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At-risk drinking in US adults with health conditions: Differences by gender and race and ethnicity in the National Survey of Drug Use and Health, 2015-2019

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Abstract

Few studies in the United States (US) address alcohol consumption patterns in adults with chronic health conditions, and little is known about race and ethnicity differences. This study examined at-risk drinking prevalence rates among US adults with hypertension, diabetes, heart condition or cancer and assessed differences by gender and, among adults aged 50 and older, by race and ethnicity. We used data from the 2015-2019 National Survey on Drug Use and Health (N=209,183) to estimate 1) prevalence rates and 2) multivariable logistic regression models predicting odds of at-risk drinking among adults with hypertension, diabetes, heart condition, or cancer, compared to adults with none of these conditions. To examine subgroup differences, analyses were stratified by gender (ages 18-49 and ages 50+) and by gender and race and ethnicity for adults ages 50+. Results showed all adults with diabetes and women ages 50+ with heart conditions in the full sample had lower odds of at-risk drinking relative to their counterparts without any of the four conditions. Men ages 50+ with hypertension had greater odds. In race and ethnicity assessments among adults ages 50+, only non-Hispanic White (NHW) men and women with diabetes and heart conditions had lower odds, and NHW men and women and Hispanic men with hypertension had greater odds of at-risk drinking. There were differential associations of at-risk drinking with demographic and lifestyle indicators across race and ethnicity groups. These findings underscore tailored efforts in community and clinical settings to reduce at-risk drinking in subgroups with health condition diagnoses.

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Author Contributions

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Competing Interests

The authors have no competing interests to disclose.

Ethics Approval

This is an observational study and exempt from human subjects approval.

Keywords

at-risk drinking; health conditions; hypertension; diabetes; heart condition; cancer

Introduction

Excessive alcohol consumption is a leading cause of preventable death in the United States (US) [1], and alcohol-attributable mortality among US adults increased substantially over the past decade [2]. While drinking is a well-recognized cause of health conditions such as liver disease and pancreatitis [3], alcohol remains an overlooked risk factor for prevalent diseases including hypertension, diabetes, heart conditions and cancer. People with these health conditions and continue to drink are at high risk for severe health consequences. Sustained drinking with chronic health conditions is related to increased risk for long-term consequences on the heart [4], cancer mortality [5] and medical complications [6], partly through poor medication adherence and health behaviors resulting in poor disease management [7].

Studies have more recently shown that older adults in the US have increasing prevalence of alcohol consumption and binge drinking [8–10] and alcohol-related morbidity and mortality [11], thereby underscoring the need for examining drinking in older adults. Given health condition onset and diagnoses during later adulthood [12, 13], it is critical to improve drinking interventions for US demographic subgroups with important, but not well-recognized, alcohol-related health problems that could ameliorate disease management, treatment adherence and overall health [7]. The current study examines prevalence rates and correlates of at-risk drinking among a general population sample of US adults with hypertension, diabetes, heart condition, or cancer diagnoses. In particular, and given gender differences in alcohol metabolism and risks for health [14, 15], we investigate at-risk drinking by gender and age group and, furthermore among people ages 50 and older, by race and ethnicity (hereafter “race/ethnicity”).

US racial and ethnic minority populations bear greatest risks for long-term health consequences from alcohol consumption (e.g., liver cirrhosis, cardiovascular diseases) [16, 17], and racial and ethnic minority adults also have higher rates of health conditions relative to their non-Hispanic White (NHW) counterparts [18–20]. For example, Black and Hispanic/Latinx (hereafter “Hispanic”) Americans have higher rates of uncontrolled hypertension than NHW Americans [21], and certain Asian ethnicity subgroups have higher rates of hypertension and diabetes than their NHW peers [22, 23]. Further compounding these disparities is that racial and ethnic minority adults are less likely to access healthcare [24] and alcohol-related treatment [25, 26] relative to NHW adults. This study will explore at-risk drinking among midlife and older men and women (i.e., 50 years or older) with health conditions by race/ethnicity. Doing so will provide data for enhancing intervention strategies to mitigate risks of more serious disease conditions and alcohol-related mortality.

