of the National Survey on Midlife Development in the United States found that compared with heterosexuals, SM women and men more frequently reported both discrete discrimination events (e.g., being fired from a job) and day-to-day discrimination (e.g., being called names or insulted) (Mays and Cochran 2001). Perceived discrimination was associated with reduced quality of life and with indicators of psychiatric morbidity in both SM and heterosexual respondents. Other studies have shown that harassment and discrimination based on sexual orientation are associated

with psychological distress (Herek et al. 1997; Lewis et al. 2001, 2003; Meyer 1995), loneliness (Szymanski and Chung 2001), and lower self-esteem (Szymanski et al. 2001). Relatively few studies have examined the impact of such stressors on the drinking behaviors of SMs (Hatzenbuehler et al. 2008, 2010; McCabe et al. 2010). In an early study of lesbian women and gay men, McKirnan and Peterson (1989*b*) found that stress was associated with alcohol- or drug-related problems in high-vulnerability gay men (those with greater orientation to gay bars and positive expectancies about the tension-reducing effects of alcohol). However, such associations were not statistically significant for lesbians or for low-vulnerability gay men.

Drinking Norms

Drinking behavior is governed to a large extent by social structures (rules, role expectations, norms, and values) of the individual's cultural group and by the drinking behavior of peers. Because of their history of being excluded and discriminated against in mainstream settings, many SM people have traditionally found bars to be an important venue for social interaction. Findings from the 2000 National Alcohol Survey conducted in the United States (Trocki et al. 2005) indicated that SMW spend more time in bars and party settings and consume more alcohol in these settings than do heterosexual women. Although gay men spent more time in bars than did bisexual or heterosexual men, rates of heavy drinking among men did not vary by sexual orientation across settings.

According to Cochran and colleagues (2012), the adoption of a minority sexual identity and affiliation with gay-identified communities increase exposure to more tolerant social norms regarding AOD use. These researchers found that SMs report more tolerant norms about AOD use and greater availability of these substances. These two factors also mediated a substantial portion of the relationship between minority sexual orientation and substance use.

Experiences of Victimization

Abuse, violence, and victimization are considered major life stressors and are consistently linked with long-term adverse consequences, including hazardous drinking and alcohol use disorder (Briere 1988; Dube et al. 2002; Kendler et al. 2000; Nelson et al. 2002; Wilsnack et al. 2004). For example, a review of research linking childhood abuse to alcohol use and related problems in adulthood has estimated that globally, a history of child sexual abuse accounts for 4 percent to 5 percent of alcohol misuse/dependence in men and 7 percent to 8 percent in women (Andrews et al. 2004).

SMs are at increased risk for childhood abuse compared with heterosexuals (Alvy et al. 2013; Austin et al. 2008; Drabble et al. 2013; Hughes et al. 2010*a*, 2014; Tjaden et al. 1999), thereby further increasing their risk of developing alcohol-related problems. Using a pooled sample from two large studies of U.S. women, Wilsnack and colleagues (2008) found that those who identified as lesbian, bisexual, or mostly heterosexual reported significantly higher rates of childhood sexual abuse (CSA) compared with women who identified as exclusively heterosexual. In addition, SMW reported significantly higher rates of heavy drinking, heavy episodic drinking, and symptoms of potential alcohol dependence than exclusively heterosexual women.

In addition to high rates of CSA, accumulating evidence suggests that many other forms of lifetime sexual and physical abuse, violence, and victimization also are more common among SMs (Balsam et al. 2005; Drabble et al. 2013; Hughes et al. 2010*a*). Using the pooled sample described above, Hughes and colleagues (2014) found that SMW were significantly more likely than exclusively heterosexual women to report each of six types of lifetime victimization: CSA, childhood physical abuse, childhood neglect, adult sexual assault, adult physical assault, and intimate-partner violence. The number of types of victimization experiences was positively associated with hazardous drinking among both SM and heterosexual women but contributed to higher levels of hazardous drinking among SMW.

Hughes and colleagues (2010*a*) analyzed data from the NESARC. Results supported findings from previous studies suggesting that SM women and men are at higher risk for victimization than their heterosexual counterparts. Lesbian and bisexual women were more than twice as likely as heterosexual women to report any lifetime victimization. Lesbians, gay men, and bisexual women also reported a greater number of victimization experiences. The largest difference between lesbian and heterosexual women was in reports of CSA: 3 times as many lesbians (34.7 percent) as heterosexual women (10.3 percent) reported this experience (see figure). Bisexual women also were more likely than heterosexual women to report CSA, as well as three other lifetime victimization experiences. Women who reported two or more victimization experiences had two to four times the odds of alcohol dependence and drug use disorders as women who reported no victimization. Lesbians who reported childhood neglect had more than 30 times the odds of alcohol dependence as heterosexual women who reported neglect. In contrast, although gay men were significantly more likely than heterosexual men to report four of seven victimization experiences, these differences did not increase gay men's risk of substance use disorders (SUDs). Bisexual men were similar to heterosexual men in prevalence of victimization experiences, but associations between victimization and SUDs were stronger in bisexual men.

In addition to SMW's higher rates of childhood victimization, the severity of victimization experiences also may vary by sexual orientation. Two recent studies have found that women who

self-identify as lesbian report significantly greater severity of CSA (Wilsnack et al. 2012) and of childhood physical abuse (Alvy et al. 2013) than do women who identify as heterosexual.

Higher rates of victimization among SMs, especially SM youth, may be related to gender-atypical appearance and behavior. For example, in a recent review of findings from 12 countries (Australia, Austria, Belgium, Canada, Israel, Japan, the Netherlands, New Zealand, Norway, South Africa, the United Kingdom, and the United States), Collier and colleagues (2013) found that sexual orientation and gender expression were associated with peer victimization, which in turn was related to AOD abuse. Similarly, gender-atypical behavior was associated with more negative parental relationships (D'Augelli et al. 2008; Ryan et al. 2009), a factor that can lead youth to run away from home and/or to be more likely to participate in situations that put them at risk for victimization.

Societal Attitudes and Policies Regarding SMs

SMs and their families now are experiencing increasing public support and access to legal rights, such as marriage, in some parts of the world. According to the Pew Research Center, as of June 26, 2015, 22 countries worldwide permitted lesbian women and gay men to marry their same-sex partners, and same-sex marriage is legal in some parts of Mexico (Pew Research Center 2015). Although attitudes toward SMs also are changing in some other parts of the world, most people (and thus the majority of SM people) live in countries with strong anti-gay policies. In 2014, it was estimated that 2.79 billion people live in countries where being openly gay or lesbian is punishable by imprisonment or death—a number 7 times greater than those who live in countries with laws that recognize same-sex marriage (Ball 2014).

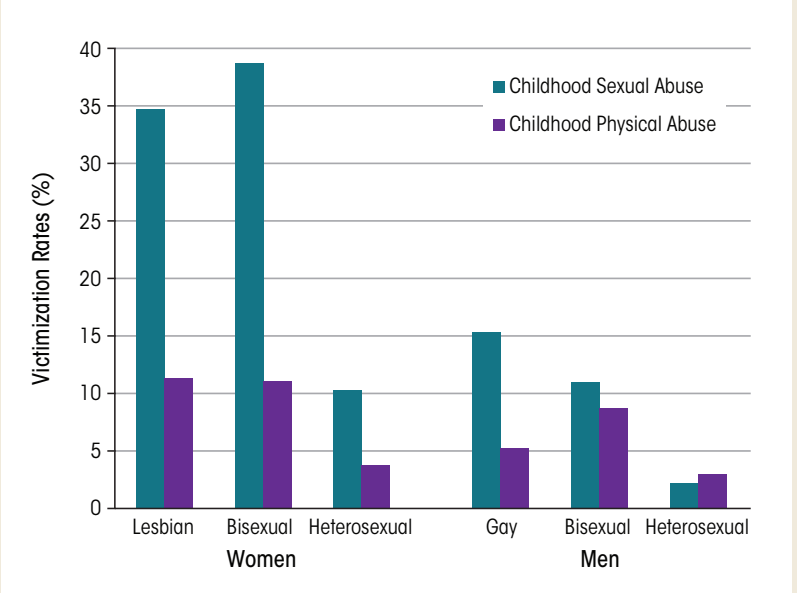

Figure Victimization rates among lesbian/gay, bisexual, and heterosexual women and men, based on findings from the National Epidemiologic Survey on Alcohol and Related Conditions, a nationally representative survey of U.S. adults.

SOURCE: Hughes et al. 2010*a*.

Increasing evidence throughout many parts of the world documents the negative effects of stigma, discrimination, and criminalization on SM people's health, including minority stress, depression, and fear of seeking help (Kates 2014). Whether and how the World Health Organization (WHO) should address SM health has been debated over the past few years. Although opposition from a number of African and Middle Eastern countries has prevented this topic from being included on the WHO agenda (Daulaire 2014), the Pan-American Health Organization (PAHO), the WHO regional arm representing the Americas, unanimously passed a resolution addressing SM health, including discrimination in the health sector. This marks the first time any United Nations body has adopted a resolution specifically addressing these issues (PAHO 2012, 2013).

Research suggests that societal norms and policies that discriminate against SMs increase the risk of alcohol use disorder for SMs. For example, one U.S. study that examined the relationship between State-level policies and psychiatric morbidity found that lesbians, gays, and bisexuals who lived in States without protective policies toward SMs (e.g., laws against hate crimes and employment discrimination) had higher odds of alcohol use disorder than those who lived in States with protective policies (Hatzenbuehler et al. 2009). The authors also examined psychiatric morbidity among SMs before (2001–2002) and after (2004–2005) States had enacted same-sex marriage bans (Hatzenbuehler et al. 2010). Mood disorder (36.6 percent), generalized anxiety disorder (248.2 percent), and alcohol use disorder (41.9 percent) all increased significantly among SM residents in these States between the 2 data collection points. Psychiatric disorders did not significantly differ over time among SMs living in States without marriage bans. In addition, the researchers found statistically significant increases in generalized anxiety, panic, and

alcohol use disorder among heterosexuals living in States with the bans, but these increases were not of the same magnitude as those experienced by SMs.

Conclusions/Recommendations/Future Directions

What Explains the "Gender Paradox"?

This review has documented clear differences in gender-related patterns of alcohol use between heterosexual and SM persons. Specifically, most studies that ask about sexual orientation find that SMW substantially exceed heterosexual women in high-risk drinking and adverse drinking consequences, whereas SMM may exceed heterosexual men but by a much smaller margin, if at all. This creates a "gender paradox": heterosexual men typically drink much more than heterosexual women, but the reverse is true among SM men and women.

An intriguing question is why these sexual orientation differences exist, and what they can tell us about gender and alcohol use more generally. In our opinion, one important factor contributing to the gender paradox is the differential adoption of traditional gender roles by SMs compared with heterosexuals. There is ample evidence that culturally defined gender roles in most societies link alcohol use (and especially heavier use) more closely with traditional masculine roles than with traditional feminine ones. As discussed earlier, men in many cultures use alcohol to demonstrate masculine gender superiority and power, whereas women's drinking is limited by cultural beliefs that drinking could threaten their performance of traditional feminine roles as mothers, caretakers, and controllers of men's drinking (Holmila and Raitasalo 2005; Wilsnack et al. 2005). To the extent that SM persons of both genders reject these traditional gender roles and expectations (Lippa 2000), SMW would be expected to drink more than heterosexual women and SMM would feel less pressure to engage in traditionally masculine heavy drinking. Thus, whereas minority stress may contribute to greater risk of drinking in both SM women and men (Hatzenbuehler 2009; Meyer 2003), relative freedom from traditional gender roles would predict larger increases in drinking by SM women than SM men, reversing the heterosexual pattern of men's drinking exceeding women's.

Additional influences may contribute to the gender paradox. For example, gay men may drink less due to weight and body image concerns (Kimmel and Mahalik 2005) or to greater socialization with heterosexual women, who evoke less pressure toward heavy drinking (van Griensven et al. 2004), and SMW's greater dependence on gay bars as venues for socialization may increase their risks of frequent and/or heavy drinking (Kuang et al. 2004; Trocki et al. 2005). However, the important links between traditional gender roles and heavier versus lighter drinking seem of central importance in understanding both the heavier drinking by heterosexual men than heterosexual women *and* the reversal of this pattern among SM women and SM men. This interpretation of the gender paradox also suggests that social change (and intentional intervention efforts) that produce less gender-role differentiation and greater gender-role flexibility could help to reduce gender-role–related alcohol use and alcohol problems among both heterosexual and SM women and men.

Research

Sexual Minority Research

Until the advent of HIV/AIDS in the 1980s, there was almost no funding for SM health research. Since then, apart from HIV/AIDS, there has been relatively little funding for research with SMs—even in the United States, where most of this research has been done. Recently, Coulter and colleagues (2014) conducted a review of grants funded by the National Institutes of Health (NIH). Between 1989 and 2011, apart from studies of HIV/AIDS, only 0.1 percent of all NIH-funded studies focused on SMs. Of these, most have focused on SMM, with only 13.5 percent focusing on SMW and only 13 percent of funded SM studies focusing on alcohol use. The dearth of funding is a major contributor to gaps in knowledge, especially in non-Western countries. In addition, researchers throughout the world who study SM health must move beyond the focus on disease and deviance, to also study strengths and resilience factors among SMs. And just as women (or men) should not be considered a single homogeneous group, SM people are extremely diverse in terms of their health behaviors and health outcomes (Boehmer 2002). Future research must take into account the nuances of gender and gender identity, sexual orientation, and culture as well as economic and social resources.

Gender and Alcohol Research

To some extent, research on sexual orientation disparities in alcohol use and related problems is following a trajectory similar to that of research on women and alcohol. Until the 1970s, research on alcohol use and misuse gave little attention to drinking by women; when women were even considered, it was assumed that their drinking and its consequences would be similar to those of men. In 1970, only 28 English-language alcohol research articles could be found that included women as research participants (Sandmaier 1980). Research on women's drinking, and on how gender is related to alcohol use and its consequences, has increased dramatically since the 1970s, to the point where more than 1,000 new articles related to gender and alcohol are published each year (Wilsnack and Wilsnack 2013). Reasons for the increased attention paid to women and gender

include effects of the U.S. women's movement of the 1960s and 1970s, growing awareness of fetal alcohol syndrome and other adverse outcomes of alcohol use in pregnancy, and a gradual recognition in medical and behavioral science that many diseases and disorders could not be understood and adequately prevented or treated without taking into account the multiple ways they are affected by gender.

Like research on SMs, research on women's drinking initially focused on comparisons between women (as a homogeneous group) and men (as an equally homogeneous group). Only gradually did investigators begin to explore variations *within* gender groups—by age, race/ethnicity, and socioeconomic status, and eventually by sexual orientation. We hope that this trend toward greater attention to within-group variations will also continue in research on SMs, and that the sections on demographic differences in this article (e.g., by age, race/ethnicity, and SES) will help to accelerate this trend.

Prevention, Intervention, and Treatment

Research on treatment for AOD use disorders among women and men in the general population comprises a large and growing body of literature whose review is beyond the scope of this article. However, it may be helpful to highlight a few investigations that have focused on treatment issues specifically relevant to SM persons and to consider factors that may influence SM women and men's access to and benefit from AOD interventions.

Interventions to promote the health of SMs need to address the intersections of multiple minority statuses (e.g., minority sexual orientation, minority race/ethnicity, female gender) and issues such as power, stigma, and victimization (Hatzenbuehler et al. 2013). Positive strategies such as strengthening resilience and promoting family, community, and workplace acceptance have the potential to contribute to long-term health promotion for SM women and men.

Both gender and SM status may affect a person's ability to find substance abuse treatment that is accessible, affordable, and socially and culturally appropriate. A 2007 review concluded that, although women-only treatment is not necessarily more effective than mixed-gender treatment, treatment approaches that address problems facing substance-abusing women, or that are designed for specific subgroups of women, are more effective (Greenfield et al. 2007).

Along the same lines, SM men and women may benefit from specialized treatment programs especially designed to address the unique issues of SMs, such as coming out; internalized homophobia; violence and discrimination; socialization, dating, and intimacy; family support; and spirituality and religion (Hicks 2000). It may be difficult to find such programs, however, and the lack of available programs may affect choice of and satisfaction with treatment. A telephone survey of substance abuse programs (Cochran et al. 2007*a*) found that 71 percent of agencies with listings indicating sexual minority-specific services did not in fact offer such services. Only 7.4 percent had any kind of specifically tailored treatment.

Using NESARC data to evaluate use of substance abuse treatment among SM adults, McCabe and colleagues (2013) found that, despite having a higher rate of substance use disorders, women who self-identified as lesbian or who reported only same-sex attraction or behavior did not enter substance abuse treatment more often than heterosexual women. The researchers did not find any significant differences in health insurance coverage between lesbian and heterosexual respondents. Likewise, research has found that SM men and women have lower levels of satisfaction with substance abuse treatment compared with heterosexuals (Drabble et al. 2005; Senreich 2009).

In conclusion, although research and clinical interventions are important, broader social and political action is needed to address social determinants of health and to remove barriers to opportunity and equality, whether these barriers are based on gender, minority sexual orientation, age, minority race/ethnicity, low SES, or other marginalized statuses. Such social action may be the ultimate prevention strategy, not only for negative alcohol-related outcomes but also for a wide variety of other health and social problems that affect both SMs and heterosexual persons throughout the world.

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Associations Between Socioeconomic Factors and Alcohol Outcomes

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Socioeconomic status (SES) is one of the many factors influencing a person's alcohol use and related outcomes. Findings have indicated that people with higher SES may consume similar or greater amounts of alcohol compared with people with lower SES, although the latter group seems to bear a disproportionate burden of negative alcohol-related consequences. These associations are further complicated by a variety of moderating factors, such as race, ethnicity, and gender. Thus, among individuals with lower SES, members of further marginalized communities, such as racial and ethnic minorities and homeless individuals, experience greater alcohol-related consequences. Future studies are needed to more fully explore the underlying mechanisms of the relationship between SES and alcohol outcomes. This knowledge should be applied toward the development of multilevel interventions that address not only individual-level risks but also economic disparities that have precipitated and maintained a disproportionate level of alcohol-related consequences among more marginalized and vulnerable populations.

Key words: Alcohol consumption; alcohol-related problems; alcohol-related consequences; special populations; socioeconomic status; socioeconomic factors; economic disparities; racial minority; ethnic minority; homeless

According to the World Health Organization (2014), alcohol consumption is responsible for approximately 5.9 percent of deaths worldwide and a global loss of 139 million disability-adjusted life-years. The alcohol-related disease burden is precipitated in part by acute intoxication, which decreases reaction time, perception and motor skills, and inhibitions and is thereby associated with an increased risk for traffic accidents, self-inflicted injuries, suicide, falls, drownings, alcohol poisoning, and interpersonal violence. Longer-term effects of alcohol consumption also contribute to the disease burden by way of various medical conditions (e.g., cancer, cardiovascular disease, and liver cirrhosis) and psychiatric disorders (e.g., depression and alcohol use disorder [AUD]). Given the strong positive association between alcohol use and negative alcohol-related consequences, it is important to understand social determinants of these alcohol outcomes.

The quantity and frequency of a person's alcohol use, the resulting negative alcohol-related consequences (also known as alcohol-related problems), and his or her risk of AUD are determined by a variety of influences. These include higher-level chrono- and macrolevel factors, such as historical time and geopolitical context, as well as meso-, micro-, and individual-level factors, such as community context, family/peer influences, biological predisposition, effects of prenatal alcohol exposure, psychological factors, and sociodemographic features (e.g., gender, age, race, ethnicity, culture, religious affiliation, and socioeconomic status [SES]) (Edwards 2000; Gately 2008). These factors, which operate within various systems and levels, interact and transact over time to determine alcohol-related outcomes, such as drinking patterns and negative alcohol-related consequences (Gruenewald et al. 2014; Holder 1998).

This article focuses on one particular aspect of this complex set of systems, namely the relationship between SES—including income/economic factors, educational level, employment status, and housing status—and alcohol-related outcomes. It synthesizes data primarily obtained from English-language systematic reviews and meta-analyses that were based on studies conducted in the past decade involving adult populations (for a summary of these reviews and meta-analyses, see table 1). In some cases, these analyses were limited to studies from only one country, whereas other analyses were

cross-national. In any case, caution must be used when interpreting these findings, because the cultural and political contexts in which these phenomena occur can differ widely. In addition, this article reviews some larger, population-based studies (see table 2), particularly those that were not addressed within the included reviews and which directly assess the association between SES and alcohol consumption and related outcomes. Although most of the studies only included adults, a few also involved adolescents when meta-analyses and reviews did not exclude such studies.

Across the studies discussed in this article, SES has been operationalized on various levels (e.g., individual, area/neighborhood, and national levels) using a variety of parameters, such as personal income and debt, family or household income, educational level, employment status, and housing status; neighborhood or area disadvantage; and gross national income. Although these variables often are interrelated, this article addresses economic, income, and educational factors; employment status; and housing status in separate sections to facilitate interpretation of the overall findings.

Alcohol-related variables evaluated in this article, which were assessed either cross-sectionally or longitudinally, include the following:

- Alcohol use, which is operationalized either continuously (e.g., by quantity and/or frequency of alcohol use or heavy episodic drinking [HED],[1] defined as consuming four or more drinks per episode for women and five or more drinks per episode for men), or dichotomously by alcohol-use status (e.g., ever-drinker, heavy drinker, heavy episodic drinker);
- Presence of AUD; and
- Alcohol-related problems, including alcohol-related mortality.

It is important to keep in mind that these are outcomes at the individual level; however, alcohol use and misuse certainly also have consequences at the familial, community, or societal levels. A discussion of these consequences is outside of the scope of this article.

The article first summarizes cross-sectional perspectives on the associations of socioeconomic variables such as income, economic factors, and educational level with the quantity and frequency of alcohol use as well as negative alcohol-related consequences. In addition, it reviews the findings of longitudinal analyses regarding the associations between SES and alcohol-related outcomes before focusing on studies assessing two specific socioeconomic variables—i.e., employment status and housing—and their relationship with alcohol outcomes and touching on the effects of changes in SES on alcohol use and its consequences. A discussion of the limitations of the existing research and future directions concludes the review. Note that in some of the studies discussed, alcohol-related variables have been collapsed with other drug-related variables (e.g., any alcohol or other drug [AOD] use, alcohol and nicotine dependence), and this is noted accordingly.

Cross-Sectional Associations Between SES Variables and Alcohol Outcomes

Quantity and Frequency of Alcohol Use

In the past decade, several population-based studies, but no meta-analyses or systematic reviews, have assessed the cross-sectional relationship between snapshots of SES and quantity and/or frequency of alcohol use. These studies typically have focused on either individual-level (e.g., personal income, debt, or education) or area-level (e.g., neighborhood median income or economic disparities in a given region) SES variables.

The Centers for Disease Control and Prevention (CDC) (2012) conducted a population-based study of the association between HED and several SES-related variables among adults (N = 457,677) in 48 States and Washington, DC. The findings indicated that people who did not graduate from high school and had a low income had the lowest prevalence of HED. In fact, HED prevalence increased with household income and was highest among those with a household income greater than $75,000 a year. However, among those respondents who did engage in HED, those who reported the lowest educational and income levels reported the highest frequency of HED and the highest quantity consumed per occasion (CDC 2012). Another population-based study conducted in New York City at the neighborhood level yielded similar findings (Galea et al. 2007). Specifically, the neighborhoods with the highest income and with the greatest income disparities showed the highest prevalence of alcohol use as well as greater frequency of drinking. Similarly, analysis of data from a large, population-based survey called the Panel Study of Income Dynamics demonstrated that three indicators of family-background SES—income, wealth, and parental education—predicted alcohol use in young adults (Patrick et al. 2012). Young adults with the highest family-background SES reported greater alcohol use, and those with greater family wealth reported higher monthly HED prevalence. It is conceivable, however, that other factors, such as regional differences or personal characteristics (e.g., religiosity) may influence these associations.

A few studies have examined alternative operationalizations of individual-level SES by looking at each participant's subjective assessment of his or her social status (Finch et al. 2013) or personal unsecured debt (Richardson et al. 2013). Finch and colleagues

[1] The terms "heavy episodic drinking" and "binge drinking" have sometimes been used synonymously. The latter, however, has fallen out of favor with some alcohol researchers and treatment professionals because it can be confused with a longer-term and more extreme alcohol-use period than is typically referred to as a heavy drinking episode.

Table 1 Summary of Meta-Analyses and Reviews of Cross-National Studies Reporting on the Association Between Socioeconomic Status (SES) and Alcohol Outcomes

Authors	Type	Number of Studies Included	Variables Analyzed	Main Findings Regarding the Association Between SES and Alcohol Outcomes
Bryden et al. 2013	Systematic review	48	Association between community-level social factors and alcohol use among adults and adolescents	• Findings were inconclusive for associations between alcohol use and deprivation, poverty, income, unemployment, social disorder, and crime. • Social-capital characteristics (e.g., social support, community cohesion, social participation, supportiveness) may protect against alcohol use.
Fazel et al. 2008	Meta-analysis	29 (n = 5,684)	Prevalence of psychiatric disorders among homeless people	• Prevalence of psychiatric disorders varied greatly among studies. • The most common psychiatric disorders were alcohol dependence (prevalence 8.1 to 58.5 percent) and drug dependence (prevalence 4.5 to 54.2 percent).
Grittner et al. 2012	Meta-analysis	Survey data from 42,655 individuals in 25 countries participating in the Gender, Alcohol and Culture: An International Study (GENACIS)	Association of country-level characteristics and individual SES and individual alcohol-related consequences	• Lower gross national income was associated with more social problems in men. • Lower educational attainment was associated with more reported alcohol-related consequences at comparable drinking levels in both men and women.
Karriker-Jaffe 2011	Systematic review	41; 34 studies used for main analysis	Association between area-level disadvantage and substance use	• Strong evidence suggested that substance-use outcomes cluster by geographic area. • There was limited/conflicting support that area-level disadvantage is associated with increased substance use. • The association between area-level disadvantage and substance use seemed to vary according to age, ethnicity, size of area examined, type of SES measure, specific outcome analyzed, and analysis techniques.
Probst et al. 2014	Meta-analysis	15	Association between SES and alcohol-related mortality vs. all-cause mortality	• For both men and women, lower SES was associated with 1.5- to 2-times-higher alcohol-related mortality compared with all-cause mortality. • Alcohol consumption and SES interacted to lead to greater harm in people with lower SES even at comparable levels of alcohol consumption.
Richardson et al. 2013	Meta-analysis	65, including 5 studies (n = 26,706) assessing problem drinking	Association between personal, unsecured debt and health outcomes (eg, various mental disorders, suicide attempt or completion, problem drinking, drug dependence)	• Most studies found that more debt is related to worse health (i.e., increased odds of mental disorders, alcohol and drug dependence, suicide attempt or completion). • A significant relationship existed between debt and problem drinking (odds ratio = 2.68).
Wiles et al. 2007	Systematic review	19 longitudinal studies	Association between childhood SES and alcohol use later in life	• Evidence indicated only weak and inconsistent associations between lower childhood SES and later alcohol use and abuse.

(2013) found that subjective social status was not associated with level of alcohol use; however, consistent with the findings of other studies, personal and household income were positively correlated with alcohol-use quantity and frequency as well as frequency of HED. Richardson and colleagues (2013) conducted a meta-analysis of 65 studies examining the effects of personal, unsecured debt on various health outcomes, including 5 studies that included alcohol-related outcomes. The findings from those studies indicated that personal, unsecured debt was associated with 2.68 times higher odds of "problem drinking," which was variously defined as higher quantity/frequency of alcohol use, HED, or presence of AUD.

In another review of 41 studies, Karriker-Jaffe (2011) examined whether area-level disadvantage (i.e., the effects of living in a certain neighborhood, zone, county, or country) was associated with increased AOD use. The studies included in the analysis assessed the impact of a wide range of area-level SES effects. The review concluded that residents in a given area were relatively similar in their AOD use (i.e., AOD-use outcomes clustered by geographic area). However, the studies reviewed provided only limited and conflicting support for the hypothesis that area-level disadvantage was associated with increased AOD use, with some effects supporting the hypothesis and others pointing in the opposite direction (i.e., indicating that area affluence was associated with increased alcohol use). A wide range of factors related to the populations studied (e.g., age and ethnicity), the size of the areas examined, the specific SES measures used, the specific outcomes evaluated, and the analytic techniques employed all seemed to influence the association between SES and AOD use. Similarly, in a review of 48 studies, Bryden and colleagues (2013) reported inconclusive findings regarding the association between alcohol use and various measures of SES (e.g., neighborhood deprivation, poverty, income levels, and unemployment). The analyses did, however, offer area-level corroboration of the conclusions from individual-level studies because there was some indication that adults living in higher-income areas reported greater alcohol use. The findings also indicated a protective effect of the level of community participation and involvement on alcohol use.

Another population-based study (Karriker-Jaffe et al. 2012) that used data from the 2000 U.S. Census and the 2000 and 2005 National Alcohol Surveys (NAS) (N = 13,864) examined relationships between neighborhood disadvantage (i.e., low levels of education, employment, and income/financial assets) and several parameters, including levels of abstinence, heavy drinking, and negative alcohol-related consequences. Analyses using various models incorporating both individual-level and neighborhood-level measures indicated that individual-level SES had the strongest impact on drinking patterns and consequences. When such individual-level factors were removed from the models, neighborhoods with lower SES were characterized by greater prevalence of alcohol abstinence compared with neighborhoods with higher SES, although among those who did drink, neighborhood disadvantage was associated with heavy drinking and negative alcohol-related consequences. These associations were moderated by various demographic characteristics, such as race/ethnicity and gender. Thus, African-American and Hispanic men were excluded from the protective effect of neighborhood disadvantage on risk of any drinking. Furthermore, neighborhood disadvantage was associated with reduced heavy drinking for European Americans but with increased heavy drinking for African Americans.

To some extent the racial/ethnic differences may be the result of different levels of exposure to social disadvantage. Thus, in a separate analysis of data from the 2005 NAS (Mulia et al. 2008) that compared the relationship among social disadvantage, stress, and alcohol use among Black, Hispanic, and White Americans, the investigators found that for all three racial/ethnic groups, exposure to social disadvantage (e.g., greater poverty, unfair treatment, racial or ethnic stigma) was associated with problem drinking. However, Blacks and Hispanics reported greater exposure to social disadvantage than Whites, which may account for higher rates of problem drinking.

Additional analyses of data from the 2000 U.S. Census and 2000 and 2005 NAS (Mulia and Karriker-Jaffe 2012) further identified interactions between individual-level and neighborhood SES that influenced alcohol consumption and related problems. Among men, living in a neighborhood with higher SES was associated with higher odds of heavy drinking and intoxication only among those with a low individual SES compared with men with a middle or higher SES living in the same advantaged neighborhoods. In contrast, neighborhood disadvantage was associated with an increased risk for alcohol-related problems in women, and individual-level SES did not seem to influence this association.

Alcohol-Related Harm and AUD

Studies have shown a strong association between SES and alcohol-related mortality, the most severe form of alcohol-related harm. In a meta-analysis of 15 studies capturing data on approximately 133 million people worldwide, Probst and colleagues (2014) examined the association between SES (operationalized as a pooled measure reflecting occupation, employment status, income, and education) and alcohol-related mortality as well as all-cause mortality. The analyses found that lower SES increased the risk of alcohol-related mortality by 66 percent for men and 78 percent for women compared with all-cause mortality.

Additional studies have supported these findings. In a recent study involving data from the U.S. Health and Retirement survey (N = 8,037), being in the most disadvantaged SES

Table 2 Summary of the Design and Main Findings of Population-Based Studies Concerning the Association Between Socioeconomic Status (SES) and Alcohol Outcomes

Authors	Type; Country of Study	Number of Participants	Variables Analyzed	Main Findings Regarding the Association Between SES and Alcohol Outcomes
Berg et al. 2013	Longitudinal; Finland	1,334	Association between drinking trajectories and adult health and socioeconomic disadvantage	• Among Finnish men, those with a steady high or increasing drinking trajectory had an increased risk of experiencing health and economic disadvantage. • Among Finnish women, those with a steady high drinking trajectory had an increased risk of almost all health and economic disadvantages.
Blomgren et al. 2004	Cross-sectional; Finland	1.1 million	Association between individual-level and area-level SES characteristics and alcohol-related mortality	• Individual-level socioeconomic and cultural factors were protective against alcohol-related mortality. • Some, but not all, area-level factors were protective against alcohol-related mortality. • Individual-level SES factors had a greater impact than area-level factors.
Centers for Disease Control and Prevention 2012	Cross-sectional; United States	457,677	Prevalence, frequency, and intensity of heavy episodic drinking (HED) and influence of various sociodemographic variables	• Overall prevalence of HED was 17.1 percent; among binge drinkers the average frequency was 4.4 episodes per month and the average intensity was 7.9 drinks per occasion. • With respect to household income, binge-drinking prevalence was highest among those with the highest income (> $75,000), but frequency and intensity were highest among those with the lowest income (< $25,000).
Collins et al. 2012	Longitudinal; United States	95	Association between project-based Housing First and alcohol-use trajectories among homeless people	• Time spent in low-barrier, non–abstinence-based, permanent, supportive housing (Housing First model) was associated with declining alcohol use. • Greater number of months spent in housing predicted additional decreases in alcohol use.
Compton et al. 2014	Cross-sectional; United States	Ca. 405,000	Association between employment status and alcohol and other drug outcomes	• Unemployment was associated with higher rates of heavy alcohol use, past-year alcohol and other drug abuse/dependence, and past-month tobacco and illicit drug use. • Marked increases in unemployment rates during the recent recession did not moderate these associations.
Fothergill and Ensminger 2006	Longitudinal; United States	1,242	Association between childhood/adolescent antecedents and adult alcohol and drug problems in African Americans	• Educational attainment was associated with reduced risk of substance-use problems.
Galea et al. 2007	Cross-sectional; United States	1,355	Association between neighborhood income and income distribution and prevalence and frequency of alcohol and other drug use	• Neighborhoods with both the highest income and the highest income maldistribution had the highest prevalence of alcohol use. • On an individual level, both high neighborhood income and income maldistribution were associated with greater likelihood of alcohol use as well as with greater frequency of alcohol use.

