



Published in final edited form as:

*Addict Behav.* 2022 December ; 135: 107452. doi:10.1016/j.addbeh.2022.107452.

## Prevalence of heavy episodic drinking and alcohol use disorder diagnosis among US college students: Results from the national Healthy Minds Study

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### Abstract

Alcohol use is a common, recognized problem on college campuses. This study examined alcohol use in a national sample of US college students across 78 campuses. Using four waves of data from the Healthy Minds Study (2015–2019), we explored variations by student demographics in prevalence of recent: alcohol consumption, heavy episodic drinking (HED, 4/5 + drinks in one sitting), frequent HED (3 + HED events), and lifetime alcohol use disorder (AUD) diagnosis. Stratified analyses and logistic regression with response propensity weights were used. Two-thirds of students consumed alcohol and roughly-one-third engaged in HED in the past 2 weeks. Alcohol use was more common among students who: identified as cis women/men, bisexual or gay/lesbian/queer, white non-Hispanic, lived in Greek housing or off-campus, were not first generation, or those not rating religion as important. Prevalence of HED among recent drinkers was high (56.7%) but varied by gender identity, race-ethnicity, living situation, and religiosity. In addition, higher HED prevalence was reported among: international, undergraduate, and underage (under 21) students. There was little variation in HED by sexual orientation identity or first generation status among recent drinkers. In a sub-sample of students engaging in frequent HED, AUD diagnosis was uncommon (1.4%) and less likely among students identifying as: cis women/men, heterosexual, racial-ethnic minorities (particularly Asian/Asian American or Pacific Islander), international, religious, or living in Greek housing. Alcohol use continues to be a part of college life, while screening and treatment remains rare. There are opportunities for improved programming and outreach acknowledging college student diversity.

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#### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### CRedit authorship contribution statement

**Lynsie R. Ranker:** Conceptualization, Methodology, Formal analysis, Writing – original draft. **Sarah K. Lipson:** Conceptualization, Methodology, Writing – review & editing, Supervision.

## Keywords

College students; Alcohol use; Heavy episodic drinking; Diagnosis; Treatment; Prevalence

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## 1. Introduction

Alcohol use and misuse is a widely recognized problem on college campuses. In the United States (US), an estimated 50% of full-time college students drank in the past month, with approximately 40% engaging in heavy episodic drinking (HED, 4/5 drinks in a single setting). (Dawson et al., 2004; White and Hingson, 2013; Schulenberg et al., 2017; Substance Abuse and Mental Health Services, 2014).

Alcohol use in college is associated with a broad range of personal and societal consequences. HED may disrupt students' educational goals by reducing time spent studying, (Wolaver, 2002) reducing student engagement, (Porter and Pryor, 2007) decreasing academic performance, (White and Hingson, 2013; Singleton and Wolfson, 2009) and has been associated with discontinuous enrollment (Arria et al., 2013) as well as decreased likelihood of graduate school enrollment. (Arria et al., 2019) Yet, the consequences go beyond academics. Alcohol use may increase risk for unintentional injuries such as alcohol-related traffic fatalities and violence, including experiences of intimate partner violence, sexual assault, and suicide. (White and Hingson, 2013; National Institute on Alcohol Abuse and Alcoholism, 2021) Additionally, other college students may experience secondhand consequences from drinking peers including reduced wellbeing, sleep disruption, and assaults. (Casswell et al., 2011; Livingston et al., 2010; Wechsler and Nelson, 2008) There are also consequences that extend beyond the college years. Drinking heavily in college is associated with increased likelihood of experiencing alcohol use disorder (AUD) and alcohol-related problems later in adulthood. (Jennison, 2004; O'Neill et al., 2001) In addition to the health consequences, heavy use is associated with delays in developmental milestones and may limit occupational and financial success. (Jennison, 2004).

Colleges have made efforts to address alcohol use and alcohol-related harms. Prior research has identified a variety of factors which contribute to heavy drinking patterns in college including alcohol accessibility, drinking norms, and involvement in organizations traditionally associated with drinking (i.e., fraternities and sororities, collegiate athletics). (White and Hingson, 2013) Many programs and interventions, such as online modules for incoming students (e.g., AlcoholEdu<sup>®</sup> for College (CollegeAim, 2022), brief skills and feedback interventions (e.g., eCHECKUP TO GO (CollegeAim, 2022), AUD screening days, and alternative (non-drinking) weekend programming have been developed to reduce campus drinking overall or among "high-risk" groups including cisgender men and those involved in Greek life. (National Institute on Alcohol Abuse and Alcoholism, 2021) Evidence suggests HED may be as high or higher among often overlooked but growing student populations (e.g., sexual minority, (Coulter et al., 2016) gender minority, (Tupler et al., 2017) first generation (House et al., 2020; Kuhl and Burrington, 2020) students). Yet, few studies have examined these subgroups within a large, multi-school, population-based sample.

Access to substance use prevention and treatment are critical for students engaging in HED and experiencing related consequences. Screening and other campus programming offer opportunities to identify students who may benefit from services during this high-risk period. Yet, alcohol screening remains rare on college campuses, with one study finding less than half of 4-year colleges and universities had formal screening processes in place. (Winters et al., 2011) While prior work has suggested low treatment engagement among students, with variations in engagement by demographics, (Pedrelli et al., 2016; Cranford et al., 2009; Wallenstein et al., 2007) few have specifically examined alcohol-related diagnoses.

There are over 20 million students enrolled in US post-secondary education. (Hussar et al., 2020) It is critical to understand the distribution of drinking among students as well as diagnosis patterns during the psychosocially significant and epidemiologically vulnerable college years. As the first known study of its kind, the aims of the current research are twofold. First, to compare prevalence of alcohol use, HED, and alcohol-related substance use diagnosis by student demographic characteristics. Second, to compare prevalence of HED and alcohol-related diagnoses among students who drink. This research fills important gaps in understanding of alcohol use in college settings. First, by using large-scale, population-level data to examine demographic variations. Second, by looking at prevalence of alcohol-related diagnoses specifically. The findings hold implications for advancing equity around treatment and prevention of alcohol use disorder in diverse college student populations.

