

NCI Monograph 24

Tobacco and Alcohol: Understanding Co-Use to Reduce Cancer Incidence and Mortality

Chapter 2
Surveillance and Behavioral Epidemiology
of Tobacco and Alcohol Use Among Adolescents
and Adults in the United States

Chapter Contents

Introduction.....	27
Measurement of Tobacco and Alcohol Co-Use.....	28
Methods.....	30
The Monitoring the Future Study	30
The National Alcohol Surveys.....	30
The National Survey on Drug Use and Health	31
Measures	31
U.S. Population Patterns of Tobacco and Alcohol Use	33
Trends Over Time in Tobacco and Alcohol Consumption.....	34
Co-Use of Tobacco and Alcohol Among Adolescents	36
Studies of Co-Use of Tobacco and Alcohol Products Among Adolescents	37
Monitoring the Future Analysis: Tobacco and Alcohol Co-Use Over Time Among 8th, 10th, and 12th Grade Students.....	39
Monitoring the Future Analysis: Alcohol Use Among 8th, 10th, and 12th Grade Students Who Use Tobacco.....	46
Summary: Co-Use of Tobacco and Alcohol Among Adolescents	48
Co-Use of Tobacco and Alcohol Among Adults.....	48
National Alcohol Surveys and National Survey on Drug Use and Health Analyses of Tobacco and Alcohol Co-Use.....	52
Lifetime Co-Use of Tobacco and Alcohol.....	66
Summary: Tobacco and Alcohol Co-Use Among Adults.....	70
Chapter Summary	71
Research Needs.....	74
Conclusions.....	75
References.....	127

Figures and Tables

Figure 2.1	Trends in U.S. Per Capita Sales of Cigarettes and Alcohol, 1977–2021	35
Figure 2.2	Co-Use Prevalence Over Time Among Students in 8th, 10th, and 12th Grade (2000–2023 Monitoring the Future Study)	41
Figure 2.3	Alcohol Use by Tobacco Use Status Among Students in 8th, 10th, and 12th Grade (2023 Monitoring the Future Study).....	47
Figure 2.4	Co-Use Prevalence in 2014–2015 and 2019–2020 National Alcohol Surveys (<i>N</i> = 14,125) and 2015–2019 National Survey on Drug Use and Health (<i>N</i> = 210,684) Among Adults Ages 18 and Older.....	53
Figure 2.5	Past-Year Alcohol Use by Past-Year Tobacco Use Status (2014–2015 and 2019–2020 National Alcohol Surveys; <i>N</i> = 14,125).....	54
Figure 2.6	Past-30-Day Alcohol Use by Past-30-Day Cigarette Smoking Status, Overall and by Sex (2015–2019 National Survey on Drug Use and Health; <i>N</i> = 210,684).....	58
Figure 2.7	Past-30-Day Alcohol Use by Past-30-Day Smokeless Tobacco Use Status, Overall and by Sex (2015–2019 National Survey on Drug Use and Health; <i>N</i> = 210,931).....	59
Figure 2.8	Past-30-Day Alcohol Use by Past-30-Day Cigar Smoking Status, Overall and by Sex (2015–2019 National Survey on Drug Use and Health; <i>N</i> = 210,958)	61

Figure 2.9	Average Number of Drinks Consumed in Past Year by Age, Past-Year Tobacco Use Status, and Sex (2014–2015 and 2019–2020 National Alcohol Surveys; <i>N</i> = 14,125).....	63
Figure 2.10	Past-Year Alcohol Use by Setting on a Weekly Basis or More, by Past-Year Tobacco Use Status and Age (2014–2015 and 2019–2020 National Alcohol Surveys; <i>N</i> = 14,125).....	65
Table 2.1	Tobacco and Alcohol Use Measures in the Monitoring the Future Study, National Alcohol Survey, and the National Survey on Drug Use and Health	32
Table 2.2	Past-Year Alcohol Use by Past-Year E-Cigarette Status in the 2019–2020 National Alcohol Survey (<i>N</i> = 8,308), Overall and by Sex (<i>Row Percents</i>)	56
Table 2.3	Average Number of Lifetime 5+ Drinking Days by Past-Year Tobacco Use Status in the 2014–2015 and 2019–2020 National Alcohol Surveys (<i>N</i> = 14,125), Overall and by Sex, Stratified by Age	68
Table 2.4	Lifetime Number of 5+ Drinking Days by Cigarette Smoking History (Pack Years) in the 2014–2015 National Alcohol Survey (<i>N</i> = 5,632), Overall and by Sex, Stratified by Age (<i>Row Percents</i>)	69
Table 2D.1	Past-30-Day Tobacco and Alcohol Use Among 8th Grade Students in the Monitoring the Future Study, 2000–2023	97
Table 2D.2	Past-30-Day Tobacco and Alcohol Use Among 10th Grade Students in the Monitoring the Future Study, 2000–2023	99
Table 2D.3	Past-30-Day Tobacco and Alcohol Use Among 12th Grade Students in the Monitoring the Future Study, 2000–2023	101
Table 2D.4	Past-30-Day Alcohol Use by Tobacco Use Status and Grade Among Students in The Monitoring the Future Study, 2023.....	103
Table 2D.5	Characteristics of Participants in the 2014–2015 and 2019–2020 National Alcohol Surveys (<i>N</i> = 14,125).....	105
Table 2D.6	Characteristics of Participants in the 2015–2019 National Survey on Drug Use and Health (<i>N</i> = 214,505)	107
Table 2D.7	Co-Use Prevalence in the Past Year in 2014–2015 and 2019–2020 National Alcohol Surveys (<i>N</i> = 14,125) and in the Past Month in the 2015–2019 National Survey on Drug Use and Health (<i>N</i> = 210,684)	110
Table 2D.8	Past-Year Alcohol Use by Tobacco Use Status in the 2014–2015 and 2019–2020 National Alcohol Surveys (<i>N</i> = 14,125), Overall and by Sex (<i>Row Percents</i>)	111
Table 2D.9	Past-Year Alcohol Use by Tobacco Use Status in the 2014–2015 and 2019–2020 National Alcohol Surveys (<i>N</i> = 14,125), Overall and by Sex, Stratified by Age (<i>Row Percents</i>)	112
Table 2D.10	Past-Year Hazardous Alcohol Use by Tobacco Use Status in the 2014–2015 and 2019–2020 National Alcohol Surveys (<i>N</i> = 14,125), Overall and by Sex, Stratified by Age (<i>Row Percents</i>).....	114
Table 2D.11	Past-Year Alcohol Use by E-Cigarette Status in the 2019–2020 National Alcohol Survey (<i>N</i> = 8,096), Overall and by Sex, Stratified by Age (<i>Row Percents</i>)	116