There is a dearth of prevalence data on drinking behaviors among people with certain health conditions. The only US study on drinking with cancer revealed more than half of cancer survivors reported past-year current drinking and, of those, 35% reported exceeding

moderate drinking levels (>1 and 2 drinks for women and men per day; US Department of Agriculture, 2020) and 21% reported binge drinking [28]. Other US studies showed 9% of myocardial infarction survivors engaged in past 30-day binge drinking [29] and nearly half of adults with heart disease (46%) consumed any alcohol in the past 30 days [30]. There are no US prevalence studies of drinking among people with a diabetes or hypertension diagnosis, but studies from mostly outside the US generally show reduced drinking among those with diabetes and heart disease [31–34] and not hypertension. While excessive drinking includes both at-risk and heavy (or binge) drinking, we focus on at-risk drinking because exceeding certain levels of daily or weekly drinking significantly increases risk for diagnosable alcohol-related health problems [14, 15, 35]. Current studies on alcohol and health typically examine heavy drinking frequency over a sustained period [34, 36], and the threshold for at-risk drinking is especially relevant for older individuals with increased alcohol sensitivity or who take medications that may interact with alcohol [37, 38] and thus have lower drinking guidelines [39]. Moreover, people with condition diagnoses may not recognize consequences associated with at-risk drinking.

There is scant research on race/ethnicity differences in at-risk drinking among US adults with health conditions, and virtually none on intersections of race/ethnicity by gender. Current scholarship indicates varied associations between alcohol consumption and health outcomes across race/ethnicity [40] and between health condition onset and later heavy drinking across gender and race/ethnicity groups separately [34, 36]. The extent to which drinking behaviors vary by race/ethnicity and gender subgroups with health conditions is largely unknown. Identifying elevated at-risk drinking among subpopulations who have health conditions is important for adapting drinking reduction intervention efforts. We build on prior work by investigating at-risk drinking among gender and race/ethnicity groups among US adults 50 years and older with hypertension, diabetes, heart conditions or cancer.

This report addresses the following questions using the 2015-2019 National Survey on Drug Use and Health (NSDUH): 1) What are prevalence rates and correlates of at-risk drinking among individuals with hypertension, diabetes, heart conditions, or cancer by gender (for ages 18-49 and 50+) and by race/ethnicity and gender group (for ages 50+)?; and 2) Is there elevated at-risk drinking in demographic subgroups with health conditions compared to those without these conditions? We explored race/ethnicity differences by gender among the four largest US groups (NHW, Black, Hispanic, and Asian adults).

Methods

Design and Study Sample

We used public-use survey data from adults 18 years and older in the 2015-2019 National Survey of Drug Use and Health (NSDUH) (SAMHSA, 2020). The NSDUH is a nationally representative survey of the US non-institutionalized civilian population including persons with no permanent residence and living in college dormitories, in group homes, and on military bases. The survey uses multistage, probability sampling methods for each of the 50 states and the District of Columbia to select a representative sample of respondents aged 12 years or older. Youth ages 12-17 and adults 18-25 were oversampled in years 2015 to 2017. The NSDUH uses a combination of computer-assisted personal interviewing and audio

computer-assisted self-interviewing. A detailed description of NSDUH survey methodology is available elsewhere (see SAMHSA, 2020). This observational study was exempt from IRB approval.

Given a focal study aim on race/ethnicity drinking differences among older individuals with reported health conditions, we merged NSDUH across years to maximize sample sizes. Before collapsing these data for analyses, we ascertained there were no or few discernible changes in at-risk drinking by age and gender group from 2015 to 2019. Online Resource 1 presents logistic regression estimates for associations between continuous survey year and odds of at-risk drinking among adults with each health condition (hypertension, diabetes, heart condition, and cancer). There were few significant changes in at-risk drinking, and these changes were small and emerged among respondents ages 18-49. There were reduced odds of at-risk drinking among people ages 18-49 with heart conditions, and men appeared to drive these results. Women ages 18-49 with diabetes had increased odds of at-risk drinking across years. The relative lack of drinking changes by survey year allowed the study team to capitalize on a large US national sample to investigate drinking patterns for understudied race/ethnicity groups, which is relevant for informing prevention strategies.