## 2. Methods

### 2.1. Study design and data collection

The Healthy Minds Study (HMS) is a web-based survey of undergraduate and graduate students, conducted annually. (Healthy Minds Study, 2020) The current study analyzed four waves of HMS data from 2015 to 2019. The survey contained questions about demographics, mental health, health-related behaviors (including measures of substance use), and service usage/diagnoses. Recruiting and administration methods of HMS have been reported on previously. (Healthy Minds Study, 2020; Lipson et al., 2018) In brief, at each participating institution, a random sample of 4,000 students from the full population of degree-seeking students were invited to participate. For smaller institutions, all degree-seeking students were contacted. Participating institutions vary from year-to-year. While it is possible for an individual student to participate across multiple years, the likelihood of this is low given the random sampling to select participants and the low number of schools participating more than once in a four-year period. In order to participate in the survey, students had to be 18 years of age or older. Invitations including a survey link were sent to students via email. The link included an informed consent page which students were required to review and agree to before entering the survey. All invited students were eligible to win one of several prizes (total cash value of prizes offered was \$2,000 annually). HMS received institutional review board approval from all campuses.

Data were collected via Qualtrics. Response rates were approximately 20% across annual waves of data collection. Sample probability weights were constructed to account for

potential differences between responders and non-responders. (Lipson et al., 2018; Lipson et al., 2021) Weights incorporated administrative data from participating institutions on sex, race-ethnicity, academic degree/level, and grade point average of currently enrolled students. Each participant was assigned a weight equal to one divided by the probability of response.

## 2.2. Analytic sample

For the current analyses, individuals had to be between the ages of 18 and 29 with complete information on demographics, alcohol use in the past 2 weeks, and service use. This age range was selected to reflect a focus on alcohol use in young and early adulthood. Research has consistently shown that people tend to drink heaviest during this time. (National Institute of Alcohol Abuse and Alcoholism, 2006).

## 2.3. Demographic variables

All variables were self-reported by students via the web-based survey. Key demographic variables included age, gender identity (male, female, trans male/trans man, trans female/trans woman, genderqueer/gender non-conforming, self-identify), sexual orientation identity (heterosexual, bisexual, homosexual (gay/lesbian/queer), questioning, other), and race-ethnicity (American-Indian/Native American/Alaskan Native, Asian/Asian American or Pacific Islander, Black/African American, Hispanic/Latinx, Middle Eastern/Arab/Arab American, other, multiple races). In addition, we examined first-generation status (no parent(s)/guardian(s) completed a Bachelor's degree), international status (not a citizen or US permanent resident), undergraduate status (actively completing an Associate's/Bachelor's degree), importance of religion in their life (important versus not important/neutral), being of legal drinking age (21+), and current living situation (on-campus housing residence hall, on-campus housing apartment, fraternity or sorority house, on or off-campus co-operative housing, off-campus non-university housing, with parents/relatives, other).

## 2.4. Alcohol use and substance use diagnosis variables

*Any alcohol use in the past two weeks* was determined by responses (yes/no) to the question “Over the past 2 weeks, did you drink any alcohol?”.

*Heavy episodic drinking* (HED) was defined as consuming 4+/5+ drinks in a single setting in the past 2 weeks based on response to the following question: “Over the past 2 weeks how many times did you have [\*] or more alcoholic drinks in a row (1 drink is a can of beer, a glass of wine, a wine cooler, a shot of liquor, or a mixed drink)?” Where [\*] was replaced with 5+ for male students, 4+ for female, and 4 or 5+ for all other students. We also explored HED 3 or more times in the past 2 weeks—an approximation of the heavy alcohol use definition used by the Substance Abuse and Mental Health Services Association (SAMHSA; binge drinking 5 or more times in the past 30 days). (NSDUH, 2019).

*History of alcohol-related substance use disorder diagnosis* (hereon referred to as AUD) was determined via a participant responding they had been diagnosed with “alcohol abuse or other alcohol-related disorder” as part of a broader question about mental health-related diagnoses: “Have you ever been diagnosed with any of the following conditions by a health professional (e.g., primary care doctor, psychiatrist, psychologist, etc.)?”.

## 2.5. Statistical analysis

We first examined the prevalence of each outcome in the sample overall and compared prevalence by demographics via stratified analyses. Next, we focused on a sub-sample of students who drank any alcohol in the past 2 weeks assessing: prevalence of HED, frequent HED, and AUD diagnosis overall and stratified by demographics. We ran separate unadjusted and age-adjusted logistic regressions for each of the demographic variables and outcomes of interest. Odds ratios were conceptually reported as prevalence ratios (PR) and corresponding 95% confidence intervals (CIs) were generated. All analyses used response weights to account for non-response bias.

## 3. Results

A total of 168,297 students from 78 US campuses met criteria for inclusion in the analytic sample.

The average age was 21.1 (standard error = 0.06). The sample was evenly split between being of legal drinking age (50.4%) and underage (49.6%). Over half (56.2%) of respondents identified as female, with 2.7% identifying as transgender, genderqueer/non-conforming, or preferring to self-identify (Table 1). Eighty-one percent of students identified as heterosexual, with 8.8% identifying as bisexual, and 5.8% identifying as gay, lesbian, or queer. Questioning or identifying with another sexual orientation identity (i.e. pansexual, asexual) represented 4.1% of the sample. Participating students were racially and ethnically diverse: 10.9% Asian/Asian American or Pacific Islander, 10.3% Hispanic/Latinx, 6.0% Black/African American, and 5.5% identified as multiple races. White, non-Hispanic was the largest racial and ethnic group (64.6%). Nearly-one third (32.0%) of students identified as first generation, and 15.4% reported international student status. Over 80% (83.7%) were pursuing an undergraduate degree.

### 3.1. Alcohol use and HED

Overall, 61.2% of students reported consuming alcohol in the past two weeks, and 34.7% reported HED (Table 2). Among students who drank in the past two weeks, 56.7% reported HED at least once, and 19.8% reported 3 or more HED events in the past 2 weeks.

Alcohol use prevalence varied by gender identity. Gender minority status (those identifying as transgender, genderqueer or gender non-conforming, or self-identifying) was associated with lower likelihood of past 2-week alcohol use (Table 3; age-adjusted PR (aPR): 0.69, 95% CI 0.61, 0.79) or HED compared to cis females (aPR: 0.65, 95% CI 0.56, 0.76).

Among the subsample of students who consumed alcohol in the past 2 weeks, gender minorities were only slightly less likely to have engaged in HED 3 or more times in the past 2 weeks compared to cis females (Table 4: 16.2% versus 17.7%, respectively; aPR 0.90 95% CI 0.72, 1.11). Among those who drank in the past 2 weeks, cis males reported the highest prevalence of frequent HED (22.9%), which was significantly higher than cis females (aPR = 1.40, 95% CI 1.29, 1.51).