Table 2 Summary of the Design and Main Findings of Population-Based Studies Concerning the Association Between Socioeconomic Status (SES) and Alcohol Outcomes *(continued)*

Authors	Type; Country of Study	Number of Participants	Variables Analyzed	Main Findings Regarding the Association Between SES and Alcohol Outcomes
Karriker-Jaffe et al. 2012	Cross-sectional; United States	13,864	Association between neighborhood disadvantage and alcohol outcomes (drinking, heavy drinking, alcohol-related consequences, dependence)	• Neighborhood disadvantage was significantly associated with increased abstinence among all groups except for African-American and Hispanic/Latino men. • Neighborhood disadvantage was inversely associated with heavy drinking for White drinkers but positively associated with heavy drinking for African-American drinkers. • Neighborhood disadvantage was marginally associated with elevated alcohol-related consequences among those who do drink, particularly among African-American men and White women.
Karriker-Jaffe et al. 2013	Cross-sectional; United States	13,997	Association between State-level income inequality (Black–White and Hispanic–White poverty ratios) and alcohol outcomes	• Higher Black–White poverty ratios were associated with higher levels of light and heavy drinking among Whites and Blacks. • Higher Black–White poverty ratios were associated with increased alcohol-related consequences and dependence for Blacks. • Higher Hispanic–White poverty ratios were associated with higher levels of light drinking by Whites and Hispanics. • Higher Hispanic–White poverty ratios were associated with increased alcohol-related consequences and dependence for Hispanics.
Melchior et al. 2006	Longitudinal; France	20,570	Association between socioeconomic trajectory and mortality	• Steadily disadvantaged SES or downward SES trajectory increased risk of premature all-cause mortality. • Alcohol consumption was one of the factors explaining this association.
Mulia and Karriker-Jaffe 2012	Cross-sectional; United States	8,728	Association between neighborhood and individual SES and alcohol use and alcohol-related problems	• For men with low SES, living in a neighborhood with a high SES was associated with increased risk drinking, intoxication, and alcohol-related problems. • For women, living in a neighborhood with low SES was associated with increased risk of alcohol problems, but no interactions existed with individual SES.
Mulia et al. 2008	Cross-sectional; United States	6,631	Association between social disadvantage (poverty level, frequency of unfair treatment, racial/ethnic stigma consciousness) and alcohol outcomes (drinking, at-risk drinking, problem drinking)	• Blacks and Hispanics reported greater exposure to social disadvantage than Whites. • In all groups, exposure to social disadvantage was associated with problem drinking. • Frequent unfair treatment, high racial stigma, and extreme disadvantage was associated with 2 to 6 times greater experience of alcohol problems. • The association can be partially explained by psychological distress.
Mulia et al. 2014	Cross-sectional; United States	5,382	Association between types of economic loss and alcohol outcomes	• Severe economic loss (job, housing) was positively associated with negative drinking consequences, alcohol dependence, and, marginally, with intoxication. • Moderate economic loss (retirement savings, reduced hours/wages, trouble paying bills) was unassociated with alcohol outcomes. • Gender and age moderated these associations.

Table 2 Summary of the Design and Main Findings of Population-Based Studies Concerning the Association Between Socioeconomic Status (SES) and Alcohol Outcomes *(continued)*

Authors	Type; Country of Study	Number of Participants	Variables Analyzed	Main Findings Regarding the Association Between SES and Alcohol Outcomes
Murphy et al. 2014	Cross-sectional; United States	5,307	Association between housing instability and alcohol outcomes (social, legal, work-related, health, injuries/accidents) during the 2007–2009 U.S. recession	• Both unstable and lost housing were associated with more alcohol problems and alcohol dependence symptoms. • Perceived family support moderated the associations. Greater family support was associated with fewer alcohol problems, irrespective of housing instability. • Job loss was not associated with alcohol outcomes if housing instability was included in the analysis.
Nandi et al. 2014	Cross-sectional; United States	8,037	Associations between SES, health behaviors (drinking, smoking, physical inactivity), and all-cause mortality	• Being in the subpopulation with the lowest SES was associated with increased mortality. • Drinking, smoking, and physical inactivity accounted for about two-thirds of the increased mortality risk.
Patrick et al. 2012	Cross-sectional; United States	1,203	Association between family SES (income, wealth, parental education) and substance use (drinking, smoking, marijuana use) in young adults	• Alcohol and marijuana use in young adults were associated with higher family SES. • HED in young adults was most strongly predicted by greater family wealth. • Smoking in young adults was associated with lower family SES.
Platt et al. 2010	Longitudinal; United States	6,787	Association between drinking trajectories and various personal characteristics in older adults	• Alcohol consumption declined for most adults studied, with substantial variation in the rate of decline; in a minority, alcohol consumption increased. • High SES (affluence, high educational attainment) was associated with increasing alcohol consumption over time.
Poonawalla et al. 2014	Longitudinal; United States	1,356	Association of changes in family income with adolescent alcohol use and smoking	• Family income trajectory was associated with past-year alcohol use at age 15 and ever-smoking at age 15. • Children of families with declining SES were more likely to drink than were children from the most advantaged and most disadvantaged families.
Popovici and French 2013	Cross-sectional; United States	43,093	Association between employment status and alcohol outcomes	• Job loss during the past year was positively associated with average daily alcohol consumption, frequency of HED, and alcohol abuse or dependence.
Tompsett et al. 2013	Longitudinal; United States	371	Association between substance abuse, affiliation with substance-using peers, and homelessness	• Recent homelessness and affiliation with alcohol-using friends was associated with increased risk of alcohol abuse. • The influence of alcohol-using friends on alcohol abuse decreased over time. • The duration of initial homelessness did not influence substance abuse over time.
Zemore et al. 2013	Cross-sectional; United States	5,382	Associations among race/ethnicity, economic loss, and drinking	• After experiencing severe economic loss, Blacks were more likely to experience alcohol-related problems and alcohol dependence compared with Whites. • The associations between economic loss and alcohol outcomes were weak/ambiguous for Hispanics.

quartile was associated with a 2.84 times greater risk of all-cause mortality than being in the most advantaged quartile. Mediating factors, including alcohol use, smoking, and physical inactivity, significantly and collectively accounted for 68 percent of this all-cause mortality (Nandi et al. 2014). Further, a Finnish study of men ages 25–64 showed that individual-level socioeconomic (i.e., higher education and occupation status) and cultural (i.e., being part of the Swedish-speaking minority) factors were protective against alcohol-related mortality. As with the association with alcohol use discussed earlier, these factors typically dwarfed the influence of area-level factors (Blomgren et al. 2004). Thus, neither area-level median income nor income inequality was associated with alcohol-related mortality. Nevertheless, some area-level SES variables (i.e., percentage of manual laborers and unemployment) were significant risk factors for alcohol-related mortality when explored on their own.

Other investigators have focused on negative alcohol-related consequences beyond mortality. A meta-analysis of cross-sectional surveys conducted across 25 countries (N = 42,655) indicated that men and women with less education were more likely to report negative alcohol-related consequences than their more educated counterparts—even after controlling for drinking patterns (Grittner et al. 2012). In addition, men from countries with lower gross national incomes reported more societal consequences of drinking compared with men from countries with higher gross national incomes (Grittner et al. 2012). Again, these effects of SES-related variables on negative alcohol-related consequences may be moderated by other individual-level factors, such as race and ethnicity. A recent population-based study in the United States (N = 13,997) that explored socioeconomic disparity by race and ethnicity (Karriker-Jaffe et al. 2013) determined that in States with greater between-race income inequality, African-American and Latino/Hispanic individuals were at greater risk for negative alcohol-related consequences and alcohol dependence than were European-American individuals.

Finally, Lee and colleagues (2013) evaluated the relationship between SES and AUD in a study (N = 808) of substance-use (i.e., alcohol, nicotine, and cannabis) and psychiatric-disorder (i.e., depression and anxiety) latent classes. The study identified four groups of participants: those with virtually no symptoms of mental health or substance-use problems, those with symptoms of licit-substance use disorders (mostly alcohol and nicotine dependence), those with mental health disorder symptoms, and those with comorbid symptoms of all five mental health and substance-use indicators. The analysis suggested that the relationship between SES and AUD is not simply unidirectional but that effects actually occur in both directions. Thus, the investigators found that people who did not earn their high school diploma by age 21 were more than twice as likely to belong to the alcohol- and nicotine-dependence group and six times more likely to belong to the comorbid-symptoms group compared with those who had achieved a higher educational attainment. At the same time, people with greater alcohol- and nicotine-dependence symptoms or comorbid symptomatology achieved lower wealth accumulation at age 30 compared with people with low overall symptom experience (Lee et al. 2013). Taken together, these findings indicate a strong, bidirectional relationship between SES and alcohol-related harm. Specifically, people with lower SES tend to experience more negative alcohol-related consequences than people with higher SES. Further, people with greater experience of negative alcohol-related consequences tend to have lower income.

Longitudinal Associations Between SES and Alcohol Outcomes

Looking beyond static and cross-sectional relationships of SES and alcohol use and its consequences is important for understanding developmental changes in alcohol-related variables as a function of changing SES and vice versa. These associations have been studied using a variety of strategies. A few studies have examined the relationship between childhood SES and later alcohol use and related outcomes, often without identifying a clear association. For example, a systematic review of 19 international longitudinal studies of childhood SES and alcohol use in adulthood only revealed weak and inconsistent associations between childhood SES and later drinking (Wiles et al. 2007). Another 25-year longitudinal study that followed African-American children through young adulthood (N = 1,242) found no significant direct effects of childhood SES (i.e., parental education and family income) on later AOD problems (Fothergill and Ensminger 2006). However, the study did identify significant indirect effects of lower SES, such that lower SES predicted fewer years of education, which in turn increased the risk for AOD problems.

Poonawalla and colleagues (2014) used a different approach by conceptualizing SES not as static but as a trajectory of its own. Using latent-class growth analysis of data from the Study of Early Child Care and Youth Development survey (N = 1,356 families), these investigators examined the relationship between childhood SES trajectories and alcohol-use prevalence at age 15. The analyses indicated that family-level economic downturns predicted past-year drinking at age 15. Similarly, a French occupational cohort study (N = 20,570) suggested that downward or steadily disadvantaged SES trajectories along with alcohol and tobacco use predicted greater later all-cause mortality (Melchior et al. 2006).

A third approach used in longitudinal analyses is to follow the alcohol trajectories of participants and relate these to SES. Such studies have yielded mixed findings. Platt and colleagues (2010) focused on U.S. adults over age 50, assessing their alcohol use as

well as a variety of demographic, socioeconomic, and other characteristics. The study found that alcohol use generally tended to decrease over time in this population. However, the investigators identified a minority (2.2 percent) of individuals with increasing alcohol use. This group was largely characterized by greater affluence, European-American race, male gender, nonmarried status, lower levels of religiosity, and good-to-excellent health, thus suggesting that increased alcohol use was associated with higher SES. Conversely, a Finnish study following participants (N = 1,334) from ninth grade through adulthood found that people with increasing and heavy-drinking trajectories from ages 16 through 42 had greater socioeconomic difficulties at age 42, even after controlling for baseline SES (Berg et al. 2013).

Associations Between Specific Socioeconomic Variables and Alcohol Use

Employment Status

Compared with various measures of SES discussed in many of the above studies (e.g., neighborhood disadvantage, personal income, household income, and education), the association of employment status with alcohol use is less equivocal. Thus, a systematic review of five studies suggested that adult unemployment was associated with increased levels of alcohol use (Bryden et al. 2013). It should be noted, however, that the review included only a relatively small number of studies and that those studies primarily involved adolescents.

A few population-based studies have corroborated these findings. Popovici and French (2013) conducted a fixed-effect analysis of data from waves 1 and 2 of the population-based National Epidemiologic Survey of Alcohol and Related Consequences (NESARC) (N = 43,093). The investigators found that past-year unemployment was associated with increases in average daily alcohol quantity, HED frequency, and probability of an AUD diagnosis. Compton and colleagues (2014) analyzed the associations between unemployment and heavy drinking and AUD using data from the U.S. National Survey on Drug Use and Health between 2002 and 2010, taking into consideration the economic downturn during that time period. The analyses indicated that unemployment was significantly associated with heavier alcohol use and AUD and that this association was nearly independent of gender, age, or race/ethnicity. This association did not significantly differ between the periods before and after the economic downturn of 2008.

Housing Status

Homelessness may be viewed as an extreme form of socioeconomic disadvantage and marginalization.[2] The top reasons for homelessness include lack of sufficient income, loss of employment, and increased expenses, as well as lack of affordable housing (Mojtabai 2005; Tessler et al. 2001).

In addition to socioeconomic disadvantage, homeless individuals are disproportionately affected by other problems. For example, the prevalence of alcohol use among homeless individuals has been estimated to be as high as 80 percent (Velasquez et al. 2000), which is substantially higher than in the general population. A meta-analysis of international studies determined a mean alcohol-dependence prevalence of 38 percent among homeless individuals (Fazel et al. 2008), which is 10 times the prevalence of alcohol dependence in the general U.S. population (Grant et al. 2004). Chronically homeless people also often have severe and persistent psychiatric, medical, and substance-use disorders (Collins et al. 2012; Fazel et al. 2008; Hwang 2001; Mackelprang et al. 2014; Martens 2001). Together, these factors lead to greater mortality, including increased alcohol-related mortality, in the homeless population (Hawke et al. 2007; Hwang et al. 2009; O'Connell 2005) as well as an increased burden on the health care and criminal justice systems (Larimer et al. 2009; World Health Organization 2011).

Several studies have suggested that housing status and alcohol outcomes may share a complex longitudinal association that is apparent across the lifespan. For example, a study of 370 adolescents indicated that recent homelessness was the strongest predictor of subsequent substance abuse (Tompsett et al. 2013). In addition, a within-subject analysis involving the older and more severely affected end of the homeless population (i.e., chronically homeless individuals with alcohol dependence) showed that alcohol use and negative alcohol-related consequences seemed to decrease as a function of time spent in housing (Collins et al. 2012). Thus, homelessness seems to precipitate substance abuse, and the provision of adequate and low-barrier housing to people affected by homelessness may in turn reduce negative alcohol-related consequences.

Effects of Changes in SES on Alcohol Use and Its Consequences

As indicated previously, not only overall SES but also changes in SES may have an impact on people's alcohol use and its consequences. The economic recession that affected the United States between 2007 and 2009[3] has afforded researchers an opportunity to study the consequences of such

[2] The U.S. Federal Government defines homelessness as lacking a fixed, regular, and adequate nighttime residence; having a primary nighttime dwelling that is not a regular sleeping accommodation; living in a supervised shelter or transitional housing; exiting an institution that served as temporary residence when the individual had previously resided in a shelter or place not meant for human habitation; or facing imminent loss of housing when no subsequent residence is identified and insufficient resources/support networks exist (Homeless Emergency and Rapid Transition to Housing [HEARTH] Act of 2009).

[3] The National Bureau of Economic Research (2015) has officially dated the recession as lasting from December 2007 to July 2009; however, individual studies may refer to slightly different time periods.

economic downturns. Mulia and colleagues (2014) used data from the 2009–2010 NAS (N = 5,382) to assess the association between economic loss and alcohol consumption, intoxication, negative alcohol-related consequences, and alcohol dependence. The analyses found that severe economic loss, such as loss of a job or housing, was associated with greater experience of negative alcohol-related consequences, alcohol dependence, and intoxication, whereas moderate economic loss, such as loss of retirement savings or reduced work hours or wages, had no such impact.

Several sociodemographic characteristics, such as gender, age, and race/ethnicity, moderated these associations. For example, women affected by economic loss showed increased alcohol consumption, whereas men showed increased intoxication, drinking consequences, and alcohol dependence (Mulia et al. 2014). Additional analyses of the same dataset determined that the association between exposure to severe economic loss and alcohol consumption and related consequences differed among Blacks, Hispanics, and Whites. Thus, not only were Blacks and Hispanics more likely than Whites to experience economic loss, such as job loss or housing problems, but Blacks also had a significantly higher risk than Whites of experiencing two or more negative alcohol-related consequences and alcohol dependence when experiencing severe economic loss (Zemore et al. 2013). For Hispanics, in contrast, only weak and ambiguous associations existed between economic loss and alcohol outcomes.

Other less concrete factors, such as informal social support systems, also may influence the association between changes in SES and alcohol use and alcohol-related negative consequences. When researchers examined the effects of housing instability (e.g., difficulties paying rent or mortgage as well as loss of housing) on alcohol use during the 2007–2009 recession, they confirmed the findings described earlier that housing instability was associated with more negative alcohol-related consequences and increased risk of alcohol dependence (Murphy et al. 2014). This association was modified by perceived family support—that is, respondents who thought that they had greater support from their families reported fewer alcohol-related consequences compared with respondents with less perceived support. These observations further underscore that the relationships between SES and alcohol use and related consequences are highly complex and influenced by a multitude of interacting factors.

Limitations

The existing research reviewed here has some important limitations that deserve mention. First, some of these meta-analyses, reviews, and studies have conflated measures of alcohol use (e.g., quantity/frequency measures) with measures of negative alcohol-related consequences. For example, in their analysis, Richardson and colleagues (2013) combined higher levels of alcohol use (i.e., greater quantity and HED frequency) with AUD symptomatology into one construct of "problem drinking," even though none of the studies they included in their meta-analysis used designated measures of negative alcohol-related consequences. Future research should more clearly differentiate between these measures and terms to avoid confusion, because heavier drinking does not necessarily translate into a greater experience of negative alcohol-related consequences or problem drinking.

Second, relatively few meta-analyses have comprehensively explored the associations between various conceptualizations of SES and alcohol outcomes. Therefore, the current overview and many of the reviews cited within rely on subjective assessments of the literature. Given the number of studies that have been conducted in this area, this approach is an inefficient way to synthesize such a complex body of research (Borenstein et al. 2009). Therefore, future research should involve more comprehensive meta-analyses to more rigorously analyze the association between SES and various operationalizations of alcohol use and related outcomes (e.g., quantity/frequency, experience of negative alcohol-related consequences, and presence of AUD). Such meta-analyses also should consider the moderation of these associations by other factors, such as race, ethnicity, gender, housing status, or drinking status. A more comprehensive approach would help better understand the relationship between SES and alcohol outcomes and their repercussions for more marginalized groups in our society.

Summary and Future Directions

This review has summarized the current state of knowledge regarding the associations between SES and alcohol use and its negative consequences, based on a variety of study approaches (e.g., cross-sectional vs. longitudinal studies, meta-analyses vs. summary reviews, population-based vs. individual-level studies). The literature on the cross-sectional associations between alcohol use and individual- and area-level income and economic factors mostly has supported a positive relationship between SES and alcohol use, such that individuals with higher SES (or living in areas with higher SES) engage in more frequent and heavier drinking. However, this relationship may be moderated by other individual-level variables, such as drinking status, gender, race, and ethnicity (CDC 2012; Karriker-Jaffe et al. 2012). Therefore, future studies should clarify these associations by simultaneously examining the roles of these factors, particularly within meta-analyses that could capitalize on increased power to identify significant moderating effects.

In contrast to the findings for alcohol use, cross-sectional analyses have indicated that SES is inversely related to negative alcohol-related consequences, including alcohol-related

mortality. In other words, although people with lower SES may be less likely to drink and may be consuming less alcohol overall, they are more negatively affected by its effects. Findings to date suggest that economic disparities and their secondary effects are moderating the relationship between alcohol use and the experience of negative alcohol-related consequences; however, the exact nature of these complex relationships requires further exploration.

Research on the long-term associations between SES and alcohol outcomes has shown inconsistent correlations between snapshots of childhood SES and later alcohol outcomes. In contrast, a relatively consistent, inverse association seems to exist between long-term trajectories of SES and alcohol outcomes, with downward SES trajectories predicting heavier subsequent drinking and greater negative alcohol-related consequences. Further studies involving more sophisticated longitudinal analytic methods (e.g., cross-lagged panel modeling) are needed to more explicitly test and establish the nature of the complex transactional dependencies between the trajectories of SES and alcohol outcomes over time.

Two of the numerous factors that can be used to operationalize and assess SES are employment and housing status, and the relationship of these two factors with alcohol use and related outcomes sometimes has been evaluated separately from more general SES studies. Such studies have indicated that among adults, unemployment is associated with increased drinking and elevated risk for AUD. Interestingly, this relationship has not seemed to be affected by the economic downturn in 2008 (Compton et al. 2014). Taking a cue from the longitudinal literature discussed above, however, future studies should focus on evaluating the effects of changing employment status on alcohol outcomes and negative alcohol-related consequences.

Although homelessness may be considered a more extreme form of socioeconomic disadvantage, its effects on individuals go beyond those of SES. The literature on housing status and alcohol outcomes shows an unequivocal and clinically significant association between homelessness and increases in alcohol use, negative alcohol-related consequences, and AUD prevalence. In recent years, research efforts have begun to shed light on the relationship between homelessness and alcohol outcomes (U.S. Department of Health and Human Services 2007). However, more research is necessary to fully assess and address the needs of this marginalized population, which is multiply affected by psychiatric, medical, and substance-use disorders and disproportionately uses high-cost health care and criminal justice services.

Taken together, the findings discussed in this review suggest that although individuals with higher SES may consume similar or greater amounts of alcohol compared with individuals with lower SES, the latter group seems to bear a disproportionate burden of negative alcohol-related consequences. Future studies—particularly rigorous meta-analyses—are needed to more fully explore the mechanisms underlying these relationships. This research can contribute to data gathered in the context of larger public health efforts, including the Healthy People 2020 Initiative, which seeks to assess health disparities in the U.S. population by tracking rates of death, chronic and acute conditions, and health-related behaviors for various marginalized subpopulations (U.S. Department of Health and Human Services 2010). This knowledge should be applied toward the development of multilevel interventions that address not only individual-level risks but also economic disparities at higher levels that have precipitated and maintained a disproportionate level of negative alcohol-related consequences among more marginalized and vulnerable populations. Such interventions would fit well in the context of larger public health efforts (e.g., Affordable Care Act; HHS Action Plan to Reduce Racial and Ethnic Health Disparities) that are aiming to increase access to health care among people with low SES, create more preventative health programs, and improve quality of care for people seeking health care services in lower-SES areas (U.S. Department of Health and Human Services 2010, 2011).

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Alcohol Use and Related Problems Along the United States–Mexico Border

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The southern border the United States shares with Mexico has been of particular interest to alcohol researchers because of the presence of multiple risk factors conducive to alcohol-related problems. The border region spans 2,000 miles and is home to more than 7 million U.S. residents of predominantly Mexican-American ethnicity.

Compared with other areas of the United States, border residents have higher rates of poverty, undereducation, and unemployment (Gerber 2009; Soden 2006). They also are at elevated risk for multiple negative health outcomes, including tuberculosis, hepatitis A, diabetes, and liver disease (Centers for Disease Control and Prevention 2008*a,b*; Pan American Health Organization 2007; Texas Comptroller of Public Accounts 2003) and are differentially affected by crime related to illegal drug trafficking (Office of National Drug Control Policy 2011).

The border also separates two distinct geopolitical areas with long-standing differences in alcohol policy. In Mexico, the legal drinking age is 18, compared with 21 in the United States, and alcohol is comparatively inexpensive. The many Mexican bars within walking distance of the border cater primarily to people in younger age-groups who travel from U.S. border towns to Mexico specifically to capitalize on the cheap alcohol and easier access (Lange and Voas 2000; Lange et al. 2002).

Consistent with the risk factors described above, early studies of alcohol use within border populations showed that border residents were at higher risk for some alcohol outcomes compared with people who do not live near the border. However, the findings varied depending on the following factors:

- The populations studied—for example, Texas versus California;
- The comparison group used—for example, U.S. Hispanics versus U.S. Mexican Americans; and
- The specific alcohol outcome in question—for example, alcohol use versus alcohol-related problems (Substance Abuse and Mental Health Services Administration 2004; Wallisch 1998; Wallisch and Spence 2006; see also Harrison and Kennedy 1996; Holck et al. 1984).

Demonstrating the difficulties of finding good comparison groups, one study (Wallisch and Spence 2006) showed that, compared with more densely populated areas, rates of binge drinking and alcohol dependence tend to be higher in colonias, which are unregulated and sparsely populated settlements within the U.S. border region that often lack basic public services.

In more recent studies, researchers have drawn samples from geographic areas spanning the entire border region, and they have shifted the focus to comparisons between more ethnically homogeneous subgroups on and off the border, with the goal of clarifying the precise risk conferred by living in the border region. In general, these studies find that drinking levels are higher in U.S. border regions, regardless of ethnicity, compared with non-border regions and are particularly elevated among younger age-groups (Caetano et al. 2012; Liu 2012). Similar patterns

are seen for alcohol-problem outcomes such as abuse, dependence, and social problems (Caetano et al. 2013*c*; Vaeth et al. 2012). Despite these findings of generally higher levels of alcohol use and related problems, in general, rates of driving under the influence do not differ on and away from the border (Caetano et al. 2013*b*), and border residents do not report more treatment seeking for alcohol-related problems than non–border residents (Reingle et al. 2014). Both findings, however, are consistent with risks that primarily are restricted to younger age-groups in the region, particularly considering that younger age-groups have not had time to consume large cumulative quantities of alcohol that lead to chronic alcohol problems and typically precede treatment seeking.

One factor that clearly contributes to elevated alcohol-related risks along the U.S. side of the border is the ability to temporarily cross into Mexico to drink. This leads to generally higher annual levels of drinking and alcohol-related problems on the U.S. side of the border, particularly among younger age-groups who deliberately exploit Mexico's lower legal drinking age. For example, among current drinkers living on the U.S. side of the border, those who reported any drinking in Mexico in the past year tended to be younger and reported significantly more alcohol intake (measured in volume), higher rates of binge drinking, and higher rates of alcohol problems than those who reported drinking only in the United States (Caetano et al. 2013*a*; Clapp et al. 2001). Many of these individuals cross the border on foot, spend the evening patronizing the local bars, and return to their cars on the U.S. side in the early hours of the morning (Lange and Voas 2000). When bars in the border city of Juárez, Mexico, shifted to an earlier closing time (from 5 a.m. to 2 a.m.), the percentage of people crossing back into the United States with a positive blood alcohol content dropped by 89 percent (Voas et al. 2002). A second factor associated with higher alcohol-related risks among U.S. border residents seems to be drinking in bars, as opposed to elsewhere, whether on the Mexico side or the U.S. side of the border. Among U.S. border residents, more than 75 percent report not traveling to Mexico at all in the past year, and young adult border residents report more drinking than other groups, regardless of whether they cross into Mexico to drink (Caetano et al. 2012, 2013*a*). Surprisingly, young adult border residents who reported not traveling to Mexico to drink actually reported slightly higher rates of past-year bar attendance (75 percent) than those who reported drinking in Mexico (69 percent), both of which were higher than rates of past-year bar attendance among non-border young adults (59 percent). Moreover, the specific pattern of differences on and off the border in drinking (Mills et al. 2012, 2014) and acute alcohol problems are precisely mirrored in, and are statistically explained by, patterns of bar attendance across these areas. These effects cannot be attributed to age or border/non-border differences in the ways people think about drinking (e.g., more liberal drinking attitudes) or perceptions of broad neighborhood characteristics (e.g., perceptions of violence). Bar attendance seems to be a key contributing factor to elevated alcohol-related risks among the border region's younger population. Therefore, future research would benefit from identifying characteristics of these on-premise alcohol outlets in border areas, including their geographic distribution (Berke el at. 2010; Pollack et al. 2005; Romley et al. 2007) and characteristics of their clientele (Graham et al. 2006).

In sum, U.S. residents living near the country's border with Mexico are at higher risk for alcohol use and related consequences. This risk is accentuated among young people and is tightly connected to this group's higher frequency of bar attendance, whether on the U.S. or Mexico side of the border. Travelling to Mexico to drink—a major focus of early border research—contributes to this risk but falls short of fully explaining it. U.S. policymakers should be aware that high levels of alcohol-related risks on the border are not simply a south-of-the-border phenomenon. To a large extent, they reflect factors within U.S. borders that are under their direct control.

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Alcohol Use Patterns Among Urban and Rural Residents

Demographic and Social Influences

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Rates of alcohol use and alcohol use disorder (AUD) vary with geographic location. Research on risks for AUD associated with living in a rural versus urban setting is complicated by the varied systems used to classify geographic location. Studies comparing the prevalence of heavier or binge drinking and AUD based on a dichotomous urban/rural classification have mixed findings when compared with those using more detailed urban-to-rural categories. In addition, urban/rural residence interacts with other demographic factors such as age, U.S. region, and race/ethnicity to affect alcohol use. Social and cultural factors help explain the relationship between geographic location and alcohol use. However, this area of research could be improved by the use of standardized definitions as well as the analysis of a more complete urban-to-rural continuum (e.g., urban, suburban, and rural areas). Having a better understanding of how geographic characteristics influence alcohol use would help inform and improve prevention and treatment efforts.

Key words: Alcohol use, abuse, and dependence; alcohol use patterns; alcohol use disorder; geographic location; urban society; rural society; risk and protective factors; demographic risk and protective factors; cultural risk and protective factors; environmental risk and protective factors; social influences

Geographic location can be an important factor in determining a person's level of risk for alcohol-related problems. Certain factors associated with living in an urban or rural area may increase risk, while others may be protective. For example, the availability of alcohol, norms for acceptable drinking behaviors, demographic characteristics, and economic factors all vary with respect to geographic area and may influence drinking behaviors. The National Institute on Alcohol Abuse and Alcoholism's (NIAAA) Health Disparities Strategic Plan 2009–2013 (NIAAA 2009) recognized that differences exist due to location and called attention to addressing the impacts of alcohol use and its consequences on rural populations. This article represents a partial response to that call and examines rates of alcohol use and alcohol use disorder (AUD) in urban versus rural locations. Consideration is also given to how U.S. region, race/ethnicity, and age intersect with these drinking patterns, as well as other social and cultural factors that characterize place of residence. Both government documents and peer-reviewed journal articles were used to examine this topic. This article considers how more delineated categories on an urban-to-rural continuum could better characterize the relationships between geographic location, alcohol consumption, and AUD and improve prevention and treatment efforts.

Definitions of Urban versus Rural Population Areas

Defining and characterizing urban and rural population areas can be a complicated task. There are over two dozen definitions of "rural" used by U.S. government agencies (Bucholtz 2008). Three examples of such definitions are presented in table 1. These definitions have been applied in alcohol studies (with some of the related results reviewed in this article) and have implications for defining the percentage of the U.S. population that live in an urban versus a rural area. For example, according to the U.S. Census Bureau (USCB) and using its urban area, urban cluster, and rural area classifica-

tions, approximately 80.7 percent of the U.S. population in 2010 lived in an urban community, with the remainder (19.3 percent) living in a rural area (USCB 2013). The Office of Management and Business (OMB) employs a different 3-group urban-to-rural classification (OMB 2010, 2013), which defines Core Based Statistical Areas (CBSA) as metropolitan, micropolitan, or non-core based. The CBSA classification has been used to define a rural area in two ways: (1) living outside of both a metropolitan and a micropolitan county, or (2) only living outside of a metropolitan county. Based on these two definitions, in 2010 approximately 6.3 percent or 16.3 percent of Americans, respectively, lived in a rural area (Mackun and Wilson 2011). The United States Department of Agriculture (USDA), through the Economic Research Service (ERS), has also developed multiple methods of categorizing non-metropolitan counties, one of which is referred to in table 1 (USDA 2013*b*). According to the USDA denition of metropolitan versus non-metropolitan areas, in 2012, approximately 14.7 percent of the U.S. population lived in a non-metropolitan area (USDA 2013*a*).

These definitions exemplify the potential difficulties involved in defining urban or rural settings, and the possibility of organizing geographic data into categories based on a variety of urban/rural thresholds. These varied definitions complicate the study of how urban and rural areas are associated with patterns of alcohol use in the United States. For example, population estimates of alcohol use and AUD from the Substance Abuse and Mental Health Services Administration annual household surveys (from 1971 to 2001 called the National Household Survey on Drug Abuse [NHSDA], and from 2002 to the present called the National Survey on Drug Use and Health [NSDUH]) cannot be readily compared across urban and rural categories. The NHSDA defined urban and rural residence through a dichotomous metropolitan versus non-metropolitan classification using OMB definitions (SAMHSA 2003*a*), whereas the NSDUH uses the expanded 9-category classification based on the Rural/Urban Continuum Codes (RUCC) and updated OMB standards for defining a metropolitan area. Given the periodic updates of these definitions by government agencies, it can even be difficult to compare surveys

Table 1 Three Classifications of Urban-to-Rural Geographic Locations

Government Agency	Primary Geographic Area	Basis of Classification	Urban-to-Rural Categories
U.S. Census Bureau (USCB)	Census tract	Population density	Three-tier classification system: (1) Urban areas are census tracts with populations of 50,000 people or more; (2) urban clusters are census tracts with populations from 2,500 to 49,999; and (3) rural areas are all other census tracts outside urban areas and urban clusters.[1]
Office of Management and Budget (OMB)	County	Population clusters; and urbanized cores	Counties are designated as a Core Based Statistical Area (CBSA) or a non-CBSA area. CBSA areas are subdivided into Metropolitan Statistical Areas (MSA), or counties with an urbanized core of 50,000 residents or more; and Micropolitan Statistical Areas, or counties with a population cluster of between 10,000 and 49,999 residents. Frequently, MSA is used when discussing this classification system rather than CBSA.[2]
U.S. Department of Agriculture (USDA), and Economic Research Service (ERS)	County	Rural/Urban Continuum Codes (RUCC)	OMB's Metropolitan/non-Metropolitan Statistical Area categories are further divided. Metropolitan Statistical Areas are divided into three subcategories based on USCB population estimates; and non-metropolitan (i.e., Micropolitan Statistical Area and non-CBSA area) are divided into six subcategories, based on proximity to a Metropolitan Statistical Area. Metropolitan subcategories include (1) metro counties of 1 million population or more; (2) metro counties of 250,000 to 1 million; and (3) metro counties of less than 250,000. Non-metropolitan subcategories include: (1) non-metro county with urban population of 20,000 or more adjacent to a metro area; (2) non-metro county with urban population of 20,000 or more not adjacent to a metro area; (3) non-metro county with urban population between 2,500 and 19,999 adjacent to a metro area; (4) non-metro county with urban population between 2,500 and 19,999 not adjacent to a metro area; (5) rural county with urban population less than 2,500 adjacent to a metro area; and (6) rural county with urban population less than 2,500 not adjacent to a metro area.[3]

NOTE: Urban-to-rural classifications were based on information from the following sources: [1]USCB 2012; [2]OMB 2010, 2013; and [3]USDA 2013*a,b*.

from year to year (e.g., changes made from the 2002 to the 2003 NSDUH surveys) (SAMHSA 2004).

According to the 2002 NSDUH, prevalence rates of past-year alcohol use were highest for those living in large (72.9 percent) and small metropolitan areas (70.2 percent) compared with non-metropolitan areas (61.6 percent) (SAMHSA 2003*b*). Data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) for 2001–2002 used OMB's CBSA system to define geographic residence. One report identified past-year alcohol use rates using a dichotomous urban (67.2 percent) versus rural (58.4 percent) delineation (Dawson et al. 2011). Both surveys show higher rates of drinking in metropolitan areas. However, the utility is compromised, because the two surveys do not use consistent definitions and classifications to define place and are not entirely comparable. These surveys do use the same U.S. region classification based on USCB's state groupings (i.e., Northeast, Midwest, South, and West), enabling region-based estimates to be compared between the surveys.

Variations in Rates of Alcohol Use and AUD Across the Urban-to-Rural Continuum

Despite these varying definitions, epidemiologic studies have attempted to characterize geographic differences in prevalence rates of alcohol use and AUD (either reporting lifetime or past 12-month AUD rates or rates of alcohol dependence) in the adult U.S. population over the past 20 years. According to data from the 1991–1992 National Longitudinal Epidemiologic Survey (NLAES) (using an older version of OMB's metropolitan statistical area/non-metropolitan statistical area classification), the residents in urban areas compared with rural areas (odds ratio = 1.22) were more likely to report lifetime alcohol use. Among drinkers, however, urban and rural residents had similar risks for lifetime alcohol dependence (Grant 1997).