Measures

Respondents indicated from a list of health conditions a health professional ever told them they had, including *hypertension, diabetes, heart condition* ("Any kind of heart condition or heart disease"), or *cancer*. Health condition statuses were not mutually exclusive. To address differences between adults with a particular condition versus none, responses were coded dichotomously to reflect each health condition versus none of the four. Self-reported cancers included bladder, leukemia, breast, cervix, colon, esophagus/stomach, gallbladder/liver/pancreas, kidney, larynx/windpipe/lung, melanoma, mouth/tongue/throat/pharynx, ovary, prostate/testis, skin, thyroid, uterus, other, and "don't know".

At-risk drinking was based on self-reported drinking in the past 30 days. Following guidelines from the US Department of Agriculture (USDA), at-risk drinking was a binary indicator for whether the respondent reported more than 7 and 14 drinks weekly, respectively (USDA, n.d.). We first calculated drinking volume using drinking frequency (number of days having consumed at least one drink of any alcoholic beverage), usual quantity (average number of drinks on days when drank), and binge days (frequency of 4 or 5 drinks for women and men, respectively). Given respondents' tendencies to underestimate their own consumption, we incorporated binge days into our volume calculation [43, 44] by following previous work [45, 46]. For respondents whose usual quantity was fewer than 5 (men) or 4 (women) drinks, volume was calculated using (frequency days – binge days) * usual quantity + binge days * 6 (women) or 7 (men) drinks. For respondents whose usual quantity was equal to or more than 5 or 4 drinks, volume was calculated by multiplying frequency days and usual quantity. We used volume to derive average weekly and daily consumption, and whether respondents exceeded USDA guidelines and thus were categorized as at-risk drinkers. To account for respondents missing on drinker status and do not have information for usual binge days, we imputed volume using only frequency and usual quantity (19.3% [n = 660] of missings).

Focal demographic characteristics were gender, race/ethnicity group (Non-Hispanic White, Black, Hispanic/Latinx, Asian, and other race/ethnicity including American Indian/Alaska Native, Native Hawaiian/Pacific Islander, and multiracial), and age group. Covariates associated with alcohol consumption and/or health were college degree or higher (vs. less than high school, high school diploma, or some college), full-time employment (vs. part-time employment or unemployed/other), $75,000 or more family income (vs. <$20,000, $20,000-$49,999, or $50,000-$74,999) [47], sexual minority status (gay/lesbian/bisexual vs. heterosexual) [48], never married (vs. married/cohabitating or widowed/divorced/separated) [49], currently covered by private or public health insurance (vs. no health insurance) [50], and lower English proficiency (speaks English not well at all, not well, or well vs. very well) [51, 52]. Other *health indicators* that could confound health condition diagnoses included fair or poor self-rated health (vs. good/very good/excellent) [53], body mass index (BMI; calculated using self-reported weight and height) [54], any past 30-day cigarette use [55, 56], and any past-year drug use (including illicit drugs such as cocaine, crack, heroin, hallucinogens, inhalants, methamphetamine and prescription drug misuse of painkillers, tranquilizers, stimulants) [57].

Analytic Strategy

First, we estimated past-month at-risk drinking prevalence among US adults stratified by each health condition (hypertension, diabetes, heart condition, cancer, or none of the four conditions). Next, we conducted multivariable logistic regression analyses to test whether and how at-risk drinking differed between respondents with each health condition and those without any of these conditions. All analyses were stratified by gender and age group (18-49 and 50+), and further by race/ethnicity group for adults ages 50+. Race/ethnicity analyses for adults aged 50+ were limited to NHW, Black, Hispanic, and Asian groups given small samples for American Indian/Alaska Native, Native Hawaiian/Pacific Islander, and multiracial race/ethnicity groups. Covariates were collapsed or omitted due to collinearity for Asian-stratified models to maximize cell sizes.

To avoid sample reduction and maintain adequate power to detect associations, missing data for some covariates (i.e., sexual minority status, English proficiency, BMI) were imputed using multiple imputation through chained equations. We created 50 complete datasets that included all relevant variables and used the average or mode of imputed replicates for missing continuous covariates or missing categorical covariates, respectively. All final models incorporated survey weights to account for the complex sampling design and survey nonresponse and adjusted for survey year. All analyses were implemented in Stata 17.

Results

Sample Characteristics

Demographic characteristics for the analysis sample across NSDUH, years 2015-2019 (N=209,183), are presented in Table 1.