There were also variations in drinking prevalence by sexual orientation identity. Across the full sample, students who identified as bisexual had a higher prevalence of drinking compared to heterosexual peers (aPR 1.16, 95% CI 1.08, 1.25) as did students who identified as gay, lesbian, or queer (aPR 1.11, 95% CI 1.01, 1.21). Students who identified as questioning or who self-identified their sexual orientation identity, had the lowest prevalence of past 2 week drinking. When looking specifically among those who drank in the past 2 weeks, there was less variation in any HED and frequent HED by sexual orientation identity (Table 4).

There was also variation in drinking prevalence by race-ethnicity. Students identifying as white had the highest prevalence of drinking (66.3%), while those identifying as Middle Eastern/Arab/Arab American had the lowest (37.8%; Table 3). This pattern continued when looking at any HED.

When looking only among students who drank in the past two weeks (Table 4), the highest prevalence of HED was reported among students identifying as American Indian, Native American, Alaskan Native (64.5%; aPR: 1.45, 95% CI 0.88, 2.16 compared to white) and those identifying as Hispanic/Latinx (59.8%; aPR: 1.12, 95% CI 0.98, 1.29 compared to white), while the lowest prevalence was reported by Asian/Asian Americans or Pacific Islanders (50.2%; aPR: 0.79, 95% CI 0.68, 0.91 compared to white). Frequent HED among those who drank recently (Table 4) was similar across groups with the exception of lower prevalence among Asian/Asian American or Pacific Islander and Middle Eastern/Arab/Arab American students.

Campus living situation was also associated with variations in recent alcohol use in the overall population (Table 3). Relative to on-campus residence halls, those who lived in fraternity/sorority houses, co-op housing, on-campus apartments, and off-campus tended to have higher drinking prevalence. Those living with family had the lowest prevalence of drinking compared with other living situations.

Among those who drank in the past 2 weeks, living in an on-campus residence hall or in a fraternity/sorority house was associated with higher prevalence of HED, with residence in Greek housing associated with the highest prevalence (Table 4; aPR: 1.61, 95% CI 1.06, 2.45, relative to on-campus residence halls).

Additional demographic characteristics were associated with variation in any drinking and HED prevalence both overall and among past 2-week drinkers. While being a first generation student was associated with lower likelihood of drinking (Table 3; 54.5% and 64.4%, respectively), those who drank in the past 2 weeks (Table 4) were just as likely as non-first generation students to report any HED in the past 2 weeks (both 56.7%), but were slightly less likely to have engaged in frequent HED (18.0% versus 20.5%, respectively). International student status was associated with slightly higher HED prevalence overall (Table 3) and among recent drinkers (Table 4). Religiosity may be protective for drinking and HED overall (Table 3), and among the sub-sample of recent drinkers (Table 4). Among recent drinkers, undergraduate students (compared to graduate students) reported higher prevalence of HED and nearly-two times the prevalence of frequent HED (21.4% vs 12.6%;

Table 4). Finally, being underage was associated with lower prevalence of drinking overall (Table 3), but among those who drank in the past 2 weeks those who were under legal drinking age had higher prevalence of HED compared with those 21 years of age and older (Table 4).

### 3.2. Prior AUD diagnosis

Lifetime AUD diagnosis was rare (0.6%) and overall prevalence varied by demographics (Table 3). Focusing on those who reported frequent HED in the past two weeks—a sample that might be indicated for treatment—prevalence was higher at 1.4% (Table 4). Among this subgroup, gender minority status was associated with higher prevalence of AUD diagnosis compared to cis females (aPR 3.64, 95% CI 1.73, 7.69). Identifying as a cis male was associated with lower prevalence of diagnosis compared to cis females (aPR = 0.71, 95% CI 0.50, 1.02). There was also variation in diagnosis by sexual orientation identity, with heterosexual students having the lowest prevalence of prior diagnosis. Prevalence of diagnosis by race-ethnicity was lower among Asian/Asian American, Black/African American, Hispanic/Latinx, Middle Eastern/Arab/Arab American, and American Indian/Native American/Alaska Native students compared to white students with frequent HED (note a PR could not be generated for American Indian/Native American/Alaska Native students as no diagnoses were reported).

In addition, international student status, religiosity, pursuing an undergraduate degree, and living in a fraternity/sorority house were associated with decreased prevalence of diagnosis. Higher prevalence of diagnosis was seen for off-campus university housing, living with family and other living situations compared to on-campus housing.

### 3.3. Sensitivity analyses

Overall, results remained consistent when comparing unadjusted and age-adjusted results (Appendix A Tables A1–A2) and when restricting the sample to only those who were under age 21 (Appendix A Tables A3–A4).

## 4. Discussion

Using four waves of survey data from the Healthy Minds Study (2015–2019), we explored prevalence of alcohol consumption, frequent HED, and alcohol-related substance use disorder diagnoses among students aged 18–29 across 78 US campuses. These analyses add to our understanding of the distribution of alcohol use among college students, and the large sample size allowed us to explore the diversity of students engaging in alcohol use. Nearly-two-thirds of the sample reported consuming alcohol in the past two weeks, and HED (4/5+ drinks in one sitting) was reported by roughly-one-third of students. While prior diagnosis of AUD was rare, there were variations in diagnosis prevalence by demographics. Results are a reminder that alcohol use, and particularly HED, remains high on college campuses while screening and treatment for AUD remains rare.

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Appendix A. Supplementary data  
Supplementary data to this article can be found online at <https://doi.org/10.1016/j.addbeh.2022.107452>.

In this sample, prevalence of any alcohol use in the past 2 weeks varied by a broad range of demographic factors including: gender identity, sexual orientation identity, race-ethnicity, first generation status, international status, religiosity, living situation, and degree being pursued. Our results are consistent with prior work including the Monitoring the Future survey (Schulenberg et al., 2017) and SAMHSA's National Survey on Drug Use and Health. (NSDUH, 2019) Overall, non-gender minority, white, and non-first generation students continue to be most likely to consume alcohol during college.