Using 2001–2002 NESARC data, Dawson and colleagues (2011) reported, as shown above, that prevalence rates of past-year drinking in the adult population were higher for urban residents compared with rural ones. However, the rates of past-year heavy episodic drinking (i.e., 5 or more drinks on any day for men, and 4 or more drinks on any day for women) were similar for residents living in both locations (23.7 and 23.2 percent for urban and rural residents, respectively). The 12-month AUD rates among urban and rural residents (8.4 percent and 8.8 percent, respectively) were also similar. Another analysis of NESARC data found that the lifetime prevalence of an AUD was somewhat lower for urban residents (29.6 percent) than for rural ones (33.3 percent) (Hasin et al. 2007).

Further, Borders and Booth (2007) used 2001–2002 NESARC data and a 3-tiered (urban, suburban, and rural) classification of residence based on OMB's CBSA definitions. They found that rates of abstinence were lowest for suburban residents (31.3 percent) compared with urban (35.4 percent) and rural (41.7 percent) residents. However, rural drinkers were significantly more likely than suburban drinkers to report exceeding the recommended daily drinking limits (more than 4 drinks for men and more than 3 drinks for women) (suburban: 34.5 percent; urban: 37.4 percent; and rural: 40.0 percent). Urban drinkers were more likely than suburban drinkers to report drinking more than 14 drinks for men and more than 7 drinks for women in a typical week (i.e., exceeding recommended weekly drinking limits) (suburban: 14.9 percent; urban: 17.1 percent; and rural: 16.7 percent). Rural drinkers (15.1 percent) were also significantly more likely than suburban drinkers (11.6 percent) to report a past-year AUD, with rates for urban drinkers (14.0 percent) falling in between.

The 2011 and 2012 NSDUH (SAMHSA 2013) include more current data, although these findings are not easily comparable with NLAES and NESARC. For adults ages 18 and older in 2011, the prevalence of past 12-month AUD was higher in large metropolitan areas (7.1 percent) and small metropolitan areas (7.0 percent) than in non-metropolitan areas (4.9 percent). In 2012, these rates remained higher for residents in metropolitan areas (large metropolitan: 7.4 percent; small metropolitan: 7.4 percent), but the past 12-month AUD rate for residents in non-metropolitan areas increased from the previous year to 6.1 percent. Recent treatment admissions data, based on the 2009 Treatment Episode Data Set (TEDS), showed other differences by urban and rural locations using, the National Center for Health Statistics (NCHS) standards and based on census data and Metropolitan Statistical Areas (MSAs) (Eberhardt et al. 2001; NCHS 2014). For example, persons admitted to treatment in rural areas (49.5 percent) were more likely to report alcohol as their primary drug of abuse compared with persons admitted in urban areas (36.1 percent) (SAMHSA 2012).

Although these studies are difficult to compare, the ones reviewed here suggest that rates of alcohol use are higher for urban versus rural residents and that rates of AUD tend to be similar across rural and urban environments. However, there is some indication that a more detailed evaluation of the urban-to-rural continuum will yield more nuanced relationships with alcohol use and AUD across geographic areas, particularly when suburban residence is separated from and compared with rural and urban residence.

Interactions Between Rural/Urban and Other Demographics

To understand an individual's alcohol-related risk profile, it is important to consider the interaction of a number of demographic characteristics with

geographic setting. The sections below examine U.S. region, race/ethnicity, and age as factors that interact with rural/urban setting to influence risk.

U.S. Regions

The Southern U.S. region consistently has the lowest rates of alcohol use. The 1991–1992 NLAES showed the lowest rates of lifetime drinking among Southern residents, followed by residents of the Midwest, West, and Northeast (Grant 1997). Drinkers in the West and Midwest were more likely than Southern drinkers to report lifetime alcohol dependence, whereas drinkers in the Northeast were less likely to report such dependence compared with those in the South. Similarly, based on survey data from the 1993 Behavioral Risk Factor Surveillance System (BRFSS), residence in the deep South (Alabama, Georgia, Louisiana, and Mississippi) was the single greatest predictor of past-month abstinence compared with other regionally representative states (New York, Illinois, Colorado, and California) (Lindquist et al. 1999). Further analysis of AUD based on the 2001–2002 NESARC showed that the Midwest (35.3 percent) and West (32.6 percent) had higher percentages of residents with a lifetime AUD compared with the Northeast (27.1 percent) and South (27.0 percent) (Hasin et al. 2007). NSDUH data from 2012 also showed that those living in the West had the highest past 12-month AUD rate at 8.0 percent, followed by the Midwest (7.7 percent), Northeast (6.8 percent), and South (6.5 percent). For residents in the South, the 2012 past 12-month AUD rate was significantly higher than in 2011 (5.7 percent), whereas the rates for other U.S. regions showed little change from the previous year (SAMHSA 2013). Researchers suggest that a relationship exists in the South between the high levels of Protestant religiosity, which encourages abstinence, and lower drinking and AUD rates (Booth and Curran 2006; Lindquist et al. 1999; Michalak et al. 2007). Religiosity and other social and cultural factors that are associated with geographic location and alcohol use are reviewed in a later section.

Using 2001–2002 NESARC data, Borders and Booth (2007) examined the intersection between urban, suburban, and rural residence and U.S. regions in predicting alcohol use and AUD. Residents from the rural South were most likely to abstain from drinking; they had the highest past-year abstinence rate at 52.1 percent compared with the next highest rate at 39.0 percent for urban Northeast residents. The lifetime abstinence rate was also highest in the rural South (27.5 percent) but lowest in the rural Northeast (9.2 percent). The urban Midwest (29.4 percent) had the highest percentage of residents exceeding daily drinking limits, and the rural South had the lowest percentage (17.3 percent). Residents in the urban West (18.3 percent) were more likely to exceed weekly drinking limits, whereas residents in the suburban Midwest were least likely to (12.7 percent). Urban Midwest drinkers also reported the highest prevalence of past 12-month AUD (12.4 percent), followed by drinkers in the rural Midwest (11.0 percent) and rural West (10.3 percent). The lowest rate of past 12-month AUD was reported by residents in the rural South (6.7 percent).

These regional urban-to-rural comparisons based on the NESARC set the rural South and the urban Midwest at opposite endpoints of the continuum from less risky to more risky drinking and AUD. The ranking of other locations in between these points is less consistent. Eberhardt and colleagues (2001) examined data from multiple government agencies (CDC, SAMHSA, DHHS) about rural and urban health. They reported within-region comparisons for heavy alcohol use (i.e., 5 or more drinks in one day) between metropolitan and non-metropolitan residents using MSAs. For example, in both the Northeast and West, adults ages 18 to 49 who lived in small metropolitan and non-metropolitan areas had higher rates of past-year heavy drinking than those who lived in large metropolitan areas within those same regions. It was also found that men in metropolitan areas were more likely to engage in heavy drinking (56 percent) compared to non-metropolitan areas (48 to 52 percent). However, it is unclear to what degree including a well-defined suburban classification would have altered the results.

Race and Ethnicity

The intersection of race and ethnicity with urban and rural location is another important comparison for understanding the alcohol use patterns of U.S. subpopulations. Data from several different reports generated using 2010 census data reveal concentrations of racial/ethnic groups across certain geographic areas (Ennis et al. 2011; Hixson et al. 2011, 2012; Hoeffel et al. 2012; Norris et al. 2012; Rastogi et al. 2011). The U.S. population of rural residents has shifted some; for example, the percentage of Hispanics living in rural areas has increased (in 1980, 3 percent; and in 2006, 6 percent) (Economic Research Service, n.d.). Rural residents in 2012 were 78 percent White, 9 percent Hispanic, and 8 percent Black, while urban residents were 44 percent White, 27 percent Black, and 17 percent Hispanic (Housing Assistance Council 2012). American Indian reservations are often in rural areas; however, only 22 percent of American Indians/Alaska Natives live on a reservation, on trust land, or in other designated areas (Norris et al. 2012).

Some studies examining the rates of alcohol use and AUD among race/ethnic groups by urban and rural location have mixed results. Booth and Curran (2006) studied Blacks and Whites in six Southern states and showed that rural residence (i.e., living outside of an MSA) was protective for alcohol use in both Blacks and Whites. Urban Blacks had higher abstinence

rates (63.0 percent) than urban Whites (49.9 percent) over the past 28 days, while rural residents of both groups had similar abstinence rates (66.8 percent and 65.5 percent, respectively). Blacks in urban areas also had lower rates of current problem drinking compared with Whites in urban areas (6.1 percent versus 10.0 percent), but similar rates to Whites in rural areas (6.0 percent and 6.9 percent, respectively). Diala and colleagues (2004) examined lifetime AUD rates across urban-to-rural locations for Blacks and Whites using the 1990–1992 National Comorbidity Survey. Blacks were less likely than Whites to report a lifetime AUD in rural areas (i.e., counties with less than 2,500 population) and urban areas (i.e., counties with a city of 50,000 or more population), but both groups had a similar likelihood in large metropolitan areas (i.e., counties with 100,000 or more population and a central city). Differences in the findings between these two studies may be attributed to the different definitions of urban/rural residence used by each study or the samples: Southern residents versus U.S. adults.

Using 2003 NSDUH data, Van Gundy (2006) compared past 12-month AUD rates for several races/ethnicities by urban versus rural location in two age groups. For young adults age 18 to 25, Whites were significantly more likely to report an AUD when living in an urban area (i.e., metropolitan area; 20.0 percent) versus a rural one (i.e., non-adjacent metropolitan area; 17.9 percent). The rates among Blacks in that age group were similar in urban (9.9 percent) and rural environments (10.5 percent). AUD rates declined with older age for all racial and ethnic groups. Among Blacks age 26 and older, those in urban areas had significantly higher rates (6.8 percent) of AUD compared with those in rural areas (3.0 percent). The difference in AUD rates among Whites was less dramatic ranging from 6.2 percent (urban) to 5.5 percent (rural). The AUD rate for Whites was similar to that of Blacks in urban areas in this 26-and-older age group; yet in rural areas, AUD rates were lowest for Blacks compared with other racial/ethnic groups. AUD rates were not significantly different among Hispanics or Asians/Pacific Islanders by urban or rural setting in either the 18-to-25 age group (Hispanics: 15.3 percent urban, 15.0 percent rural; and Asians/Pacific Islanders: 14.4 percent urban, 20.2 percent rural) or the 26-and-older age group (Hispanic: 6.6 percent urban, 8.3 percent rural; and Asians/Pacific Islanders: 3.6 percent urban, 5.8 percent rural). Bigger sample sizes could be needed to identify significant differences in some of these race/ethnicity-by-age subgroups.

Van Gundy (2006) also reported no significant differences in the 12-month AUD rates between American Indians living in urban and rural areas, either for individuals ages 18 to 25 (urban 24.9 percent; rural 20.2 percent) or ages 26 and older (urban 16.6 percent; rural 13.9 percent). An earlier study suggested that there is little difference in the quantity of alcohol consumed by urban and rural American Indians, but that urban American Indians tend to drink more frequently (Weisner et al. 1984). Other studies have examined alcohol use for American Indians living in different U.S. regions, including the Southwest and Plains regions that comprise parts of the West, Midwest, and South. O'Connell and colleagues (2005) examined drinking patterns across four groups: (1) reservation-based Southwestern Indians (SW-AI); (2) reservation-based Northern Plains Indians (NP-AI); (3) American Indians who were geographically dispersed (NLAES-AI); and (4) the U.S. general population excluding American Indians (NLAES-GP). Sixty percent of the NLAES-AI group lived in urban areas, while the reservation-based American Indian groups were primarily rural residents (O'Connell et al. 2005). Comparisons of American Indians living on and off reservation areas overlap some with rural versus urban comparisons; however, rural reservations have unique characteristics not shared with rural areas more generally. Reservation-based American Indians (SW-AI and NP-AI) showed a general pattern not only of high-quantity drinking (e.g., higher rates of drinking 5 or more drinks in 1 day and being intoxicated in the past year), but also of low-frequency drinking (e.g., lower rates of drinking monthly and drinking more than 8 days in a month). NP-AI males and females, in particular, were most likely to report high-quantity drinking. Several studies report that American Indians are less likely than the general U.S. population to be current drinkers; however, there is variability in the drinking rates and quantity of consumption by region and tribal affiliation (Beauvais 1998; May 1996; Szlemko et al. 2006; Young and Joe 2009).

Underage Drinking in Urban and Rural Areas

Using NSDUH data, rates of underage drinking can be compared across urban-to-rural locations. Pemberton and colleagues (2008) reported on past-month alcohol use and binge drinking based on the 2002–2006 NSDUH for 12- to 20-year-olds. County types were categorized by a 4-level urban-to-rural continuum, including metropolitan areas both large (with a population of 1 million or more) and small (less than 1 million population), as well as urbanized (20,000 or more population) and rural (less than 20,000) non-metropolitan areas. Past-month alcohol use was similar across location categories—i.e., large metropolitan (27.5 percent), small metropolitan (30.1 percent), urbanized non-metropolitan (31.3 percent), and rural non-metropolitan (28.1 percent). Prevalence rates for binge drinking were also similar by location (large metropolitan 17.7 percent; small metropolitan 20.8 percent; urbanized non-metropolitan 22.2 percent; and rural non-metropolitan 19.8 percent). Conversely, Lambert and colleagues (2008) used

2002–2004 NSDUH data for individuals ages 12 to 17 and reported significantly higher rates of past-month alcohol use and binge drinking when comparing four rural categories to one combined metropolitan category. These rates were highest in the most rural category (i.e., medium to small rural areas with a population less than 20,000 and not adjacent to a metropolitan area). Findings were less consistent for young adults ages 18 to 25 when comparing rural and urban areas.

Table 2 presents urban/rural prevalence rates based on 2002–2006 NSDUH data for Whites, Blacks, and Hispanics between ages 12 and 20 (Pemberton et al. 2008). In metropolitan areas, underage Whites were more likely to engage in binge drinking than Hispanics, while in urbanized non-metropolitan areas the rates between Whites and Hispanics were similar, and in rural non-metropolitan areas Hispanics had higher rates than Whites. Comparable differences were observed for rates of past-year AUD between Whites and Hispanics across urban/rural areas. Underage Blacks had higher rates of binge alcohol use and past-year AUD in urbanized non-metropolitan areas than in other areas; however, prevalence rates of binge drinking and AUD were lower for Blacks than Whites and Hispanics, regardless of urban/rural category.

Past-year AUD rates, reported by Van Gundy (2006) and based on the 2003 NSDUH, included additional race/ethnic groups. Comparisons were made based on an urban and rural dichotomy and in a smaller age group of youth ages 12 to 17. These data seem to similarly distinguish rural Hispanic youth as a potential risk group. Hispanics who live in rural areas (8.9 percent) were significantly more likely to report an AUD than those who live in urban areas (4.9 percent). Asian/Pacific Islanders reported higher rates of AUD in rural (11.4 percent) compared with urban (4.1 percent) areas, but this difference did not reach statistical significance. All other ethnic groups (i.e., Whites, Blacks, and American Indians/Alaska Natives) reported similar past-year rates of AUD in urban and rural areas.

Beyond Rural vs. Urban: Social and Cultural Characteristics of Geographic Locations

Understanding the relationship between alcohol use and geographic location requires more than assessing population density and proximity to a metropolitan area. A number of social and cultural factors are related to alcohol use patterns and also characterize urban and rural settings. These include religious cultural practices, community and family relationships, economic conditions, the availability of alcohol, and the enforcement of alcohol laws, among others. One mechanism that links these characteristics to drinking is the potential to control (increase or decrease) access to alcohol for residents in an area, but they may alternatively represent potential buffers or stressors that influence alcohol use.

Social relationships in a community may influence drinking behaviors. As previously mentioned, lower alcohol use rates in the Southern states have been attributed to higher participation in religions that encourage abstinence. A 2000 National Alcohol Survey study found that higher levels of religiosity and the religious proscription of drinking are significantly associated with drinking behaviors, particularly higher abstinence levels (Michalak et al. 2007). Community social capital, defined as neighborhood attachment, supportiveness, or participation, is also protective for problem drinking (Bryden et al. 2013). The family environment in particular, including parental monitoring, parental approval, and communication style, has a strong influence on drinking patterns among youth (Nash et al. 2005). Van Gundy (2006), for example, reported a 4-percent increase in alcohol abuse

Table 2 Prevalence of Underage Binge Drinking and Alcohol Use Disorder (AUD) by Urban to Rural Area and Race/Ethnicity (Percentage)

	Metropolitan Area*	Urbanized Non-metropolitan Area	Rural Non-metropolitan Area
Binge Alcohol Use			
Whites	22.9	23.6	20.7
Blacks	9.0	14.2	10.4
Hispanics	17.0	21.1	24.7
AUD			
Whites	10.9	12.1	10.0
Blacks	4.4	7.8	4.9
Hispanics	8.4	11.3	12.5

NOTE: *Metropolitan included both large and small metropolitan areas. Percentages were from the 2002–2006 NSDUH for youth ages 12 to 20 (Pemberton et al. 2008). Binge alcohol use was in the past 30 days and alcohol use disorder in the past year.

among rural youth when either the mother or father were absent from the home.

The economic conditions in a geographic area may be associated with local rates of alcohol use. Karriker-Jaffe (2011) reported varied relationships between alcohol outcomes and area-level socioeconomic status. Neighborhood disadvantage was associated with more heavy alcohol use in adults, while neighborhood advantage was associated with more alcohol use among underage drinkers. The qualities of the built environment, where someone lives, are also associated with alcohol use. Bernstein and colleagues (2007) reported that residents living in urban areas characterized by substandard buildings (stairway, window, or heating problems) were more likely to report heavy drinking. Community disorder more generally, defined by population density, crime, etc., was positively associated with alcohol use in adolescents and adults (Bryden et al. 2013).

Both the perceived and actual availability of alcohol from formal and informal sources can influence the prevalence of drinking and related problems (Treno et al. 2008). In adolescents, greater exposure to alcohol advertising was associated with increased drinking and a greater likelihood of alcohol use (Bryden et al. 2012). In assessing the relationship between alcohol outlet density (AOD) and specific area-level demographic characteristics, Berke and colleagues (2010) examined urban, suburban, large town, and rural geographic locations. In urban areas, AOD was associated with poverty, education, and Black and Hispanic race/ethnicity, but there were no associations for these characteristics with AOD in suburban areas, large towns, and rural areas. AOD predicted higher rates of binge drinking in urban areas at densities greater than 80 alcohol outlets per square mile (Ahern et al. 2013). The retail mix in a geographic area may also matter (i.e., higher binge drinking rates were reported in areas with liquor stores only versus areas with food stores only) (Shimotsu et al. 2013).

Other means of controlling the availability of alcohol in a geographic area include alcohol taxation and the enforcement of alcohol laws. There is evidence to support the use of price and tax policies; higher alcohol prices and taxes are associated with reductions in problems associated with binge and heavy drinking, including alcohol-related crash facilities (Elder et al. 2010). Jackson and colleagues (2014) reported that both the perceived enforcement of liquor laws and the level of funding for enforcement are associated with lower levels of alcohol use. Paschall and colleagues (2012) similarly showed that funding for underage drinking enforcement across various size cities in California was associated with a lower frequency of alcohol use in adolescents, but that AOD and the level of adult drinking in the area had positive correlations with adolescent drinking. Finally, Ying and colleagues (2013) recommended, to be most effective, that alcohol laws and policies (e.g., zero tolerance, open container, minimum legal drinking age, and blood alcohol content) should be adapted to the characteristics of the area where they are implemented.

Implications for Prevention and Treatment

The urban/rural patterns of alcohol use and area-level characteristics described above may have implications for developing intervention strategies. First, the reviewed research identifies potential at-risk subpopulations to target for intervention. Urban residents showed lower rates of abstinence; but more specifically, Midwest residents in urban areas had higher rates of heavier drinking and AUD. By both race/ethnicity and age, there was some evidence that White young adults and older Black adults had higher AUD rates in urban areas. Conversely, rural residence was associated with higher AUD rates for underage Hispanic drinkers, and underage drinking appeared to be higher in the most rural U.S. areas. American Indians had high AUD rates in both urban and rural settings, but reservation-based American Indians in the Northern Plains were at greater risk.

Second, the reviewed research may suggest potential strategies for reducing risky alcohol use in a geographic area, including at individual, community, and policy levels. For example, knowledge of the level of religiosity, the community and family relationships, and the social drinking norms of a population could be used to further target at-risk groups or to conceptualize intervention and prevention strategies. A computerized training program for 12-year-olds living in an urban setting showed positive effects (e.g., lower alcohol use and binge drinking and fewer drinking friends) that held over the course of 7 years compared to the control group (Schinke et al. 2010). Though not specifically addressed, this may have implications for rural underage drinking reduction; computerized intervention methods may be a cost-effective option for rural and sparsely populated areas. Geographic areas characterized by greater socioeconomic disadvantage and disorder could be targeted for community-level interventions to address these conditions and to reduce problem alcohol use through the building of social capital. Policy-level interventions to reduce AOD or to change the mix of retail options in a community may be of particular importance in urban areas, while alcohol taxation and law enforcement are more generally effective at reducing heavy drinking and drinking-related problems across geographic locations.

It also is important to consider whether the availability of treatment services matches the need in urban and rural areas. Lenardson and Gale (2007) used data from the 2004 National Survey of Substance Abuse Treatment Services to comparatively describe treatment facilities in urban and rural locations. Fewer facilities

and treatment beds are located in rural areas. Approximately 9 percent of all surveyed treatment facilities were located in a non-metropolitan area that is not adjacent, 12 percent in an adjacent non-metropolitan area, and 79 percent in a metropolitan area. Differences in the types of services offered by treatment facilities in urban and rural locations may also influence access to treatment services. Lenardson and Gale (2007) also reported that non-metropolitan treatment facilities were less likely than metropolitan ones to offer detoxification (15.4 percent versus 22.4 percent), transitional housing (7.6 percent versus 10.9 percent), and day treatment/partial hospitalization programs (9.4 percent versus 15.2 percent). Non-metropolitan counties also had a lower percentage of facilities offering substance abuse specialty services (51.9 percent) compared with metropolitan facilities (64.3 percent). It is unclear to what extent that the treatment needs in rural and urban areas are or are not being met according to this reported availability of services. However, given that the reviewed studies showed similar rural and urban AUD rates or higher rates among some segments of the rural population, it seems inconsistent that the need for treatment would be less in rural areas than urban ones. This apparent discrepancy between treatment availability and treatment need in rural areas could require a policy-level intervention.

Recommendations

Conducting alcohol studies on urban and rural populations is complicated by the various methods of defining these terms. The definitions have changed over time and are different across surveys, complicating direct comparisons between studies. Consistent and clearly stated definitions of what is meant by urban, suburban, or rural are important for understanding the relationship of these geographic locations to drinking patterns, as well as their implications for prevention and treatment needs. A dichotomous urban/rural classification may inappropriately aggregate data such that it masks the risky drinking behaviors of populations living in urban or rural areas compared with suburban locations. Future studies need to go beyond a rural/urban dichotomy to more fully examine the urban-to-rural continuum. For example, Kuo and Porter (1998) completed a demographic study and examined seven subgroups of Asian/Pacific Islanders in urban, suburban, and rural areas and across regions. Borders and Booth (2007) also offer an example of how to examine alcohol use patterns by intersecting regional and urban, suburban, and rural locations. Further study of differences in drinking and risks for AUD across the urban-suburban-rural continuum could present a more contextualized understanding of the relationship between alcohol use and geographic context.

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Advances in Substance Abuse Prevention and Treatment Interventions Among Racial, Ethnic, and Sexual Minority Populations

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Substance abuse research among racial, ethnic, and sexual minority populations historically has lagged behind that conducted with majority samples. However, interesting and potentially important advances in prevention, brief interventions, and treatment have been made in the last few years, at least among some minority populations, such as American Indian youth. New prevention efforts have focused on point-of-sale interventions for alcohol, as well as on family-unit interventions designed with subpopulation cultural values in mind. In addition, previously established evidence-based and culturally relevant interventions are being combined with computer technology. Empirical data support using brief interventions with patients of color in medical settings, capitalizing on teachable and reachable moments during a physical trauma or other health crisis. Finally, use of empirically supported treatment may be helpful, with a caveat that these interventions must appropriately match cultural traditions and respect the values of the clients. More research clearly is needed, especially among certain minority populations in the United States. A greater emphasis should be placed on developing novel, culturally grounded interventions in partnership with communities, in addition to adapting existing mainstream interventions for use by other cultures.

Key words: Alcohol use, abuse, and dependence; alcohol research; race; ethnicity; minorities; ethnic minorities; sexual minorities; prevention; intervention; treatment; point of sale intervention; family intervention; computer technology; cultural traditions; culturally grounded intervention

Historically, prevention and treatment intervention research rarely has been conducted with racial and ethnic or sexual minorities as its principal focus; this also holds true for the alcohol and other drug abuse field. The lack of credible research has been one source of the disparities in substance abuse and its consequences found among many of these groups. Fortunately, advances recently have been made in preventing, intervening in, and treating substance abuse among traditionally underserved racial, ethnic, and sexual minority subpopulations. This article reviews some of these advances, focusing on alcohol abuse but also including abuse of other drugs or substance abuse in general, as appropriate. The article also will suggest next steps for research in this area.

Challenges in Addressing Prevention and Treatment for Minority Populations

Many minority populations in the United States face well-documented challenges, such as higher-than-average rates of poverty, homelessness, and incarceration, which may contribute to increased rates of alcohol use disorder as well as other substance use disorders. A less concrete factor influencing prevention and treatment is that minorities often face stereotypes in the general population. Such stereotypes foster biased behavior toward minority groups, which may promote alcohol and other drug abuse and create greater levels of anxiety among group members themselves (Blume et al. 2012). Such factors also are likely to affect whether members of minority groups decide to seek treatment and how they experience treatment if they do (for a review of access to treatment studies, see Schmidt in this issue).

Cultural background also figures into how minority populations respond to treatment and prevention efforts. Differences in worldviews, cultural traditions, and upbringing mean that not all groups may respond to an intervention that has demonstrated success in the general population (Taylor 2003). Certain groups also face specific challenges. For treatment to be effective, providers need to identify those challenges and offer appropriate interventions. For example, American Indian (AI) and Alaska Native (AN) populations face high rates of alcohol abuse among youth (SAMHSA 2014), and relatively easy access to alcohol may be one of the contributing factors. Thus, in one study (Lynne-Landsman et al. 2015) about 75 percent of all outlets tested sold alcohol to young-appearing AI buyers at least once. Other research confirmed that underage AI youth may obtain alcoholic beverages from stores both on and near reservations either directly through illegal sales to minors or indirectly through purchases by adult friends (Lee et al. 2015). Prevention efforts aimed at lowering sales of alcohol to minors therefore could be effective for these groups. For example, Moore and colleagues (2013) demonstrated that a reward-and-reminder underage drinking prevention program in convenience stores could reduce alcohol sales to minors near rural reservations.

Recent research focused on prevention and treatment efforts for minorities has suggested that feeling safe in the environment both inside and outside of treatment centers plays a pivotal role in the success of interventions. As is discussed below, when a group's basic needs are met, group members are more likely to cut back on drinking (Larimer et al. 2009). Furthermore, when they feel secure—that is, understood culturally and not threatened—they express deeper satisfaction with treatment or prevention programs and may be more likely to continue participating (Guerrero 2013). In some cases, adapting empirically proven treatment methods is sufficient in helping clients feel safe; but in others, novel, culturally centered approaches may prove useful.

Advances in Understanding the Treatment Environment

Various studies have highlighted the importance of a safe environment for positive treatment outcomes among clients from racial, ethnic, and sexual minority groups. The groundbreaking Housing First study demonstrated that a safe housing environment alone was sufficient to improve substance-use outcomes and reduce public health costs in people with severe alcohol problems, including many homeless people of color (Larimer et al. 2009). A more recent data analysis found that motivation to change predicted improved alcohol-use outcomes 2 years after the Housing First intervention, whereas attending abstinence-based treatment did not (Collins et al. 2012).

The prevention and treatment environment also affect substance abuse treatment outcomes through the therapeutic working alliance—that is, the working relationship that clients believe they have with their therapists. Positive working alliances have been found to predict successful treatment engagement and completion (Meier et al. 2005). Davis and Ancis (2012) pointed out that most studies investigating the working alliance in treatment have been conducted with predominately White patient samples. However, they did identify three important factors that affect the working alliance among clients of color. First, culturally responsive treatment has been positively associated with improvements in

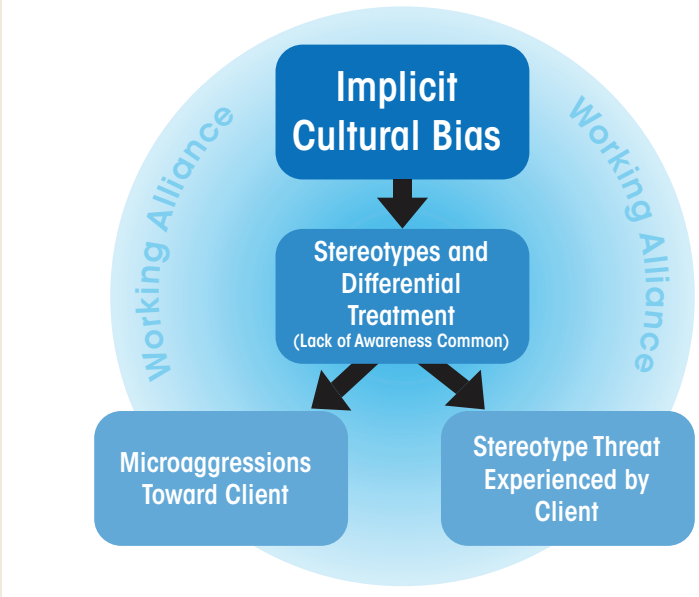

Figure 1 Implicit bias and its threat to working alliance. All people, including treatment professionals, are affected by implicit biases transmitted within our culture that may escape our personal awareness. Implicit bias makes the commission of microaggressions by staff and the experience of stereotype threat by minority clients more likely. This potentially harms the working alliance and undermines treatment outcomes.

the working alliance. Second, in their interactions with both counselors and other treatment staff, clients of color encounter biased beliefs and attitudes, which often are the result of stereotyping. Third, poor working alliances frequently are a function of how often a client in therapy experiences microaggressions—commonly experienced insults, put-downs, or messages of exclusion stemming from stereotypes associated with minority-group membership—and of a client's perceptions of a therapist's low cultural competence.

Microaggressions correlate with alcohol abuse and greater anxiety (Blume et al. 2012). Thus, they may foster an environment conducive to alcohol problems and also may undermine the treatment environment and the working alliance. Microaggressions occur in the context of culturally implicit bias—that is, cultural biases ingrained in the social order that perpetuate stereotypes and prejudices often expressed automatically and without awareness by members of the social order (figure 1). Mental health professionals may direct microaggressions toward their clients automatically and unwittingly. Microaggressions also may result from programmatic or institutional cultural insensitivity toward clients (Sue et al. 2007). Interestingly, clients of color interpret the common lack of discussion in treatment concerning bias and prejudice and their links to substance-use behavior as a microaggression (Burris 2012).

Stereotyping also may influence substance-use and treatment outcomes by increasing the risk of stereotype-threat situations, in which minority members find themselves at risk for fulfilling a commonly held group-based stereotype (e.g., African Americans in academic situations where they are expected to perform poorly) (Steele and Aronson 1995). These situations place significant stress on minority-group members that can affect both physiological responses (e.g., blood pressure) (Blascovich et al. 2001) and cognitive function, including in substance abusers (Cole et al. 2006; Looby and Earleywine 2010). As an example, AI/AN clients often are stereotyped by the firewater myth, a belief that Native Americans cannot tolerate or regulate the ingestion of alcohol and will lose behavioral control if they drink any alcohol. AI/AN clients could experience stereotype- threat situations that may adversely affect treatment outcomes when treatment programs or professionals (perhaps unwittingly) communicate an understanding of addiction that aligns with the assumptions of the firewater myth.

The therapist is only one source of stereotyping and microaggression. The working alliance transcends the client–therapist relationship and includes the positive or negative impacts of institutional climate on clients. Indeed, discussions concerning prejudice and homophobia and their links to substance abuse have largely been ignored until very recently.

Research also has demonstrated that the cultural climate of treatment is a critical factor influencing treatment outcomes. Thus, increased cultural competence among treatment-center staff has been shown to contribute to higher rates of treatment retention (Guerrero 2013). Similarly, improved cultural sensitivity among treatment-program managers has been positively associated with higher rates of retention and less time on waitlists before treatment admission (Guerrero and Andrews 2011). Increasing the cultural competence of treatment administrators, counselors, and treatment-center staff who interact with clients seems to be one method for improving treatment outcomes, perhaps by making it less likely that clients will experience microaggressions and stereotype-threat situations.

Matching and Molding Prevention and Treatment Interventions

In addition to evaluating the impact of the treatment environment, investigators have focused on determining which alcohol-related interventions facilitate success for minority clients. Recent studies in both prevention and treatment show that some mainstream interventions may be effective when matched with certain population subgroups in culturally appropriate ways. Moreover, their success often improves when adapted for use in different cultures.

Moving beyond such adaptations, some research suggests that creating new prevention and treatment methods with the participation of minority-group members can foster the success of interventions even more (Bermúdez Parsai et al. 2011; De las Nueces et al. 2012; Stacciarini et al. 2011; Tapp et al. 2013). Community-based participatory research (CBPR) methods, a research model that respects minority-community authority, needs, and values in the conduct of research, makes community stakeholders equal partners with scientists during all phases of project development, implementation, and dissemination. CBPR can be used to create novel interventions specifically tailored for racial and ethnic minority communities. The following sections focusing on prevention and treatment studies, respectively, demonstrate that all three approaches—matching existing methods in culturally relevant ways to the values and needs of the communities being served, adapting existing methods to different cultures, and creating new strategies with the participation of the target community—are demonstrating success in addressing alcohol problems among minority clients.

Advances in Prevention

Over the last few years, researchers have begun developing and sometimes adapting prevention programs aimed at addressing problems specific to target populations and testing the programs empirically. One promising intervention targeted the availability of alcohol to underage purchasers near AI reservations in California. The reward-and-reminder program

enlisted young-looking confederates who attempted to purchase alcohol without showing proper identification. When convenience-store clerks requested identification, they were rewarded with gift cards; when they did not, they were sent reminder letters concerning State laws about liquor sales. After two cycles of rewards and reminders, stores were completely in compliance when assessed (Moore et al. 2012).

Culturally relevant prevention programs that focus on the family rather than on individuals have been successful, because they acknowledge beliefs held by many minority cultures concerning the importance of the family (rather than the individual) as the principal unit of function (figure 2). This family-oriented approach stresses the value of interdependence and the commonly held tenet that families work together to solve the problems of individual members. These interventions generally involve family members and parent–youth dyads working in unison on various family-building strategies (e.g., family communication) and substance-use prevention program components (e.g., parental monitoring). Other approaches include completing the more traditional individualized prevention components, such as parent training (for adults) or drink-refusal skills (for youth).

One family-oriented intervention, for example, targeted mother–daughter dyads through a Web-based delivery system. The investigators found reduced substance use, improved child–parent relationships, and increased self-efficacy and refusal skills among female adolescent African Americans, Asian Americans, and Latinas (Fang et al. 2010; Schinke et al. 2011). Other examples include the Familias Unidas program with Latino youth in the juvenile justice system and their primary caretakers, which led to a drop in substance abuse as well as in high-risk sex (Prado et al. 2012). The Strong African American Families and Adults in the Making programs resulted in slower increases in alcohol consumption and intoxication (i.e., slower alcohol-use escalation) among African-American youth compared with control subjects (Brody et al. 2010, 2012).