The weighted prevalence rate for at-risk drinking was 9.4% in the full sample. Of all adults, 19.6% reported hypertension, 10.7% diabetes, 10.6% heart condition, and 6.3% cancer,

while 66.5% did not report any of the four conditions. Nearly 52% identified as female and over 45.0% were 50 years and older. The majority was Non-Hispanic White (NHW) (64.3%), followed by Hispanic (15.9%), Black (11.7%), and Asian (5.5%), and the majority also had at least some college education or higher. About half were employed full-time (49.6%) and the more than half rated their health to be very good or excellent (57.0%).

Differences by Health Condition among All Adults

Table 2 details at-risk drinking rates among all adults (by age and gender) with each condition and those without any (of the four), and adjusted odds of at-risk drinking among adults with each condition relative to those without any.

Prevalence Rates for At-Risk Drinking—Among the full male sample and men ages 50+, those without conditions reported the highest at-risk drinking rates (10.1% and 9.5%, respectively). Among men ages 18-49, those with heart conditions (11.5%), hypertension (11.2%), and cancer (10.9%) had the highest rates. Among all women, those without conditions reported the highest rates (10.4% for full female sample, 11.0% for ages 18-49, and 9.1% for ages 50+).

Differences in Men's Drinking—Among all male samples, diabetes was associated with lower odds of at-risk drinking relative to men without conditions. Hypertension was associated with higher odds for the full male sample, and men ages 50+ appear to drive this association (aOR=1.40, p<.001). Smoking, drug use, and being divorced/widowed/separated elevated risk in both age groups. Sexual minority status attenuated risk for men ages 18-49 only. All covariate coefficient estimates are available in Online Resources 2–4.

Differences in Women's Drinking—Among all female samples, diabetes was associated with lower odds of at-risk drinking relative to women without conditions. Heart condition was associated with lower odds for the full female sample, and women ages 50+ appear to drive this association (aOR=0.77, p<.01). In both age groups, smoking and drug use elevated risk, while higher BMI attenuated risk. Except for women ages 50+ with some college, and relative to those with college or more, women in both age groups with less education had lower odds of drinking relative. Sexual minority status and very good/excellent health elevated risk in full and age-stratified estimates.

Race/ethnicity Differences in Older Adults (Ages 50+)

Table 3 summarizes at-risk drinking by race/ethnicity and gender for respondents ages 50+ with each health condition compared to those without any.

Among respondents ages 50+, at-risk drinking prevalence was highest only among NHW and Black men and women without conditions. Hispanic men and women with hypertension and heart conditions, respectively, and Asian men and women with cancer and hypertension, respectively, had highest rates.

Only NHW men and women with diabetes and heart conditions had lower odds of at-risk drinking than their counterparts without conditions. Conversely, hypertension was associated with higher risk for these subgroups. NHW men who were divorced/widowed/separated

had elevated risk. NHW men with some college or less was related to *higher* odds, while NHW women with high school or less was related to *lower* odds. Lower income and greater BMI were associated with lower odds, while better health, smoking and drug use elevated risk for both NHW gender groups. Part-time employment elevated risk for men, and being unemployed attenuated risk for women.

Among race/ethnicity minority respondents, only Hispanic men with hypertension had higher odds of at-risk drinking relative to their counterparts with no condition (aOR=1.79, $p<.05$). Current smoking and drug use conferred risk for all race/ethnicity minority gender groups except for drug use among Black men and Hispanic women. Greater BMI was related to lower risk for Black women. Lower English language proficiency decreased risk among Hispanic and Asian women only. Socioeconomic indicators including education, employment status, and income were differentially associated with at-risk drinking across race/ethnicity and gender groups.

Discussion

This study documented prevalence rates of at-risk drinking in US men and women with hypertension, diabetes, heart conditions, or cancer and compared their drinking risk to adults without any of these health conditions. We also explored these aims for older adults ages 50+ by race/ethnicity group. Nearly 10% of US adults reported past-year at-risk drinking, and highest prevalence rates generally emerged among people without any conditions. All men and women with diabetes, regardless of age, and women ages 50+ with heart conditions engaged in less at-risk drinking, while men ages 50+ with hypertension drank *more*. In race/ethnicity-stratified assessments among adults ages 50+, only NHW men and women with diabetes and heart conditions drank less, and NHW men and women and Hispanic men with hypertension drank more. There were differential associations of at-risk drinking with lifestyle behaviors and demographic indicators across race/ethnicity groups.