However, there are additional subgroups of students who may be drinking frequently. First, cis women had similar drinking prevalence compared to cis men. This confirms prior work suggesting the drinking gender-gap is closing. (Slade et al., 2016) In addition, students who identified as bisexual or gay, lesbian or queer were more likely to report drinking compared to heterosexual students. This finding is consistent with minority stress theory, as well as prior work in smaller college student samples. (Coulter et al., 2016; Kerr et al., 2014) Students identifying as sexual minorities likely experience higher levels of discrimination (both overt and covert) and drinking may be a way of coping. Current college-based alcohol programming and screening outreach which tend to be either non-specific or focus on other high-risk groups (i. e., those involved in Greek life or college athletics), (National Institute on Alcohol Abuse and Alcoholism, 2021) likely miss opportunities to engage sexual minority students.

Our findings among recent drinkers are an important addition to the literature. The large sample size allowed us to examine variations in HED by student demographics. While we identified potentially informative demographic differences in HED prevalence among recent drinkers, the critical finding is that any HED remained common (~50%) and 3 or more HED events hovered around 15–20% across student demographics. Although evidence suggests alcohol use is decreasing in younger populations, (Keyes and Miech, 2013) heavy use among college students who drink remains an issue regardless of demographics.

Consistent with prior work, we found HED was more common among students involved in Greek life, undergraduates, and underage students, (White and Hingson, 2013; National Institute on Alcohol Abuse and Alcoholism, 2021) and that religiosity was associated with lower likelihood of HED. (Galen and Religiosity, 2015) Surprisingly, sexual minority students who drank recently reported similar levels of HED compared to heterosexual students and HED was less common among gender minority students (compared to cis men). However, we were unable to disaggregate gay, lesbian, and queer sexual orientation identities due to question wording and gender minority identities (e.g., transgender, non-binary) due to small sample sizes. It is possible that further disaggregation would reveal HED heterogeneity seen in prior studies (Coulter et al., 2016; Tupler et al., 2017) and in our overall drinking results.

Among recent drinkers, there were variations in HED by race-ethnicity. Students identifying as American Indian/Native American/Alaskan Native and Hispanic/Latinx had the highest prevalence of HED. These findings underscore the need to invest in programs and support that are culturally relevant and that acknowledge how experiences related to racial and ethnic discrimination may impact drinking and other coping behaviors.



While HED prevalence among first generation students was similar to non-first generation students, prior work suggests this may be a sub-group in need of additional support. (House et al., 2020; Kuhl and Burrington, 2020) We also found that international students who drink may engage in higher levels of frequent HED. Both first generation and international students may face challenges adjusting or finding community in college. Drinking may be a way of forming community and/or a coping mechanism for stress. Colleges should consider harm reduction interventions and outreach among these sub-populations, particularly as they settle into campus life.

Across the sample, prior AUD diagnosis was rare and remained rare when looking among those reporting frequent HED—a group that could be considered high risk. Our results are consistent with prior work conducted within HMS showing low treatment prevalence and variations by student demographics (Pedrelli et al., 2016; Lipson et al., 2018; Lipson et al., 2021) and studies that have examined screening practices on college campuses. (Winters et al., 2011; Wallenstein et al., 2007) We found prior AUD diagnosis was more common among students identifying as a gender or sexual minority, which may reflect generally higher service utilization. (Liu et al., 2019;36(1):8.) Lower diagnoses among those under age 21 demonstrate need for earlier screening and referrals. The variations by other student characteristics (i.e., race-ethnicity, living situation, international status) may reflect barriers to access. For example, racial and ethnic minorities face additional barriers, such as stigma and lack of culturally sensitive services. (Liu et al., 2019;36 (1):8.; McGuire and Miranda, 2017) Efforts to foster a diverse mental health workforce and engage student groups and organizations to assist with education and screening may help reach students experiencing access barriers.

This study has several strengths and limitations. One strength is that HMS is the largest, most comprehensive national survey of college student mental health. It provides a population-level perspective, compared to studies relying on clinical samples. While the study is not reflective of all students enrolled in US postsecondary education, the samples represent their institutions and HMS includes a diversity of institutional types. In addition, the large sample allows examination of smaller, often overlook demographic groups. However, the study still encountered small samples sizes. In particular, race-ethnicity results should be interpreted as preliminary. Another limitation is that the study is cross-sectional, and we relied on a metric for AUD that was limited to “ever” diagnosis and was non-specific (asking only about “alcohol abuse or other alcohol-related disorders”). Certain factors like living situation and degree enrollment may be related to drinking and AUD history. These temporality issues cannot be addressed by the currently available data. Another limitation is that, due to the descriptive nature of the research, we did not explore root causes, potential modifiers (i.e., safety/enforcement concerns, stigma/discrimination, treatment access/retention) or potential protective factors (i.e., social support, campus diversity) of the observed variations. Future research should explore these mechanisms. Finally, we examined sub-groups defined by single identities; future research should examine these questions with an intersectional approach. In spite of these limitations, this study fills important knowledge gaps as there remains little research on this topic among college students at a population-level.

Our findings demonstrate that alcohol use remains a common part of the college experience for many students. Screening and programming to reduce alcohol use should account for the diversity of students who may be engaging in alcohol use. This includes screening and programming specifically developed to reach gender minority, sexual orientation minority, and racial and ethnic minority students. Also, practitioners should consider outreach efforts for international and first generation students. Investing in and offering students treatment options and providers that reflect student diversity may help to assist in prevention, early identification, and treatment of AUD.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Funding

SKL is supported by a career development award from the National Institute of Mental Health, Bethesda, MD [K01MH121515, 2020-24] and the William T. Grant Foundation Scholars Program, New York, NY [2020-25].

## Abbreviations:

<b>aPR</b>	age-adjusted prevalence ratio
<b>AUD</b>	alcohol use disorder
<b>CI</b>	confidence interval
<b>HED</b>	heavy episodic drinking
<b>HMS</b>	Healthy Minds Study
<b>SAMHSA</b>	Substance Abuse and Mental Health Services Administration
<b>US</b>	United States