Skill-based interventions that incorporate traditional practices to strengthen the bonds of youth to their communities and cultures also are under investigation. Komro and colleagues (2015) are conducting a promising screening, brief intervention, and referral to treatment (SBIRT) prevention trial that includes a culturally centered approach to intervention targeting the youth environment within the Cherokee Nation. A computer-based intervention that incorporates developmentally appropriate gaming and video clips to prevent substance use (Project HAWK) also is being tested among AI youth (Raghupathy and Go Forth 2012). Researchers have not yet evaluated the efficacy of these new methods. Think Smart, another school-based program that develops both traditional and mainstream cultural competence among AI participants in the later elementary school grades, was associated with lower student inhalant abuse but showed null results for other substance use (Johnson et al. 2009).

Both Project HAWK and the Think Smart program were derived from the evidence-based State-wide Indian Drug Prevention Program that features skills training to increase bicultural competence and resilience among at-risk AI youth (Schinke et al. 2000). Use of innovative skills-training interventions is a fruitful area for improving prevention programs for other groups as well. For example, the REAL skills groups that focus on various refusal skills and a group-based social-norms approach have improved outcomes in the culturally

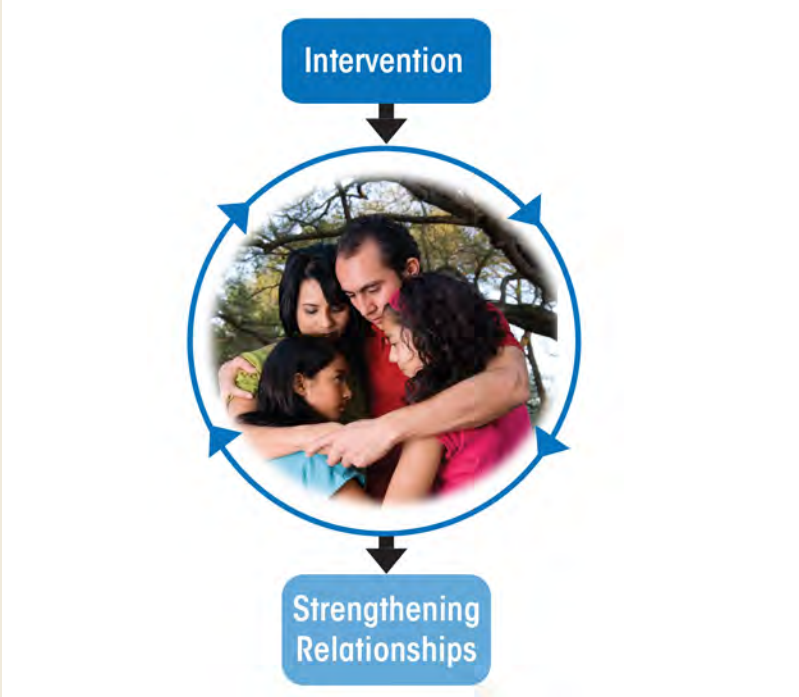

Figure 2 Family-oriented interventions. Recent advances in effective prevention programs among subpopulations have focused on family-level interventions consistent with the strong cultural values about the importance of family in collectively addressing the needs of a family member.

based prevention program for Latino youth called Keepin' It Real, especially when used with youth around the seventh grade (Marsiglia et al. 2012).

Beyond such adaptations of existing programs, other communities are experimenting with new methods developed in cooperation with minority groups themselves. For example, the Cherokee Talking Circle school-based intervention program, a uniquely Cherokee-centered strategy that includes the use of talking-circle groups as a culturally relevant approach to solving problems together, was associated with reduced substance use among AI youth. Those randomly assigned to the Cherokee Talking Circle intervention had significantly better outcomes with respect to total symptom severity, substance use, general life problems, and internal and external behavior at 3 months post-intervention than those assigned to a mainstream school-based substance abuse education program (Lowe et al. 2012).

Such CBPR among racial and ethnic minority populations has demonstrated the ethical and practical necessity of adaptive interventions that tend to evolve during the course of a research study. This can be done while preliminary outcomes are analyzed by researchers and community stakeholders and used to modify interventions (Henry et al. 2012). At the same time, some researchers have voiced concerns about overemphasizing the process of culturally adapting empirically validated mainstream interventions to the exclusion of other methods. One experienced AI research team (Whitbeck et al. 2012) urged a paradigm shift away from adapting Western best practices and toward development of novel evidence-based and culturally relevant interventions in partnership with Native communities. They suggested such a shift because interventions developed for Western populations sometimes do not align with Native worldviews and traditions. Moreover, many Native communities harbor a lingering deep distrust of Western-oriented practices because of historical abuses by researchers (Whitbeck et al. 2012).

Advances in SBIRT and Motivational Interventions

Although novel, culturally based treatments ultimately may be considered ideal, mainstream SBIRT has been used successfully in racial and ethnic populations. One report (Madras et al. 2009) pooled data from multiple medical care settings (including emergency departments, primary care, and other institutions) for a study funded by SAMHSA to evaluate SBIRT, with the majority of the participating patients being people of color. The investigators found that, across the sites, patients experienced improved outcomes for substance-use and functional status 6 months post-intervention. Unfortunately, the types of brief interventions were not consistent across sites and there were no control groups, although all participating sites seemed to foster the spirit of motivational interviewing.

Brief motivational interventions with African Americans and Latinos in trauma centers also have been associated with reductions in alcohol use at 6 and 12 months post-intervention (Field et al. 2010). Ethnic matches between Latino clients and interventionists seemed to improve outcomes (Field and Caetano 2010), potentially supporting other research on the importance of the working alliance. Positive outcomes also did not depend on whether the subject subsequently attended treatment (Field et al. 2013).

Research from the National Institute on Drug Abuse (NIDA) Clinical Trials Network found that motivational enhancement therapy was particularly effective among African-American participants with higher readiness-to-change scores (Burlew et al. 2013). In a multisite randomized controlled trial, motivational enhancement therapy also was effective with and personally appealing to Spanish-speaking Latino adults who primarily misused alcohol, but less effective for those who used other drugs (Carroll et al. 2009). In another pilot study, culturally adapted motivational interviewing was well received by Latino immigrant participants (Lee et al. 2011).

Other Advances in Treatment

Research studies have demonstrated empirical support for mindfulness-based relapse prevention as a substance-use intervention among women of color (Amaro et al. 2014; Witkiewitz et al. 2013; see sidebar "Religious Affiliation and Spiritual Practices: An Examination of the Role of Spirituality in Alcohol Use and Alcohol Use Disorder"). Although interest in using mindfulness as a substance-use intervention among racial and ethnic minorities has increased substantially, some researchers have raised questions about the cultural relevance of such interventions. For example, Hall and colleagues (2011) expressed concerns that mindfulness interventions may be highly Westernized. These strategies are not particularly helpful for certain racial and ethnic minority groups unless they are aligned with traditional cultural values and traditions.

Drink-refusal skills also have been identified as potentially helpful for African-American clients. In an examination of Project COMBINE data, African-American participants who completed drink-refusal skills training had significantly more positive treatment outcomes compared with those who did not complete the skills-training component. The positive outcomes were demonstrated up to 1 year post-intervention (Witkiewitz et al. 2011).

Communities also have collaborated with researchers using CBPR methods to create novel treatment interventions, just as they have done with prevention programs. One recent and promising example is the development of Drum-Assisted Recovery Therapy, which uses traditional Native American drumming and singing as well as talking circles to help AI/AN treatment

clients with recovery from substance abuse (Dickerson et al. 2012). Researchers used qualitative methods and key community stakeholder involvement to develop and refine the culturally grounded therapy protocol that bears little resemblance to traditional treatment methods or mainstream therapies.

Interventions for Sexual Minorities

Sexual minorities have been relatively overlooked in prevention and treatment intervention research, perhaps because of substance abuse stigma and homophobia. For sexual-minority clients of color, there also are the added dimensions of racial- and ethnic-based prejudice and bias. Sexual minorities experience elevated risk for substance abuse, but intervention research with this particular subpopulation is sorely lacking (Green and Feinstein 2012). However, researchers have found that in general, sexual-minority clients prefer to seek alternative rather than mainstream forms of treatment, especially if they do not closely identify with mainstream heterosexual beliefs (Dillworth et al. 2009).

Real Men Are Safe is a group-based program that emphasizes motivational enhancement, didactics, and skills training targeting high-risk sexual behavior among men in substance abuse treatment. It has been associated with modest improvements in safe-sex practices among sexual-minority men of color in substance abuse treatment. The program was culturally adapted by a qualitative examination of data collected from an expert panel of professionals who conducted research among ethnic sexual minorities that was then used to revise and enhance program content. Some evidence also suggests that the adapted Real Men Are Safe may have been more culturally relevant for African Americans and Latinos than for other groups (Calsyn et al. 2012, 2013). The results are promising and suggest that mainstream treatment can be culturally adapted for sexual-minority clients in ways that may reduce other risk behaviors.

Advances in Pharmacologic Treatment

Beyond advances in psychotherapy, pharmacological approaches have been investigated in minority populations as well. In one randomized placebo-controlled trial with a rather high dropout rate, naltrexone use was associated with fewer alcohol-related consequences and greater percentage of days abstinent among AN clients in isolated rural areas of Alaska (O'Malley et al. 2008; see also Greenfield and Venner 2012).

However, two other studies found null results for naltrexone's efficacy among African-American clients—one from Project COMBINE that examined alcohol-dependent participants (Ray and Oslin 2009) and another that investigated social drinkers under laboratory conditions (Plebani et al. 2011). Few pharmacotherapy studies have been conducted with minority population samples large enough to produce meaningful results. More investigation is needed to assess the efficacy of specific drugs, including naltrexone, among various subpopulations.

Conclusions and Future Directions

Exciting new programs for prevention, brief opportunistic intervention, and treatment have been successfully developed and tested with racial, ethnic, and sexual minority populations—groups often at risk for substance abuse and with well-documented disparities. Recent interventions have combined computer- or Web-based technologies with culturally relevant adaptations, including a focus on the family as the unit of intervention, as well as culturally grounded and informed measurement (see Allen and Mohatt 2014). In addition, empirically supported skills-based approaches seem helpful for certain subpopulations, with the caveat that the interventions may require appropriate cultural alignment of the intervention with the beliefs and traditions of the group being targeted. Recent studies continue to demonstrate that when appropriate CBPR methods are used, evidence-based interventions can be used in culturally appropriate ways to benefit some racial, ethnic, and sexual minority populations.

However, given the vast heterogeneity of some minority groups (e.g., AI/AN) (Etz et al. 2012), some minority communities likely will reject existing interventions as culturally insensitive or not reflecting their beliefs and values (Whitbeck et al. 2012). In addition, some studies using culturally adapted interventions based on empirical evidence have found null or inconsistent outcomes (e.g., Carroll et al. 2009), suggesting that other approaches are needed. Thus, although such interventions can be helpful for some minority groups, a prudent strategy would involve simultaneously developing novel and culturally specific interventions using rigorous CBPR strategies for communities where other interventions may not work well (Etz et al. 2012; Whitbeck et al. 2012).

Intervening at the level of the treatment environment to improve outcomes for racial, ethnic, and sexual minority clients also is an exciting new development that holds particular promise for improving the working alliance, a consistent predictor of treatment outcomes independent of intervention modality. Above all, more can be done to improve the climate of prevention and treatment programs. Such efforts could reduce the likelihood of microaggressions and risk of stereotyping and stereotype threats that may negatively affect client outcomes following interventions.

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Social and Cultural Contexts of Alcohol Use

Influences in a Social–Ecological Framework

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Alcohol use and misuse account for 3.3 million deaths every year, or 6 percent of all deaths worldwide. The harmful effects of alcohol misuse are far reaching and range from individual health risks, morbidity, and mortality to consequences for family, friends, and the larger society. This article reviews a few of the cultural and social influences on alcohol use and places individual alcohol use within the contexts and environments where people live and interact. It includes a discussion of macrolevel factors, such as advertising and marketing, immigration and discrimination factors, and how neighborhoods, families, and peers influence alcohol use. Specifically, the article describes how social and cultural contexts influence alcohol use/misuse and then explores future directions for alcohol research.

Keywords: Alcohol consumption; alcohol misuse; morbidity; mortality; risk factors; alcohol-related consequences; social factors; cultural factors; environmental factors

The alcohol research literature is overwhelmingly focused on risk factors, from the societal level down to the individual. Worldwide, 3.3 million deaths were attributed to alcohol misuse in 2012 (World Health Organization 2014). Excessive alcohol use is the third leading cause of death in the United States, accounting for 88,000 deaths per year (Centers for Disease Control and Prevention 2014). Globally, alcohol-attributable disease and injury are responsible for an estimated 4 percent of mortality and 4 to 5 percent of disability-adjusted life-years (DALYs) (Rehm et al. 2009). The harmful effects of alcohol misuse are far reaching and range from accidents and injuries to disease and death, as well as consequences for family, friends, and the larger society. Economic costs attributed to excessive alcohol consumption are considerable. In the United States alone, the costs of excessive alcohol use were estimated at $223.5 billion in 2006, or $746 per person (Bouchery et al. 2011). Much of these costs result from a loss in workplace productivity as well as health care expenses, criminal justice involvement, and motor vehicle crashes (Rehm et al. 2009).

This article reviews some of the cultural and social influences on alcohol use and places individual alcohol use within the contexts and environments where people live and interact. This is not an exhaustive review but aims to show the wide range of contexts that may shape alcohol use.

Disparities in and Influences on Alcohol Use: A Social–Ecological Framework

Alcohol consumption varies across gender and race/ethnicity. Across the world, men consume more alcohol than women, and women in more developed countries drink more than women in developing countries (Rehm et al. 2009). American men are much more likely than women to use alcohol (56.5 percent vs. 47.9 percent, respectively), to binge drink (30.4 percent vs. 16 percent, respectively), and to report heavy drinking (9.9 percent vs. 3.4 percent, respectively) (Substance Abuse and Mental Health Services Administration [SAMSHA] 2013). (Binge drinking is defined here as the number of instances in the past 12 months that women drank 4 or more drinks and men drank 5 or more drinks within a 2-hour period.) Among racial and ethnic groups, Whites report the highest overall alcohol use among persons age 12 and over (57.4 percent). American Indian/Alaska Natives report the highest levels of binge drinking (30.2 percent), followed by Whites (23.9 percent), Hispanic/Latinos

(23.2 percent), African Americans (20.6 percent), and Asians (12.7 percent) (SAMHSA 2013). Alarmingly, according to two nationally representative samples, trends in alcohol misuse increased among both men and women and African-American and Hispanic youth over the decade between 1991–1992 and 2001–2002. Rates of dependence also increased among men, young Black women, and Asian men during the same time period (Grant et al. 2004).

Given these trends, it is clear that a better understanding of the underlying social and cultural factors contributing to these disparities is needed. For example, socioeconomic status (SES) indicators (i.e., education, income, and occupation) usually are strong predictors of health behaviors and outcomes and tend to be positively associated with health. People with higher SES tend to drink more frequently than others (Huckle et al. 2010). Among drinkers, low-SES groups tend to drink larger quantities of alcohol (Huckle et al. 2010).

Like other health issues, alcohol use can be linked to a complex array of factors ranging from individual-level (i.e., genetics) to population-level (i.e., cultural and societal factors) characteristics (Berkman et al. 2000; Krieger 2001; Link and Phelan 1995). On a population level, emerging research has documented the relationship between social determinants and health (Berkman and Kawachi 2000; Berkman et al. 2000) and, specifically, the social epidemiology of alcohol use (Bernstein et al. 2007; Galea et al. 2004). Social capital theory suggests that social networks and connections influence health (Berkman et al. 2000). Individuals who have higher levels of social support and community cohesion generally are thought to be healthier because they have better links to basic health information, better access to health services, and greater financial support with medical costs. (Berkman and Kawachi 2000).

This article examines these population-level as well as individual influences through a social–ecological framework, which posits that human health and development occur across a spectrum—from the individual to the macro or societal level (Bronfenbrenner 1994). In the context of alcohol use, individuals are nested within their microsystem (their home, work, and school environments), which is nested itself within the larger community. Macrolevel factors, such as exposure to advertising, may influence family and peer network attitudes and norms, which ultimately affect individual attitudes and behaviors (see figure).

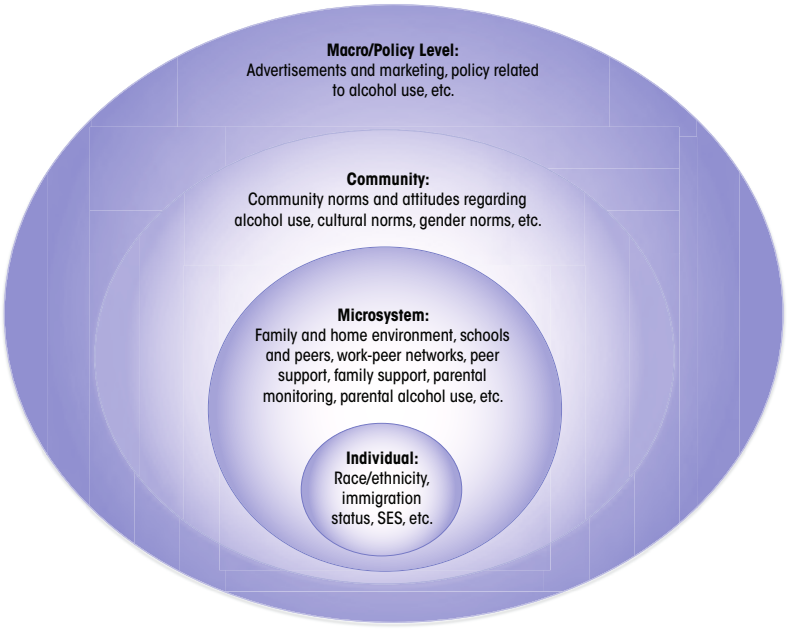

Figure A social–ecological framework for explaining influences on alcohol use. Individual-level factors that influence alcohol use are nested within home, work, and school environments, which are nested within the larger community. Macro-level factors, such as exposure to advertising, may influence family and peer network attitudes and norms, which ultimately affect individual attitudes and behaviors.

Societal Influences: Advertising, Marketing, and Social Media

Media exposure helps influence social norms about alcohol through advertising, product placements, and stories in a wide range of sources, including movies, television, social media, and other forms of entertainment. Although alcohol sales and marketing are highly regulated, people are exposed to a wide variety of alcohol and liquor advertisements, especially in the United States. Whether these advertisements directly result in an increase in consumption has been the topic of many public policy debates and much alcohol and consumer research. Recent studies have used robust methodological designs in order to assess the effects of advertisements on alcohol consumption (Grenard et al. 2013; Koordeman et al. 2012). Although longitudinal studies have found that alcohol commercials particularly affected younger adolescents' propensity to consume alcohol (Grenard et al. 2013), an experimental design randomly assigning college students to alcohol advertisements demonstrated no differences compared with the control group (Koordeman et al. 2012). It is likely that the effects of advertisement differ across age groups and races. The alcohol industry uses complex targeted marketing strategies that focus on African Americans, Latinos, and American Indians, among other demographic groups, such as youth and other ethnic minorities (Alaniz and Wilkes 1998; Moore et al. 2008). Empirical studies show that targeted alcohol marketing results in individuals developing positive beliefs about drinking, and creating and expanding environments where alcohol use is socially acceptable and encouraged (Alaniz and Wilkes 1998; Hastings et al. 2005; McKee et al. 2011). These factors can result in the onset of drinking and binge drinking, and in increased alcohol consumption (Tanski et al. 2015).

Since the introduction of flavored alcoholic beverages in the 1980s, the alcohol industry has engaged in targeted marketing efforts toward youth in general, and especially young women (Mosher and Johnsson 2005). Products with sweet fruity flavors, colorful appearance and packaging, as well as lower alcohol content are designed to appeal to young women. Fruity drinks mask the taste of traditional alcoholic beverages with the sugary flavors of soft drinks (Mosher and Johnsson 2005), making them more palatable for this consumer market. Although the alcohol industry claims that its marketing strategies target adults ages 21–29, products like flavored alcoholic beverages remain attractive to younger drinkers.

Research estimates that 38.5 percent of high school students have used alcohol in the past month, and 20.5 percent of teenagers started drinking before age 13 (Eaton et al. 2012). Approximately 75 percent of high school seniors and 64 percent of high school 10th graders report having experimented with alcohol (Kann et al. 2014). Youth under age 21 see and hear marketing for flavored alcoholic beverages disproportionally on a per capita basis compared with adults (Jernigan et al. 2005), and a disproportionate number of youth consume alcoholic beverages (Mosher and Johnsson 2005). Furthermore, youth exposed to alcohol advertisements tend to drink more on average than their peers who were exposed to less intensive alcohol-related marketing (Snyder et al. 2006). Specifically, the authors found that each additional advertisement viewed by youth increased the reported number of drinks consumed by 1 percent.

Alcohol marketing also can lead to youth and young adults developing alcohol brand preferences (Albers et al. 2014; Ross et al. 2015), which can influence their reports of alcohol consumption (Roberts et al. 2014). For example, youth reported on average 11 more drinks per month when responding to an online survey that used brand-specific measures compared with a survey using more general alcohol measures (Roberts et al. 2014). The relationship between alcohol brand receptivity and alcohol brand consumption also has been linked to whether and when adolescents begin to binge drink (Morgenstern et al. 2014).

Increased use of social media for alcohol marketing has paralleled changes in communication methods among adolescents and college-age youth (Hoffman et al. 2014). Marketing techniques for a wide range of products reflect studies that online platforms are likely to influence adolescent behaviors (Cook et al. 2013). Social media venues are most widely used by youth, with 92 percent of teens reporting being online daily and 24 percent online "almost constantly" (Lenhart 2015). Social-networking sites such as Twitter, Instagram, and Facebook feature alcohol-related marketing. One study found that by 2012, there were more than 1,000 alcohol-related sites on Facebook alone (Nhean et al. 2014). Alcohol use increases with the number of online peer ties and greater peer density, a measure of interconnectedness in the social network (Cook et al. 2013). Despite self-imposed regulations aimed at preventing underage youth from accessing alcohol advertisements on social media, more than two-thirds of advertisements on YouTube are accessible to youth under the legal drinking age (Barry et al. 2015).

Racial and ethnic minorities, especially those living in African-American communities, are likewise exposed to targeted alcohol beverage advertisements (Wilson and Till 2012). African Americans account for 13 percent of the U.S. population, but they purchase 67 percent of all malt liquor sold (Miller Brewing Company 2000). Malt liquor generally has higher alcohol content, is less expensive, and is sold in larger volumes than other beers and ales, and African Americans are exposed to more malt liquor advertisements than other groups. Billboards and other advertisements for malt liquor are disproportionately found in neighborhoods with higher percentages of African Americans, and rap music lyrics frequently mention malt

liquor (Herd 2013; McKee et al. 2011). When examining alcohol advertising in newspapers, Cohen and colleagues (2006) found that there were more alcohol-related ads in newspapers targeted to African-American readers compared with newspapers with a more general readership. Kwate and Meyer (2009) found a correlation between problem drinking among African-American women and exposure to alcohol advertisements, suggesting that as ad exposure increased, so did alcohol consumption.

These findings, however, must be interpreted with caution, as it is difficult to determine whether advertisements directly result in increased alcohol consumption. To begin with, a variety of marketing strategies including distribution, product development, pricing, and targeted marketing all may affect links between advertising and consumption (Alaniz and Wilkes 1998; Roberts et al. 2014). For example, Molloy (2015) found that after controlling for targeting, only moderate advertising effects are seen, despite the strong correlations between alcohol advertising and drinking among youth. It also is unclear which aspects of online social media advertisements are related to the observed correlations. Research shows that drinkers like advertising about alcohol more than nondrinkers do, respond neurologically to the advertising more intensively than nondrinkers do, and may recall the advertising more clearly (Snyder et al. 2006), making it harder to distinguish among the specific mechanisms behind the observed relationships. As a result, making causal statements about alcohol use and marketing is problematic because the temporal order between using alcohol and seeing advertisements is not frequently established (Snyder et al. 2006).

Despite these challenges, it is important to develop new strategies to systematically examine the impact of advertising and marketing on alcohol use among different populations. For example, researchers might continue to compare marketing and advertising strategies within specific neighborhoods to more fully understand targeted marketing's influence on alcohol use. Further research and evaluation studies also are needed that can help establish whether and how advertising and marketing can lead to alcohol use in vulnerable and disadvantaged populations.

Influences From Discrimination

A number of social and cultural factors predict increased alcohol use, including discrimination and its related stigma. The role of discrimination and stress in health-related risk behaviors, including alcohol use, is well established (Dawson et al. 2005; Hatzenbuehler 2009; Paradies 2006). The stress and coping framework frequently is applied to explain the influence of discrimination and stigma on health (Krieger 1999; Pascoe and Smart Richman 2009; Walters et al. 2002). This long-held theory posits that people consume alcohol to cope with the stress of their daily lives, including work-related stressors and racial and ethnic discrimination (Conger 1956).

Discrimination is seen as a key social stressor that elicits a physiological response, including elevated blood pressure and release of stress hormones (Williams and Mohammed 2009), which may have lifelong deleterious effects, including increased alcohol use (Pascoe and Smart Richman 2009). Self-reported unfair treatment and racial discrimination has been linked to higher alcohol use among Asian Americans (Chae et al. 2008; Gee et al. 2007; Yoo et al. 2010) and Latinos (Mulia et al. 2008).

The picture is less clear among African Americans. Although similar positive associations have been found between level of discrimination and alcohol use in this population (Boynton et al. 2014; Gibbons et al. 2004; Mulia et al. 2008), other recent studies (Kwate and Meyer 2009) among African-American adults have found no relationship between high levels of racial discrimination and heavy and episodic drinking. However, Borrell and colleagues (2007) did report an association between discrimination and past-year alcohol use. The mixed results among African Americans may relate more to SES than to discrimination. Past studies suggest that African Americans with higher levels of education were more likely to report experiencing discrimination, whereas the opposite was true among Whites (Borrell et al. 2007; Krieger et al. 1998). This may be because better educated African Americans find themselves in situations in which they may be exposed to discrimination, or they may be more acutely aware of how subtly it can be expressed. Whites of lower SES may be in the minority and therefore may be more likely to report experiencing discrimination. This may explain the mixed results found in this particular population segment, as socioeconomic position actually may mute the effects of discrimination on alcohol use. Further research is needed to examine these potential mechanisms and other underlying factors that interact with racial discrimination to influence and alcohol use and misuse among minorities.

Another group that may be at particular risk for alcohol problems stemming from their experiences with discrimination are those in the lesbian, gay, bisexual, and transgender (LGBT) community, who experience high levels of discrimination related to sexual orientation and gender identification (Krieger and Sidney 1997). One study found that more than two-thirds of LGBT adults experienced discrimination, and individuals who reported discrimination based on race, gender, and sexual orientation were almost four times more likely to use alcohol and other substances (McCabe et al. 2010). This suggests that future studies and public health interventions should focus not only on racial and gender discrimination, but also sexual orientation and gender identification.

Immigration-Related Influences

Societal influences can shape drinking behavior among immigrants to the United States. In 2010, nearly 40 million people, or 13 percent of the U.S. population, had been born in another country—the largest absolute number of U.S. immigrants ever and the highest proportion who are foreign born since the 1920s (Grieco et al. 2012). With wide diversity among immigrants in terms of national origin, language, religion, and social class, and with even more reasons for and processes of migration than ever before (Dubowitz et al. 2010), it is no surprise that the evidence on alcohol consumption among immigrants is similarly complex.

Immigration may influence alcohol consumption and its consequences in at least two ways. The first theory suggests that immigrants encounter difficulties and hardships as they transition into a new society and culture (Berry 1997). Hardships include the stress of experiencing new environments and cultures; living in poor neighborhoods; finding good, secure jobs in safe work environments; encountering few opportunities to enhance income or wealth; and engaging with fewer and smaller social networks that may otherwise offer instrumental and emotional support. It also is possible that immigrants may not become fully integrated into American society because of experiences with discrimination and obstacles in social mobility (Unger et al. 2014). Because these factors are associated with alcohol consumption and problems, immigrants may consume more alcohol (Unger et al. 2014). As they become settled in the new society, this consumption pattern decreases (Bui 2012). A second hypothesis posits that alcohol consumption increases the longer immigrants live in a new location (Lee et al. 2013). Over time, immigrants may learn the behaviors and adapt the lifestyles often associated with alcohol consumption in American society (i.e. experience acculturation) (Caetano 1987; Vaeth et al. 2012).

Strong evidence indicates that norms in countries of origin have long-term effects on the drinking patterns of immigrants (Cook et al. 2014). Recent immigrants generally have lower rates of alcohol consumption and excessive drinking than other U.S. residents (Brown et al. 2005; Szaflarski et al. 2011). Available reviews find that acculturation leads to more alcohol consumption among immigrants, including Latinos (Valencia and Johnson 2008; Zemore 2007). Higher acculturation is associated with higher odds of drinking and heavier drinking among Latino women (Zemore 2007). The findings for Latino men appear less clear cut, with high acculturation tied to greater likelihood of drinking but not a definitive pattern for problem drinking.

Studies are beginning to recognize the importance of premigration factors, including levels of alcohol use before migration as well as the cultural influences of countries of origin (Sanchez et al. 2014; Walsh et al. 2014). One study (Sanchez et al. 2014) among Latinos found that Latino men had higher levels of alcohol use before immigration, with steeper declines postmigration compared with Latino women. This finding suggests that future studies may need to focus on trajectories of alcohol use to address alcohol prevention efforts. Moreover, retaining culture of origin also has been shown to have protective influences for alcohol use (Schwartz et al. 2012), including protective family and traditional values.

Timing also may be critical in understanding how immigration is associated with alcohol consumption. Age at immigration can be seen as the developmental context of people's experiences when they first arrive in the United States. This context helps to shape language use, heterogeneity of social networks, and schooling. The social institutions that affect people's lives vary by age of immigration (Fuligni 2004; Rumbaut 2004). The number of social groups and institutions, such as schools, clubs, friendship networks, and family ties, geared toward supporting children to integrate into their new society is far greater than those available for adults (Takeuchi et al. 2007). These social groups, in turn, offer children greater access to the opportunity structures in a new culture. Conversely, immigrant children may have a larger set of social groups available to them than older immigrants. As a result, they also could experience a greater amount of negative stressors and influences that could lead to detrimental social and health outcomes as they mature. Immigrants who move to the United States at younger ages may be at risk for behaviors like alcohol use and misuse because they have the potential to be involved in social networks that may offer greater access and opportunity to engage in these behaviors, as well as lower levels of parental attachment (Hahm et al. 2003; Vaeth et al. 2012).

A recent study found that Mexican immigrants who come to the United States before age 14 have higher alcohol consumption rates than those who are older when they immigrate (Reingle et al. 2014). Immigrants who come at a younger age have alcohol consumption patterns similar to their U.S.-born counterparts. The study by Reingle and colleagues also shows that immigrants who arrive when they are younger than 14 and who live beyond the U.S.–Mexico border region have much higher rates of alcohol use than immigrants in the border region. This particular finding suggests that where immigrants live is another social context worth further investigation.

Community Influences

The literature on community influences on alcohol use focuses primarily on environmental aspects, such as neighborhood characteristics and opportunities for alcohol purchasing and consumption. For example, one study found that individuals who lived

in a neighborhood with a poorly built environment, characterized by inferior building conditions, housing, and water and sanitation indicators, were 150 percent more likely to report heavy drinking compared with those living in better built environments (Bernstein et al. 2007). Other studies have examined the spatial epidemiology of neighborhoods regarding alcohol availability, individual consumption, and community disorganization and violence (Cohen et al. 2006; LaVeist and Wallace 2000; Scribner et al. 2000; Shimotsu et al. 2013; Theall et al. 2011). Spatial relations between alcohol outlets and individual consumption also may be a key to explaining differential rates in alcohol use across racial/ethnic groups. A number of studies suggest that minority communities have higher concentrations of liquor stores than White communities (Alaniz and Wilkes 1998; LaVeist and Wallace 2000; Pollack et al. 2005; Romley et al. 2007; Treno et al. 2000), potentially increasing access to alcohol among minority populations (Freisthler et al. 2015; Scribner et al. 2000). Moreover, living in a disadvantaged neighborhood at an early age has long-term effects. Childhood exposure to violence leads to increased exposure to delinquent peers and alcohol use (Trucco et al. 2014). In another study, realizing how easy it is to get alcohol, witnessing neighborhood drug dealing, and seeing peers drink were all associated with increased alcohol use (Chung et al. 2014).

Relating neighborhood characteristics to alcohol use risk is useful for public health program planning because it allows policymakers and programmers to understand how changing structural-level factors of the built environment may affect health risk behaviors, including alcohol use. However, methodological challenges remain when analyzing the impact of complex community factors on individual behaviors. Such factors include social stratification (i.e., the probability of living in certain neighborhoods, which is higher for certain types of persons) and social selection (i.e., the probability that drinkers are more likely to move to certain types of neighborhoods). It remains unclear whether neighborhood disadvantage causes alcohol problems, and whether frequent drinkers are in fact usually more attracted to certain neighborhoods (i.e., self-selection). These challenges limit the interpretation of research on community-level effects. Some studies have attempted to address these issues using propensity matching and time-sensitive indicators (Ahern et al. 2008). Future studies should take these challenges into consideration and address subgroup differences in alcohol use norms across race/ethnicity and gender.

Cultural Norms

Cultural norms and beliefs are strong predictors of both current drinking and frequent heavy drinking (Brooks-Russell et al. 2013; Caetano and Clark 1999; LaBrie et al. 2012; O'Grady et al. 2011; Paschall et al. 2012). Across race and ethnicity, African Americans and Latinos report more conservative attitudes toward drinking compared with Whites (Caetano and Clark 1999; LaBrie et al. 2012). These more conservative norms may be associated with lower drinking rates among African Americans and Latinos compared with Whites (SAMHSA 2013). Few studies have examined diversity within racial and ethnic groups such as Latinos, Blacks, and Asians, limiting our ability to meet the needs of specific subpopulations. Some studies suggest that alcohol-related problems differ substantially across Latino subgroups, including higher rates of alcohol abuse and dependence among Mexican-American and Puerto Rican men compared with Cuban Americans and Central and South Americans (Caetano et al. 2008). These findings may best be explained by considerable differences in cultural norms, especially the cultural beliefs regarding appropriate alcohol use (Greenfield and Room 1997; LaBrie et al. 2012). For example, some scholars explain heavy-drinking patterns among Latino men through the concept of machismo, which has been a significant cultural influence for generations and remains integral to Latino male identity (Dolezal et al. 2000). Machismo suggests that Latino men attempt to appear strong and masculine because of cultural values, and drinking greater amounts of alcohol further exemplifies their masculinity. More recently, scholars have commented that concepts like machismo cannot account for the complexity of Latino drinking behavior (Caetano 1990).

Asians, on the other hand, generally are thought to have higher abstention rates compared with other racial and ethnic groups, especially when they are integrated within their ethnic cultures (Cook et al. 2012). One measure of the retention of ethnic values and cultural norms is generation status. That is, the longer immigrants have lived in the United States, the more likely they are to acculturate to the cultural norms of their destination community (Berry et al. 2006). Lower levels of ethnic identity may be one explanation for these differences across Asian subgroups. Japanese Americans, Filipino Americans, and Korean Americans often have been in the United States longer than other Asian subgroups, such as Cambodians, Thais, and Vietnamese, and also report higher levels of alcohol use compared with other Asian Americans and Asian immigrants (Iwamoto et al. 2012). Ethnic identity may promote stronger family values and traditional ties, leading to lower levels of alcohol use. Moreover, Asian-American adolescents who have a high attachment to family or who share their family's negative attitudes toward drinking are less likely to consume alcohol (Hahm et al. 2003).