Except for men ages 18-49, adults without diabetes, heart conditions, hypertension, and cancer generally had higher at-risk drinking prevalence rates than adults with any of these conditions. After accounting for confounders, however, there were no differences between men ages 18-49 with hypertension, heart conditions, or cancer and men ages 18-49 with no condition. In particular, and qualitatively contrasted with their female counterparts, sexual minority (SM) status was associated with less risk for men ages 18-49. These findings are not surprising given US national studies show a “gender paradox” with respect to drinking among SM adults: While heterosexual men typically drink more than heterosexual women, the reverse is true among SM men and women [58]. Furthermore, because SM adults have greater risk of health condition diagnoses relative to their heterosexual counterparts [59, 60], and in particular cardiovascular disease among SM women from a younger age [61], it would be worthwhile to tailor drinking reduction interventions for all young adult SM women and older NHW SM women in particular.

While these results support existing work on lower alcohol consumption among samples ages 50 and older with certain health conditions [31, 34], we also show these patterns vary by race/ethnicity group. Our findings revealed NHW men and women ages 50+

and Hispanic men ages 50+ with hypertension drink *more* than their counterparts without conditions, despite previous studies having yielded no associations between hypertension and drinking outcomes [31, 34]. Given age is correlated with increased sensitivity to alcohol [37], an at-risk measure was useful for assessing alcohol consumption over more prolonged periods rather than within a single drinking occasion. Further work to explain elevated risk among identified subgroups with hypertension is warranted. We also found no drinking differences between adults with cancer and those without conditions, and thus future research to examine *types* of cancer diagnoses in which alcohol consumption could affect disease prognosis may be informative. For instance, drinking following diagnosis for certain cancer types such as breast and head and neck is associated with increased mortality [5, 62, 63] or recurrence [64].

While NHW adults ages 50+ with diabetes and heart conditions for the most part drank less than their counterparts without conditions, less drinking was not observed among other race/ethnicity groups ages 50+ with health conditions. We caution against generalizing these findings for race/ethnicity gr oups due to their exploratory nature, and so replicating these analyses would be valuable. Further, as there may be lifestyle differences between midlife (ages 50-64) and older (ages 65 and older) adults in the US [65], future work could disaggregate the 50+ age category to further understand differences in drinking with health conditions between midlife and older adulthood. Midlife and older adults may also have more than one condition and therefore greater motivation to decrease drinking [66], and excluding comorbidity from the current study is a clear limitation. Causes of comorbidity vary, and associated risk factors include lifestyle habits, genetics, and medical treatments that may increase risk of other health conditions that compound as the individual ages [67, 68].

Research on drinking after multiple diagnoses is sparse, and virtually absent for specific disease conditions. While 6.3% of our full analysis sample reported more than one health condition, 20.2% of adults 50 years and older reported at least two of our four conditions of interest. Among adults ages 50+, over a majority with each health condition also had another diagnosis (50.8% of those ages 50+ with hypertension also reported diabetes, heart conditions, or cancer; 63.3% with diabetes reported another condition; 62.7% with heart conditions reported another condition; and 56.5% with cancer reported another condition). Although the question on comorbidity is outside the scope of this study's aims, further inquiry addressing its relationship with at-risk drinking might be informative. Despite the exploratory nature of our results by race/ethnicity, racial and ethnic minority populations still carry higher burdens of risk for health conditions than NHW adults [18–21, 69, 70], and their limited accessibility to health care [24] and alcohol-related treatment [25, 26] further exacerbate existing disparities. Thus, it is critical for future work to investigate reasons at-risk drinking among racial and ethnic minority adults with health conditions.

There generally were differential associations of demographic and lifestyle correlates with at-risk drinking across race/ethnicity groups, thus highlighting the importance of examining drinking patterns among subgroups. Interestingly, better self-rated health was associated with more at-risk drinking among NHW adults ages 50 and older only. This may suggest race/ethnicity groups have varying perceptions of health literacy and problem

recognition, thereby emphasizing health education that considers group-specific factors including cultural norms [71] and prior experiences with the American healthcare system [72]. Past work has cited lack of cultural competence within health care settings for Hispanic and Asian populations [73–75]. Hence, it is critical to continue investigating whether there are indeed varied drinking patterns that could lend insight to barriers in racial and ethnic minority Americans' propensity to less frequently utilize health services [76] and to find alternate mechanisms for tailoring health messaging outside of traditional clinical settings to ameliorate their burden of alcohol-related health consequences.