Table 2D.12	Current (Past-30-Day) Alcohol Use by Cigarette Smoking Status in the 2015–2019 National Survey on Drug Use and Health ($N = 210,684$), Overall and by Sex (<i>Row Percents</i>)	118
Table 2D.13	Current (Past-30-Day) Alcohol Use by Smokeless Tobacco Use Status in the 2015–2019 National Survey on Drug Use and Health ($N = 210,931$), Overall and by Sex (<i>Row Percents</i>)	120
Table 2D.14	Current (Past-30-Day) Alcohol Use by Cigar Smoking Status in the 2015–2019 National Survey on Drug Use and Health ($N = 210,958$), Overall and by Sex (<i>Row Percents</i>)	121
Table 2D.15	Average Past-Year Alcohol Consumption (Overall and Beverage-Specific) by Tobacco Use Status in the 2014–2015 and 2019–2020 National Alcohol Surveys ($N = 14,125$), Overall and by Sex, Stratified by Age	122
Table 2D.16	Past-Year Drinking Context by Tobacco Use Status in the 2014–2015 and 2019–2020 National Alcohol Surveys ($N = 14,125$), Overall and by Sex, Stratified by Age (<i>Row Percents</i>)	124

Appendices

Appendix 2A	National Surveys With Tobacco and Alcohol Use Measures	77
Appendix 2B	Literature Search Strategy	90
Appendix 2C	Methods—Monitoring the Future Study, National Alcohol Surveys, and National Survey on Drug Use and Health Analyses	91
Appendix 2D	Monitoring the Future, National Alcohol Surveys, and National Survey on Drug Use and Health Tables	97

Chapter 2

Surveillance and Behavioral Epidemiology of Tobacco and Alcohol Use Among Adolescents and Adults in the United States

Introduction

Epidemiologic surveillance of tobacco and alcohol co-use is important to understand population-level and subgroup behavior regarding these substances and to track usage patterns over time.¹⁻³ Surveillance may also inform clinical and public health efforts to prevent and control use of these hazardous products and to determine where resources and interventions are most needed. Tobacco and alcohol are among the most widely used addictive and carcinogenic substances that, whether used separately or together, have large impacts on the U.S. and global burden of disease.^{4,5} These substances have synergistic effects on risk for certain cancers (see chapter 4),⁶⁻⁸ in addition to the risk for other cancers and serious chronic diseases associated with their separate use.^{9,10}

Tobacco and alcohol use are closely linked; the substances are often used by the same individual, frequently at the same time.^{3,11-18} Early onset smoking is a significant predictor of lifetime drinking and the subsequent development of an alcohol use disorder (AUD), and is associated with more severe AUDs compared with late onset smoking and lifetime nonsmoking.¹⁹ People who smoke are at greater risk for AUDs than people who have never smoked yet drink equivalent quantities of alcohol.²⁰ Among individuals with an AUD, diseases caused by smoking are estimated to cause around one-half of all deaths, a rate greater than that for alcohol-related causes.²¹⁻²³ This chapter and chapter 3 present detailed information on use and co-use of tobacco and alcohol across the life course in the United States. Chapters 2 and 3 focus primarily on cigarette smoking, but also present data on use of other tobacco products including cigars, smokeless tobacco, and e-cigarettes.

The chapter first discusses measurement of tobacco and alcohol co-use, defined as the concurrent use of tobacco and alcohol or the use of both substances within a given time frame. It then describes patterns of tobacco and alcohol co-use based on data from published literature and from new analyses of three nationally representative surveys: the Monitoring the Future (MTF) survey, the National Alcohol Surveys (NAS), and the National Survey on Drug Use and Health (NSDUH). These three surveys focus on tobacco, alcohol and substance use, and are the major sources of data on co-use for children and adults in the United States. The chapter draws attention to questions not fully addressed in the literature, including the extent of tobacco and alcohol co-use among individuals in the U.S. population and whether greater intensity of use is associated with co-use. The chapter's findings highlight the strong positive association between tobacco and alcohol use, as well as between cigarette smoking frequency and alcohol quantity and heavy drinking occasions. In chapter 3, data are presented in relation to various demographic subpopulations. Although tobacco and alcohol are often co-used with cannabis, trends in cannabis use and co-use are outside of the scope of this chapter.