Cultural norms also vary by context and place. Some alcohol researchers have used multilevel approaches to distinguish among the causal effects

of individual and neighborhood-level norms. For example, Ahern and colleagues (2008) found that neighborhood norms against drunkenness were a more robust and stronger predictor of binge drinking than permissive beliefs about it held either by the individual or family and friends. If an individual lived in a neighborhood that frowns on binge drinking, that individual was less likely to drink, even if he or she believed it acceptable to do so. This was particularly true for women, suggesting gender norms around alcohol use may be a factor.

Specifically, past studies found that gender differences in alcohol use may reflect the greater social stigma directed at women who drink. This seems to be more pronounced in certain cultures. Caetano and Clark (1999), for example, found stronger gender norms related to alcohol use in Latino cultures compared with the United States (Kulis et al. 2012). This results in greater gender differences in alcohol use among Latinos compared with other U.S. populations, with recent trends suggesting similar levels of binge drinking between men and women in Western cultures (Iwamoto et al. 2012). This may reflect changing beliefs about gender and social status. Although traditionally perceived as a "masculine" behavior, binge drinking is now more acceptable among women in certain cultures that foster more balanced gender roles (Lyons and Willott 2008).

Family and Peer Influences on Adolescent and Young Adult Drinking

Some of the strongest influences on adolescent drinking behavior come from the people that youth spend the most time with: family and friends. Studies have found that higher levels of alcohol use among parents and peers is associated with increased alcohol use among adolescents and young adults (Cruz et al. 2012; Dawson 2000; Mares et al. 2011; Osgood et al. 2013; Trucco et al. 2014; Varvil-Weld et al. 2014; Wallace et al. 1999; Walsh et al. 2014; Williams and Smith 1993). Developmentally, people's social contexts shift from the family unit during childhood to focus more on their peers and their schools during adolescence. Reflecting this, parental alcohol use seems to exert a greater influence before age 15 and diminishes over time (Dawson 2000).

Conversely, family support, bonding, and parental monitoring is associated with lower alcohol use (Bahr et al. 1995; White et al. 2006) and social networks and social support also have protective effects (Ramirez et al. 2012). For example, one study that assessed the effects of leaving home and attending college found that although the transition overall was associated with higher levels of alcohol use, young people with fewer friends who use alcohol reported higher levels of religiosity. Higher parental monitoring also protected against alcohol and marijuana use (White et al. 2006). Moreover, higher levels of familism (values that place family needs over individual needs) and being in a nuclear family served as protective factors among adolescents (Ewing et al. 2015).

Peer norms play an important role at this life stage (Jackson et al. 2014). By the late adolescent period, parental influences related to alcohol use are small compared with peer influences (Schwinn and Schinke 2014; Zehe and Colder 2014). Much of the focus on peer influences has highlighted the risk networks associated with alcohol use. Peer pressure (Studer et al. 2014), peer alcohol norms (Varvil-Weld et al. 2014), and socializing with substance-using peers (Patrick et al. 2013) were associated with alcohol misuse and binge drinking. Studies note that leaving the home environment, entering college, and joining Greek organizations increased alcohol use as a result of more socially permissive norms around drinking (Scott-Sheldon et al. 2008; White et al. 2006).

More recent studies have attempted to assess the synergistic influence of peers and families. Whereas the majority of studies on peers have focused on the negative consequences of social networks, research shows that greater parental support and monitoring can lead to prosocial peer affiliations (Williams et al. 2015). One study found that protective influences in parental domains can moderate the negative effects of negative peer influences among Latino college students (Varvil-Weld et al. 2014). In particular, maternal communication resulted in less alcohol use; conversely, maternal permissive norms and peer norms were associated with more alcohol use. Greater parental disapproval toward alcohol use is associated with lower involvement in peer networks that use alcohol, less peer influence to use, and greater self-efficacy and stronger negotiation skills to avoid alcohol (Nash et al. 2005). Interventions aimed at establishing and fostering conservative peer norms were found to be more effective than individual resistance training (Hansen and Graham 1991), whereas multilevel interventions incorporating peers, families, and communities are known to be effective among adolescents (Chapman et al. 2013; Perry et al. 2002; Toumbourou et al. 2013).

Existing successful interventions to reduce alcohol use include incorporating culturally sensitive delivery models, such as employing community health workers among Latino populations (Ornelas et al. 2014) and using Web-based interventions to change norms (Patrick et al. 2014). In a recent review, *Familias: Preparando la Nueva Generación,* a culturally grounded intervention for parents to support Mexican-heritage youth, showed reductions in parental drinking (Williams et al. 2015). Because past studies show that parents may potentially moderate negative peer influence, fostering synergistic solutions between multiple contexts should be a priority (Ewing et al. 2015).

Directions for Future Research

This article highlights examples of how societal factors, cultural norms, neighborhoods, and social contexts may be associated with alcohol misuse. Certain gaps in the literature clearly remain. Methodologically, these findings should be interpreted with caution, because it is difficult to distinguish between and among societal and community-level influences. Future studies should use advanced statistical methods such as multilevel modeling techniques, based on theoretical and conceptual approaches in population health. In addition, longitudinal data will help support causal hypotheses and relationships.

Risk and protective factors, prosocial peer affiliations, and synergistic relationships between social contexts are worth further research. Among immigrants, retaining the cultural values of the country of origin has shown to have protective influences on alcohol use, and this finding should be incorporated into future interventions for immigrant populations. Focusing on risk and protective factors will help inform future programs addressing alcohol initiation, specifically helping parents and communities understand how they may influence alcohol use among adolescents and young adults.

Alcohol research should also more actively acknowledge new social contexts among youth culture. A better understanding of the influence online social networking sites and new media have on alcohol use is particularly important among adolescent populations, and this should be explored more fully in future studies.

Developmentally appropriate strategies are needed to delay initiation of alcohol use, because the family environment may be less influential compared with the influence of peers, social norms, and media among older adolescents and young adults. Future interventions should focus on multiple levels of societal environments, from the community to the individual level.

Finally, given the changing demographic landscape of the United States, including a larger and more diverse immigrant population, interventions and treatment options should also reflect the growing needs of certain groups. However, studies have found that focusing only on changing social norms is insufficient, and that broader interventions that influence multiple levels of an individual's environment, such as family and schools, may have greater impact. Alcohol education programs need to also address individual intent and motivations while offering personalized feedback and protective behavioral strategies (Patrick et al. 2014). Public health and treatment programs need to be culturally sensitive, paying particular attention to cultural factors such as ethnic identification and orientation.

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Recent Developments in Alcohol Services Research on Access to Care

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In the United States, only about 10 percent of people with an alcohol or drug use disorder receive care for the condition, pointing to a large treatment gap. Several personal characteristics influence whether a person will receive treatment; additionally, many people with an alcohol use disorder do not perceive the need for treatment. The extent of the treatment gap differs somewhat across different population subgroups, such as those based on gender, age, or race and ethnicity. Recent health care reforms, such as implementation of the Patient Protection and Affordable Care Act of 2010, likely will improve access to substance abuse treatment. In addition, new treatment approaches, service delivery systems, and payment innovations may facilitate access to substance abuse services. Nevertheless, efforts to bridge the treatment gap will continue to be needed to ensure that all people who need alcohol and drug abuse treatment can actually receive it.

Key words: Alcohol use disorder; alcohol services research; health care disparities; health care financing; treatment; substance abuse treatment; treatment access; access to care; parity; socioeconomic disparity; special populations; gender; age; race; ethnicity; health care reform; Patient Protection and Affordable Care Act

Of the more than 18 million Americans who need treatment for alcohol use disorder (AUD), less than 10 percent actually receive care (Substance Abuse and Mental Health Services Administration [SAMHSA] 2013). This problem, often referred to as the substance abuse treatment gap, is a longstanding concern for alcohol services research. Studies suggest that many factors contribute to the treatment gap, ranging from inadequate treatment capacity to organization and financing policies, negative attitudes on the part of potential treatment seekers, and inequities in the distribution of care. However, today, the landscape of alcohol treatment is shifting with health care reform, the advent of new treatment modalities, and secular changes in the populations needing care. In light of these trends, the research and treatment communities are seeking new answers to old questions: What is the current scope and nature of the treatment gap? Which subpopulations are the most underserved? How are major policy changes affecting access to alcohol treatment? And how can the newest treatments become available to a wider segment of the population in need?

Understanding the Treatment Gap

Recent analyses of the U.S. population buttress claims that there exists a considerable unmet need for substance abuse treatment—enough to warrant serious, sustained attention by policymakers. It is safe to say that the substance abuse treatment gap in the United States is somewhere close to 90 percent. In other words, only about 10 percent of people with a current alcohol or drug use disorder receive care for the condition. This conclusion is based on a thorough national analysis that estimated the treatment gap using a wide range of possible metrics (Schmidt 2007*a*). The analysis found that even after using diverse measurement approaches, estimates of the treatment gap tended to cluster within a relatively narrow range of 8 percent to 12 percent. More recently, the 2014 National Survey on Drug Use and Health (NSDUH) found that approximately 18 percent of people needing treatment for alcohol and other drug use problems actually received any care in the previous year, and about 11 percent received specialty care (SAMHSA 2015). These estimates of the change in treatment gap pale in comparison to the magnitude of the problem they quantify.

The substantial gap between those who need treatment and those who actually get treatment has, in fact, been a longstanding issue in alcohol

services research. In the 1980s, researchers began trying to understand what distinguished people who receive treatment from those who do not (Weisner 1988). What began as an effort to simply describe the problem evolved into a wide-ranging research enterprise seeking to explain why so many Americans fail to obtain needed care. Further analyses demonstrated that a cluster of factors robustly predict the likelihood of receiving substance abuse treatment, including the client's age, gender, marital status, perceived need for treatment, and prior use of services (Weisner et al. 2002).

It also is clear that people who meet the criteria for an AUD often do not see a need for professional care. According to the 2014 NSDUH, only 6.3 percent of people diagnosed with substance use disorder or treated for substance use problems in a specialty treatment facility felt that they needed treatment (SAMHSA 2015), and the majority did not make an effort to seek care (SAMHSA 2015). Respondents cited several reasons for not seeking or receiving treatment, including not being ready to stop substance use, lack of health care coverage or means to afford treatment, fear of problems at work or stigmatization by others, and not knowing where to go for treatment. Others may question the efficacy of treatment (SAMHSA 2002). However, the reaction of family and friends to a person's drinking problem can motivate care seeking, even when the affected individual is hesitant, and social support also can influence responses to treatment (Worley et al. 2015).

Some investigators have examined the "thresholds of severity" at which individuals with a drinking problem will perceive a need for care (Schmidt 2007*a*). These studies found that a person who is experiencing symptoms of mental distress, in addition to having problems with substance use, is much more likely to see a need for treatment than is a person without those symptoms. Once again, perceptions by others in the problem drinker's life are critical factors in seeking care. Experiencing family, work, and legal problems also significantly increase the likelihood that people would see a need for care and eventually get there.

Who Lacks Care? Uneven Access Across Subpopulations

Not all subgroups in the U.S. population are equally affected by the treatment gap. To better understand the causes and extent of the treatment gap for people with AUD, it is useful to look separately at different subpopulations based on gender, age, race and ethnicity, and other variables.

Gender

During the 1980s, women were underrepresented in addiction treatment programs by a one-to-four ratio compared with men. Therefore, researchers prodigiously investigated the reasons contributing to this underrepresentation, finding that women largely sought care from other types of providers, such as mental health providers, to avoid the stigma of substance abuse treatment (Weisner and Schmidt 1992). Since then, the gender gap has substantially narrowed (Steingrímsson et al. 2012). Although almost twice as many men than women received any substance use treatment in 2014 (Center for Behavioral Health Statistics and Quality 2015), the prevalence of substance abuse and dependence similarly was about twice as high among men as it was among women.[1] The narrowing of this gender gap has led researchers to focus on other underserved populations.

Age

A significant concern today is the disproportionately low rate of treatment utilization, and particularly specialty treatment, among adolescents and young adults in the United States. According to the 2014 NSDUH, about 1.3 million adolescents ages 12–17, and 5.8 million young adults ages 18–25, needed treatment for substance use problems (SAMHSA 2015). However, only 8.5 percent of these adolescents and 8.0 percent of young adults received treatment at a specialty facility, compared with 13.2 percent of adults ages 26 and older who needed treatment (SAMHSA 2015). The need for treatment appears similar among male and female adolescents, as indicated by a similar prevalence of substance abuse and dependence, but females are more likely to receive care from professionals specially trained in substance abuse treatment (Center for Behavioral Health Statistics and Quality 2015).

Looking at the other end of the age spectrum, studies point to a treatment gap for elderly people with alcohol and illicit drug problems, albeit a narrower one. According to the 2014 NSDUH, more than 1.1 million people ages 65 and older needed treatment for a substance use disorder, but only about 234,000 people in this age group (or about 21 percent) received treatment (Center for Behavioral Health Statistics and Quality 2015). This treatment gap may, at least in part, result from difficulties with the identification and diagnosis of substance use problems in this population (Blow et al. 2002).

Race and Ethnicity

The debate about racial and ethnic disparities in health care access reached national prominence in 2002, with the publication of the watershed Institute of Medicine report *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care* (Smedley et al. 2002). The report delivered a scathing view of gross inequities in access to, and the quality of, health care for America's racial and ethnic minority groups. Although it seemed almost inevitable that substance abuse researchers would uncover similar evidence of disparities, by and large,

[1] According to the 2014 NSDUH, the prevalence of abuse or dependence among men was 3.4 percent for illicit substances, 8.5 percent for alcohol, and 10.7 percent for illicit drugs or alcohol, compared with 1.9 percent, 4.4. percent, and 5.7 percent, respectively, among women (Center for Behavioral Health Statistics and Quality 2015).

those observed in the wider health care system appear far more pronounced.

Studies in the substance abuse field show more modest and subtle variations in treatment access by race and ethnicity (Schmidt et al. 2006). African Americans and Hispanics—the two groups most commonly studied—tend to experience more health and social consequences for a given level of drinking than their White counterparts. The higher incidence of negative social consequences among minorities could result from stress associated with discrimination or from differences in how various racial and ethnic communities respond to risky drinking and how the wider society responds to drinking within these communities (Mulia et al. 2009). With respect to treatment use, few differences exist between Whites, African Americans, and Hispanics, at least in those who experience alcohol problems on the less severe end of the spectrum. With increasing problem severity, however, African Americans and Hispanics have lower odds of entering treatment compared with Whites (Chartier and Caetano 2010; Schmidt et al. 2007*b*). In addition, when members of different ethnic groups do seek help for an alcohol problem, they tend to obtain different types of care. Hispanics receive less specialty care than do Whites (Schmidt et al. 2007*b*). Finally, although treatment retention is similar across ethnic groups, White patients receive more types of clinical services than Hispanics or African Americans, with the exception that African Americans receive more employment services (Niv et al. 2009).

One potential contributor to ethnic disparities in treatment access is geographic variation in the availability of treatment slots. In an interstate comparison of the alcohol treatment supply, McAuliffe and Dunn (2004) found that the Southern and Southwestern regions of the United States—regions with disproportionately large minority populations—are the most underserved. Surveys suggest that long wait times resulting from limited treatment capacities are a primary reason for unmet treatment need (Andrews et al. 2013). In national surveys, African Americans were disproportionately more likely to report lengthy wait times as a reason for not entering care (Schmidt et al. 2006). Individuals referred to treatment by the criminal justice system, who are more likely to belong to a minority group, also experience longer wait times (Andrews et al. 2013).

Who Pays? Health Care Reform, Parity, and Access to Care

Lack of or insufficient insurance coverage may be one of the barriers that prevents people with alcohol problems from entering treatment. Accordingly, recent health care reforms are expected to have a significant impact on access to substance abuse treatment. In the late 1990s and early 2000s, mental health and substance abuse spending was growing at a slower rate than the gross domestic product and shrinking as a share of all health care spending (Mark et al. 2011). Indications are that this could change dramatically under health care reform. Approximately 25 million individuals will become newly insured as a result of the Patient Protection and Affordable Care Act of 2010 (ACA), known colloquially as "Obamacare" (Mark et al. 2015). Even before that, reforms under the Mental Health Parity and Addiction Equity Act of 2008 (MHPAEA) required commercial health plans, as well as Medicaid managed-care plans, to cover substance abuse treatment services at comparable levels to medical and surgical services. The ACA expands access to health insurance through Medicaid, further promotes insurance parity, and encourages new models of payment and service delivery. Although the MHPAEA and the ACA do not guarantee parity coverage for all Medicaid recipients, they offer a variety of mechanisms by which States may do so at their discretion (Burns 2015). (For more information on the influence of these health care reforms on treatment access, see the sidebar "Parity, the Affordable Care Act, and Access to Treatment.")

It is notable, however, that empirical studies prior to these reforms did not identify insurance coverage as one of the most significant predictors of entering alcohol treatment (Schmidt and Weisner 2005). Because addiction treatment is heavily subsidized by a separate stream of federal block grant funding, uninsured individuals often appeared to have better access to alcohol treatment than some groups of insured people. The MHPAEA and ACA may be changing this by expanding access to health insurance, deepening mandates for parity, and offering unprecedented opportunities for service growth and delivery-system reform. Under the ACA, overall funding for substance abuse services is increasing (Buck 2011). Before the health care reforms, Medicaid was not a major funder of substance abuse treatment, but this now is changing (Andrews et al. 2015*b*).

The State of Massachusetts, which created the blueprint for the ACA, presents a window into the potential long-range impacts of the federal reforms. This State's experience paints a cautiously optimistic picture for the Nation. Since the State's health care reforms, treatment capacity in Massachusetts has expanded to accommodate a growing number of people seeking alcohol services. Treatment admissions increased by 17.1 percent, and daily censuses of patients in substance abuse treatment increased by 4.7 percent. However, the reforms in Massachusetts appear to be having somewhat mixed effects on the quality of care, and uninsured people continue to face challenges (Maclean and Saloner 2015).

In nationwide studies carried out since the passage of the ACA and the MHPAEA, having Medicaid or private insurance was associated with a higher likelihood of receiving substance abuse treatment among people

who perceived a need for it (Ali et al. 2015; Mechanic 2012). Moreover, national studies of health plans suggest that the 2008 MHPAEA parity law has met its goal of putting coverage for behavioral health care on par with coverage for medical and surgical care (Horgan et al. 2015). For people with commercial insurance, the MHPAEA has had modest effects on reducing out-of-pocket costs and increasing access to outpatient services (Haffajee et al. 2015). Federal parity also is associated with an increased probability of out-of-network visits and increased average spending on substance abuse treatment (McGinty 2015). Many predicted that, under parity laws, health plans would more aggressively manage utilization, for example, through more stringent requirements on prior authorization for services. However, a national survey of health plans found that only 5 percent of plans require prior authorization for outpatient substance abuse treatment (Merrick et al. 2015).

Although the evidence to date is promising, a variety of limitations in the implementation of the new laws suggest that it could take many years to realize the promise of federal parity and health care reform. Twenty States have completely opted out of the ACA's

Parity, the Affordable Care Act, and Access to Treatment

Although having insurance coverage is not the most important factor influencing access to substance abuse treatment, the ways in which insurance coverage works do affect treatment availability and influence people's decisions about seeking care. Recent health care reforms present both fresh opportunities and new barriers affecting treatment access.

The Mental Health Parity and Addiction Equity Act of 2008 requires group health plans offering mental health and addiction services to cover such services at the same levels that they cover other medical and surgical services. The law applies to Medicaid managed-care plans as well as to private plans, but exempts health plans with fewer than 50 employees. Parity technically means that all aspects of coverage are comparable to those covering medical and surgical care, including deductibles and copayments, limitations on the frequency of treatment, and methods of determining whether treatment is necessary. Coverage for alcohol treatment offered by insurance plans therefore becomes more generous under this reform. However, the law does not require that plans cover addiction treatment at all, nor does it require that all areas of addiction be covered. Because of this, there are concerns that companies previously offering some addiction treatment benefits may choose to drop coverage in response to the parity law (Stewart and Horgan 2011).

The Patient Protection and Affordable Care Act of 2010 (ACA) extends insurance coverage to more Americans by expanding Medicaid eligibility and requiring individuals to obtain insurance coverage. Because private insurance plans still are not required to furnish substance abuse coverage, the focus of discussions about access to alcohol and other substance treatment revolves primarily around the effects of the expanded Medicaid benefits. The ACA also includes ideas for health care delivery and payment reforms that are likely to help providers deliver a wider range of behavioral health services. It encourages the use of preventive services, continuity of care, and substance abuse education. It also allows providers treating mental illness to pay more attention to substance abuse problems and provides pathways for incorporating evidence-based treatments. As poor continuity and coordination of care accounted for part of the substance abuse treatment gap and problems with treatment access, the ACA may offer tools to address these issues (Mechanic 2012).

These two pieces of legislation seem to have an impact on the treatment gap. For example, insured people who heretofore ran into caps or limits on their substance abuse coverage may benefit from the parity requirement. In addition, some people who previously could not afford insurance will now be able to obtain coverage (Mark et al. 2011). However, although the ACA does not allow States to reduce Medicaid enrollment, they still can cut health care services funded through general State funds. Because substance abuse treatment relies heavily on non-Medicaid public funds through block grants, treatment and ancillary services remain especially vulnerable to funding cuts during State budget shortfalls (Mark et al. 2011).

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Medicaid expansion program, thus substantially limiting its national impact. There are further concerns that treatment systems may lack the capacity and manpower to treat the swelling numbers of newly covered individuals (Ghitza and Tai 2014; Weil 2015). One survey of State agencies found that fewer than half were helping providers to modernize care or had technical support to maximize insurance participation (Andrews et al. 2015*a*). Similarly, a study of public treatment programs in Los Angeles County found them ill prepared to align their programs with the new realities of health care reform (Guerrero et al. 2015).

Access to What? New Treatments and Service Delivery Systems

Services research has demonstrated that access to new treatment modalities and service-delivery forms is in flux under health care reform. Service delivery and payment innovations introduced by the ACA could facilitate access to services that have not previously been reimbursable, including comprehensive care management, care coordination, social support, transition care, collaborative care, and other evidence-based interventions. The ACA also has ushered in a trend toward integrating addiction and primary health care under the auspices of "patient-centered medical homes" (PCMH) and Medicaid "health homes" (Starfield and Shi 2004). Health homes target chronic-disease comorbidities prevalent in alcohol treatment populations, and almost all participating States include substance abuse in their qualifying conditions.

The PCMH model originated in private health plans as a strategy to lower costs while improving the quality and continuity of care. Under this model, substance abuse services are linked to primary care through strong referral networks using electronic medical records, or they may be "co-located" under one roof in efforts to more deeply integrate care (Rittenhouse and Shortell 2009). Early evaluations—mostly in large, integrated delivery systems—show that this model improves quality, with savings in total health care costs (Crabtree et al. 2011). To a more limited extent, PCMH applications have shown positive outcomes for accessibility and continuity of care in safety-net populations, where substance abuse treatment need is disproportionately high (Rittenhouse et al. 2012).

Health care reform further appears to be catalyzing a longstanding structural shift toward the use of screening and brief interventions (SBIs) delivered in mainstream medical care settings, most notably primary care and hospital settings (Babor and Higgins-Biddle 2000). SBIs may help close the treatment gap by expanding capacities within mainstream medical care settings. An SBI can be as brief as 5 to 10 minutes and can be particularly effective when performed by a primary care physician. It begins with an assessment of the patient's alcohol use; patients screening positive for an alcohol problem then are advised to cut down or abstain and may be referred for further professional help. Studies have long shown that SBI offers an evidence-based, cost-effective approach for reducing patients' drinking (Fleming and Barry 1991). Introducing SBI programs into settings such as Federally Qualified Health Centers,[2] schools, workplaces, and criminal justice settings could broaden their reach and also help more disadvantaged populations (Mulia et al. 2014). Health services researchers are developing and testing more streamlined Web-based approaches to training health care providers in SBI skills, which could increase the system's capacity to provide this form of care (Stoner et al. 2014). Electronic versions of SBI and "guided self-change" approaches also hold promise for allowing efficient self-treatment for people with moderately severe substance use disorders (Sinadinovic et al. 2014; Wagner et al. 2014). However, a 2010 national survey of health plans found that only 18 percent of insurance products required screening for alcohol- and drug-abuse problems in primary care (Garnick et al. 2014).

A related challenge is promoting the adoption of even newer evidence-based treatments, most notably pharmaceutical approaches. "Second-generation" medications, such as acamprosate and regular and extended-release naltrexone, are clinically efficacious during detoxification and recovery from alcohol abuse. A national survey of health plans found that 96 percent of insurance products included coverage for addiction medications (Horgan et al. 2014). However, for patients, difficulties in gaining health plan authorization and covering high copayments may be barriers to using addiction medications. Providers also face challenges ordering and obtaining licenses to administer certain medications.

Initiatives such as Advancing Recovery and the Medication Research Partnership have been effective in working with the public and private sectors to facilitate adoption of pharmacotherapies for AUD. These organizational-change initiatives bring payers and providers together into collaboratives that test organizational changes supporting the increased use of medications through brief, experimental "change cycles." Implementation strategies that work are quickly scaled up through sharing across members of the collaborative. Demonstrations suggest that supported partnerships such as these can achieve a wider adoption of evidence-based treatment practices more rapidly and effectively (Ford et al. 2015; Schmidt et al. 2012).

Bridging the Treatment Gap: A Continuing Agenda

As seen through the lens of health services research, problem drinkers face better prospects for treatment in

[2] Federally Qualified Health Centers are community-based organizations that offer comprehensive primary care and preventive care, including substance abuse services, to people of all ages, regardless of their ability to pay or health insurance status. They are therefore an important part of the health care safety net.

the current landscape, characterized by the expansion of insurance coverage under health care reform and parity laws, as well as rapid clinical innovations and service-delivery-system reforms. But it also is a landscape in which the need for care still far outstrips the supply of treatment—one in which waiting lists for care are long as the alcohol field looks to the wider health care system to build greater capacity. Above all, today's health services researchers describe a treatment system that is moving toward closer alignment with the wider health care system. This can be seen in the movement toward more integrated models of service delivery through the PCMH and Medicaid health homes. It also is evident in the push toward parity in insurance coverage, and in the scaling-up of SBI programs in primary care and other medical care settings. Finally, alignment with the greater health care system can be observed in the promotion of pharmaceutical therapies, most notably the new second-generation pharmaceuticals for treating addiction. Deepening collaboration between alcohol treatment and mainstream health care systems will likely lead to further—undoubtedly controversial—changes in services for people with alcohol problems. But this may very well be the field's best hope for solving what is arguably its greatest challenge: reaching a greater proportion of the population in need of care.

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Under-Researched Demographics: Heavy Episodic Drinking and Alcohol-Related Problems Among Asian Americans

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Historically, Asian Americans have reported lower rates of alcohol misuse compared with other racial/ethnic groups (Substance Abuse and Mental Health Services Administration 2009; Wechsler et al. 2000). However, epidemiological data illustrates that heavy episodic drinking and alcohol abuse are significant and increasing among U.S.-born Asian-American young adults ages 18–25 (Grant et al. 2004). Within one decade alone, the prevalence of alcohol abuse increased fivefold among Asian Americans, from 0.74 percent in 1991–1992 to 3.89 percent in 2001–2002 (Grant et al. 2004). Moreover, recent studies have identified high-risk subgroups of Asian-American young adults who engage in higher rates of heavy episodic drinking compared with their Asian-American peers (Iwamoto et al. 2010). Additionally, some U.S.-born Asian-American ethnic subgroups may engage in heavy episodic drinking at comparable rates to high-risk groups (e.g., college fraternity members) in the general population (Iwamoto et al. 2011*b*). Despite this growing concern, Asian Americans are perceived as a low-risk group with respect to alcohol problems, partially because of the "model minority" myth and the stereotype of Asian Americans generally being well assimilated to U.S. culture, being financially and academically successful, and with low levels of psychological distress (Gupta et al. 2011).

This general perception, which is largely upheld by the research community, hinders our understanding of the specific alcohol-related problems experienced by this population. However, given that Asian Americans are the fastest-growing racial group in the United States (Le 2010), it is crucial to understand the determinants and mechanisms of risk among Asian Americans. This article reviews the research over the last 15 years pertaining to Asian Americans' alcohol use. Specifically, it highlights the role of genetic factors (e.g., alcohol dehydrogenase [ADH] and aldehyde dehydrogenase genes [ALDH]) as well as of sociocultural factors (e.g., physiological and cognitive expectancies, acculturation, enculturation, discrimination, mental health problems, and gender socialization) on heavy episodic drinking and alcohol-related problems in this demographic.

Genetic Factors

Two genetic factors that have been significantly associated with alcohol use and related problems include specific variants (i.e., alleles) of the genes encoding certain ADH (ADH1B) and ALDH (ALDH2) enzymes. The *ADH1B* gene encodes an enzyme that metabolizes ethanol into acetaldehyde (Eng et al. 2007). One allele of this gene (i.e., *ADH1B*2*) encodes an enzyme that accelerates the oxidation of ethanol, resulting in a buildup of acetaldehyde (Borson and Li 1986; Eng et al. 2007; Eriksson 2001). High levels of acetaldehyde can create a heightened and unpleasant response to alcohol characterized by facial flushing, headache, and nausea (Wall et al. 2005), thereby making alcohol consumption unpleasant and thus protecting against high consumption and, consequently, risk of alcohol use disorder. Luczak and

colleagues' (2006) meta-analysis suggested that Asian individuals who are the most protected from alcohol abuse possess one or two copies of the *ADH1B*2* allele. Specifically, Asians with two *ADH1B*2* alleles were five times less likely to be dependent on alcohol than were those who did not possess this allele (Luczak et al. 2006).

The *ADH1B*2* allele is found predominantly in certain subgroups of East Asians, including those of Japanese descent, of whom an estimated 81 percent carry at least one copy of this allele (Eng et al. 2007); Chinese descent (84 to 92 percent); and Korean descent (88 to 96 percent). The frequency of the *ADH1B*2* allele in East Asians is comparable, albeit not precisely matched, to the rates of the *ALDH2*2* allele, which encodes an inactive variant of ALDH2 (Eng et al. 2007). This suggests that although there is some overlap between those with the protective alleles of *ADH1B* and *ALDH2*, many carry only one but not the other. Carrying only one of the protective alleles still can reduce risk of alcohol use disorder. Thus, Asian Americans with a fully active *ALDH2* gene (*ALDH2*1*) who additionally possess the protective high-activity *ADH1B* allele (*ADH1B*2*) were 80 percent less likely to be alcohol dependent compared with Asian Americans who possessed the standard alleles of both enzymes (Luczak et al. 2006; Whitfield 2002). This finding indicates that *ADH1B*2* may be protective against alcohol dependence even in the presence of the fully active *ALDH2* allele, suggesting even mild discomfort experienced because of alterations in acetaldehyde metabolism may prevent overindulgence in alcohol.

ALDH2 is responsible for mediating the oxidation of acetaldehyde generated by the actions of ADH into acetate (Bosron and Li 1986). Individuals carrying the reduced-activity *ALDH2* variant (*ALDH2*2*) metabolize acetaldehyde at a much slower rate or not at all, resulting in similar unpleasant symptoms after alcohol consumption to those associated with the *ADH1B*2* allele (Crabb et al. 2004; Hendershot et al. 2009; Thomasson et al. 1993). The reduced-activity *ALDH2*2* allele most commonly is found in people of East-Asian descent (i.e., Chinese, Japanese, and Korean), meaning these subgroups theoretically are most protected against alcohol abuse (Eng et al. 2007). Among subpopulations in the United States, the influence of *ALDH2*2* is especially relevant for Asian Americans, because 30 to 50 percent of these individuals (Goedde et al. 1992) possess this enzyme deficiency that provokes physical irritation and discomfort (Hendershot et al. 2009; Thomasson et al. 1993). Given the high prevalence of the inactive *ALDH2* allele among Asian Americans, numerous studies have investigated its role in drinking behaviors in this population. These analyses have revealed that people carrying the *ALDH2*2* allele are protected against alcohol abuse, especially those of Han Chinese and/or Japanese ethnicities (Luczak et al. 2006).

Although the *ADH1B*2* and *ALDH2*2* alleles both can serve as protective factors against alcohol abuse, they do not seem to eliminate alcohol consumption altogether. Wall and colleagues (2001) found that although college students with fully active *ALDH2* alleles were significantly more likely to be regular drinkers (78 percent) than those carrying an inactive allele, 58 percent of students with an inactive *ALDH2*2* allele still were regular drinkers. Thus, even if possession of the inactive allele reduces the likelihood of alcohol consumption, it by no means provides full protection. In fact, the incidence of alcoholism in South Korea and Japan as well as of high-risk drinking among young adult Asian Americans is relatively high, even in people possessing an inactive ALDH2 enzyme (Higuchi et al. 1996; Kim et al. 2010; Wall et al. 2001; Yokoyama et al. 2003). Thus, beyond these genetic factors, sociocultural factors may influence the risk of alcohol use and related problems in this population (Doran et al. 2007; Luczak et al. 2004; Lum et al. 2009).

Social–Cognitive Factors

Alcohol Expectancies

One social–cognitive factor that seems to be associated with genetic factors, including the protective variants *ALDH2*2* and *ADH1B*2*, is alcohol expectancies, or the cognitions and beliefs about the positive, negative, and physiological effects of alcohol use. Theoretically, alcohol sensitivity may influence alcohol-related learning processes, including development of alcohol expectancies, through differences in physiological responses to alcohol (Hendershot et al. 2009). Hendershot and colleagues (2009) developed a measure assessing physiological expectancies—that is, the anticipation that drinking excessively will result in negative physiological responses such as nausea, flushing, and dizziness—and subjective response to alcohol. The analyses revealed that individuals carrying the *ALDH2*2* allele were more likely to

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have negative physiological alcohol expectancies and, thus, engage in lower alcohol use. Consequently, individuals who hold negative physiological alcohol expectancies and possess the inactive *ALDH2* allele are at substantially lower risk for alcohol abuse (Goldman et al. 2006; Hendershot et al. 2009). However, although negative physiological expectancies may be a prominent factor in risk of alcohol use, abuse, and dependence, especially in conjunction with genetic factors, other sociocultural factors further explicate Asian Americans' drinking patterns.

Acculturation

Acculturation is a multidimensional process that occurs when immigrants and people raised in immigrant households experience the merging of cultural norms, values, and behaviors from the heritage culture and receiving culture (Phinney 2003; Schwartz et al. 2010). Acculturation has been studied extensively in relation to alcohol use among Asian Americans. Thai and colleagues (2010) used data from the National Longitudinal Study of Adolescent Health to investigate the influence of acculturation, peer substance use, and academic achievement on alcohol use in Asian-American adolescents compared with other racial/ethnic groups. The study determined that acculturation, although not as robust a predictor of alcohol use as peer substance use and academic achievement, was more pertinent in Asian Americans than in other U.S. racial/ethnic groups. Specifically, people who were more acculturated were at greater risk for alcohol use. Similarly, Hahm and colleagues (2003) reported that Asian Americans who spoke English at home and were born in the United States (i.e., had a higher level of acculturation) were three times more likely to use alcohol compared with those who were less acculturated.