There are several study limitations yet to be acknowledged. First, these data were self-reported: Health condition measurement is a limitation to the extent some respondents had undiagnosed conditions, and there is a risk of recall bias for alcohol consumption. The timing of health condition diagnoses also were unavailable for these analyses. Individuals tend to reduce drinking as they age [77], but small sample sizes by race/ethnicity in the NSDUH precluded us from further understanding differences between adults ages 50-64 and their counterparts ages 65 and older. Our findings using a broader categorization of adults ages 50 and older should be interpreted with this in mind. Third, the cross-sectional nature of the NSDUH does not allow for causal conclusions to be drawn and we were unable to assess changes in drinking over time. Finally, in addition to small samples of Asians reporting health conditions (and therefore yielding no estimates or large confidence intervals), these data precluded us from exploring patterns by Asian or Hispanic ethnicity and would benefit from further study. Despite these limitations, however, our analyses included a large representative sample of the US population to ascertain prevalence rates of at-risk drinking among demographic subgroups at high risk for health consequences.

Conclusions

The current study provides a foundation upon which to explore mechanisms for reducing at-risk alcohol consumption among US adults with a health condition diagnosis. Given elevated risk for health condition diagnoses among midlife and older adults, and coupled with increasing rates of alcohol consumption, there is an imminent need for strengthening tailored communication efforts at the community and clinical levels to mitigate at-risk drinking.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Study Population Characteristics, NSDUH 2015-2019 (N = 209,183)

Characteristics	Unweighted N (%)	Weighted % (95% CI)
At-Risk Drinking	21,511 (10.8)	9.4 (9.1-9.6)
Health Condition Status[1]		
Hypertension	25,861 (12.4)	19.6 (19.4-19.9)
Diabetes	14,355 (6.9)	10.7 (10.5-10.9)
Heart Condition	13,986 (6.7)	10.6 (10.3-10.8)
Cancer	7,557 (3.6)	6.3 (6.2-6.5)
None of 4	162,192 (77.9)	66.5 (66.2-66.8)
Sex		
Male	96,964 (46.4)	48.1 (47.8-48.5)
Female	112,219 (53.7)	51.9 (51.5-52.2)
Age Group		
18-25	67,913 (32.5)	13.8 (13.6-14.0)
26-34	42,928 (20.5)	15.9 (15.7-16.2)
35-49	55,273 (26.4)	24.7 (24.4-25.0)
50-64	24,671 (11.8)	25.3 (25.0-25.7)
65+	18,398 (8.8)	20.0 (19.6-20.6)
Race and Ethnicity		
Non-Hispanic White	126,682 (60.6)	64.3 (63.8-64.8)
Black	26,128 (12.5)	11.7 (11.4-12.1)
Hispanic	35,601 (17.0)	15.9 (15.5-16.3)
Asian	9,933 (4.8)	5.5 (5.3-5.8)
Other Race and Ethnicity	10,839 (5.2)	0.3 (0.3-0.3)
Educational Attainment		
Less than High School	26,554 (12.7)	12.4 (12.2-12.7)
High School Diploma	55,188 (26.4)	26.7 (24.4-25.0)
Some College	70,547 (33.7)	31.0 (30.7-31.3)
College or more	56,894 (27.2)	31.9 (31.5-32.4)
Sexual Minority	14,654 (7.0)	4.9 (4.8-5.1)
Marital Status		
Married/Cohabitating	86,368 (41.3)	52.0 (51.5-52.4)
Divorced/Widowed/Separated	32,91 (15.7)	19.7 (19.4-20.0)
Never Married	93,716 (44.8)	28.3 (28.0-28.7)
Employment Status		
Full-Time	109,182 (52.2)	49.6 (49.2-50.0)
Part-Time	32,918 (15.7)	13.0 (23.9-13.3)
Unemployed/Other	67,083 (32.1)	37.3 (39.9-37.7)
Family Income		
Less than $20,000	41,397 (19.8)	16.1 (15.8-16.4)
$20,000-49,999	65,037 (31.1)	29.3 (28.9-29.7)