Measurement of Tobacco and Alcohol Co-Use

Several major U.S. health surveys measure tobacco and alcohol use among adolescents and/or adults (Box 2.1). A description of the measures of tobacco and alcohol use in these surveys is provided in Appendix 2A.

Box 2.1. Major National Health Surveys With Tobacco and Alcohol Use Measures

- [Monitoring the Future](#) (sponsored by the National Institute on Drug Abuse)
 - [National Epidemiologic Survey on Alcohol and Related Conditions](#) and [National Alcohol Surveys](#) (sponsored by the National Institute on Alcohol Abuse and Alcoholism)
 - [National Health Interview Survey](#), [National Health and Nutrition Examination Survey](#), and [Behavioral Risk Factor Surveillance System](#) surveys (sponsored by the Centers for Disease Control and Prevention)
 - [National Survey on Drug Use and Health](#) (sponsored by the Substance Abuse and Mental Health Services Administration)
 - [Population Assessment of Tobacco and Health Study](#) (sponsored by the National Institutes of Health and the U.S. Food and Drug Administration)
-

Although most U.S. national health surveys include questions about both tobacco and alcohol use, understanding the extent and patterns of co-use of these two substances is often difficult. Few nationally representative studies examine *both* alcohol use and tobacco use in-depth (see Appendix 2A). Rather, surveys often include detailed questions about use of one substance but a far less detailed assessment of use of the other (e.g., with binary [yes/no] response format). In addition, no general population studies measure simultaneous co-use (use of both tobacco and alcohol at the same time and/or during circumstances when one substance is already being consumed), although it is a common behavior with important implications for prevention, cessation, and disease risks. Rather, surveys define co-use of tobacco and alcohol as use of both substances within a particular reference period, which can range from 1 day to 1 week, 2 weeks, 30 days or 1 month, a year, a decade, or a lifetime. The reference period selected for measurement or analysis affects the estimated prevalence of co-use. Current tobacco or cigarette use is often defined as use within the past 30 days. However, this timeframe has limitations for the assessment of current alcohol use because a substantial number of people who use alcohol drink less than monthly.^{24,25} Additionally, seasonal variation in alcohol consumption, such as heavier alcohol use in winter months, is not necessarily captured by past-30-day measures.^{24,25}

Surveys also vary in their inclusion of detailed measures of frequency and intensity of use (e.g., number of drinks per day or occasion, number of cigarettes per day, or number of days of use within a reference time period), and specific alcohol (e.g., beer, wine, spirits) or tobacco products (e.g., cigarettes, cigars, smokeless tobacco, hookah, e-cigarettes) used (see Appendix 2A). Some surveys assess heavy episodic drinking, also known as binge drinking, defined as the frequency of having five or more drinks on a single occasion or day, or having five or more drinks for men and four or more for women on a single occasion or day. Time

frames for measuring binge drinking may also vary. Some measures of binge drinking refer to drinks consumed within 2 hours so that consumption can be closely correlated to elevated blood alcohol content, while other measures of binge drinking refer to drinking within a day or an undefined “occasion.” Less commonly used measures of heavy drinking include high intensity drinking (HID), defined as the frequency of having had a specific, high number of drinks (e.g., more than 8, 10, 12, or 15 drinks) per day or occasion²⁶⁻²⁸ and the maximum number of drinks consumed in 1 day during a defined period,²⁹ such as the past week, month, year, or lifetime.

Almost all national surveillance surveys rely on self-report.^{30,31} There are challenges regarding the accuracy of self-reported measures of tobacco and alcohol use and co-use. In particular, individuals may underreport or misreport their tobacco or alcohol use, or the amount, frequency, and patterns of use, due to perceived stigma or social desirability bias.³²⁻³⁵ This is particularly true for people for whom alcohol and/or tobacco use is highly stigmatized, such as people with cancer or pregnant people.³⁶⁻³⁸ Some research indicates that around 1 in 10 patients fail to disclose their actual smoking status to their health care providers.³⁹⁻⁴¹ Similarly, a review of 54 studies examining the relationship between self-reported smoking status and smoking status verified by cotinine measurement found that self-report underestimates actual smoking by between 4.8% to 9.4%, depending on whether cotinine was measured in saliva, serum, blood, or plasma.⁴² Nonetheless, self-reported tobacco product use tends to be valid in population-based studies, and the extent of underreporting has not changed over time.⁴³⁻⁴⁶ Accurate, self-reported quantification of tobacco use intensity can also be challenging, particularly for e-cigarettes and other emerging tobacco products. For example, self-reported number of sessions and amount of e-liquid used may underestimate use of e-cigarettes compared to self-reported number of puffs.⁴⁷

Underreporting is also a challenge for self-reported measures of alcohol use. In particular, stigmatization of people with AUDs can influence self-report of heavy drinking and treatment for AUDs.⁴⁸⁻⁵¹ Generally, adult self-report of any current drinking can be expected to be accurate.⁵²⁻⁵⁴ However, self-reported lifetime never drinking has been shown to include adults who drank at some point in the past; typically, past consumption was usually of low frequency and quantity, but about 20% of people reporting lifetime abstinence reported having 5 or more drinks at least monthly at another time.⁵⁵ In addition, older adults may not accurately recall past alcohol consumption, or may deliberately underreport past alcohol use.^{25,56} Analysis of the coverage of sales (i.e., comparison of alcohol sales with reported drinks consumed) in general population surveys shows substantial underreporting of consumption.⁵⁷ Explanations for underreporting of actual consumption include social desirability bias, that actual drink sizes are frequently larger than the standard drink size, and the use of survey measures that focus on typical drinking, missing occasions where heavy drinking occurs.²⁵ In addition, people who drink heavily may be underrepresented in general population surveys.²⁵

Overall, the research shows that inaccuracy in self-report is likely to result in underreporting of tobacco and alcohol use behaviors, and therefore self-reported data may underestimate the extent of the problem of tobacco and alcohol use in the United States. Measurement challenges related to tobacco and alcohol use are discussed further in chapter 4.