These findings highlight the possible stress that coincides with the acculturation process. Many people experience acculturative stress, defined as a significant reduction in physical, psychological, and social health related to the challenges of acculturation (Berry et al. 1987). Specific stressors include conflicting family values and expectations, having to learn a new language, experiencing discrimination, and struggling to adopt a new culture (Szapocznik et al. 1989). Because acculturative stress places people at increased risk for psychological distress, it also may encourage problematic coping behaviors, including heavy alcohol use or other self-medicating behaviors (Unger et al. 2009). The association between acculturative stress and heavy drinking has been identified among Asian-American samples. For example, one study (Park et al. 2014) investigating the impact of acculturation and related stress on alcohol use in Chinese, Filipino, and Vietnamese samples suggested that general acculturative stress was significantly related to alcohol use in Vietnamese-American participants.

One proxy of acculturation that has been studied in relationship to Asian-American drinking patterns is nativity, or whether an individual was born in the United States. Nativity has been identified as an important factor that helps explain within-group differences in drinking patterns among Asian Americans. According to the National Epidemiological Survey of Alcohol and Related Conditions (NESARC), U.S.-born Asian Americans were more likely to report alcohol abuse and alcohol dependence, as defined by the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition*, compared with foreign-born Asians (Breslau and Chang 2006). Similarly, a study of one of the largest samples of U.S.-born Asian-American young adults (N = 1,575) revealed that heavy episodic drinking and alcohol-related problems generally were higher in this group compared with studies that aggregate data for all Asian-American groups regardless of immigration and generational status (Iwamoto et al. 2012). The same study also investigated possible Asian-ethnic-group differences in drinking patterns and, consistent with other studies, found that individuals of Japanese, Filipino, South-Asian, multi-Asian (i.e., having parents from different Asian ethnic groups), and Korean descent reported higher rates of drinking compared with people of Chinese and Vietnamese descent (Duranceaux et al. 2008; Lum et al. 2009). Researchers have hypothesized that drinking rates may be higher among Japanese- and Filipino-American young adults because these groups tend to be more acculturated and, as a result, often have beliefs and values similar to their White-American counterparts (Chen et al. 1999). In contrast to this hypothesis, Hendershot and colleagues (2008) identified acculturation as a protective factor against alcohol abuse, specifically among Korean Americans. The researchers theorized that this trend was related to the cultural differences in alcohol use between Korea and other countries. Thus, Korea, in particular, has more permissive attitudes toward alcohol use and higher prevalence rates of alcohol use disorder compared with the United States. Taken together, research in this area has highlighted the significant within-

group differences among Asian Americans and underscores the importance of analyzing U.S.- and foreign-born Asian Americans independently.

Ethnic Drinking Cultures

In light of the well-documented heterogeneity in drinking patterns among Asian-American ethnic groups, Cook and colleagues (2009, 2012, 2013) have taken a novel and culturally focused approach to understanding problem drinking among this group. These investigators have conducted a number of key studies investigating culturally focused factors, including ethnic drinking cultures, or the "drinking cultures of the Asian countries of origin" (Cook et al. 2012, p. 340). The concept of ethnic drinking cultures illustrates how Asian Americans who are descendants of Asian countries with high per capita alcohol consumption (e.g., South Korea and Japan) may be at higher risk of problematic alcohol use compared with individuals from ethnic drinking cultures with low per capita alcohol consumption (e.g., Malaysia). Several key studies strongly support the influence of ethnic drinking cultures on drinking behaviors among Asian Americans and highlight how this factor may help explain unique variance in alcohol-use patterns above and beyond acculturation. Cook and colleagues (2009) revisited the role of acculturation in alcohol use patterns among Korean-American adolescents and found that after controlling for factors such as age, amount of spending money available, number of peers who drink, and social affiliation (i.e., Korean vs. non-Korean affiliations), no significant associations between acculturation and alcohol existed. In another study using Wave 2 of the NESARC, Cook and colleagues (2012) demonstrated that Asian Americans from ethnic drinking cultures with high per capita alcohol use were more likely to engage in heavier use and be current drinkers compared with individuals from drinking cultures with lower per capita use. Moreover, ethnic drinking cultures with high per capita alcohol use were associated with higher levels of intoxication, alcohol abuse, and alcohol dependence symptoms among foreign-born young-adult Asian Americans (Cook et al. 2013). These observations should encourage researchers to reevaluate the acculturation-centered approach in investigating alcohol use behavior in immigrant populations and to consider the complexity of Asian Americans' experiences when researching other potential sociocultural factors in relation to alcohol use among this group.

Enculturation

Another relevant cultural factor for Asian Americans is enculturation, or the adherence to a heritage culture's traditional values, which is a separate and distinct process from acculturation. Thus, greater endorsement of the values of the heritage culture does not imply decreased adherence to the values of the receiving culture (Kim 2007; Miller et al. 2011). Enculturation is a central aspect of social identity and cultural adaptation among Asian Americans and arguably the primary process involved in identity development among this ethnic minority group (Weinreich 1999, 2009). Therefore, when studying drinking behaviors in Asian Americans, it is crucial to gain a firm understanding of the country of origin's cultural values that influence alcohol use and abuse in this population. Kim and colleagues (2001) identified several distinct cultural values that are central to many Asian cultures, including collectivism, filial piety, humility, personal restraint, and emotional suppression. Filial piety, or respect for one's parents, has been found to have a significant direct protective effect against alcohol initiation in Asian-American adolescents (Shih et al. 2012). Moreover, alcohol resistance self-efficacy (e.g., the ability to resist the pressure to use alcohol) and positive alcohol expectancies both mediated the effect of parental respect on alcohol initiation in this group. The investigators theorized that parental respect reduces alcohol initiation both by enabling individuals to develop the necessary skills to combat alcohol-use pressure and by reducing positive alcohol expectancies.

Although research by Shih and colleagues (2012) generated evidence linking distinct cultural values with alcohol-use behavior among Asian Americans, other studies have found no such relationships. Two studies examining broad Asian values (e.g., a global unidimensional measure called the Asian Values Scale that included collectivism, filial piety, and restricting emotions) and heavy episodic drinking among young adult Asian-American men (Liu and Iwamoto 2007) and Asian-American women (Iwamoto et al. 2011*a*) found no significant effect of Asian cultural values on drinking behaviors. This lack of a significant relationship could be a consequence of the assessment approach of the Asian Values Scale (Kim et al. 1999) that was used in these two studies. Thus, this instrument measures cultural values unidimensionally—that is, although the scale assesses six separate aspects

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of cultural values (i.e., conformity to norms, family recognition through achievement, emotional self-control, collectivism, humility, and filial piety), the six scores are summed together to create a global aggregated score. Such a global score may be too generalized to detect the protective/risk effects of the individual cultural values (e.g., filial piety). Future studies need to provide greater specificity to clarify the relationship between cultural values and drinking behaviors among Asian-American young adult samples.

Collectively, the literature exploring the roles of acculturation, nativity, and enculturation on heavy episodic drinking and alcohol use among Asian Americans has yielded inconsistent results. With the rates of alcohol use and abuse among Asian Americans rapidly rising (Grant et al. 2004; Iwamoto et al. 2010), it is imperative to conduct further research to clarify the roles of additional sociocultural variables, including discrimination and mental health, on alcohol use behaviors in this group.

Discrimination

Perceived discrimination has been found to be a cause for self-medication (Khantzian 1985), implying a plausible link between experienced negative and unfair treatment of Asian Americans and alcohol use. Asian Americans seem to experience a significant amount of discrimination at comparable rates with other racial groups (Iwamoto and Liu 2010; Yoo et al. 2010). For example, Asian Americans may be treated or perceived as perpetual foreigners even though many of them were born in the United States, or may receive differential treatment because of their racial/ethnic characteristics (Yoo et al. 2010). Analyses among Asian-American adults revealed that a significant association exists between racial discrimination and alcohol use, even after controlling for gender, nativity, and language use (Yoo et al. 2010). Additionally, Chae and colleagues (2008) found that unfair treatment in the form of discrimination was associated with higher odds of having alcohol use disorder in both U.S.- and foreign-born Asian Americans. Perceived ethnic identification served as a possible buffer against such disorders, because higher levels of ethnic identification moderated the effects of discrimination on alcohol use disorder (Chae et al. 2008). Similarly, Gee and colleagues (2007) examined the relationship between perceived discrimination and alcohol dependence among a nationally representative sample of Filipino Americans. These investigators detected a twofold increased probability of alcohol dependence for every one-unit increase in reported unfair treatment (i.e., being treated differently because of their ethnicity, speaking a different language, or having an accent) (Gee et al. 2007). These findings suggest that Asian Americans may abuse alcohol to cope with the deleterious stressors of discrimination.

Mental Health

In the general population, alcohol-related problems have been linked to mental health problems such as unspecified psychological distress and depression. A similar association seems to exist for Asian Americans (Grant et al. 2004; Windle and Davies 1999). Mental health problems are especially relevant for Asian-American young adults who have one of the highest rates of depressive symptomology (Iwamoto et al. 2011*a*; Kearney et al. 2005). Several studies examining Asian-American adolescents have revealed that depressive symptomology and suicidal ideation were significantly associated with problematic alcohol use (Nishimura et al. 2005; Otsuki 2003). Among young-adult Asian-Americans samples, depressive symptoms were associated with heavy episodic drinking and alcohol-related problems (Iwamoto et al. 2011*a*; Kim et al. 2014). Finally, depressive symptoms and mental health problems, including anxiety disorders and suicidal ideation, were related to heavy drinking among a nationally representative community sample of Asian-American women (Cheng et al. 2012). These associations are consistent with previous research indicating that poor mental health and alcohol abuse often co-occur (Canino et al. 2008). In particular, the association with mental health problems seems to be an especially relevant factor in explaining alcohol-use patterns for Asian-American women.

Gender-Relevant Factors

Alcohol consumption is a gendered activity—that is, gender differences exist in drinking behavior, and cultural norms predispose men to generally drink more than women (Grant et al. 2004). However, alcohol use and alcohol-related problems seem to be a growing concern among Asian-American women. One study using a nationally representative sample of Asian-American adolescents revealed that in this population, girls engage in heavy episodic drinking more frequently than do boys (33.6 percent for girls vs. 30.6 percent for boys) (Hahm et al. 2004). It is possible that gendered and cultural expectations may exacerbate stress and encourage heavy drinking as a self-medicating behavior, given the unique gender

expectations placed on Asian-American women (Pyke and Johnson 2003). These women often are perceived as hyperfeminine, passive, subservient, dutiful, and sexually exotic (Pyke and Johnson 2003). Accordingly, Asian-American women's gendered experiences may present unique risks for alcohol use and abuse, and research should focus on gender-relevant factors to help explain Asian-American women's alcohol use.

One theoretically promising gender-relevant factor includes conformity to feminine norms, or endorsement of beliefs, expectations, and values of what it means to be a woman (Mahalik et al. 2005). Feminine norms may help explain sex differences and within-group variability in alcohol use and related problems among women. Adherence to feminine norms may be particularly salient for Asian-American women who have to contend with the demands of acculturative factors as well as of the culture of origin, which generally emphasizes conforming to traditional notions of femininity. Because of the expectation of hyperfemininity, Asian-American women may strongly internalize feminine norms, potentially resulting in high pressure to meet gender-relevant standards set out of reach by society (Levant 1996). This stress of attempting to meet unattainable, heavily emphasized notions of femininity may result in negative health symptomology (Boskind-Lodahl 1976) and ultimately may influence heavy drinking as a means of self-medication and coping with gender strain.

Similarly to Asian-American women, Asian-American men experience racialized and gender-based stereotypes, including being perceived as awkward, sexually inadequate, and perpetual foreigners (Wong et al. 2012). For Asian-American men, one way of reinforcing masculinity may be through alcohol use, likely because drinking large quantities of alcohol has been linked to traditional notions of masculinity, including power and control (Iwamoto 2010). Masculine norms, like feminine norms, are multidimensional and describe the socially constructed beliefs, values, and expectations of what it means to be a man in contemporary U.S. society (Mahalik et al. 2003). These norms include (1) striving to win at all costs; (2) being a playboy, or demonstrating sexual prowess; (3) showing emotional control; (4) engaging in risk taking; (5) exhibiting an inclination towards violence and physical aggression; (6) asserting dominance; (7) being self-reliant; (8) prioritizing work; (9) having power over women; (10) presenting oneself as heterosexual; and (11) pursuing importance or high status. Men are expected to ascribe to these norms in order to prove and display their manliness.

It is important to understand these gender-relevant factors in relation to men's alcohol use, because drinking is viewed as a symbol of manliness in the United States. As a result, men who strive to endorse specific masculine norms may engage in more problematic drinking patterns (Lemle and Mishkind 1989). Research has supported this notion; in particular, several studies suggest that power over women (Liu and Iwamoto 2007) and being a playboy (i.e., desiring to have multiple sexual partners), risk-taking, and striving to win (Iwamoto et al. 2011*b*, 2014) heighten the risk of problematic drinking and alcohol-related problems. Consistent with masculine-norms theory (Courtenay 2000; Levant 1996) men may attempt to prove their masculinity by consuming large quantities of alcohol, drinking as many alcoholic beverages as fast as they can, and demonstrating how much alcohol they can "hold" or tolerate (Iwamoto 2010). In particular, men who want to have multiple sex partners or adhere to the playboy norm, as well as those who endorse self-reliance norms, are at increased risk for reporting alcohol-related consequences (Iwamoto et al. 2011*b*). However, other masculine norms (e.g., primacy of work) may protect against drinking to intoxication, because men who orient themselves toward this norm prioritize their work and thus may not want to drink heavily.

Thus, multidimensional gender norms seem to serve as both risk and protective factors for heavy episodic drinking and subsequent alcohol-related problems (Iwamoto et al. 2011*b*; Lemle and Mishkind 1989). Although gender-relevant research among Asian Americans to date has yielded promising results, future research must continue to examine the intersection of gender and culture in relation to problem drinking.

Summary

Asian Americans represent the fastest-growing population in the United States (Le 2010). At the same time, there is evidence that problematic drinking rates are increasing among young-adult Asian Americans (Grant et al. 2004). Accordingly, it is essential to understand the etiological determinants and mechanisms of risk that may help explain this growth in problematic alcohol use among this group. The high prevalence of the *ALDH2*2* and *ADH1B*2* alleles in a large percentage

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of Asian subgroups has been studied as a potential protective factors against alcohol abuse, yet some individuals who possess these genes still engage in problematic alcohol use (Wall et al. 2001). Other social and psychological factors may account for this discrepancy. Thus, some factors, such as negative physiological alcohol expectancies, are protective against alcohol abuse in this population (Hendershot et al. 2009). Sociocultural factors such as acculturation and nativity also may help explain drinking patterns among this group.

The literature suggests that vast and significant within-group differences exist among Asian Americans, such that individuals who were born in the United States and/or are more acculturated are at elevated risk for alcohol abuse and related problems (Hahm et al. 2003). Differences also have been observed among Asian-American ethnic subgroups, with some groups (e.g., Japanese, Korean, and multi-Asian Americans) reporting higher rates of drinking compared with others (e.g., Chinese and Vietnamese Americans) (Iwamoto et al. 2012). Furthermore, Asian Americans who report higher levels of depressive symptoms, psychological distress, and perceived discrimination seem to be at a heightened risk for abusing alcohol (Iwamoto et al. 2011*a*; Nishimura et al. 2005; Yoo et al. 2010). Finally, an emerging body of research examining gender-relevant factors, including feminine and masculine norms, may help explain within-group differences among Asian-American women and men. Thus, traditional norms that may directly pertain to hyperfeminized Asian-American women, including modesty and sexual fidelity, may protect against heavy episodic drinking (Young et al. 2005). Conversely, the risk for heavy episodic drinking may be enhanced in men who strive to demonstrate traditional notions of masculinity through risk-taking and endorsement of playboy norms (Iwamoto et al. 2010).

Although this review has illustrated the contemporary state of research on alcohol use among Asian Americans, it also highlights the significant limitations in this literature. Many of the studies reviewed here have used cross-sectional data, which do not allow researchers to infer causality between the various sociocultural factors and problematic alcohol use. One way of addressing this gap in the existing literature may be to implement longitudinal designs to further understand how the temporal relationship between sociocultural factors, including acculturation and gender norms, may impact alcohol use and alcohol-related problem trajectories. There also is a pressing need to develop greater understanding of within-group differences among U.S.-born and foreign-born Asian Americans as well as among as specific ethnic groups. To date, epidemiological research has largely neglected to examine these significant discrepancies. Given the growing prevalence of alcohol use and alcohol-related problems among Asian-American women (Grant et al. 2004; Iwamoto et al. 2010), studies also should focus on this group and explore how the intersection of gender and culture may influence alcohol use. Finally, the majority of research on this population has been conducted in college samples; therefore, it is important to also examine community samples, including U.S.-born young adults who are not attending college and older adult Asian-American populations.

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Alcohol Consumption in Demographic Subpopulations

An Epidemiologic Overview

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Alcohol consumption is common across subpopulations in the United States. However, the health burden associated with alcohol consumption varies across groups, including those defined by demographic characteristics such as age, race/ethnicity, and gender. Large national surveys, such as the National Epidemiologic Survey on Alcohol and Related Conditions and the National Survey on Drug Use and Health, found that young adults ages 18–25 were at particularly high risk of alcohol use disorder and unintentional injury caused by drinking. These surveys furthermore identified significant variability in alcohol consumption and its consequences among racial/ethnic groups. White respondents reported the highest prevalence of current alcohol consumption, whereas alcohol abuse and dependence were most prevalent among Native Americans. Native Americans and Blacks also were most vulnerable to alcohol-related health consequences. Even within ethnic groups, there was variability between and among different subpopulations. With respect to gender, men reported more alcohol consumption and binge drinking than women, especially in older cohorts. Men also were at greater risk of alcohol abuse and dependence, liver cirrhosis, homicide after alcohol consumption, and drinking and driving. Systematic identification and measurement of the variability across demographics will guide prevention and intervention efforts, as well as future research.

Key words: Alcohol consumption; alcohol abuse and dependence; alcohol use disorder; health consequences; burden of health; injury; demographics; epidemiology; age; race; ethnicity; gender; surveys; National Epidemiologic Survey on Alcohol and Related Conditions; National Survey on Drug Use and Health

Alcohol consumption is common across diverse populations in the United States; however, the level of consumption and its consequences vary considerably across major demographic subgroups. This review presents findings on the distribution and determinants of alcohol use and its aspects (i.e., age of onset, abstention vs. any drinking, binge drinking, and heavy drinking), alcohol abuse and dependence as defined in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM–IV) (American Psychiatric Association 1994),[1] and related health consequences. The health consequences considered include a selection of those often linked to alcohol consumption, such as unintentional and intentional injuries as well as liver disease (World Health Organization 2011). The article aims to summarize recent research and provide a comprehensive depiction of alcohol consumption and alcohol-related group differences across age, race/ethnicity, and gender. The growing emphasis on these group differences in alcohol epidemiologic research can expand our understanding of the etiology of alcohol use disorder (AUD), including the contribution of social contextual risk factors, and the receipt of prevention and treatment services.

The information presented in this article is based primarily on self-reported alcohol use as ascertained in two large surveys of the U.S. general population—

[1] *Alcohol Research: Current Reviews* generally uses the term alcohol use disorder (AUD) to denote the full range of disorders, from abuse to dependence, associated with heavy drinking, as specified in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (American Psychiatric Association 2013). Exceptions to this policy may be made when referring to studies using other diagnostic criteria. For more detail on the specific criteria used to diagnose the disorders mentioned in this article, readers should consult the original studies cited in the text.

the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) and the National Survey on Drug Use and Health (NSDUH). The NESARC, funded by the National Institute on Alcohol Abuse and Alcoholism, with supplemental funding from the National Institute on Drug Abuse, is a two-wave, longitudinal study of adults ages 18 and older that provides rich information on the epidemiology of alcohol and drug use disorders, psychiatric disorders, other health-related conditions and characteristics, and risk and protective factors (Grant et al. 2004). To ascertain these conditions, the survey used the interviewer-administered Alcohol Use Disorder and Associated Disabilities Interview Schedule—DSM–IV Version (AUDADIS–IV) (Grant 1997). Wave 1 was conducted in 2001–2002 and Wave 2 in 2004–2005. The NSDUH, funded by the Substance Abuse and Mental Health Services Administration (SAMHSA), is a national cross-sectional survey conducted annually of people ages 12 and older that is designed to track trends in substance use and other variables and collects data on substance use through self-administered computerized interviews (SAMHSA 2014).

The estimates presented throughout this article were derived across both waves of the NESARC as well as across several years of the NSDUH. Use of both of these datasets gives readers a comprehensive overview of findings from large-scale U.S. surveys on the epidemiology of alcohol consumption. In addition, the NESARC and NSDUH complement one another in several ways:

- Both surveys include adults age 18 and older. In addition, the NSDUH assesses alcohol and other drug use among adolescents (i.e., ages 12–17). Therefore, incorporating information from both surveys presents a picture of alcohol consumption across the life course.

- Test–retest reliability coefficients for AUDADIS–IV alcohol consumption and AUD diagnoses have been shown to be good to excellent (kappa ≥ 0.60) in a wide range of studies in the United States (Canino et al. 1999; Grant et al. 1995, 2003; Hasin et al. 1997) and elsewhere (Chatterji et al. 1997; Vrasti et al. 1998). AUDADIS–IV alcohol dependence also demonstrated fair to very good concordance with a clinician-administered interview (Cottler et al. 1997) and psychiatrist re-interviews (Canino et al. 1999).

Alcohol consumption from an early age can have long-term effects on the trajectory of drinking and health consequences across the life course.

The alcohol-dependence factor structure was significantly associated with external criterion variables (Grant et al. 2007), offering further support for the validity of the diagnosis. Less reliability and validity information is available on the NSDUH measure of AUD.

- The NSDUH data have been collected annually on a cross-section of the population, thus supplying a different type of information (i.e., yearly trends) that is not captured in the two waves of the NESARC.

- The two waves of interviews of the NESARC respondents 3 years apart constitute a longitudinal study following a large national cohort of people over time. This allows for causal inference, specifically regarding temporality, as well as for estimates of incidence, persistence, and offset when considering determinates of alcohol use and AUD. In contrast, discerning temporal ordering of variables is more difficult in cross-sectional designs, such as that of the NSDUH.

In addition to the NESARC and NSDUH, this article includes other recently published data from peer-reviewed journals to present the most current information and additional relevant research to supplement findings from these surveys.

Alcohol-Use Epidemiology

In the NESARC Wave 1 sample, approximately 65 percent of respondents reported any past-year consumption and 51 percent reported consuming at least 12 drinks in the past year (Dawson et al. 2004). Further, 17.8 percent and 4.7 percent, respectively, reported symptoms and criteria indicating a diagnosis of lifetime and past-year alcohol abuse, and 12.5 and 3.8 percent, respectively, reported symptoms and criteria indicating a diagnosis of lifetime and past-year alcohol dependence (Grant et al. 2004; Hasin et al. 2007). Similar results were obtained in secondary analyses with the 2002 NSDUH sample, the survey for which data are available that corresponds most closely to the NESARC Wave 1 sample. In the 2002 NSDUH, approximately 88 percent of respondents reported any alcohol consumption in their lifetime and around 70 percent reported past-year consumption (Grucza et al. 2007). Thus, the differences in estimates are slight.

The two-wave study design of the NESARC enabled researchers to make accurate estimates of the incidence and persistence of alcohol abuse and dependence over a 3-year period. Incident cases are those respondents who developed a disorder for the first time in their lives during the specified period (Grant et al. 2009). In the NESARC, 1-year incidence of alcohol abuse was 1.02 percent and 1-year

incidence of alcohol dependence was 1.70 percent (Grant et al. 2009). Persistent cases are respondents who met the criteria for a current disorder at Wave 1 and continued to meet these criteria throughout the 3-year period. An analysis of the persistence of alcohol dependence between Waves 1 and 2 of the NESARC indicated that the disorder persisted in 30.1 percent of respondents with alcohol dependence at baseline (Hasin et al. 2011).

The following sections examine alcohol use and its consequences in specific subgroups of the general U.S. population based on age, race/ethnicity, and gender.

Alcohol Use and Its Consequences in Different Age Groups

In data analyses by age, the NESARC and NSDUH samples frequently have been collapsed into different age groups. NESARC results commonly are presented in four age groups: 18–29 years, 30–44 years, 45–64 years, and 65 years and older. NSDUH results commonly are divided into five age groups: 12–17 years, 18–25 years, 26–35 years, 36–49 years, and 50 years and older. For clarity, the specific age groups analyzed are clearly identified below when presenting published findings.

More generally, the population can be subdivided into adolescents, young adults, middle-aged adults, and older adults; accurate information on drinking behaviors and related consequences is important for each of these groups. Among adolescents and young adults, alcohol consumption from an early age can have long-term effects on the trajectory of drinking and health consequences across the life course (Patrick et al. 2013); moreover, these two age groups represent the peak age of onset for AUD (Hasin et al. 2007). Middle-aged adults are important to study because many people whose AUD began in young adulthood "mature out" of such a disorder in this age group (Dawson et al. 2005, 2006; Lee et al. 2013; Watson and Sher 1998); further, the mean age of individuals with AUD is 42.2 years (Cohen et al. 2007). Finally, it is essential to examine alcohol use in older adults, because alcohol consumption in this age group can exacerbate many pre-existing vulnerabilities to physical and mental health problems (Sacco et al. 2009).

Abstention Versus Drinking and Binge Drinking

Despite the fact that alcohol sales to individuals under age 21 are illegal in the United States, many initiate drinking between the ages of 12 and 14, and the prevalence of alcohol use and binge alcohol use increases sharply as adolescents transition into early adulthood (i.e., ages 18–21) (Faden 2006). Consistent with previous studies (Grant 1997; Grant et al. 2001), early drinking initiation in NESARC participants predicted frequency of binge drinking between Waves 1 and 2 (Hingson and Zha 2009). In the NESARC Wave 2 sample, the risk for binge drinking in the 12 months before Wave 2 was approximately twice as high among respondents with drinking onset at age 16 or younger compared with respondents whose drinking began at age 21 or older (Hingson and Zha 2009). In fact, drinking onset across all adolescent age groups (i.e., age 14 or younger, age 15–16, age 17–18, and age 19–20) was associated with significantly higher odds of binge drinking compared with drinking onset at age 21 (i.e., the minimum legal drinking age) (Grant et al. 2001).

The prevalence of any alcohol consumption peaks among young adults. Thus, 73.1 percent of NESARC Wave 1 respondents ages 18–29 reported drinking in the past year. Further, 21.1 percent of young adults reported drinking heavily (5 or more drinks for men or 4 or more drinks for women) more than once a month, and 11 percent reported drinking heavily more than once a week (Dawson et al. 2004). Among young adults, those enrolled in college drink heavily more frequently than their nonstudent counterparts (Dawson et al. 2004).

After age 30, the incidence and prevalence of alcohol consumption generally decreases gradually with age, particularly after age 65 (Chan et al. 2007). In the 2002 NESARC, respondents ages 30–44 had a 25 percent lower prevalence of any past-year drinking compared with respondents ages 18–29. Respondents ages 45–64 and age 65 and older had a 50 percent and 68 percent, respectively, lower prevalence of any past-year drinking compared with the youngest group (Dawson et al. 2004). In the 2002 NSDUH, lifetime and past-year alcohol-use prevalence among adults age 65 and older was 78 percent and 50 percent, respectively (Moore et al. 2009). In the NESARC Wave 1 sample, the odds of past-year alcohol use were particularly low among respondents age 85 or older (odds ratio [OR] = 0.64) and ages 75–84 (OR = 0.64), compared with a reference group of 65- to 74-year-olds (Moore et al. 2009). More recently, in the 2007 NSDUH sample, 43 percent of adults age 65 and older reported past-year alcohol use (Blazer and Wu 2011). The mean number of drinks per drinking occasion also declines with age. Thus, adults ages 18–34 on average consume more than 2 drinks per drinking occasion, adults ages 35–64 between 1 and 2 drinks per occasion, and adults age 65 and older less than 1 drink per occasion (Chan et al. 2007).

DSM-IV–Defined Alcohol Dependence and Abuse

In the NESARC, prevalence of current and lifetime alcohol abuse and dependence generally decreased with age (Hasin et al. 2007). A similar pattern was evident for incident AUD (Grant et al. 2009). Age of drinking onset also was a predictor of alcohol dependence and abuse in both the NSDUH and NESARC. Among NSDUH respondents age 21 or older

at the time of the interview who had started drinking before age 14, about 15 percent reported an AUD after age 21. Among those who had begun to drink at ages 15–17, ages 18–20, or age 21 and older, in contrast, only 9 percent, 5 percent, and 2 percent, respectively, reported an AUD after age 21 (SAMHSA 2014). In the NESARC, respondents with drinking onset before age 16 had approximately twice the odds of developing alcohol dependence/abuse between Waves 1 and 2 compared with respondents whose drinking began at age 21 or later (Hingson and Zha 2009).

In addition, compared with the oldest age group (i.e., age 50 and older), the odds of incident alcohol abuse and dependence after controlling for NESARC Wave 1 demographic and clinical characteristics were significantly higher among people ages 20–29, with ORs of 11.6 for alcohol abuse and 8.7 for alcohol dependence. The risk also was higher among respondents ages 30–54 compared with people age 55 and older (OR = 4.3 for alcohol abuse and OR = 3.5 for alcohol dependence) (Grant et al. 2009). Overall, in the NESARC, 1.2 percent of women and 4.8 percent of men age 50 and older were classified as having either current alcohol dependence or current alcohol abuse (Balsa et al. 2008). Similarly, in the 2005–2007 NSDUH, 1.9 percent and 2.3 percent of adults ages 50–64 endorsed dependence and abuse, respectively, as did 0.6 percent and 0.9 percent, respectively, of adults ages 65 and older (Blazer and Wu 2011).

People in older age groups not only have lower prevalence of alcohol abuse or dependence but also have fewer alcohol-related role-function problems (e.g., problems at work or school). Thus, in the NSDUH, adults ages 26–34 had higher odds of such problems compared with adults ages 65 and older, followed by young adults ages 18–25 and adults ages 35–49, respectively (Alameida et al. 2010).

The finding that younger cohorts were at a higher risk of AUD in both surveys could indicate a true age effect or could be the result of underrepresentation among older cohorts as a result of differential mortality or poor recall of remote events. Birth cohort effects, or historical effects, also may contribute to the observed findings, but prospective population-based investigation is required to adequately address this issue.

Alcohol-Related Health Consequences

The health burden associated with alcohol use stretches across the lifespan, beginning in utero, with prenatal alcohol exposure resulting in a variety of adverse birth effects, including fetal alcohol syndrome as the most severe consequence (Warren et al. 2011). Over the life course, alcohol use contributes to a variety of health conditions and risk behaviors. Among adolescents, heavy alcohol use is correlated with other risky health behaviors, including tobacco use, violence, suicide, and driving under the influence (Windle 2003). In the NESARC Wave 1 sample, young adults ages 20–29 were most likely to engage in risk behavior after drinking (age 20–24 versus 50 or older, OR = 6.5; age 25–29 versus 50 or older, OR = 4.2) compared with older adults (age 50 or older). The oldest age group (age 50 or older) in the sample was the least likely to drive under the influence of alcohol (Hingson and Zha 2009). Overall, the proportion of alcohol-related deaths was highest among young adults ages 18–24 and decreased with age (Rehm et al. 2014).

Alcohol Use and Its Consequences in Different Racial/Ethnic Groups

In analyses of NESARC data, alcohol consumption and AUD most commonly have been investigated in five U.S. Census–defined racial/ethnic groups: Whites, Blacks, Native Americans, Asians, and Hispanics. The NSDUH uses the same racial/ethnic categories, with the addition of respondents reporting two or more races, because over time, individuals are increasingly endorsing more than one race, indicating a growing population of people identifying as biracial or multiracial (Hirschman et al. 2000; Jones and Bullock 2012).

Abstention Versus Drinking and Binge Drinking

In the 2007 NSDUH, current (i.e., past 30 days) alcohol consumption was most prevalent among Whites (59.8 percent) and least prevalent among Asian Americans (38.0 percent). Native Americans/Alaskan Natives (47.8 percent), Hispanics (46.3 percent), and Blacks (43.8 percent) reported similar prevalence of any alcohol consumption (Chartier and Caetano 2010). In the NESARC Wave 1, the prevalence of current alcohol consumption was highest among Whites (63.5 percent), followed by Hispanics (60.3 percent) and Blacks (52.5 percent) (Caetano et al. 2010). However, the prevalence of weekly drinking (i.e., once per week or more) was higher among Hispanics (14.1 percent) than among Whites (13.6 percent) and Blacks (11.4 percent) in the same sample (Caetano et al. 2010).

An analysis of Asian-American adults from the NESARC Wave 2 sample showed that Asians reported the least amount of drinking compared with other groups. However, heterogeneity in alcohol consumption existed within this group, with Korean, Japanese, Taiwanese, and Chinese subpopulations reporting the highest per-capita annual alcohol consumption and Vietnamese, Malaysian, Indian/Afghan/Pakistani, and Indonesian groups reporting the lowest consumption (Cook et al. 2012). The level of acculturation, measured by the use of the subject's native Asian language, also influenced patterns of alcohol consumption. Among Asian Americans from countries of origin with low per-capita annual alcohol consumption, the probability of being a current

drinker was highest among those who reported low use of Asian languages. Among Asian Americans from countries of origin with higher per-capita annual alcohol consumption, the probability of being a current drinker was similar regardless of Asian-language use (Cook et al. 2012).

Hispanic subgroups also display heterogeneity in alcohol consumption. In the 2003–2005 NSDUH, the prevalence of current alcohol use was highest among Cubans, followed by Puerto Ricans, Mexicans, and people of Central/South American descent (Lipsky and Caetano 2009). These patterns differed for binge and heavy drinking, which had the highest prevalence among Puerto Ricans, followed by Mexicans, Cubans, and Central/South Americans. Varying degrees of acculturation may help to explain these subgroup differences among Hispanics; however, the impact of acculturation on drinking also may vary by gender and age (Lipsky and Caetano 2009).

Racial/ethnic differences also exist with respect to binge drinking and heavy drinking during pregnancy. Pregnant White women reported more binge drinking during pregnancy than other racial/ethnic groups (Caetano et al. 2006). However, another study using the Pregnancy Risk Assessment Monitoring System (2001–2005) found that among those who binge drank in the last month, Black, Hispanic, and Asian women were less likely to reduce heavy drinking during pregnancy compared with White women (Tenkku et al. 2009). More research on alcohol consumption patterns among pregnant women by ethnic group is needed to better elucidate racial disparities in the risk for fetal alcohol syndrome (Tenkku et al. 2009).

DSM-IV–Defined Alcohol Dependence and Abuse

Both alcohol abuse and alcohol dependence are most prevalent among Native Americans and least prevalent among Blacks and Asians. For example, among Native Americans in the NESARC Wave 1 sample, 5.8 percent met criteria for past-year alcohol abuse and 6.4 percent met criteria for past-year alcohol dependence, whereas among Asians, 2.1 percent met criteria for past-year alcohol abuse and 2.4 percent met criteria for past-year alcohol dependence (Hasin et al. 2007). Among Blacks, the prevalence for past-year alcohol abuse and dependence was 3.3 percent and 3.6 percent, respectively, and among Hispanics it was 4.0 percent for both past-year abuse and dependence (Hasin et al. 2007). Among drinkers, Blacks and Hispanics reported more symptoms of past-year alcohol dependence than did Whites (Mulia et al. 2009).