Characteristics	Unweighted N (%)	Weighted % (95% CI)
$50,000-$74,999	32,812 (15.7)	16.0 (15.8-16.3)
$75,000 or more	69,937 (33.4)	38.6 (38.0-39.1)
Health Insurance Coverage		
Yes (Private/Public)	184,871 (88.4)	90.2 (90.0-90.4)
No	24,312 (11.6)	9.8 (9.6-10.0)
English Proficiency		
Speaks Less than Very Well	24,700 (11.8)	13.5 (13.2-13.9)
Speaks Very Well	184,483 (88.2)	86.5 (86.2-86.8)
Self-rated Health		
Fair/Poor	23,602 (11.3)	13.8 (13.5-14.1)
Good	58,485 (28.0)	29.2 (28.8-19.5)
Very Good/Excellent	127,096 (60.8)	57.0 (56.5-57.5)
BMI (M/SD)	28.0 (6.4)	28.2 (28.2-28.3)
Past Month Smoker	47,008 (44.5)	19.4 (19.1-19.7)
Past Year Other Drug Use	24,262 (11.6)	8.7 (8.5-8.9)

Note: [1]Health conditions are not mutually exclusive

Table 2.

Weighted Past-Month Prevalence and Adjusted Odds of At-Risk Drinking among US Adults by Health Condition Status among Gender and Age Subgroups, NSDUH 2015-2019 (N = 209,183)

	Men				Women			
	Weighted % (95% CI)		aOR (95% CI)		Weighted % (95% CI)		aOR[1] (95% CI)	
	All Ages							
Hypertension	9.81	(9.15-10.51)	1.29***	(1.16 - 1.45)	6.76	(6.22-7.34)	1.09	(0.97 - 1.22)
Diabetes	5.37	(4.84-5.95)	0.60***	(0.53 - 0.69)	3.25	(2.76-3.84)	0.53***	(0.44 - 0.63)
Heart Condition	7.65	(6.94-8.43)	0.89†	(0.77 - 1.02)	5.83	(5.21-6.53)	0.78**	(0.68 - 0.91)
Cancer	7.32	(6.17-8.66)	0.87	(0.72 - 1.06)	7.17	(6.33-8.12)	0.88	(0.75 - 1.04)
None of 4	10.14	(9.74-10.54)	Reference		10.41	(10.06-10.76)	Reference	
	n = 96,964				*n* = 112,219			
	Ages 18-49							
Hypertension	11.24	(10.15-12.42)	1.09	(0.94 - 1.27)	9.13	(8.29-10.03)	1.04	(0.92 - 1.19)
Diabetes	8.01	(6.64-9.64)	0.75*	(0.60 - 0.93)	5.27	(4.49-6.17)	0.59***	(0.49 - 0.71)
Heart Condition	11.47	(10.06-13.04)	1.05	(0.90 - 1.23)	9.54	(8.08-11.24)	0.84†	(0.70 - 1.01)
Cancer	10.93	(8.40-14.10)	0.98	(0.72 - 1.32)	10.51	(10.16-10.86)	0.80†	(0.63 - 1.02)
None of 4	10.40	(10.01-10.80)	Reference		11.03	(10.73-11.35)	Reference	
	n = 77,376				*n* = 88,738			
	Ages 50+							
Hypertension	9.31	(8.50-10.19)	1.40***	(1.21 - 1.63)	6.13	(5.47-6.86)	1.15†	(0.99 - 1.35)
Diabetes	4.68	(4.04-5.41)	0.56***	(0.46 - 0.67)	2.58	(1.99-3.34)	0.53***	(0.40 - 0.70)
Heart Condition	6.90	(6.10-7.78)	0.84†	(0.71 - 1.00)	4.81	(4.17-5.54)	0.77**	(0.64 - 0.93)
Cancer	6.90	(5.69-8.35)	0.85	(0.69 - 1.06)	6.59	(5.64-7.68)	0.90	(0.74 - 1.09)
None of 4	9.49	(8.77-10.27)	Reference		9.07	(8.36-9.82)	Reference	
	n = 19,588				*n* = 23,481			

Note: All regression models controlled for race/ethnicity, age, education, sexual minority status, marital status, employment, income, insurance status, English proficiency, self-rated health, BMI, smoking, other drug use, and survey year. Covariate estimates are available in Online Resource 2.