Differences in the history of minimum legal age sale or purchase of tobacco and alcohol might also influence self-reported use due to social desirability bias. As discussed in chapter 8, the minimum legal age to purchase or possess alcohol in the United States has been 21 since the 1984 National Minimum Drinking Age Act.⁵⁸ However, the minimum legal age of sale for tobacco products was only made 21 nationwide in 2019 via Tobacco 21 provisions in the Further Consolidated Appropriations Act.⁵⁹ For tobacco, self-reported tobacco use declined after passage of Tobacco 21 legislation, but biomarker results were not as consistent in indicating declines in use.⁶⁰ This suggests that self-report is sensitive to changes in minimum legal age, but it is not known how long such an effect will persist and whether social desirability bias differs in relation to tobacco and alcohol.

Methods

To identify studies that estimated the prevalence of tobacco and alcohol co-use in the U.S. population overall, targeted keyword searches using combinations of tobacco and alcohol terms were conducted using Google Scholar, PubMed, Ovid, and Scopus. Literature searches were also conducted for prospective alcohol mortality and morbidity studies, because these studies have also examined tobacco co-use as a confounder. Search terms are listed in Appendix 2B.

The chapter highlights findings from nationally representative studies; in addition, findings from nonnationally representative studies were included to provide information about specific subgroups. New analysis of the NAS and the NSDUH were conducted to better understand tobacco and alcohol co-use patterns among adults, while the MTF was analyzed to better understand co-use patterns among adolescents. These surveys were chosen because they are nationally representative, have large sample sizes, and include detailed tobacco and alcohol measures or subgroup data not provided by other nationally representative surveys.

The Monitoring the Future Study

MTF is a nationally representative survey of U.S. students in 8th, 10th, and 12th grade.⁶¹ The analyses provide annual estimates of past-30-day co-use (use of alcohol with cigarettes, large cigars, smokeless tobacco, and nicotine vaping) prevalence from 2000 to 2023 by grade. Among participants who reported use of cigarettes, large cigars, smokeless tobacco, or nicotine vaping in 2023, prevalence of past-30-day alcohol use and past-2-week binge drinking was also reported. For additional details on the MTF methodology and measures, see Appendix 2C.

The National Alcohol Surveys

The NAS are a population-based survey series representative of noninstitutionalized adults ages 18 or older within all 50 states and the District of Columbia.⁶² As of 2026, the NAS is the only U.S. population-based survey that includes measures that allow for the calculation of lifetime-accumulated tobacco and alcohol use. For the current analyses, data from adults surveyed in the 2014–2015 and 2019–2020 NAS (the most recent NAS data available) were pooled, and estimates were weighted to be representative of the U.S. population. Pooled data were needed to analyze tobacco and alcohol co-use by subgroup characteristics; these years of data collection afforded a large enough sample for these comparisons. Because the harms of tobacco and alcohol use are cumulative, estimates of lifetime exposure are important to

understand population risks for cancer and other chronic diseases. The NAS also includes detailed measures, such as the number of beverage-specific drinks consumed, amounts of alcohol consumed in different drinking contexts, and frequency of HID. For additional details on the NAS methodology and measures, see Appendix 2C.

The National Survey on Drug Use and Health

The NSDUH is a nationally representative survey of the noninstitutionalized civilian population ages 12 or older in the United States, excluding people with no permanent residence or living in college dormitories, group homes, or on military bases.⁶³ For the current analyses, data from participants ages 18 and older in the 2015–2019 NSDUH were pooled, and estimates were weighted to be representative of the U.S. population. The 2015–2019 survey years were the most recent comparable 5-year series available for analysis; methodological changes made in 2020 due to coronavirus disease 2019 (COVID-19) prevent comparisons with earlier years. Pooled data were necessary to produce estimates for less represented subgroups (e.g., people from sexual minority groups, people with health conditions; see chapter 3). The NSDUH allows for examination of differences in tobacco and alcohol use by numerous demographic categories, including sex, age, income, educational attainment, race and/or ethnicity, sexual minority status, and military service. The 2015–2019 NSDUH included information on the frequency and quantity of alcohol consumption and cigarette smoking, cigar smoking, and smokeless tobacco use in the past 30 days, as well as the frequency of binge drinking days in the past 30 days. For additional details on the NSDUH survey methodology and measures, see Appendix 2C.