## References

- Arria AM, Caldeira KM, Vincent KB, Winick ER, Baron RA, & O’Grady KE (2013). Discontinuous College Enrollment: Associations With Substance Use and Mental Health. *Psychiatric Ser.*, 64(2), 165–172. 10.1176/APPL.PS.201200106
- Arria AM, Allen HK, Caldeira KM, Vincent KB, & O’Grady KE (2019). Excessive drinking and drug use during college: Prospective associations with graduate school plans and attendance. *Journal of American College Health*, 68(2). 10.1080/07448481.2018.1535494
- Casswell S, You RQ, & Huckle T (2011). Alcohol’s harm to others: Reduced wellbeing and health status for those with heavy drinkers in their lives. *Addiction*, 106(6), 1087–1094. 10.1111/j.1360-0443.2011.03361.x [PubMed: 21226881]
- CollegeAIM. (2022). Introduction Accessed July 8, 2022. <https://www.collegedrinkingprevention.gov/CollegeAIM/Introduction/default.aspx>.
- Coulter RWS, Marzell M, Saltz R, Stall R, & Mair C (2016). Sexual-orientation differences in drinking patterns and use of drinking contexts among college students. *Drug and Alcohol Dependence*, 160, 197–204. 10.1016/j.drugalcdep.2016.01.006 [PubMed: 26827292]
- Cranford JA, Eisenberg D, & Serras AM (2009). Substance use behaviors, mental health problems, and use of mental health services in a probability sample of college students. *Addictive Behaviors*, 34(2), 134–145. 10.1016/j.addbeh.2008.09.004 [PubMed: 18851897]

- Dawson DA, Grant BF, Stinson FS, & Chou PS (2004). Another look at heavy episodic drinking and alcohol use disorders among college and noncollege youth. *Journal of Studies on Alcohol and Drugs*, 65(4), 477–489. 10.15288/jsa.2004.65.477
- Galen LW, Rogers WM. Religiosity, alcohol expectancies, drinking motives and their interaction in the prediction of drinking among college students. <http://dx.doi.org/10.15288/jsa200465469>. 2015;65(4):469–476. doi:10.15288/JSA.2004.65.469.
- Healthy Minds Study. (2020). Healthy Minds Network Ann Arbor, MI Accessed April 9, 2021. <https://healthymindsnetwork.org/hms/>.
- House LA, Neal C, & Kolb J (2020). Supporting the Mental Health Needs of First Generation College Students. *Journal of College Student Psychotherapy*, 34(2), 157–167. 10.1080/87568225.2019.1578940
- Hussar B(NCES), Zhang J, Hein S, et al. The Condition of Education 2020.; 2020. <https://nces.ed.gov/programs/coe/>.
- Jennison KM (2004). The Short-Term Effects and Unintended Long-Term Consequences of Binge Drinking in College: A 10-Year Follow-Up Study. *The American Journal of Drug and Alcohol Abuse*, 30(3), 659–684. 10.1081/ADA-200032331 [PubMed: 15540499]
- Kerr DL, Ding K, & Chaya J (2014). Substance use of lesbian, gay, bisexual and heterosexual college students. *American Journal of Health Behavior*, 38(6), 951–962. 10.5993/AJHB.38.6.17 [PubMed: 25207520]
- Keyes K, & Miech R (2013). Age, period, and cohort effects in heavy episodic drinking in the US from 1985 to 2009. *Drug and Alcohol Dependence*, 132(1–2), 140–148. 10.1016/J.DRUGALCDEP.2013.01.019 [PubMed: 23433898]
- Kuhl DC, & Burrington LA (2020). Heavy Episodic Drinking in Early Adulthood: How Parents' Education Contextualizes the Effects of College Status. *Sociological Focus.*, 53(1), 29–52. 10.1080/00380237.2019.1703864 [PubMed: 32148337]
- Lipson SK, Kern A, Eisenberg D, & Breland-Noble AM (2018). Mental Health Disparities Among College Students of Color. *Journal of Adolescent Health*, 63(3), 348–356. 10.1016/j.jadohealth.2018.04.014
- Lipson SK, Phillips MV, Winquist N, Eisenberg D, Lattie EG. Mental Health Conditions Among Community College Students: A National Study of Prevalence and Use of Treatment Services. *Psychiatric Services* Published online March 4, 2021:appi. ps.2020004. doi:10.1176/appi.ps.202000437.
- Liu CH, Stevens C, Wong SHM, Yasui M, & Chen JA (2019). The prevalence and predictors of mental health diagnoses and suicide among U.S. college students: Implications for addressing disparities in service use. *Depression and anxiety*, 36(1), 8. 10.1002/DA.22830 [PubMed: 30188598]
- Livingston M, Wilkinson C, & Laslett AM (2010). Impact of heavy drinkers on others' health and well-being. *Journal of Studies on Alcohol and Drugs*, 71(5), 778–785. 10.15288/jsad.2010.71.778 [PubMed: 20731985]
- McGuire TG, Miranda J. New Evidence Regarding Racial And Ethnic Disparities In Mental Health: Policy Implications. <https://doi.org/10.1377/hlthaff.2017.27.2.393>. 2017;27(2):393–403. doi:10.1377/HLTHAFF.27.2.393.
- National Institute of Alcohol Abuse and Alcoholism. (2006). Young Adult Drinking. *Alcohol Alert*. <https://pubs.niaaa.nih.gov/publications/aa68/aa68.htm>.
- National Institute on Alcohol Abuse and Alcoholism. (2021). College Drinking Accessed June 20, 2022. <https://www.niaaa.nih.gov/publications/brochures-and-fact-sheets/college-drinking>.
- NSDUH. (2019). Annual National Report, CBHSQ Data Accessed April 12, 2021. <https://www.samhsa.gov/data/report/2019-nsduh-annual-national-report>.
- O'Neill SE, Parra GR, & Sher KJ (2001). Clinical relevance of heavy drinking during the college years: Cross-sectional and prospective perspectives. *Psychology of Addictive Behaviors*, 15(4), 350–359. 10.1037/0893-164X.15.4.350 [PubMed: 11767268]
- Pedrelli P, Borsari B, Lipson SK, Heinze JE, & Eisenberg D (2016). Gender Differences in the Relationships Among Major Depressive Disorder, Heavy Alcohol Use, and Mental Health Treatment Engagement Among College Students. *Journal of Studies on Alcohol and Drugs.*, 77(4), 620–628. 10.15288/jsad.2016.77.620 [PubMed: 27340967]