One-year incident rates of alcohol abuse and dependence in the NESARC Wave 2 sample varied little by race (Grant et al. 2009). However, this analysis did not include Native Americans or Asians because of small sample sizes. The only significant difference by race was that Blacks had significantly lower odds than Whites to report incident alcohol abuse (OR = 0.6) at Wave 2 of the NESARC, controlling for Wave 1 demographic characteristics and psychiatric disorders. No significant differences existed between Hispanics and Whites (OR = 0.8) (Grant et al. 2009).

A more recent analysis of Asians within the NESARC Wave 1 sample demonstrated some variations in the lifetime prevalence of AUD among Asian-American ethnic subgroups. For example, 5.4 percent of East Asians (i.e., whose countries of origin were the People's Republic of China, Japan, Korea, or the Republic of China [Taiwan]), 4.3 percent of Southeast Asians (i.e., whose countries of origin were Indonesia, Malaysia, Vietnam, Thailand, Laos, Cambodia, Myanmar, or a Pacific Island nation), and 3.6 percent of South Asians (i.e., whose countries of origin were India, Afghanistan, Pakistan, or Iran) met criteria for a DSM–IV AUD (Lee et al. 2015).

Among Hispanic subgroups, the prevalence of alcohol abuse and dependence was highest in Mexicans, followed by Puerto Ricans, and was lowest among Cubans (Lipsky and Caetano 2009). Some Hispanic subgroups exhibited a protective effect of foreign-born nativity on risk for alcohol abuse or dependence. For example, in NESARC Wave 1, 4.8 percent of foreign-born Cuban Americans reported a lifetime DSM–IV AUD, compared with 28.1 percent of U.S.-born Cuban Americans. A similar, albeit less extreme, pattern was found among Puerto Ricans, with 14.5 percent of island-born Puerto Ricans but 21.4 percent of U.S.-born Puerto Ricans reporting a lifetime AUD (Alegria et al. 2006).

Alcohol-Related Health Consequences

The burden of alcohol consumption and AUD on physical health varies by racial/ethnic group. Hispanic White males have higher age-adjusted death rates from liver cirrhosis than non-Hispanic White males, Hispanic Black males, non-Hispanic Black males, and females (i.e., Hispanic White females, non-Hispanic White females, Hispanic Black females, and non-Hispanic Black females) (Yoon and Yi 2012). Within the Hispanic subgroup, Puerto Ricans and Mexicans have the highest mortality rates attributable to liver cirrhosis. Conversely, Asians had the lowest death rates attributable to alcoholic liver disease of all racial/ethnic groups (Hoyert and Xu 2012).

Genetic factors may contribute to racial/ethnic differences in alcohol-related health consequences. For example, in Asian populations, including Asian Americans (Cook et al. 2005; Duranceaux et al. 2008), the prevalence of certain genetic variants encoding the alcohol-metabolizing enzymes alcohol dehydrogenase (ADH) and acetaldehyde dehydrogenase 2 (ALDH2) is higher than in other U.S. racial/ethnic groups. One genetic variant encoding an inactive

ALDH2 enzyme that is found primarily in Asian populations is associated with an elevated risk of cancer and digestive disease from alcohol consumption (Oze et al. 2011). This association may apply to Asian Americans as well, a topic warranting further research.

The prevalence of accidents and injuries associated with alcohol consumption, especially with heavy drinking and AUD, also often varies across racial/ethnic groups. For example, the National Violent Death Reporting System provides toxicological information on suicide victims based on coroner/medical examiner reports, death certificates, and toxicological laboratory findings. Analyses of these data have shown that fewer non-Hispanic Blacks (25.6 percent) had positive blood alcohol concentrations at the time of suicide compared with Hispanics (40.3 percent) and non-Hispanic Whites (34.3 percent) (Karch et al. 2006).

Alcohol consumption also is associated with violent crimes. In one study, the offender was under the influence of alcohol in 42 percent of violent crimes studied. However, this percentage differed substantially among racial/ethnic groups and was greatest among Native Americans (62 percent), followed by Whites (43 percent), Blacks (35 percent), and Asians (33 percent) (Chartier et al. 2013). Furthermore, although Blacks in the United States have lower prevalence of alcohol consumption, binge drinking, and AUD compared with non-Hispanic Whites, they still had higher prevalence of alcohol-related homicide (Stahre and Simon 2010). Likewise, Blacks reported drinking during an episode of interpersonal violence more often (i.e., in 41.4 percent of cases) compared with Whites (29.4 percent) and Hispanics (29.1 percent) (Chartier et al. 2013).

Racial/ethnic differences also exist in the prevalence of alcohol use in traffic crashes. According to the National Highway Traffic Safety Administration, the prevalence of intoxication among drivers who are fatally injured in car crashes is highest among Native Americans and Hispanics, followed by Whites, Blacks, and Asians (Chartier et al. 2013). Moreover, Native Americans (4.1 percent) and Whites (3.3 percent) report drinking and driving significantly more often than do Asians (1.4 percent), Hispanics (2.1 percent), and Blacks (1.5 percent) (Chou et al. 2006). However, significant heterogeneity regarding alcohol use and traffic crashes exists within Asians subgroups, with Pacific Islanders and Native Hawaiians reporting prevalence of alcohol-related motor vehicle crashes similar to that of Hispanics (Chartier et al. 2013).

In summary, ethnic minorities make up more than one-fifth of the U.S. population (U.S. Census Bureau 2013). Their risk for drinking, AUD, and other alcohol-related consequences differs markedly. Studies consistently find that Native Americans are at particularly high risk for alcohol-related health consequences. However, despite these negative consequences for Native Americans, their impact on alcohol-related health consequences in the U.S. population overall is less pronounced because Native Americans are a relatively small racial group compared with others. Future research is needed on various ethnic and racial groups to better inform the allocation of prevention and intervention efforts.

Gender-Differences in Alcohol Use and Its Consequences

Abstention Versus Drinking and Binge Drinking

Among NESARC Wave I participants, 40 percent of women were abstinent in the past year, compared with 32 percent of men. In addition, men reported more drinks per drinking occasion than women (Chan et al. 2007). Likewise, in the 2011 NSDUH, 57.4 percent of men were past-month drinkers compared with only 46.5 percent of women (Wilsnack et al. 2013). Although epidemiologic findings consistently support that men are at increased risk for alcohol consumption, current drinking, and heavy drinking compared with women, this gap is closing in younger cohorts (Keyes et al. 2008, 2010; SAMHSA 2014). As Western social norms continue to shift away from "traditional" gender roles that see women only as homemakers and mothers, women report greater lifetime largest number of drinks consumed in one sitting and greater frequency of binge drinking than they did in earlier surveys, leading to a closing of the gender gap not only in consumption but also in alcohol-related consequences (Keyes et al. 2008, 2010).

Of particular concern regarding drinking among women is alcohol consumption during pregnancy. Any alcohol drinking during pregnancy can be unsafe (Vall et al. 2015). In particular, binge drinking and heavy drinking during pregnancy are harmful to the fetus and have been related to increased risk for fetal alcohol syndrome (Caetano et al. 2006; Vall et al. 2015). In the NESARC Wave 1 sample, about one-third of pregnant women reported drinking during the last year (Caetano et al. 2006). In the combined NSDUH data from 2012 and 2013, the percentage of pregnant women who reported binge drinking and heavy drinking was 2.3 percent and 0.4 percent, respectively (SAMHSA 2014).

DSM-IV–Defined Alcohol Dependence and Abuse

In the NESARC Wave 1, the prevalence of current (i.e., in the last 12 months) alcohol abuse and alcohol dependence was 6.9 percent and 5.4 percent, respectively, among men and 2.6 percent and 2.3 percent, respectively, among women (Hasin et al. 2007). Also, between NESARC Wave 1 and Wave 2, men had significantly higher odds than women to develop incidents of alcohol abuse (OR = 2.3) and dependence (OR = 2.4), controlling for Wave 1 demographic characteristics

and psychiatric disorders (Grant et al. 2009).

Clinicians often consider AUD among women as "telescoped," with a later onset of alcohol use but shorter times from initiation to dependence and treatment (Keyes et al. 2008). However, in a recent analysis, Keyes and colleagues (2008) found little evidence for a telescoping effect among women in the general population. Further, sex differences in the prevalence of AUD seem to have decreased over time. As a result, younger women may require more targeted prevention and intervention efforts (Keyes et al. 2008, 2011). Current (Brown et al. 2012) and lifetime (Cavanaugh and Latimer 2010) alcohol abuse or dependence were prevalent among pregnant women (Vesga-Lopez et al. 2008), emphasizing the need for targeted interventions among this population (Mitchell et al. 2008). Women who had been pregnant in the past year also were 1.7 times more likely than non-pregnant women to seek treatment for alcohol abuse or dependence in the previous year (Vesga-Lopez et al. 2008).

Alcohol-Related Health Consequences

Mortality associated with AUD is higher among men than among women (Rehm et al. 2014). For example, with the exception of Native Americans, mortality rates from alcoholic liver disease were at least twice as high among men compared with women (Hoyert and Xu 2012). Gender differences also existed with respect to alcohol-related morbidity. Thus, although alcohol overall contributed to 32 percent of liver cirrhosis cases, the rates differed significantly between men (39 percent of cases) and women (18 percent of cases) (Room et al. 2005).

With regard to alcohol-related accidents and injuries, males were more likely than females to drive after drinking too much in most age and racial/ethnic groups (Chou et al. 2006). Alcohol also contributed to 7 percent of falls, 10 percent of drowning incidents, and 18 percent of poisonings each year, mostly among men, as well as to a greater proportion of self-inflicted injuries among males (15 percent) than among females (5 percent) (Room et al. 2005). Moreover, male gender was a significant risk factor for alcohol-related suicide in all racial/ethnic groups except Native Americans, where alcohol was involved in similar proportions of male and female suicides (Chartier et al. 2013). Overall, the groups reporting the highest rates of alcohol use among suicide victims were Native Americans ages 30–39, Native Americans and Hispanics ages 20–29, and Asians ages 10–19 (Chartier et al. 2013). Finally, alcohol contributed to 24 percent of homicides, with the proportion of alcohol-related homicides higher among males (26 percent) than among females (16 percent) (Room et al. 2005).

Methodological Issues

Despite the usefulness of using data from two nationally representative surveys to obtain an accurate picture of alcohol use and its consequences in the U.S. population, methodological differences between the two surveys may have contributed to some differences in population estimates (Grucza et al. 2007). For example, the private, self-administered questions in the NSDUH may have elicited some higher prevalence estimates of use than the face-to-face interviews used in the NESARC. However, the NESARC indicates a higher prevalence of AUD, perhaps resulting from the greater number of items that allowed for more in-depth probing of DSM–IV abuse and dependence criteria. Other factors, including response rates, questionnaire structures, and question text also could contribute to different estimates. Although any of these factors may have contributed to differences between the two surveys (Grucza et al. 2007), the largely common findings across the surveys attest to the robustness of the findings to methodological variation.

Conclusions

In the United States, AUD accounts for a high and potentially preventable proportion of overall disability and mortality. However, the burden of disease related to alcohol use and its consequences differs significantly between population subgroups. The myriad of genetic, social, and environmental risk factors for AUD and their impact in various subpopulations remain to be elucidated. Future epidemiologic studies will include information necessary to prevent and treat alcohol and drug use disorders by identifying factors that increase the risk of these disorders and their persistence in the general population as well as in specific subgroups.

Population-level surveys, such as the NSDUH and the NESARC, are valuable tools to describe the epidemiology of alcohol consumption and AUD in the United States. Although varying methodology may limit comparability and interpretation of estimates between these epidemiologic studies, both surveys were conducted in nationally representative samples with methodological rigor. Consequently, both surveys present a valid depiction of alcohol consumption and related disorders and can offer important information needed to develop evidence-based measures to prevent the onset of AUD and comorbidity, as well as to identify factors that increase the risk of alcohol problems.

A better understanding of the age, race/ethnicity, and gender-based differences in the various alcohol variables discussed in this review would be gained by considering the social, political, and economic context of alcohol use in various populations. These factors are discussed further in other articles in this issue.

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Alcohol Use Among Special Populations

Mary E. Larimer, Ph.D., and Judith A. Arroyo, Ph.D.

Do characteristics such as race, ethnicity, age, sex, gender, occupation, or even geographical location influence how likely people are to drink alcohol or to experience problems related to alcohol use? This issue of *Alcohol Research: Current Reviews* (*ARCR*) explores this question with an in-depth look at special populations, or groups of people who may be at increased risk for—or protected from—alcohol misuse and other alcohol-related problems.

Within the United States, the idea that certain groups of people are disproportionately affected by particular health issues first gained national recognition as a result of the Federal Government's landmark publication *Report of the Secretary's Task Force on Black and Minority Health,* published in 1985 (Secretary's Task Force on Black and Minority Health 1985). Another pivotal report followed in 2003—the Institute of Medicine's *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care* (Smedley et al. 2003). Together, these reports raised awareness of the health status of racial and ethnic minority groups in the United States. They challenged our society to better understand these differences and to work to address the "continuing disparity in the burden of death and illness experienced by Blacks and other minority Americans as compared with our Nation's population as a whole" (Secretary's Task Force on Black and Minority Health 1985, p. 9).

Since these seminal publications, the concept of special populations has evolved beyond classification based on race or ethnicity. It now includes groups of people considered by gender, sex, age, rural versus urban residence, socioeconomic status, employment status, educational attainment, and numerous other characteristics that influence health and well-being.

Research on special populations has been an ongoing priority for the National Institute on Alcohol Abuse and Alcoholism (NIAAA). From the first studies on fetal alcohol syndrome in the 1970s and the oversampling of ethnic and racial groups in the National Epidemiologic Survey on Alcohol and Related Conditions a decade ago, to the studies of personalized medicine today, NIAAA has funded research that includes the full spectrum of people who drink alcohol or who are affected—positively or negatively—by its use.

In 2014, nearly 88 percent of people surveyed in the United States reported that they had consumed alcohol at some point in their lives, and nearly 57 percent reported drinking in the past month (Substance Abuse and Mental Health Services Administration [SAMHSA] 2014*a*). Although most people who drink do so in moderation, almost 25 percent of U.S. adults reported that they engaged in binge drinking[1] in the past month (SAMHSA 2014*b*), and nearly one-third have had an alcohol use disorder (AUD) at some point in their lives (Grant et al. 2015). Considerable

[1] Binge drinking was defined as drinking 5 or more drinks on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past 30 days.

research has been devoted to understanding why some groups of people are more (or less) likely than others to consume alcohol or develop alcohol-related problems. Findings from that research show just how complex and widespread alcohol's effects can be and are shaping the development of new and more effective preventive and treatment interventions.

This issue of *ARCR* explores alcohol use among broadly defined special populations. The contributors report on how biological and demographic characteristics, life experiences, and their interactions influence patterns of alcohol use and the likelihood that a person will experience problems related to alcohol consumption. Drawing on data gathered from large national surveys conducted in the United States, Delker and colleagues offer a broad-based epidemiological overview of differences in alcohol use, misuse, and alcohol-related consequences across age, race and ethnicity, and gender. Other contributors focus on specific subpopulations, including individuals living in rural or urban environments (see article by Dixon and Chartier), Asian Americans (see article by Iwamoto and colleagues), sexual minorities (see article by Hughes and colleagues), military personnel and veterans (see article by Allen and colleagues), and people living along the U.S.–Mexico border (see article by Mills and Caetano). A special section is devoted to drinking over the lifespan, with separate articles focusing on early adolescents and youth (see article by Windle), young people of college age (see article by Merrill and Carey), and members of the Baby Boom generation (see article by Barry and Blow).

In addition to homing in on population-based differences in drinking patterns and the health and social outcomes of alcohol misuse, this issue of *ARCR* examines numerous variables that influence these differences. For example, Sudhinaraset and colleagues review cultural and social influences on alcohol use, including how macrolevel factors, such as the neighborhood in which one lives and exposure to alcohol advertising, may affect alcohol consumption. The article by Collins demonstrates that socioeconomic status plays an important but seemingly paradoxical role: whereas people of higher socioeconomic status tend to consume similar or greater amounts of alcohol compared with people of lower socioeconomic status, the latter group bears a disproportionate burden of negative alcohol-related consequences. Both associations are influenced by other factors, including race and gender.

Still, social, cultural, environmental, and economic factors only partly explain the variation in drinking patterns and drinking-related outcomes observed among individuals and groups. Biological differences are key as well. In this issue, Wall and colleagues address how certain gene variants that affect alcohol metabolism interact with biological, social, and environmental factors to influence the risk for developing an AUD.

Although special-populations research tends to focus on factors that may put certain groups at increased risk for alcohol-related problems, researchers also study factors that may make a person less likely to misuse alcohol, develop an AUD, or succumb to the adverse health effects that can result from excessive drinking. For example, studies show that many people of Asian heritage lack a key functional enzyme involved in breaking down alcohol in the body. Without this enzyme, alcohol

consumption can cause unpleasant symptoms, which may discourage excessive drinking and the adverse effects associated with it (see articles by Iwamoto and colleagues and Wall and colleagues).

Social and cultural factors can have similar protective effects. For example, there has been a long-standing interest in understanding how religion affects alcohol use behavior. In this issue, Witkiewitz and colleagues review data showing that although religiosity and religious affiliation are not sufficient to protect against the development of AUD, spiritual experiences and practices, including prayer and mindfulness meditation, may be helpful in reducing harmful drinking and in treating AUD.

In the United States, only 20 percent of the people diagnosed with an AUD actually seek treatment or help for their condition, leaving a large gap between those who need treatment and those who actually get it (Grant et al. 2015). There are many reasons why people do not seek treatment, and Schmidt discusses how health services research is helping us to better understand population-based differences in access to and use of treatment services. As Blume describes, preventive and treatment interventions designed for the general population as a whole or for one specific group may not be as effective for other specific groups, including certain special populations. Researchers are working to adapt and test existing evidence-based interventions—and to design new ones—specifically for the groups and communities in which they will be delivered.

Understanding the factors that make a person more (or less) likely to drink to excess, to seek treatment for an alcohol problem, or to benefit from that treatment is critical to developing effective interventions for every person, regardless of biological, demographic, or individual characteristics. To that end, NIAAA supports a broad range of research on special populations, including youth; veterans; older adults; and racial, ethnic, and sexual minorities. This research is expanding our understanding of population-based differences in alcohol use and misuse and related problems while expediting the development of effective interventions for all individuals in need.

Resources

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Substance Abuse and Mental Health Services Administration (SAMHSA). *2014 National Survey on Drug Use and Health* (*NSDUH*). *Table 2.41B—Alcohol Use in Lifetime, Past Year, and Past Month Among Persons Aged 18 or Older, by Demographic Characteristics: Percentages, 2013 and 2014.* Rockville, MD: SAMHSA, 2014*a*. Available at: http://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabs2014/NSDUH-DetTabs2014.htm#tab2-41b. Accessed March 7, 2016.

Substance Abuse and Mental Health Services Administration (SAMHSA). *2014 National Survey on Drug Use and Health (NSDUH). Table 2.46B—Alcohol Use, Binge Alcohol Use, and Heavy Alcohol Use in the Past Month Among Persons Aged 18 or Older, by Demographic Characteristics: Percentages, 2013 and 2014.* Rockville, MD: SAMHSA, 2014*b*. Available at: http://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabs2014/NSDUH-DetTabs2014.htm#tab2-46b. Accessed March 7, 2016.

Focus On: Ethnicity and the Social and Health Harms From Drinking

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Alcohol consumption is differentially associated with social and health harms across U.S. ethnic groups. Native Americans, Hispanics, and Blacks are disadvantaged by alcohol-attributed harms compared with Whites and Asians. Ethnicities with higher rates of risky drinking experience higher rates of drinking harms. Other factors that could contribute to the different effects of alcohol by ethnicity are social disadvantage, acculturation, drink preferences, and alcohol metabolism. This article examines the relationship of ethnicity and drinking to (1) unintentional injuries, (2) intentional injuries, (3) fetal alcohol syndrome (FAS), (4) gastrointestinal diseases, (5) cardiovascular diseases, (6) cancers, (7) diabetes, and (8) infectious diseases. Reviewed evidence shows that Native Americans have a disproportionate risk for alcohol-related motor vehicle fatalities, suicides and violence, FAS, and liver disease mortality. Hispanics are at increased risk for alcohol-related motor vehicle fatalities, suicide, liver disease, and cirrhosis mortality; and Blacks have increased risk for alcohol-related relationship violence, FAS, heart disease, and some cancers. However, the scientific evidence is incomplete for each of these harms. More research is needed on the relationship of alcohol consumption to cancers, diabetes, and HIV/AIDS across ethnic groups. Studies also are needed to delineate the mechanisms that give rise to and sustain these disparities in order to inform prevention strategies. **KEY WORDS: Alcohol consumption; alcohol-attributable fractions; alcohol burden; harmful drinking; alcohol and other drug–induced risk; risk factors; ethnicity; ethnic groups; racial groups; cultural patterns of drinking; Native Americans; Hispanics; Blacks; African Americans; Asian Americans; Whites; Caucasians; injury; intentional injury; unintentional injury; fetal alcohol syndrome; gastrointestinal diseases; cardiovascular diseases; cancers; diabetes; infectious diseases**

Research has shown differential social and health effects from alcohol use across U.S. ethnic groups, including Whites, Blacks, Hispanics, Asians, and Native Americans. The relationship of ethnicity to alcohol-related social and health harms partially is attributed to the different rates and patterns of drinking across ethnicities. Some ethnic groups have higher rates of alcohol consumption, putting them at greater risk of drinking harms. However, other ethnic minorities experience health harms from drinking that are disproportionate to their consumption. Differences in social and socioeconomic factors and biological differences related to alcohol metabolism also could contribute to alcohol's varying effects across populations. This article reviews current research examining the harms of drinking for U.S. ethnic groups. It examines such social harms as driving under the influence and alcohol-attributed violence but primarily focuses on health harms like fetal alcohol syndrome (FAS), liver diseases, and cancers.

The research reviewed focuses on Whites, Blacks, Hispanics, Asians, and Native Americans (i.e., American Indians and Alaska Natives) in the United States as general ethnic groups, although significant subgroup differences within populations also are evident. There are limitations to using these general categories because ethnicity encompasses a combination of characteristics such as tribe, ancestry, national group, birthplace, and language, which could have distinct relationships to patterns of drinking and alcohol-related harms (Caetano 1986; Cheung 1993; Heath 1990–1991). People with multiethnic backgrounds also are not well represented by these general groups. Nevertheless, studies that examine ethnicity and alcohol-attributed harms provide important information about public health and serve to identify high-risk groups in the population. This article shows that Native Americans, Hispanics, and Blacks are disproportionately affected by the adverse social and health harms from alcohol consumption.

Drinking Patterns and Other Determinants of Risk for Alcohol-Related Harms

Heavy drinking and binge drinking contribute to a variety of alcohol-attributed social and health harms (Naimi et al. 2003; Rehm et al. 2010). Heavy alcohol use, as defined by the National Institute on Alcohol Abuse and Alcoholism's (NIAAA's) *Helping Patients Who Drink Too Much: A Clinician's Guide* (NIAAA 2005), is defined as consuming more than 4 standard drinks per day (or more than 14 per week) for men and more than 3 per day (or more than 7 per week) for women. One standard drink is equivalent to 12 ounces of

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beer, 5 ounces of wine, or 1.5 ounces of 80-proof spirits. Binge drinking is defined as consuming five or more drinks in approximately 2 hours for men and four or more drinks for women (NIAAA 2004).

Other than these patterns of consumption, the volume of alcohol intake, defined as the total alcohol consumed over a time period, is linked to social and health harms. Most diseases (e.g., injury, some cancers, and liver cirrhosis) have a detrimental dose-response relationship with alcohol as risk increases with higher-volume alcohol consumption, whereas coronary heart disease and diabetes display a J- or U-shaped relationship (Howard et al. 2004; Rehm et al. 2010; Roerecke and Rehm 2012). The J and U shapes are characterized by both detrimental and beneficial (e.g., increased high-density lipoprotein "good cholesterol") (Goldberg and Soleas 2001) effects of alcohol use, with higher risks for abstainers and heavy drinkers compared with light or moderate drinkers. However, this relationship is complex and varies by age, gender, and ethnicity (Roerecke and Rehm 2012). Drinking levels that may be protective of cardiovascular health among men also may increase the risk for other harms such as injury, violence, gastrointestinal disease, and some cancers.

Epidemiological studies show that these high-risk patterns of drinking and drinking volume vary by U.S. ethnic group. Ethnicities with greater drinking volume and higher rates of daily and weekly heavy drinking could be at greater risk for experiencing alcohol-attributed harms. Among adult drinkers in the United States, based on the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) (Chen et al. 2006), Native Americans and Hispanics have greater alcohol consumption than other ethnic minority groups. Rates of daily heavy drinking were higher among Hispanics (33.9 percent), Native Americans (28.4 percent), and Whites (27.3 percent) compared with Blacks (22.5 percent) and Asians (19.2 percent). Weekly heavy drinking was highest among Native Americans (21.9 percent), followed by Blacks (16.4 percent), Whites (16.3 percent), Hispanics (11.8 percent), and Asians (9.8 percent). Based on the 2001–2002 NESARC data, Caetano and colleagues (2010) reported that White men consumed a higher volume of alcohol (22.3 drinks per month) than Black men (18.9 drinks per month) and Hispanic men (17.8 drinks per month) and that White women consumed more (6.2 drinks per month) compared with Black women (4.9 drinks per month) and Hispanic women (3.9 drinks per month). The sample for these estimates of drinking volume was the U.S. population of Whites, Blacks, and Hispanics and included abstainers. However, a study by Mulia and colleagues (2009) of current drinkers in the United States showed that Whites consumed less alcohol than Hispanics and more than Blacks. The differences between these two studies could reflect a higher rate of abstinence from alcohol among Hispanics (25.7 percent) compared with Whites (13.4 percent) in the U.S. population (Chen et al. 2006). The study that included abstainers (Caetano et al. 2010), who by definition consume zero drinks, showed higher drinking volume for Whites, whereas the study excluding abstainers (Mulia et al. 2009) reported higher volume for Hispanics. Other ethnic minority groups with higher abstinence rates include Blacks (24.7 percent) and Asians (39.1 percent). Native Americans (17.14 percent) have lower rates of abstinence than other minority groups.

Alternatively, the negative effects from drinking could be explained by factors other than alcohol consumption. Mulia and colleagues (2009) showed that Black and Hispanic adult drinkers were more likely than White drinkers to report alcohol dependence symptoms and social problems from drinking at the no/low level of heavy drinking. Blacks also experience negative health effects from alcohol use despite showing a later onset of use and levels of use often comparable with, if not lower than, Whites (Chartier et al. 2011; Chen et al. 2006; Russo et al. 2004). Other factors associated with ethnic disparities in alcohol-related harms include social disadvantage, characterized by lower socioeconomic status, neighborhood poverty, greater neighborhood alcohol availability, reduced alcohol treatment utilization, and unfair treatment or discrimination (Chae et al. 2008; Chartier and Caetano 2011; Cunradi et al. 2000; Mulia et al. 2008; Nielsen et al. 2005; Zemore et al. 2011). Some ethnic subgroups are more likely to consume high-alcohol-content beverages (e.g., malt liquor), which could result in greater social and health harms (Vilamovska et al. 2009). Preference for such beverages seems to be more common in lower-income ethnic minority communities (Bluthenthal et al. 2005). Some ethnic minority groups also face stressors related to the acculturation process. Higher acculturation, U.S.-born nativity, and longer residence in the United States are risk factors associated with alcohol use disorders and alcohol-related social problems among Hispanics, particularly women (Alegria et al. 2007, 2008; Caetano et al. 2009, 2012; Zemore 2007). Another potential contributor is ethnic differences in the alcohol content of poured drinks. Kerr and colleagues (2009) showed that Black men had drink sizes with larger average alcohol content compared with other groups, which partially could explain the higher risks for alcohol-related harms. Genes responsible for alcohol metabolism also vary across ethnic groups and could be associated with susceptibility for alcohol-related diseases. Among Whites, Blacks, and Asians, alcohol dehydrogenase (ADH) and aldehyde dehydrogenase (ALDH) genotypes have been linked in combination with drinking to alcohol-related cancers, birth defects, and pancreatitis (Yin and Agarwal 2001).

Ethnicity and Alcohol-Attributed Harms

Alcohol-attributed harms can be both acute and chronic conditions that are wholly caused (e.g., alcoholic liver cirrhosis) or associated with alcohol use via intoxication, alcohol dependence, and the toxic effects of alcohol (Rehm et al. 2010). The major injury and disease categories linked to alcohol consumption include (1) unintentional injuries, (2) intentional injuries, (3) FAS, (4) gastrointestinal diseases, (5) cardiovascular diseases, (6) cancers, (7) diabetes, and (8) infectious diseases (World Health Organization [WHO] 2011). Evidence

is incomplete on the relationship between ethnicity, drinking, and each of these categories. Below, those alcohol-related harms are described that have available findings by ethnic group in addition to important gaps in this scientific literature. Alcohol use disorders are causally linked to drinking and vary by ethnicity (i.e., more likely in Native Americans and Whites) (Hasin et al. 2007), but this disease category is not described here.

Unintentional Injuries

Unintentional injuries associated with alcohol use include falls, drowning, and poisoning (WHO 2011). However, most available research on ethnicity, alcohol use, and injuries is focused on motor vehicle crashes. Alcohol-impaired driving and crash fatalities vary by ethnicity, with Native Americans and Hispanics being at higher risk than other ethnic minority groups. Past-year driving under the influence (DUI) estimates based on the 2007 National Survey on Drug Use and Health were highest for Whites (15.6 percent) and Native Americans (13.3 percent) relative to Blacks (10.0 percent), Hispanics (9.3 percent), and Asians (7.0 percent) (Substance Abuse and Mental Health Services Administration [SAMHSA] 2008). National surveys generally show lower DUI rates for Hispanics than Whites, but studies based on arrest data identify Hispanics as another high-risk group for DUI involvement (Caetano and McGrath 2005; SAMHSA 2005). The DUI arrest rate for Native Americans in 2001, according to the U.S. Department of Justice (Perry 2004), was 479 arrestees per 100,000 residents compared with 332 for all other U.S. ethnic groups.

Based on a 1999–2004 report from the National Highway Traffic Safety Administration (Hilton 2006), rates of intoxication (i.e., blood alcohol concentration [BAC] more than or equal to 0.08 percent) for drivers who were fatally injured in a motor vehicle crash were highest for Native Americans (57 percent) and Hispanics (47 percent) and lowest for Asians (approximately 20 percent), with Whites and Blacks falling in between. Across ethnic groups, most drinking drivers killed were male, although the proportion of female drivers who were intoxicated among fatally injured drivers was highest (i.e., more than 40 percent) for Native Americans. Centers for Disease Control and Prevention (CDC) (2009*b*) statistics on alcohol-related motor vehicle crash deaths also point to an important subgroup difference for Asians. In 2006, the overall death rate among Asians (1.8 per 100,000 people) obscured the death rate among Native Hawaiians and other Pacific Islanders (5.9), which was less than the rate for Native Americans but similar to that for Hispanics (14.5 and 5.2, respectively).

Intentional Injuries

Suicide

Native Americans are overrepresented in national estimates of alcohol-involved suicides. A CDC report (2009*a*) based on 2005–2006 data from the National Violent Death Reporting System presented findings on alcohol and suicide across ethnic groups. Recent alcohol use was reported among suicides in 46 percent of Native Americans, 30 percent of Hispanics, 26 percent of Whites, 16 percent of Blacks, and 15 percent of Asians. Among those tested for alcohol, the rates of intoxication (BAC higher than or equal to 0.08) were highest for Native Americans (37 percent), followed by Hispanics (29 percent), Whites (24 percent), Blacks (14 percent), and Asians (12 percent). Age-groups identified as being at high risk for alcohol-involved suicide included Native Americans ages 30 to 39 (54 percent of suicide victims had BACs higher than or equal to 0.08), Native Americans and Hispanics ages 20 to 29 (50 percent and 37 percent, respectively), and Asians ages 10 to 19 (29 percent). Males were at higher risk than female drinkers in all ethnic groups except Native Americans; the percentages of alcohol intoxication among Native American suicides were equal for males and females (37 percent).

Violence

Ethnic groups are differentially affected by alcohol-attributed violence, including intimate-partner violence (IPV). Alcohol plays an important role in IPV and other types of relationship conflicts (Field and Caetano 2004; Leonard and Eiden 2007). Based on data from the National Study of Couples, general rates of male-to-female partner violence (MFPV) and female-to-male partner violence (FMPV), are highest among Black couples (23 percent and 30 percent, respectively), followed by Hispanic (17 percent and 21 percent) and White (12 percent and 16 percent) couples (Caetano et al. 2000). The National Study of Couples provides general population data on IPV, which includes mostly moderate violence and may differ from other studies of severe violence. In this study, regardless of ethnicity, men were more likely than women to report drinking during partner violence. Drinking during a violent episode by the male or the female partner, respectively, was more frequent among Blacks (MFPV: 41.4 percent and 23.6 percent; FMPV: 33.7 percent and 22.4 percent) than among Whites (MFPV: 29.4 percent and 11.4 percent; FMPV: 27.1 percent and 14.7 percent) and Hispanics (MFPV: 29.1 percent and 5.4 percent; FMPV: 28.4 percent and 3.8 percent). Longitudinal findings, using 5-year National Study of Couples data, identified female-partner alcohol problems (i.e., alcohol dependence symptoms and social problems) in Black couples and male- and female-partner alcohol consumption in White couples as risk factors for IPV (Field and Caetano 2003). Some evidence also suggests that interethnic couples, involving White, Black, and Hispanic partners of different ethnic backgrounds, are a high-risk group for relationship violence. Relative to intraethnic couples, these interethnic couples had higher prevalence rates of IPV, which was associated with binge drinking and alcohol problems among male partners (Chartier and Caetano 2012).

Alcohol also contributes to violence victimization among Native Americans (Yuan et al. 2006). Several studies

indicate that Native Americans are at greater risk for alcohol-related trauma (e.g., IPV, rape, and assault) compared with other U.S. ethnic groups (Oetzel and Duran 2004; Wahab and Olson 2004). Based on 1992–2001 National Crime Victimization Survey data, the U.S. Department of Justice (Perry 2004) reported that 42 percent of all violent crimes (i.e., rape, sexual assault, robbery, aggravated assault, and simple assault) were committed by an offender who was under the influence of alcohol. In particular, Native American violent crime victims were more likely (62 percent) than other violent crime victims to report alcohol use by their offender, including Whites (43 percent), Blacks (35 percent), and Asians (33 percent).