Measures

The MTF analyses focused on past-30-day cigarette smoking, cigar smoking, smokeless tobacco use, nicotine vaping, and alcohol use, as well as past-2-week binge drinking. The NAS analyses focused on past-year co-use of tobacco and alcohol and lifetime use of tobacco and alcohol. Analyses of past-year and lifetime tobacco use from the pooled 2014–2015 and 2019–2020 NAS included use of cigarettes and tobacco products other than e-cigarettes (based on the question “How often have you smoked tobacco cigarettes or used any other kinds of tobacco in the past 12 months? (Please do NOT include e-cigarettes.)”). The 2019–2020 NAS was the first to measure past-year e-cigarette use; therefore, data on co-use of e-cigarettes and alcohol are presented only for that time period. The NSDUH analyses focused on past-30-day co-use of alcohol and cigarettes, smokeless tobacco, and cigars. Estimates of past-30-day use of tobacco and alcohol and their co-use based on data from the NSDUH will differ somewhat from estimates of past-year use drawn from the NAS. As discussed in the section “Measurement of Tobacco and Alcohol Co-Use” above, the past-30-day measure covers the most recent behavior, which may be recalled more easily by participants, while the past-year measure captures longer-term patterns that are less influenced by seasonality or infrequently occurring events. The past-30-day and past-year time frames used in these surveys are the intervals for assessing “current” use. In addition, estimates of current smoking in NSDUH and current tobacco use in the NAS may differ from estimates in other nationally representative surveys in the way they assess current smoking. Some surveys (e.g., the National Health Interview Survey [NHIS]) predicate current cigarette smoking on having smoked ≥ 100 cigarettes in one’s lifetime while also indicating current smoking at the survey timepoint⁶⁴; however, the NAS and NSDUH do not use a lifetime threshold of cigarette consumption in the definition of current smoking.

The measures used in the MTF, NAS, and NSDUH analyses are described in Table 2.1.

Table 2.1 Tobacco and Alcohol Use Measures in the Monitoring the Future Study, National Alcohol Survey, and the National Survey on Drug Use and Health

Measure	Variable type	Description
2000–2023 Monitoring the Future study		
Tobacco use status in past 30 days		
Past-30-day cigarette smoking	Categorical (2 levels)	- Used in the past 30 days - Did not use in the past 30 days
Past-30-day large cigar smoking (2014–2023 only)	Categorical (2 levels)	- Used in the past 30 days - Did not use in the past 30 days
Past-30-day smokeless tobacco use	Categorical (2 levels)	- Used in the past 30 days - Did not use in the past 30 days
Past-30-day e-cigarette use (nicotine vaping; 2017–2023 only)	Categorical (2 levels)	- Used in the past 30 days - Did not use in the past 30 days
Alcohol use status in past 30 days		
Past-30-day alcohol use	Categorical (2 levels)	- Used in the past 30 days - Did not use in the past 30 days
Binge drinking in past 2 weeks		
Past-2-week binge drinking		- Binge drinking in past 2 weeks - No binge drinking in past 2 weeks
2014–2015 and 2019–2020 National Alcohol Surveys		
Tobacco use status in past year		
Tobacco use status (excluding e-cigarettes) ^a	Categorical (4 levels)	- Never use in lifetime - Former use (use in lifetime but not past year) - Nondaily use in past year - Daily use in past year
E-cigarette use status (2019–2020 only)	Categorical (3 levels)	- No use in past year - Monthly or semimonthly use in the past year (monthly or less, weekly or nearly weekly) - Daily or nearly daily use in past year
Cigarette smoking in lifetime		
Pack years ^b (2014–2015 only)	Categorical (4 levels)	0 pack years 0.1–20 pack years 20.1–40 pack years ≥40.1 pack years
Alcohol use in past year		
Drinking within guidelines ^c	Categorical (3 levels)	- No alcohol use in past year - Past-year alcohol use within guidelines (≤7/14 drinks per week or <4/5 drinks per day for women/men) - Past-year alcohol use exceeding guidelines (>7/14 drinks per week or ≥4/5 drinks per week for women/men)
5+ drinking	Categorical (2 levels)	Consuming ≥5 drinks in a single day (yes/no) in the past year

Table 2.1 (continued)

Measure	Variable type	Description
High intensity drinking (HID)	Categorical (2 levels)	Consuming $\geq 8/12$ drinks in a single day for women/men (yes/no) in the past year
Volume consumed	Continuous	Number of standard drinks consumed by drink type (beer, wine, and spirits) in the past year
	Categorical (3 levels)	Frequency of drinking at bars, house parties, or at home in the past year: - Weekly or more - Monthly or less - Never
Alcohol use in lifetime		
Number of 5+ drinking days	Continuous	Number of days over lifetime in which participants reported having 5 or more drinks on one occasion (based on participants' age and questions about drinking in each decade)
2015–2019 National Survey on Drug Use and Health		
Tobacco use status in past 30 days		
Cigarette smoking status	Categorical (5 levels)	- Never use in lifetime - Former use (use in lifetime but not in past 30 days) - Nondaily use in past 30 days, <300 cigarettes per month - Daily use in past 30 days, <300 cigarettes per month - Daily or nondaily use in past 30 days, ≥ 300 cigarettes per month
Smokeless tobacco use status	Categorical (4 levels)	- Never use in lifetime - Former use (use in lifetime but not in past 30 days) - Nondaily use in past 30 days - Daily use in past 30 days
Cigar smoking status	Categorical (3 levels)	- Never use in lifetime - Former use (use in lifetime but not in past 30 days) - Current use (nondaily or daily use in past 30 days)
Alcohol use status in past 30 days		
At-risk drinking	Categorical (5 levels)	- Never use in lifetime - Former use (use in lifetime but not in past 30 days) - Past-30-day alcohol use within guidelines ($\leq 7/14$ drinks per week or $< 4/5$ drinks per day for women/men) - Binge drinking ($\geq 4/5$ drinks on an occasion for women/men) without risky weekly use ($> 7/14$ drinks per week for women/men) in past 30 days - Risky weekly use ($> 7/14$ drinks per week for women/men) in past 30 days (with or without binge drinking)

^aThe measure of tobacco use status in the NAS excluded e-cigarettes because survey questions asked about smoking “tobacco cigarettes” or “any other kinds of tobacco,” but instructed participants to exclude e-cigarettes. ^bPack years are calculated by multiplying the number of packs smoked per day by the number of years smoked. ^cAlcohol use exceeding guidelines is defined as exceeding 7/14 drinks per week or 4/5 drinks per day for women/men, per the *Dietary Guidelines for Americans, 2020–2025*⁶⁵ and NIAAA’s definition of heavy alcohol use.⁶⁶

U.S. Population Patterns of Tobacco and Alcohol Use

This section provides a summary of tobacco and alcohol co-use among adolescents and adults based on a review of the literature and analyses of MTF, NAS, and NSDUH data.