- Porter SR, & Pryor J (2007). The effects of heavy episodic alcohol use on student engagement, academic performance, and time use. *Journal of College Student Development*, 48(4), 455–467. 10.1353/csd.2007.0042
- Schulenberg JE, Johnston LD, O'Malley PM, Bachman JG, Miech R, Patrick M. *Monitoring the Future: National Survey Results on Drug Use, 1975–2016: Volume 2, College Students and Adults Ages 19–55.*; 2017. [https://scholar.google.com/scholar?cluster=4371456172197435689&hl=en&as\\_sdt=0,22](https://scholar.google.com/scholar?cluster=4371456172197435689&hl=en&as_sdt=0,22).
- Singleton RA, & Wolfson AR (2009). Alcohol consumption, sleep, and academic performance among college students. *Journal of Studies on Alcohol and Drugs*, 70(3), 355–363. 10.15288/jsad.2009.70.355 [PubMed: 19371486]
- Slade T, Chapman C, Swift W, Keyes K, Tonks Z, & Teesson M (2016). Birth cohort trends in the global epidemiology of alcohol use and alcohol-related harms in men and women: Systematic review and metaregression. *BMJ Open*, 6(10), Article e011827. 10.1136/BMJOPEN-2016-011827
- Substance Abuse and Mental Health Services Administration. (2014). Results from the 2013 National Survey on Drug Use and Health: Summary of National Findings. <https://www.samhsa.gov/data/sites/default/files/NSDUHresultsPDFWHTML2013/Web/NSDUHresults2013.pdf>.
- Tupler LA, Zapp D, DeJong W, et al. (2017). Alcohol-Related Blackouts, Negative Alcohol-Related Consequences, and Motivations for Drinking Reported by Newly Matriculating Transgender College Students. *Alcoholism: Clinical and Experimental Research*, 41(5), 1012–1023. 10.1111/acer.13358 [PubMed: 28324915]
- Wallenstein GV, Pigeon S, Kopans B, Jacobs DG, & Aseltine R (2007). Results of national alcohol screening day: College demographics, clinical characteristics, and comparison with online screening. *Journal of American College Health*, 55(6), 341–350. 10.3200/JACH.55.6.341-350 [PubMed: 17517546]
- Wechsler H, & Nelson TF (2008). What we have learned from the Harvard School of Public Health College Alcohol Study: Focusing attention on College Student Alcohol Consumption and the environmental conditions that promote it. *Journal of Studies on Alcohol and Drugs*, 69(4), 481–490. 10.15288/jsad.2008.69.481 [PubMed: 18612562]
- White A, & Hingson R (2013). The burden of alcohol use: Excessive alcohol consumption and related consequences among college students. *Alcohol Research: Current Reviews*, 35(2).
- Winters KC, Toomey T, Nelson TF, Erickson D, Lenk K, & Miazga M (2011). Screening for alcohol problems among 4-year colleges and universities. *Journal of American College Health*, 59(5), 350–357. 10.1080/07448481.2010.509380 [PubMed: 21500052]
- Wolaver AM (2002). Effects of Heavy Drinking in College on Study Effort, Grade Point Average and Major Choice. *Contemporary Economic Policy*, 20(4), 415–428. 10.1093/cep/20.4.415

**Table 1**

Sample characteristics among US college students participating in the Healthy Minds Study (2015–2019) ages 18–29.

	<b>Total (n = 168,297)</b>	
	<b>Weighted %</b>	<b>Unweighted n</b>
Gender identity		
Cis female	56.2	111,987
Cis male	41.1	52,558
Trans male/Trans man	0.4	505
Trans female/Trans woman	0.1	149
Genderqueer/Gender non-conforming	1.5	2,117
Self-identify	0.7	981
Sexual orientation identity		
Heterosexual	81.3	138,961
Bisexual	8.8	14,243
Gay / Lesbian / Queer	5.8	8,574
Questioning/Other	4.1	6,519
Racial and Ethnic identity		
American Indian, Native American, or Alaskan Native <sup>a</sup>	0.27	396
Asian/Asian American or Pacific Islander <sup>a</sup>	10.9	21,286
Black/African American <sup>a</sup>	6.0	7,303
Hispanic/Latinx	10.3	16,618
Middle Eastern, Arab, or Arab American <sup>a</sup>	1.2	1,993
Multiple races <sup>a</sup>	5.5	9,202
Other <sup>a</sup>	1.3	1,867
White <sup>a</sup>	64.6	109,632
First generation	32.0	47,815
International student	15.4	32,478
Religion is important	36.6	60,072
Undergraduate degree program	83.7	131,402
Living situation		
On-campus, residence hall	33.7	52,721
On-campus, apartment	8.1	14,717
Fraternity/Sorority house	1.5	2,371
On or off-campus co-op housing	1.5	2,565
Off-campus, non-university	36.7	72,170
With family	17.1	21,716
Other	1.4	2,037
Under legal drinking age (under age 21)	49.6	79,495

<sup>a</sup>Non-Hispanic.

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**Table 2**

Current alcohol use and prior alcohol use related diagnoses among US college students participating in the Healthy Minds Study (2015–2019) ages 18–29.

	<b>Total (n = 168,297)</b>		<b>Among those who reported drinking in the past 2 weeks (n = 107,197)</b>	
	<b>Weighted %</b>	<b>Unweighted n</b>	<b>Weighted %</b>	<b>Unweighted n</b>
Any Alcohol (past 2 weeks)				
Yes	61.2	107,197		
No	38.8	61,100	–	–
Any HED (past 2 weeks)				
Yes	34.7	59,341	56.7	59,341
No	65.3	108,956	43.3	47,856
3 or more HED events (past 2 weeks)				
Yes	12.1	19,915	19.8	19,915
No	87.9	148,382	80.2	87,282
Alcohol use disorder or related alcohol diagnosis (ever)				
Yes	0.6	877	0.6	572
No	99.4	167,420	99.4	106,625

**Table 3**

Alcohol use, binge drinking, and alcohol use disorder diagnosis among US college students, variations by demographics (n = 168,297).