Fetal Alcohol Syndrome

Using data from the 2001–2002 NESARC, Caetano and colleagues (2006) examined alcohol consumption, binge drinking, and alcohol abuse and dependence among women who were pregnant during the past year. Most women (88 percent) who reported being pregnant and also a drinker at any point in the past 12 months indicated that they did not drink during pregnancy. Rates of past-year alcohol abuse (0.8 percent to 2.3 percent) and dependence (1.2 percent to 2.8 percent) were similar and low in White, Black, Hispanic, and Asian pregnant women. Binge drinking and alcohol consumption without binge drinking among pregnant women were highest in Whites (21.1 percent and 45.0 percent, respectively) compared with other ethnic groups (0 percent to 10.7 percent and 21.0 percent to 37.3 percent). White women in this study were at greater risk for an alcohol-exposed pregnancy. However, other studies found that Black, Hispanic, and Asian women were less likely to reduce or quit heavy drinking after becoming pregnant (Morris et al. 2008; Tenkku et al. 2009). Blacks and Native Americans are at greater risk than Whites for FAS and fetal alcohol spectrum disorders (Russo et al. 2004). From 1995 to 1997, FAS rates averaged 0.4 per 1,000 live births across data-collection sites for the Fetal Alcohol Syndrome Surveillance Network and were highest for Black (1.1 percent) and Native American (3.2 percent) populations (CDC 2002).

Gastrointestinal Diseases

Liver disease is an often-cited example of the disproportionate effect of alcohol on health across ethnic groups. Native Americans have higher mortality rates for alcoholic liver disease than other U.S. ethnic groups (see figure). According to the National Vital Statistical Reports (Miniño et al. 2011) on 2008 U.S. deaths, age-adjusted death rates attributed to alcoholic liver disease for Native American men and women were 20.4 and 15.3 per 100,000 people, respectively, compared with 6.9 and 2.4 per 100,000 for men and women in the general population.

Blacks and Hispanics have greater risk for developing liver disease compared with Whites (Flores et al. 2008), and

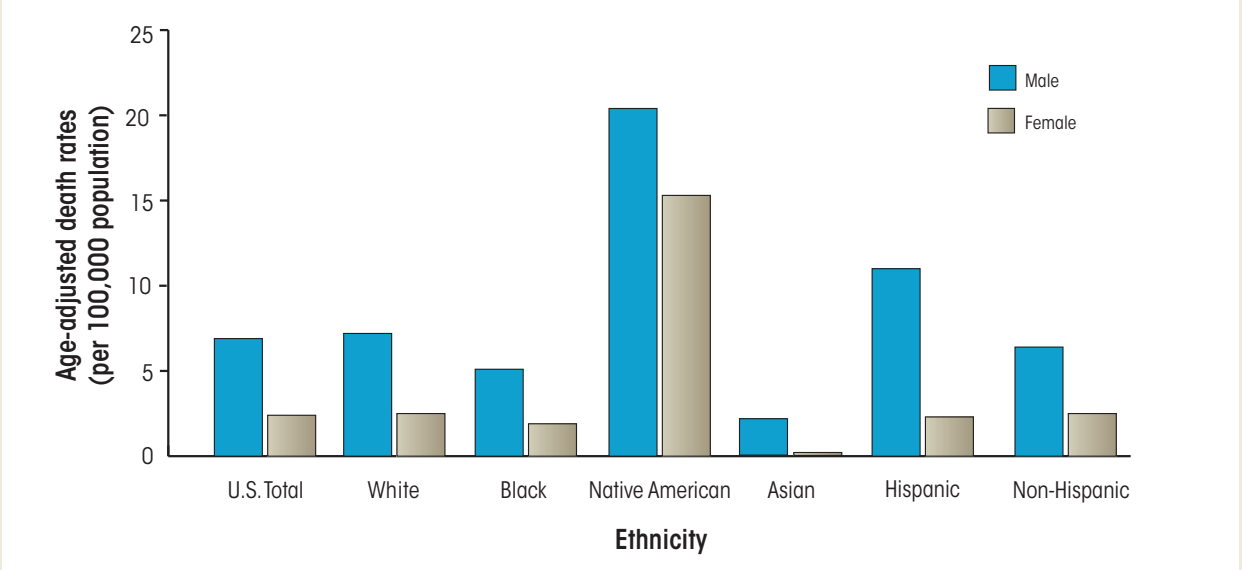

Figure In 2008, age-adjusted death rates attributed to alcoholic liver disease for Native American men and women were 20.4 and 15.3 per 100,000 people, respectively, compared with 6.9 and 2.4 for men and women in the general population.

SOURCE: Miniño, A.M. et al., Deaths: Final data for 2008. *National Vital Statistics Reports* 59(10):1–52, 2011.

death rates attributed to alcohol-related cirrhosis across populations of Whites, Blacks, and Hispanics are highest for White Hispanic men (Yoon and Yi 2008). Blacks show a greater susceptibility than Whites to alcohol-related liver damage, with risk differences amplified at higher levels of consumption (Stranges et al. 2004). Based on data from the National Center for Health Statistics, 1991–1997, mortality rates for cirrhosis with mention of alcohol were higher in White Hispanics and Black non-Hispanics compared with White non-Hispanics (Stinson et al. 2001). Male mortality rates for alcohol-related cirrhosis in White Hispanics and non-Hispanic Blacks were 114 percent and 24 percent higher, respectively, than the overall male rate (5.9 deaths per 100,000 people); female rates in White Hispanics and non-Hispanic Blacks were 16 percent and 47 percent higher than the overall female rate (1.9 deaths per 100,000 people). In contrast, death rates for White non-Hispanic and Black Hispanic males and females were lower than overall rates for each gender. In addition, there is considerable variation in deaths from liver cirrhosis across Hispanic subgroups, with mortality rates highest in Puerto Ricans and Mexicans and lowest in Cubans (Yoon and Yi 2008).

Cardiovascular Diseases

Although moderate alcohol consumption has been associated with a reduced risk for coronary heart disease (CHD) (Goldberg and Soleas 2001), there is some evidence that ethnic groups differ in terms of this protective effect, particularly for Blacks compared with Whites. Sempos and colleagues (2003) found no protective health effect for moderate drinking in Blacks for all-cause mortality, as previously reported in Whites. Kerr and colleagues (2011) reported the absence of this protective effect for all-cause mortality in Blacks and Hispanics. Similar findings have been described for hypertension and CHD risks in Black men compared with White men and women (Fuchs et al. 2001, 2004) and for mortality among Black women without hypertension (Freiberg et al. 2009). Mukamal and colleagues (2010) also showed that the protective effects of light and moderate drinking in cardiovascular mortality were stronger among Whites than non-Whites. Pletcher and colleagues (2005) found evidence that the dose-response relationship between alcohol consumption and increased coronary calcification, a marker for CHD, was strongest among Black men.

Cancers

In 1988, the WHOInternational Agency for Research on Cancer (IARC) reviewed the epidemiologic evidence on the association between alcohol consumption and cancer and found a consistent association between alcohol consumption and increased risk for cancers of the oral cavity, pharynx, larynx, esophagus, and liver (IARC 1988). Regardless of ethnicity, the risk of developing these cancers is significantly higher among men than women (National Cancer Institute 2011*c*, *d*, *e*). The incidence and mortality rates for these cancers also vary across ethnic groups. Regarding cancers of the oral cavity and pharynx, incidence rates among White and Black men are comparable (16.1 and 15.6 per 100,000, respectively); however, mortality rates are higher among Black men (6.0 versus 3.7 per 100,000 for White men) (National Cancer Institute 2011*e*). For cancer of the larynx, both incidence and mortality rates are higher among Black men than among White men (incidence, 9.8 and 6.0; mortality, 4.4 and 2.0) (National Cancer Institute 2011*c*). Although these differences may be explained by differential use of alcohol and tobacco in relation to gender and ethnicity, there is some evidence that even after controlling for alcohol and tobacco use, Blacks continue to be at increased risk for squamous cell esophageal cancer and cancers of the oral cavity and pharynx (Brown et al. 1994; Day et al. 1993).

The majority (approximately 90 percent) of all primary liver cancers are hepatocellular carcinomas (HCC) (Altekruse et al. 2009). Alcohol-related and non–alcohol-related liver cirrhosis usually precede HCC and are the two most common risk factors (Altekruse et al. 2009; El-Serag 2011; Pelucchi et al. 2006). The relative risk for developing this cancer increases with increased levels of alcohol consumption (Pelucchi et al. 2006). By ethnic group, 2003–2005 age-adjusted incidence rates for HCC per 100,000 persons were highest among Asians (11.7), followed by Hispanics (8.0), Blacks (7.0), Native Americans (6.6), and Whites (3.9) (Altekruse et al. 2009). Death rates for HCC per 100,000 people also are higher among minority groups (i.e., 8.9, 6.7, 5.8, 4.9, and 3.5 for Asians, Hispanics, Blacks, Native Americans, and Whites, respectively).

In 2007, the IARC reconvened and added breast and colorectal cancers to the list of cancers related to alcohol use (Baan et al. 2007). Research has demonstrated consistent, albeit weak, dose-response relationships between alcohol consumption and these cancers (Cho et al. 2004; Collaborative Group on Hormonal Factors in Breast Cancer 2002; Moskal et al. 2007; Singletary and Gapstur 2001). Alcohol consumption also contributes to the stage at which breast cancer is diagnosed (Hebert et al. 1998; Trentham-Dietz et al. 2000; Vaeth and Satariano 1998; Weiss et al. 1996). This could be because of the timing of disease detection, since heavy drinking has been associated with a lack of mammography utilization (Cryer et al. 1999). Alcohol consumption also may contribute to more rapid tumor proliferation (Singletary and Gapstur 2001; Weiss et al. 1996). Data from the Surveillance, Epidemiology, and End Results (SEER) Program indicate that White women, relative to women from ethnic minority groups, have higher incidence rates of breast cancer (i.e., Whites, 127.3; Blacks, 119.9; Asians, 93.7; Native Americans, 92.1; and Hispanics, 77.9 per 100,000 people) (National Cancer Institute 2011*a*). Black women, however, are more likely to be diagnosed with advanced disease (Chlebowski et al. 2005) and have significantly higher mortality rates than White women (i.e., 32.0

per 100,000 versus 22.8 per 100,000 people) (Chlebowski et al. 2005; National Cancer Institute 2011*a*). Regarding colorectal cancer, Blacks have higher incidence (67.7) and mortality (51.2) rates than all ethnic groups combined (55.0 and 41.0, respectively) (National Cancer Institute 2011*b*). Unfortunately, little is known about how drinking differentially affects ethnic differences in breast and colorectal cancers.

Diabetes

In 2010, the prevalence of diabetes was 7.1 percent, 12.6 percent, 11.8 percent, and 8.4 percent among Whites, Blacks, Hispanics, and Asians, respectively (National Institute of Diabetes and Digestive and Kidney Diseases 2011). Age-adjusted mortality rates in 2007 were 20.5, 42.8, 28.9, and 16.2 per 100,000 people among Whites, Blacks, Hispanics, and Asians (National Center for Health Statistics 2011). Data on mortality rates for diabetes among Hispanics may be underreported as a result of inconsistencies in the reporting of Hispanic origin on death certificates (Heron et al. 2009). Despite higher risks for the development of and death from diabetes in Hispanics and Blacks compared with Whites, little evidence is available to delineate the relationship of alcohol to diabetes across ethnic groups. Studies among both diabetics and nondiabetics demonstrate a J- or U-shaped curve between alcohol consumption and insulin sensitivity (Bell et al. 2000; Davies et al. 2002; Greenfield et al. 2003; Kroenke et al. 2003). Likewise, two large epidemiologic studies among diabetic subjects show that moderate alcohol consumption is associated with better glycemic control (Ahmed et al. 2008; Mackenzie et al. 2006). An important limitation of these studies, however, is that few included ethnic minority groups or failed to emphasize possible differences in relation to ethnicity in their analyses.

Infectious Diseases

Among the infectious diseases attributable to alcohol (e.g., pneumonia, tuberculosis) (WHO 2011), human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) are most relevant to U.S. ethnic health disparities. In 2009, Blacks represented 44 percent of new HIV infections and Hispanics represented 20 percent. Infection rates by gender for Blacks were 15 times (for men) and 6.5 times (for women) those of Whites, and rates for Hispanics were 4.5 times for men and 2.5 times for women, compared with rates for Whites (CDC 2011). In addition, alcohol consumption has been associated with increased HIV infection risk (Bryant et al. 2010). Caetano and Hines (1995) showed that heavy drinking predicted high-risk sexual behaviors in White, Black, and Hispanic men and women, with more Blacks than Whites and Hispanics reporting risky sexual behaviors. Among HIV-infected patients, there also is evidence that increased alcohol consumption negatively affects adherence to antiretroviral medication regimens (Chander et al. 2006; Cook et al. 2001; Samet et al. 2004) and HIV disease progression (Conigliaro et al. 2003; Samet et al. 2003). Despite these strong individual associations between ethnicity and HIV/AIDS and alcohol and HIV/AIDS, there is limited research across ethnicities on alcohol use and HIV infection or disease progression.

Conclusions

This article identifies U.S. ethnic-group differences in alcohol-attributed social and health-related harms. Three minority ethnicities are particularly disadvantaged by alcohol-related harms. Native Americans, relative to other ethnic groups, have higher rates of alcohol-related motor vehicle fatalities, suicide, violence, FAS, and liver disease mortality. Unlike other ethnic groups, in which men are primarily at risk for alcohol-related harms, both Native American men and women are high-risk groups. Hispanics have higher rates of alcohol-related motor vehicle fatalities, suicide, and cirrhosis mortality. Blacks have higher rates of FAS, intimate partner violence, and some head and neck cancers, and there is limited empirical support in Blacks for a protective health effect from moderate drinking. These patterns of findings provide recognition of the health disparities in alcohol-attributed harms across U.S. ethnicities. However, further research is needed to identify the mechanisms that give rise to and sustain these disparities in order to develop prevention strategies. The contributing factors include the higher rates of consumption found in Native Americans and Hispanics, but more broadly range from biological factors to the social environment. More research on the relationship of alcohol to some cancers, diabetes, and HIV/AIDs across ethnic groups is also needed. There is limited evidence for how drinking differentially affects ethnic differences in breast and colorectal cancers and in diabetes and HIV/AIDS onset and care, and few findings for how alcohol-attributed harms vary across ethnic subgroups. ■

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Alcohol and Stress in the Military

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Although research has independently linked stress experienced by military personnel to both alcohol use and posttraumatic stress disorder, more recently researchers have noted that there also is a significant overlap between stress reactions and alcohol use in veterans and active-duty service members. This overlap seems to be most understood in individuals who have experienced combat or military sexual trauma. This article will provide a brief review of some potential causal mechanisms underlying this relationship, including self-medication and genetic vulnerability models. It also addresses the possible implications for assessment and treatment of military personnel with co-occurring disorders. **KEY WORDS: Alcohol consumption; alcohol use and abuse; problematic alcohol use; stress; stress reaction; posttraumatic stress disorder; military personnel; active military; veteran; combat; military sexual trauma; causal pathways; self-medication; genetic vulnerability; co-occurring disorders**

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Problematic alcohol use within the United States military has been linked to substantial financial and productivity losses. Data from 2006 revealed that excessive alcohol consumption cost the U.S. military $1.12 billion per year (Harwood et al. 2009). Regarding medical expenditures, studies have found that excessive alcohol use by military members results in an annual cost of $425 million. Excessive drinking within the military is estimated to result in a loss of 320,000 work days and 34,400 arrests per year, half of which are for driving under the influence. Finally, these data indicate that each year excessive alcohol use results in 10,400 active-duty military being unable to deploy and 2,200 being separated from service duty. Given the substantial cost of alcohol misuse, it is imperative to examine factors that may contribute to problematic drinking so that interventions can be employed to address this issue within the military.

This article will examine the links between military traumatic stress and mental health problems, such as posttraumatic stress disorder (PTSD) and between military traumatic stress and problematic alcohol use. Furthermore, it will summarize the pathways that may explain these links and describe possible implications for assessment and interventions with veterans.

Prevalence of Problematic Alcohol Use in the U.S. Military

Frequent heavy drinking, defined as consuming five or more drinks on one or more occasions per week, occurs among a substantial proportion of U.S. military personnel and varies as a function of military demographic characteristics. In a large-scale survey, Bray and Hourani (2005) found that the prevalence of frequent heavy drinking in the military from 1980 through 2005 ranged from 15 to 20 percent. Consistent with findings from civilian samples that show gender differences in rates of heavy drinking, military men were nearly 3.5 times more likely to report frequent heavy drinking compared with women in the military. Frequent heavy drinking also varied as a function of ethnicity, with Hispanic and non-Hispanic Whites exhibiting higher rates of problematic drinking than non-Hispanic Blacks. In addition, military rank significantly correlated with frequent heavy drinking; rates were six times greater among enlisted personnel with the lowest rankings compared with officers. Rates of heavy drinking also varied as a function of military service branch, with those in the Army, Navy, and Marines being more likely to report frequent heavy drinking than

those in the Air Force. Other population-based studies of the U.S. military have found that heavy drinking is more likely to occur among younger military members (Stahre et al. 2009). Together, these results suggest that certain military demographic groups (e.g., younger, low-ranking, non–Air Force, White or Hispanic men) may be especially prone to engage in frequent heavy drinking.

Young adults in the military are more likely than their civilian counterparts to engage in heavy drinking. For example, Ames and Cunradi (2004) found that rates of heavy drinking were significantly higher among male military personnel aged 18 to 25 years (32.2 percent) compared with male civilians in a similar age range (17.8 percent). The researchers also found significantly elevated rates of heavy drinking among women in the military compared with similarly aged female civilians (5.5 percent). In addition to demographic factors, military-related stressful events also may contribute to the high rates of problem drinking observed.

Alcohol misuse also frequently occurs among a substantial proportion of combat veterans. In one population-based study of 88,235 veterans returning from Operation Iraqi Freedom (OIF), Milliken and colleagues (2007) found that 12 to 15 percent of veterans endorsed problematic alcohol use in the 3 to 6 months following their return from combat. These data suggest that alcohol misuse occurs among a substantial number of veterans who are exposed to combat-related traumatic stress and highlight the importance of understanding the relationships between stressful military experiences (e.g., combat and military sexual trauma) and alcohol misuse.

Military Trauma and Stress-Related Disorders

Stress-related disorders in response to military service have been noted throughout history. Whether labeled "combat fatigue" or "shell shock" or PTSD, there have been consistent reports in the literature documenting that exposure to combat experiences can lead to an impairment of psychological functioning in military personnel (Foa et al. 2009). Beginning with the Vietnam War, and more recently with the wars in Iraq and Afghanistan (Department of Defense [DOD], 2007, p. ES-1), PTSD has been the most commonly diagnosed mental health disorder for veterans returning from combat. Epidemiological studies of Operation Enduring Freedom (OEF)/OIF veterans treated in the Department of Veterans Affairs (VA) health care system have found that 14 to 22 percent of returning veterans were diagnosed with PTSD (Seal et al. 2009; Tanelian and Jaycox 2008), making it the signature psychological wound of these two wars (DOD 2007). People are diagnosed with PTSD after exposure to a trauma if they experience a strong emotional response to the event that is followed by persistent difficulty in three key areas, including reexperiencing (e.g., nightmares, flashbacks), arousal (e.g., startle response, sleep disturbance), and avoidance (e.g., withdrawal from people, places, and other reminders of the trauma). These disruptions often lead to an impaired ability to function in social, educational, and work environments, making PTSD a very debilitating condition. More recently, research has found that PTSD and related disorders, such as depression, can develop in military personnel not only as a result of combat exposure but also as a result of childhood traumas, military sexual trauma (MST), mortuary affairs duty, and training accidents (Foa et. al. 2009).

Young adults in the military are more likely than their civilian counter-parts to engage in heavy drinking.

Military Trauma and Alcohol Misuse

Not only does military trauma increase the likelihood of developing stress-related mental health disorders such as PTSD or depression, but, as alluded to earlier, there is also evidence that traumatic experiences are related to problematic alcohol use among military members. One form of military traumatic stress that has been surprisingly under-researched is the psychological impact of exposure to killing within a combat setting. In a series of studies, Maguen and colleagues (2010*a*, *b*) examined the relationships among experiences with killing within combat and psychological adjustment of combat veterans, including problematic alcohol use. As predicted, engaging in killing during combat was related to PTSD symptoms but also was independently linked to problematic alcohol use as well as the overall quantity and frequency of alcohol use among these soldiers. These results suggest that killing within the context of combat may be a distinctive risk factor for heavy drinking and problematic alcohol use following combat among members of the military.

In addition to combat-related traumatic experiences elevating the risk for alcohol misuse, there is also evidence that MST is associated with alcohol misuse among military personnel. In a review of the literature on MST, Suris and Lind (2008) examined the relationship between MST experiences and mental and physical health outcomes. They concluded that MST was related to a variety of negative mental and physical health outcomes, including elevated rates of alcohol misuse among those who experienced MST compared with nontraumatized individuals. Taken together, these results suggest that various forms of military trauma, including exposures to killing in combat and MST, elevate the risk for problematic alcohol use among members of the military. These findings also suggest that alcohol misuse is likely to co-occur with other posttraumatic mental health disorders, such as PTSD and depression, among military

personnel. Therefore, it is important to examine the co-occurrence of alcohol misuse within the context of these posttraumatic mental health disorders and to develop models that might explain these comorbidities.

Is Alcohol Used to Self-Medicate Symptoms of Military Posttraumatic Psychiatric Disorders?

The self-medication hypothesis has been proposed to explain the relationship between military traumatic stress and alcohol use disorders. According to this model, the relationship between traumatic events and the heightened risk for an alcohol use disorders is mediated by the occurrence of PTSD or other posttraumatic psychiatric disorders (Jacobsen et al. 2001; Khantzian 1999). Specifically, traumatic events are proposed to lead to psychiatric disorders such as PTSD or depression, and individuals manifesting these conditions may turn to alcohol use as a means of "self-medicating" their symptoms. From a learning-theory paradigm, alcohol use is hypothesized to be negatively reinforcing in that it provides immediate and short-term relief from posttraumatic psychiatric symptoms. For example, military veterans with PTSD reported using alcohol to specifically cope with re-experiencing and hyperarousal symptoms (Bremner et al. 1996), and given the powerful, short-term negative reinforcement effects of alcohol, the theory postulates that people may begin to use alcohol frequently and excessively, resulting in the development of an alcohol use disorder.

Although the self-medication hypothesis proposes that the initial development of an alcohol use disorder is reactionary to PTSD or other posttraumatic psychiatric disorders, an important corollary is that alcohol abuse impedes recovery and even worsens symptoms of posttraumatic mental health disorders. Within a cognitive–behavioral paradigm that attempts to understand the necessary conditions to recover from PTSD, it is hypothesized that the individual must be able to eliminate avoidance of stressful situations—i.e., they must put themselves into contact with people, places, or things that are objectively safe but that continue to cause distress, such as being in crowds, thinking about the trauma, or experiencing emotions related to the trauma (Foa and Kozak 1986). Alcohol misuse can interfere with this necessary precondition for recovery by leading individuals to continue to engage in unhelpful avoidance behaviors. In fact, within the self-medication framework, alcohol use can in itself be conceptualized as an avoidance behavior (e.g., using alcohol to avoid thinking about the traumas). In addition, alcohol withdrawal symptoms can mirror or exacerbate the symptoms of PTSD (Jacobson et al. 2001). For example, people experiencing post–acute withdrawal may have increased irritability, sleep problems, difficulty concentrating, and anxious and depressed mood, all of which overlap with symptoms of PTSD or depression. Thus, alcohol misuse feeds back into the posttraumatic mental health symptoms, in a bidirectional manner (see the figure).

Not only do alcohol use disorders complicate recovery from posttraumatic mental health disorders, such as PTSD, but these stress-related conditions have been found to impede recovery from alcoholism. Ouimette and colleagues (1999) found that substance-dependent veterans with PTSD had poorer substance abuse treatment outcomes after 2 years compared with those without PTSD. Consistent with these results, Brown and colleagues (1999) found that substance-dependent individuals with co-occurring PTSD relapsed more quickly than those without PTSD. Taken together, these results suggest that the co-occurrence of an alcohol use disorder with PTSD provides a substantial barrier to recovery from both of these disorders.

Although large-scale research from civilian populations have found support for the self-medication hypothesis (e.g., Breslau et al. 1991), there has been less research on this theory in post–Vietnam War era samples. In a study of OEF/OIF veterans, Jakupcak and colleagues (2010) found that although combat exposure per se did not increase the risk for alcohol misuse, screening positive for PTSD or depression doubled this risk. The authors concluded that the findings may be

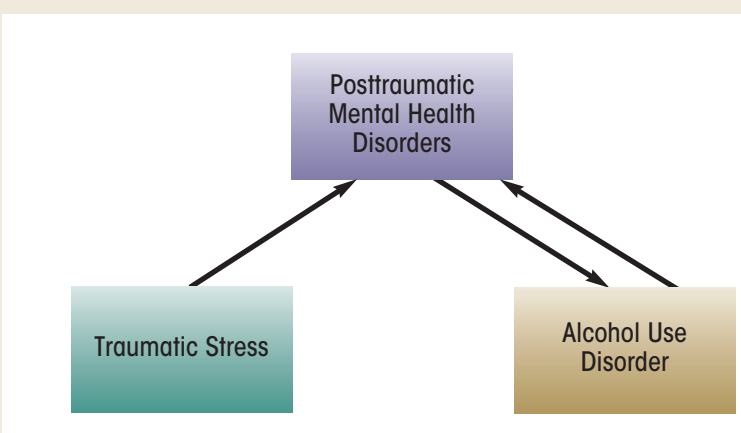

Figure Self-medication model explaining the link between traumatic stress and alcohol use disorder.

consistent with the hypothesis that these veterans were misusing alcohol as a means of coping with symptoms of PTSD and depression. In addition, the authors found that alcohol misuse was particularly associated with emotional numbing symptoms of PTSD, suggesting that veterans may have been drinking alcohol in an effort to improve their mood or to increase emotional connectivity with others. However, because these data were collected cross sectionally, it was not possible to clearly examine the causal and temporal relationship between the development of the psychiatric symptomatology and the onset of alcohol use disorders, raising questions regarding the directionality of these relationships.

Evidence shows that PTSD is not the only stress-related condition that might mediate the relationship between stress and alcohol misuse in military personnel. In a stratified, large-scale sample of military reservists, Gradus and colleagues (2008) examined whether symptoms of depression explained the relationship between military sexual harassment experiences and alcohol misuse, and they found that more severe sexual harassment was related to greater depression symptoms among female reservists. In addition, experiencing greater amounts of sexual harassment was related to higher alcohol misuse. However, when depression symptoms were entered into the equation, the relationship between women's experience of sexual harassment and alcohol misuse was no longer significant. These data suggest that female military reservists may be prone to abuse alcohol as a way of coping with depression symptoms that are secondary to experiencing military sexual harassment.

Does Heritability Play a Role in Military Members' Alcohol Misuse and Posttraumatic Psychiatric Disorders?

Research on veterans suggests that common genetic underpinnings may partially explain the relationship between combat exposure, posttraumatic psychiatric disorders, and alcohol misuse. Much of this evidence comes from studies that are derived from the Vietnam Era Twin Registry (McLeod et al. 2001; Scherrer et al. 2008; Xian et al. 2000). This registry involves a large-scale sample of monozygotic and dizygotic twin pairs who served in the military during the Vietnam era. By examining the relationships between degree of combat exposure, posttraumatic psychiatric disorders, and alcohol misuse among twin pairs that share identical (i.e., monozygotic) or nonidentical (i.e., dizygotic) genetics, researchers derived estimates as to the relative degree of genetic and environmental contributions in explaining experiences in these domains.

Several conclusions were reached by studies of the Vietnam Era Twin Registry data. PTSD and alcohol use problems were both found to be influenced by genetics, although environmental factors explained about one-half of the variance in alcohol misuse and over one-half of the variance in PTSD symptoms (McLeod et al. 2001; Xian et al. 2000). These findings suggest that although genetic factors are notable in explaining these disorders, environmental factors are equal to, if not more substantive, than genetics. Of interest, Xian and colleagues (2000) found that shared family environment did not add to the model in predicting these disorders. This suggests that environmental factors other than the family environment may be responsible for much of the variation in PTSD and alcohol misuse. In addition, these studies concluded that a common genetic element partially accounts for the co-occurrence of combat exposure, posttraumatic psychiatric disorders, and alcohol misuse. In other words, genetic factors may predispose individuals to end up in combat situations and to develop symptoms of PTSD, depression, and alcohol use disorders. Building on this finding, Scherrer and colleagues (2008) found that the genetic and environmental contributions to PTSD, in particular, explained the link between combat and alcohol misuse as well as combat and depression. This suggests that a combination of genetic and environmental vulnerability for the development of PTSD may entirely explain linkages between combat exposure and later alcohol misuse and development of depression. Such a conclusion is important because it suggests that improving understanding of the etiology of and treatment for PTSD may be a key to addressing alcohol misuse and depression following combat exposure.

Is Alcohol Misuse a Pre-existing Risk Factor for Traumatic Stress Recovery?

Although it is possible that military members may engage in alcohol misuse as a way of trying to cope with posttraumatic psychiatric symptoms, there also is evidence to suggest that pre-existing alcohol misuse contributes to posttraumatic psychiatric maladjustment. A longitudinal study by Dickstein and colleagues (2010) found several trajectories of recovery from PTSD symptoms among U.S. soldiers who were deployed to Kosovo on a peacekeeping mission. Although most soldiers (84 percent) exhibited a resilient recovery following their deployment (i.e., low initial PTSD symptoms that decreased over time), a minority exhibited problematic levels of PTSD during the follow-up period. After controlling for other possible risk factors, higher predeployment alcohol misuse distinguished soldiers who experienced PTSD symptoms over the postdeployment follow-up period. These results suggest that problematic drinking prior to the traumatic combat experience may be a risk factor for some soldiers to exhibit PTSD symptoms following combat exposure.

Although these findings suggest that problematic alcohol use may be a risk factor that precedes the development of PTSD, they are not necessarily inconsistent with the self-medication model. Predeployment alcohol misuse may be a behavioral signal for soldiers' pre-existing maladaptive coping strategies. For example, soldiers who misuse

alcohol prior to deployment may be especially prone to abuse alcohol following deployment as a way of trying to self-medicate PTSD re-experiencing symptoms and to avoid difficult and painful emotions. This type of avoidance-based coping strategy is considered an underlying factor in the exacerbation of PTSD symptoms (Foa and Kozak 1986). Hence, these soldiers may be especially prone to attempt to self-medicate posttraumatic psychiatric symptoms, thereby worsening the course of the posttraumatic psychiatric condition.

Findings from Dickstein and colleagues (2010) that alcohol misuse is a risk factor for PTSD can also be considered from the perspective of genetics research on combat, PTSD, and alcohol misuse. As previously described, the common genetic and environmental elements that connect alcohol misuse with combat exposure seem to be those shared through PTSD (Scherrer et al. 2008). Hence, the evidence reported by Dickstein and colleagues (2010) may be attributed to the common genetic and environmental vulnerabilities that alcohol misuse shares with PTSD. In this way, predeployment alcohol misuse may be an observed indicator of an underlying latent environmental and genetic vulnerability for the development of PTSD. Clearly, additional longitudinal research is required to tease out how environmental and genetic risk factors influence the course of developing PTSD and alcohol use disorders.

Traumatic Brain Injury, Alcohol Misuse, and Stress-Related Disorders

The causal links between alcohol misuse and posttraumatic mental health problems are further complicated by the role of traumatic brain injury (TBI) among military members. The rates of traumatic brain injury resulting from combat have increased dramatically with veterans from OEF and OIF versus veterans from prior conflicts. This increase in rates of TBI may be at least partially explained by improvements in body armor and the medical response to combat injuries. With these modern technologies, OEF and OIF veterans are now able to survive injuries that would have resulted in death in prior combat eras. However, many of these OEF and OIF veterans who now survive combat trauma are left with the repercussions of TBI. These TBI events often result from blast exposure during combat, which also can lead to posttraumatic mental health disorders (Corrigan and Cole 2008). Some studies have found that up to 44 percent of veterans who reported loss of consciousness and 27 percent of veterans who reported altered mental status also met criteria for PTSD (Hoge et al. 2008). Given this co-occurrence, defining the etiology of these presenting complaints can be difficult. Furthermore, the relationship between alcohol misuse and TBI often is complex because heavy drinking may predate and predispose individuals to experiencing a TBI (i.e., TBI can result from accidents that occur when people are under the influence of alcohol). In addition, alcohol misuse can exacerbate the complications of TBI by worsening TBI symptom severity (e.g., persistent memory problems) and by further increasing an individual's risk for experiencing additional alcohol-related TBI events. In summary, there are likely to be multiple interrelated factors explaining the relationship between experiencing traumatic events and alcohol misuse among members of the military.

Implications for Assessment and Intervention

Research on the self-medication hypothesis and genetic studies suggests that alcohol misuse following military trauma is likely to be highly related to the co-occurrence of PTSD and other posttraumatic psychiatric problems. Thus, early screening and identification of those who are exhibiting posttraumatic mental health problems is an important first step in intervention. In addition, given the demonstrated vulnerability for those with posttraumatic psychiatric disorders to also exhibit alcohol misuse, screening and intervention efforts should be comprehensive in addressing this common comorbidity.

Although posttraumatic psychiatric problems may be an important mediating factor between military trauma and alcohol misuse, alcohol misuse within the military is a complex phenomenon and one that is likely to have causal factors. As alluded to above, military personnel who misuse alcohol prior to experiencing military-related trauma may be prone to abuse alcohol following trauma, even in the absence of developing posttraumatic mental health problems. Thus, efforts by the military and Veterans Affairs (VA) to screen for early signs of alcohol misuse are important to identify at-risk individuals before they are exposed to combat-related trauma. As shown by Dickstein and colleagues (2010), military members who exhibit a pretrauma history of alcohol misuse may be prone to exhibit poorer recovery from PTSD symptoms following trauma exposure. Therefore, interventions to screen for a history of alcohol misuse also may help to target individuals who are at risk for developing increasingly severe PTSD symptoms following military trauma exposure.

In response to this need, the VA Healthcare System has taken extensive measures to address the issue of co-occurring substance use disorders and PTSD. For example, funding has been provided to establish substance use disorder–PTSD specialists who augment specialized PTSD treatment programs. The role of these specialists is to facilitate the assessment and diagnosis of these disorders in returning veterans and serve as a primary provider of mental health services for veterans with these comorbid conditions. Of note, a VA consensus panel (Department of Veterans Affairs 2009) recommended that specialists in these positions provide first-line evidence-based treatments such as Seeking Safety (Najavits 2002) or motivational interviewing (Miller

and Rollnick 2002). The panel also recommended that substance use disorder treatment programs should continue to use empirically supported treatments focused on treating the substance use disorder. Likewise, the panel recommended that PTSD treatment programs should continue to provide evidence-based treatments targeting PTSD. Finally, the panel concluded that the superiority of any one given treatment approach above another is not supported by the literature to date and that no "gold standard" treatment exists at this time. This serves as a reminder that ample opportunities exist within the VA and military settings to further study these existing treatments and to develop alternative approaches to treating these comorbid conditions.

Summary

Alcohol misuse is a problem among a significant minority of the U.S. military. Military-related traumatic stress seems to elevate risk for individuals to misuse alcohol. The co-occurrence of posttraumatic psychiatric disorders seems to play a major explanatory role in the association between military stress and alcohol misuse. Screening and intervention for alcohol misuse, particularly following exposure to military-related trauma, is clearly needed, as are integrated treatments that address conjoined alcohol and PTSD problems. ■

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