Trends Over Time in Tobacco and Alcohol Consumption

Over the last 50 years, cigarette smoking has declined dramatically among U.S. adults—from more than 40% of adults in 1964 to less than 10% of adults in 2024^{67,68}—with concomitant reductions in the rates of cancers and other diseases and premature death caused by tobacco.^{2,69,70} Declining smoking prevalence is widely attributed to the implementation of evidence-based tobacco control policies and programs and changing social norms regarding tobacco use.^{9,71} Additionally, patterns of smoking have changed; smoking intensity (as measured by cigarettes per day) has declined over time, and the proportion of people who smoke nondaily increasingly make up a greater proportion of people who smoke over time.⁷² For example, data from NHIS show that although daily smoking has declined considerably since the 1990s, nondaily smoking has remained relatively stable, with daily smoking prevalence declining from 22.0% in 1991 to 8.0% in 2023; and nondaily smoking prevalence declining from 4.0% to 3.0% in the same time period.⁶⁷

Although the prevalence of both smokeless tobacco use and cigar smoking are substantially lower than that of cigarette smoking, both have remained relatively stable over the last 2 decades; during 2000–2022, around 2% to 3% of adults reported current smokeless tobacco use and around 4% reported current cigar smoking.⁶⁷ Prevalence of current tobacco use is higher among men than women and among younger adults (<65 years) than older adults (ages 65 and older).^{2,73} Further details concerning various demographic groups are presented in chapter 3 and in the 2024 Surgeon General’s report, *Eliminating Tobacco-Related Disease and Death: Addressing Disparities*.³

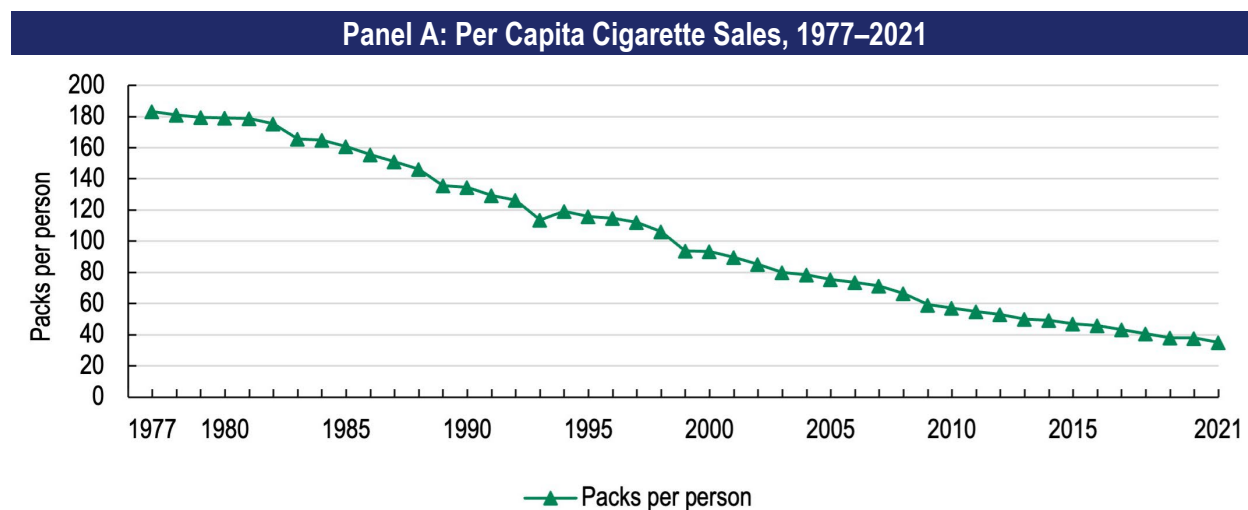
In recent years, the U.S. tobacco product marketplace has become more diverse.⁷⁴ As of 2026, the market includes combusted forms of tobacco (cigarettes, cigars, waterpipes, and others), smokeless tobacco, e-cigarettes (also known as vapes or electronic nicotine delivery systems), heated tobacco products, and nicotine pouches.