	<b>n</b>	<b>%</b>	<b>Any Alcohol Use (past 2 weeks)</b>	<b>aPR<sup>b</sup> (95 % CI)</b>	<b>%</b>	<b>Any Heavy Episodic Drinking (past 2 weeks)<sup>d</sup></b>	<b>aPR<sup>b</sup> (95 % CI)</b>	<b>%</b>	<b>Alcohol use disorder diagnosis (ever)</b>	<b>aPR<sup>b</sup> (95 % CI)</b>
<b>Gender identity</b>										
Cis female	111,987	61.1	Ref	Ref	34.3	Ref	Ref	0.5	Ref	
Cis male	52,558	62.0	1.02 (0.97, 1.07)		35.9	1.07 (1.00, 1.15)		0.7	1.24 (0.97, 1.57)	
Gender minority <sup>c</sup>	3,752	51.8	0.69 (0.61, 0.79)		25.3	0.65 (0.56, 0.76)		1.9	3.94 (2.58, 6.01)	
<b>Sexual orientation identity</b>										
Heterosexual	138,961	61.3	Ref	Ref	34.9	Ref	Ref	0.5	Ref	
Bisexual	14,243	63.6	1.16 (1.08, 1.25)		36.3	1.08 (0.98, 1.18)		1.2	2.78 (2.11, 3.68)	
Gay / Lesbian / Queer	8,574	63.6	1.11 (1.01, 1.21)		35.3	1.02 (0.91, 1.13)		1.3	2.62 (1.94, 3.53)	
Questioning/Other	6,519	51.2	0.69 (0.63, 0.76)		27.3	0.71 (0.63, 0.80)		0.9	2.08 (1.43, 3.03)	
<b>Racial and ethnic identity</b>										
American Indian, Native	396	52.1	0.49 (0.35, 0.67)		33.6	0.80 (0.61, 1.05)		1.0	1.16 (0.31, 4.41)	
American, Alaskan Native <sup>d</sup> Asian/American or	21,286	45.6	0.38 (0.34, 0.41)		22.9	0.47 (0.42, 0.53)		0.2	0.20 (0.12, 0.33)	
Pacific Islander <sup>d</sup> Black/African American <sup>d</sup>	7,303	47.4	0.43 (0.38, 0.48)		25.5	0.55 (0.48, 0.64)		0.3	0.41 (0.23, 0.72)	
Hispanic/Latinx	16,618	57.9	0.68 (0.63, 0.75)		34.6	0.86 (0.77, 0.96)		0.5	0.63 (0.44, 0.89)	
Middle Eastern, Arab, or	1,993	37.8	0.26 (0.21, 0.33)		20.0	0.39 (0.32, 0.49)		0.3	0.36 (0.11, 1.18)	
Arab American <sup>d</sup> Multiple races <sup>d</sup>	9,202	60.2	0.77 (0.71, 0.84)		33.2	0.81 (0.74, 0.88)		0.6	0.86 (0.62, 1.19)	
Other <sup>d</sup>	1,867	56.8	0.58 (0.52, 0.65)		30.1	0.68 (0.59, 0.78)		1.4	1.59 (0.85, 2.95)	
White <sup>d</sup>	109,632	66.3	Ref	Ref	38.1	Ref	Ref	0.7	Ref	
<b>First generation student</b>										
Yes	47,815	54.5	0.63 (0.59, 0.67)		30.9	0.77 (0.70, 0.84)		0.5	0.75 (0.61, 0.92)	
No	120,482	64.4	Ref	Ref	36.5	Ref	Ref	0.6	Ref	
<b>International student</b>										
Yes	32,478	58.9	0.83 (0.66, 1.04)		36.9	1.11 (0.91, 1.34)		0.4	0.47 (0.35, 0.65)	
No	135,819	61.6	Ref	Ref	34.3	Ref	Ref	0.7	Ref	
<b>Religiosity</b>										
Important	60,072	53.6	0.61 (0.57, 0.65)		28.7	0.66 (0.61, 0.70)		0.4	0.55 (0.43, 0.71)	



	Any Alcohol Use (past 2 weeks)			Any Heavy Episodic Drinking (past 2 weeks) <sup>d</sup>			Alcohol use disorder diagnosis (ever)		
	n	%	aPR <sup>b</sup> (95 % CI)	%	aPR <sup>b</sup> (95 % CI)	%	aPR <sup>b</sup> (95 % CI)		
Not Important	108,225	65.6	Ref	38.2	Ref	0.7	Ref		
<b>Degree program</b>									
Undergraduate	131,402	59.9	1.17 (1.05, 1.30)	35.1	1.31 (1.15, 1.48)	0.6	3.31 (2.57, 4.26)		
Graduate	36,895	67.9	Ref	32.8	Ref	0.5	Ref		
<b>Living situation</b>									
On-campus, residence hall	52,721	55.0	Ref	33.8	Ref	0.4	Ref		
On-campus, apartment	14,717	66.6	1.43 (1.23, 1.66)	38.0	1.19 (1.00, 1.42)	0.4	0.79 (0.53, 1.18)		
Fraternity/Sorority house	2,371	84.3	4.15 (2.50, 6.88)	60.0	2.92 (2.14, 4.00)	0.2	0.46 (0.20, 1.05)		
On or off-campus co-op housing	2,565	69.4	1.59 (1.32, 1.92)	39.0	1.24 (0.99, 1.55)	0.8	1.55 (0.75, 3.19)		
Off-campus, non-university	72,170	73.0	1.70 (1.49, 1.94)	39.2	1.23 (1.02, 1.49)	0.9	1.39 (1.00, 1.93)		
With family	21,716	42.5	0.53 (0.47, 0.60)	22.8	0.57 (0.49, 0.67)	0.5	1.09 (0.74, 1.62)		
Other	2,037	64.9	1.17 (0.94, 1.46)	35.0	1.03 (0.81, 1.31)	1.5	2.31 (1.14, 4.68)		
<b>Legal drinking age</b>									
Under 21 years	79,495	50.4	Ref	30.8	Ref	0.4	Ref		
21 years or older	88,802	71.8	2.77 (2.61, 2.94)	38.5	1.73 (1.61, 1.86)	0.9	0.98 (0.70, 1.36)		

Note: all sample sizes are unweighted counts, for all percents and ratios weighted results are shown.

<sup>a</sup> consuming 4+/5 + drinks in one sitting at least once in the past 3 weeks.

<sup>b</sup> aPR: age-adjusted prevalence ratio.

<sup>c</sup> Includes: Trans male/Trans man, Trans female/Trans woman, Genderqueer/Gender non-conforming, and those selecting self-identity.

<sup>d</sup> Non-Hispanic.