*** $p < 0.001$

** $p < 0.01$

* $p < 0.05$

† $p < 0.10$

Table 3.

Weighted Past-Month Prevalence and Adjusted Odds of At-Risk Drinking among US Adults 50+ Years by Health Condition Status among Gender and Race and Ethnicity Subgroups, NSDUH 2015-2019 (N = 209,183)

	Men				Women			
	Weighted % (95% CI)		aOR[1] (95% CI)		Weighted % (95% CI)		aOR[1] (95% CI)	
	Non-Hispanic White							
Hypertension	10.81	(9.78-11.93)	1.51*	(1.29 - 1.76)	7.40	(6.53-8.36)	1.18*	(1.00 - 1.39)
Diabetes	5.34	(4.57-6.23)	0.52*	(0.42 - 0.63)	2.81	(2.05-3.83)	0.43**	(0.31 - 0.61)
Heart Condition	7.33	(6.48-8.28)	0.81*	(0.68 - 0.97)	5.17	(4.43-6.03)	0.74**	(0.60 - 0.90)
Cancer	7.57	(6.26-9.13)	0.86	(0.69 - 1.08)	7.24	(6.18-8.47)	0.89	(0.74 - 1.08)
None of 4	11.00	(10.12-11.95)		Reference	11.07	(10.20-12.00)		Reference
	n = 14,471				*n* = 16,941			
	Black/African American							
Hypertension	4.59	(3.03-6.89)	0.81	(0.47 - 1.39)	2.71	(1.82-4.03)	0.98	(0.58 - 1.66)
Diabetes	4.49	(2.73-7.31)	0.79	(0.39 - 1.60)	1.87	(1.08-3.23)	0.56	(0.26 - 1.20)
Heart Condition	5.24	(3.07-8.82)	1.01	(0.51 - 2.00)	2.87	(1.26-6.40)	0.80	(0.30 - 2.13)
Cancer	3.65	(1.20-10.56)	0.73	(0.20 - 2.65)	1.85	(0.53-6.22)	0.72	(0.19 - 2.73)
None of 4	8.93	(6.64-11.91)		Reference	5.00	(3.64-6.82)		Reference
	n = 1,990				*n* = 2,624			
	Hispanic/Latinx							
Hypertension	5.40	(3.77-7.66)	1.79*	(1.04 - 3.08)	2.62	(1.30-5.19)	0.66	(0.29 - 1.48)
Diabetes	2.67	(1.39-5.05)	0.56	(0.24 - 1.31)	2.40	(0.99-5.72)	0.99	(0.33 - 2.97)
Heart Condition	4.06	(2.15-7.53)	0.82	(0.36 - 1.88)	5.20	(2.56-10.26)	1.68	(0.64 - 4.40)
Cancer	1.83	(0.24-12.55)	0.48	(0.07 - 3.31)	4.61	(1.38-14.35)	1.59	(0.43 - 5.83)
None of 4	4.42	(3.09-6.30)		Reference	3.52	(2.53-4.86)		Reference
	n = 1,804				*n* = 2,382			
	Asian							
Hypertension	1.83	(1.00-5.29)	1.08	(0.18 - 6.49)	4.82	(1.16-17.89)	1.92	(0.42 - 8.86)
Diabetes	2.51	(1.00-8.58)	1.19	(0.36 - 4.02)	2.87	(1.00-11.71)	1.54	(0.21 - 11.37)
Heart Condition	3.20	(1.00-15.07)	2.40	(0.44 - 13.03)	0.00	-	-	-
Cancer	3.31	(0.00-23.60)	0.33	(0.00 - 56.66)	0.00	-	-	-
None of 4	1.39	(1.00-3.70)		Reference	0.75	(0.00-4.56)		Reference
	n = 602				*n* = 655			

Note: All regression models controlled for age, education, sexual minority status, marital status, employment, income, insurance status, English proficiency, self-rated health, BMI, smoking, other drug use, and survey year. Covariate estimates are available in Online Resources 3–4.

*** $p < 0.001$

** $p < 0.01$

* $p < 0.05$

† $p < 0.10$