The U.S. alcoholic beverage market consists of beer, wine, and distilled spirits, products which differ widely in alcohol content.⁷⁵ Per capita alcohol consumption and alcohol-related mortality increased in the first decades of the 21st century.^{76,77} Age-period-cohort analyses of NAS data have documented declines in volume of alcohol consumed and number of heavy drinking occasions from 1979 to 1995 followed by increasing use levels to 2010.^{78–80} Deaths from excessive alcohol use (i.e., $\geq 4/5$ drinks on an occasion for women/men or $> 7/14$ drinks per week for women/men) have also increased between 2016 and 2021, with a notable increase from 2019 to 2020 after the onset of the COVID-19 pandemic.^{81,82} NSDUH data show that past-month binge drinking ($\geq 4/5$ drinks on an occasion for women/men) decreased from 2021 to 2024; among adults ages 18–25, binge drinking decreased from 30.0% to 26.7%, and among adults ages 26 or older, binge drinking decreased from 22.5% to 21.0%.⁸³

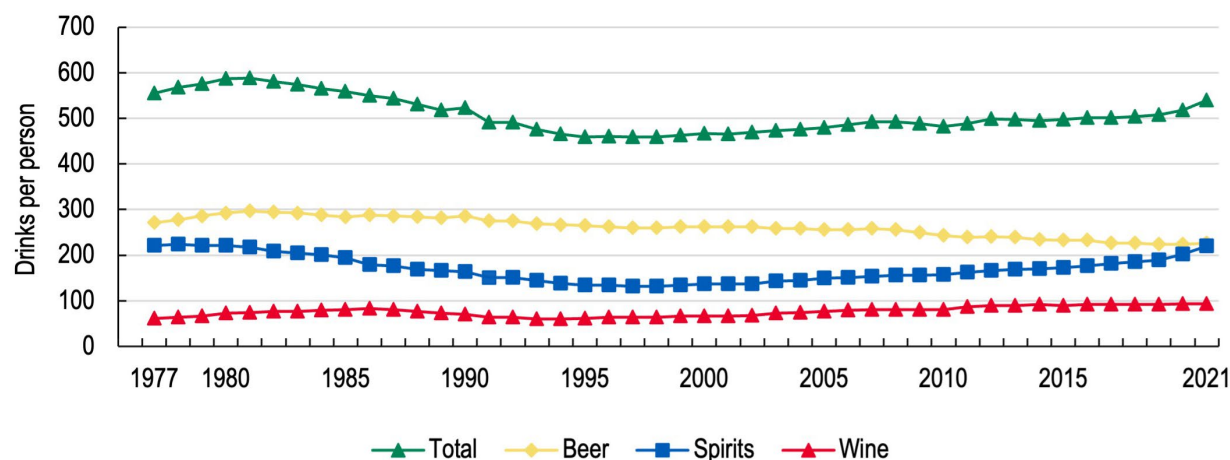
Figure 2.1 shows U.S. per capita cigarette and alcohol sales from 1977 to 2021. Per capita sales of cigarettes declined from 1977 until 2021, and per capita sales of alcohol declined from 1981 to 1995. After 1995, alcohol sales began to steadily increase. Per capita sales of cigarettes were highest in 1977 (183.2 packs per person) and declined to 35.1 packs per person in 2021. Per capita sales of alcoholic beverages per individual ages 14 or older peaked in 1981 at 2.76 gallons of ethanol (the type of alcohol used in alcoholic beverages) per year, and then declined through 1995 to 2.15 gallons before rising again, reaching 2.53 gallons (equivalent to

539 standard drinks) in 2021.⁸⁴ Alcoholic beverage preferences have also shifted over time, with beer consumption declining since the 1980s and wine and spirits consumption increasing since the 2000s. The COVID-19 pandemic brought a historically large increase in annual per capita sales of alcohol (2.1% increase) and spirits (6.7% increase) in 2020 and again in 2021 (alcohol: 4.1% increase; spirits: 8.4% increase).⁸⁴ In 2021, annual per capita sales were highest for beer (1.06 gallons of ethanol; equivalent to 226 standard drinks), followed by spirits (1.03 gallons of ethanol; 220 standard drinks), and wine (0.44 gallons of ethanol; 94 standard drinks).

Figure 2.1 Trends in U.S. Per Capita Sales of Cigarettes and Alcohol, 1977–2021



Panel B: Per Capita Alcohol Sales, 1977–2021



Note. For cigarette sales, population estimates are for the population ages 15 and older, using population data from the Centers for Disease Control (CDC) Wonder Compressed Mortality File (1977–2004) and the American Community Survey 1-year estimates (2005–2021). Cigarette sales are as reported by cigarette manufacturers. Between 2001 and 2021, values include total number of cigarettes sold and given away as reported by manufacturers. For the years 2011–2015 and 2017–2018, only total sold values are available. Packs per person per year were calculated by dividing total sales data by annual population estimates. For alcohol sales, population estimates are for the population ages 14 and older, using data from the CDC Wonder online query system, as reported by Slater and Alpert.⁸⁴ A standard drink contains 0.6 fluid ounces or 14 grams of ethanol. Gallons of ethanol per person reported by Slater and Alpert⁸⁴ were converted to standard drinks per person by multiplying the number of gallons by 213.333. Per capita sales were calculated using annual, time-varying, beverage-specific % alcohol by volume (ABV) values to account for variations over time due to changes in the strength of alcoholic beverages and beverage-type consumer preferences. The calculations of time-varying % ABV followed the methodology developed by Kerr and colleagues^{85–88} and most recently reported by Martinez and colleagues.⁸⁹

Source: Centers for Disease Control and Prevention,⁹⁰ Slater and Alpert 2024,⁸⁴ Federal Trade Commission 2021,⁹¹ U.S. Census Bureau.⁹²