**Table 4**

Alcohol use, binge drinking, and alcohol use disorder diagnosis among US college students who drank in the past two weeks, variations by demographics (n = 107,197).

	n	Any Heavy Episodic Drinking (past 2 weeks) <sup>d</sup>		Frequent Heavy Episodic Drinking (past 2 weeks) <sup>b</sup>		Alcohol use disorder diagnosis (ever) among those reporting frequent Heavy Episodic Drinking <sup>c</sup> (n = 19,915)	
		%	aPR <sup>d</sup> (95 % CI)	%	aPR <sup>d</sup> (95 % CI)	%	aPR <sup>d</sup> (95 % CI)
<b>Gender identity</b>							
Cis female	71,474	56.2	Ref	17.7	Ref	1.5	Ref
Cis male	33,696	57.9	1.09 (0.99, 1.19)	22.9	1.40 (1.29, 1.51)	1.1	0.71 (0.50, 1.02)
Gender minority <sup>e</sup>	2,027	48.8	0.74 (0.63, 0.88)	16.2	0.90 (0.72, 1.11)	5.7	3.64 (1.73, 7.69)
<b>Sexual orientation identity</b>							
Heterosexual	88,594	56.9	Ref	20.1	Ref	1.0	Ref
Bisexual	9,382	57.1	0.98 (0.89, 1.09)	18.8	0.89 (0.80, 0.99)	3.2	3.34 (2.11, 5.29)
Gay / Lesbian / Queer	5,736	55.4	0.94 (0.84, 1.06)	19.3	0.89 (0.80, 0.99)	3.8	3.49 (2.05, 5.95)
Questioning/Other	3,485	53.3	0.84 (0.72, 0.98)	16.3	0.75 (0.64, 0.89)	2.1	2.08 (1.13, 3.80)
<b>Racial and ethnic identity</b>							
American Indian, Native American, Alaskan Native <sup>f</sup> Asian/Asian American or Pacific Islander <sup>f</sup> Black/African American <sup>f</sup>	210	64.5	1.45 (0.88, 2.38)	19.5	1.00 (0.59, 1.69)	0	–
Hispanic/Latinx	9,939	50.2	0.79 (0.68, 0.91)	13.7	0.64 (0.56, 0.73)	0.8	0.45 (0.20, 0.99)
Middle Eastern, Arab, or Arab American <sup>f</sup> Multiple races <sup>f</sup>	3,657	53.8	0.89 (0.75, 1.06)	19.2	0.94 (0.82, 1.08)	1.2	0.71 (0.25, 2.00)
Other <sup>f</sup>	10,198	59.8	1.12 (0.98, 1.29)	20.3	0.99 (0.90, 1.09)	1.3	0.78 (0.43, 1.40)
White <sup>f</sup>	804	52.8	0.87 (0.68, 1.12)	14.4	0.68 (0.50, 0.91)	0.9	0.48 (0.07, 3.45)
	5,770	55.1	0.91 (0.83, 1.00)	18.2	0.85 (0.77, 0.94)	1.6	1.10 (0.61, 1.98)
	1,079	53.0	0.89 (0.74, 1.06)	19.6	1.00 (0.77, 1.29)	1.6	0.87 (0.25, 3.02)
	75,540	57.4	Ref	20.7	Ref	1.5	Ref
<b>First generation student</b>							
Yes	27,141	56.7	1.03 (0.93, 1.14)	18.0	0.88 (0.80, 0.97)	1.7	1.18 (0.81, 1.70)
No	80,056	56.7	Ref	20.5	Ref	1.3	Ref
<b>International student</b>							

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	Any Heavy Episodic Drinking (past 2 weeks) <sup>d</sup>		Frequent Heavy Episodic Drinking (past 2 weeks) <sup>b</sup>		Alcohol use disorder diagnosis (ever) among those reporting frequent Heavy Episodic Drinking <sup>c</sup> (n = 19,915)		
	n	%	aPR <sup>d</sup> (95 % CI)	%	aPR <sup>d</sup> (95 % CI)	%	aPR <sup>d</sup> (95 % CI)
Yes	20,004	62.7	1.38 (1.18, 1.62)	22.2	1.22 (1.04, 1.44)	1.0	0.64 (0.40, 1.02)
No	87,193	55.6	Ref	19.4	Ref	1.5	Ref
<b>Religiosity</b>							
Important	33,723	53.6	0.83 (0.77, 0.90)	17.7	0.81 (0.76, 0.87)	0.9	0.55 (0.36, 0.85)
Not Important	73,474	58.1	Ref	20.8	Ref	1.6	Ref
<b>Degree program</b>							
Undergraduate	81,187	58.5	1.24 (1.08, 1.44)	21.4	1.61 (1.42, 1.81)	1.4	2.25 (1.15, 4.41)
Graduate	26,010	48.3	Ref	12.6	Ref	1.6	Ref
<b>Living situation</b>							
On-campus, residence hall	28,888	61.3	Ref	22.3	Ref	0.9	Ref
On-campus, apartment	9,941	57.1	0.91 (0.75, 1.11)	20.9	1.03 (0.86, 1.22)	0.9	0.84 (0.35, 2.03)
Fraternity/Sorority house	2,080	71.1	1.61 (1.06, 2.45)	35.5	2.01 (1.47, 2.75)	0.4	0.40 (0.14, 1.17)
On or off-campus co-op housing	1,765	56.3	0.88 (0.66, 1.18)	20.6	1.01 (0.78, 1.31)	1.0	0.90 (0.30, 2.75)
Off-campus, non-university	53,373	53.7	0.87 (0.68, 1.10)	18.6	0.98 (0.81, 1.19)	1.8	1.27 (0.74, 2.16)
With family	9,753	53.5	0.82 (0.67, 1.00)	14.6	0.69 (0.58, 0.82)	2.6	2.01 (1.10, 3.67)
Other	1,397	53.8	0.86 (0.66, 1.13)	18.4	0.95 (0.75, 1.21)	4.5	3.65 (1.45, 9.21)
<b>Legal drinking age</b>							
Under 21 years	41,988	61.1	Ref	22.2	Ref	1.0	Ref
21 years or older	65,209	53.6	0.92 (0.86, 0.98)	18.2	1.09 (1.00, 1.19)	1.8	0.83 (0.46, 1.50)

Note: all sample sizes are unweighted counts, for all percents and ratios weighted results are shown.

<sup>a</sup> consuming 4+/5 + drinks in one sitting at least once in the past 2 weeks (among those who consumed alcohol in the past 2 weeks).

<sup>b</sup> consuming 4+/5 + drinks in one sitting three or more times in the past 2 weeks (among those who consumed alcohol in the past 2 weeks).

<sup>c</sup> among those who consumed alcohol in the past 2 weeks and reported HED 3 or more times in the past 2 weeks.

<sup>d</sup> aPR: age-adjusted prevalence ratio.

<sup>e</sup> Includes: Trans male/Trans man, Trans female/Trans woman, Genderqueer/Gender non-conforming, and those selecting self-identify.

<sup>f</sup> Non-Hispanic.