Co-Use of Tobacco and Alcohol Among Adolescents

Adolescence, defined by the World Health Organization as the period from ages 10 to 19,⁹³ is a unique developmental period characterized by increased autonomy from parents, a focus on peers, identity formation, experimentation, and risk-taking.^{94–97} During adolescence, risk behaviors often occur together, or “cluster,” and may have implications for adult health and disease risk.^{98–101} The majority of adults who smoke cigarettes began smoking as adolescents.¹⁰⁰ In addition to initiating the processes that may eventually lead to cancer, cardiovascular disease, chronic obstructive pulmonary disease and other adverse health effects, adolescent smoking is a risk factor for later use of alcohol and other substances.¹⁰⁰ Early onset of cigarette smoking is also a risk factor for severe nicotine dependence and development of disease caused by smoking.¹⁰⁰ Similarly, alcohol use often begins during adolescence and young adulthood and early onset of alcohol use is a risk factor for AUD, as well as use of other substances.¹⁰² Adolescent alcohol consumption is associated with a wide array of harmful consequences, including serious injury and death, impaired brain development, and poor decision-making.¹⁰² Additionally, among adolescents who use alcohol, binge drinking is the most common pattern of alcohol use.^{102,103} Although experimentation with and initiation of cannabis use also often begins in adolescence,¹⁰⁴ and often co-occurs with tobacco and alcohol use,^{105,106} this topic is beyond the scope of this monograph.

As with adults, the prevalence of adolescents' use of tobacco and alcohol products has changed over time. Adolescent cigarette smoking has declined significantly since the mid-1990s.^{3,100} For example, among 12th grade students, past-30-day cigarette smoking peaked in 1976 at 39%,¹⁰⁷ declining to 2.9% in 2023 (Appendix Table 2D.3). However, adolescents' use of tobacco products now reflects the diversity of the tobacco product marketplace. Most notably, since 2014, e-cigarettes have been the most commonly used tobacco product among U.S. middle and high school students and use of two or more tobacco products is common.^{3,108} Analysis of the National Youth Tobacco Survey found that, in 2023, 10.0% of middle and high school students reported current (past-30-day) use of any tobacco product (12.6% of high school students; 6.6% of middle school students).¹⁰⁹ Additionally, 7.7% of students reported use of e-cigarettes, 1.6% reported use of cigarettes, 1.6% reported use of cigars, 1.2% reported use of smokeless tobacco, and 1.5% reported use of nicotine pouches; roughly one-third of all students who currently used tobacco (3.4% of students overall) reported current use of 2 or more tobacco products.¹⁰⁹ Although alcohol use and binge drinking among adolescents have generally declined since the 1980s, alcohol remains the most commonly used substance among teens and use prevalence increases with age.¹⁰⁷ MTF data indicates that lifetime prevalence of alcohol use among 8th, 10th, and 12th grade students declined from 68.4% in 1993 to 35.7% in 2023,¹¹⁰ and past-30-day alcohol use declined from 36.3% to 14.3%.¹¹⁰ In 2023, lifetime alcohol use was 20.1% among students in 8th grade, 35.8% among students in 10th grade, and 52.8% among students in 12th grade,¹¹⁰ while past-30-day alcohol use by grade level was 5.9% among students in 8th grade, 13.7% among students in 10th grade, and 24.3% among students in 12th grade (see Appendix Tables 2D.1, 2D.2, and 2D.3).

Studies of Co-Use of Tobacco and Alcohol Products Among Adolescents

Selected studies using nationally representative data to understand levels and patterns of co-use of tobacco and alcohol among U.S. adolescents are described in this subsection. These studies draw on self-reported data from the Youth Risk Behavior Survey (YRBS), MTF, NSDUH, or the Population Assessment of Tobacco and Health (PATH) study and may also look at tobacco and alcohol co-use in the context of use of other substances or health risk behaviors. As noted in “Measurement of Tobacco and Alcohol Co-Use” above, self-report may underestimate use; especially in nonconfidential settings, adolescents in particular may be reluctant to disclose their use of alcohol, tobacco, and other substances.¹¹¹ In the past decade, more studies have addressed patterns of use and association of alcohol use with cigarette smoking, as well as new and emerging tobacco products.

Several studies used YRBS data to explore the co-use of tobacco and alcohol among adolescents in 9th through 12th grade. A study using 2019 YRBS data found that 7.9% of middle and high school students (ages 14–18) reported co-use of cigarettes and alcohol in the past 30 days, and 13.4% reported co-use of electronic nicotine vapor products and alcohol. Frequent use (use on ≥6 days in the last 30 days) of cigarettes and alcohol or electronic nicotine vapor products and alcohol was less prevalent (1.6% and 6.1% of students, respectively).¹¹² A study of 2017 YRBS data focused on use of e-cigarettes with other tobacco products, alcohol, and cannabis.¹¹³ Among the 12% of high school students who reported using e-cigarettes, nearly all (93%) also reported use of another substance, and the use of e-cigarettes with alcohol and one or more other substances (tobacco and/or cannabis) was by far the most common product combination. A study of 2013 YRBS data demonstrated that current (past-30-day) use of alcohol varied substantially

by tobacco use status; current (past-30-day) alcohol use was 22.9% among high school students who did not use tobacco, 70.4% among those who used a single tobacco product, and 85.8% among those who used >1 tobacco product.¹¹⁴ Additionally, students who reported current use of more than one tobacco product were at significantly greater risk of current drinking and binge drinking than students who reported either use of one tobacco product or no use of tobacco.

Daw and colleagues (2013)¹¹⁵ analyzed MTF data to describe trends in alcohol use, cigarette smoking, and their co-use in the past 30 days among U.S. students in 12th grade ($N = 556,731$) from 1976 to 2010. Among both male and female students in 12th grade, the past-30-day co-use of cigarettes and alcohol declined fairly consistently over time, as did the co-occurrence of heavy smoking and heavy drinking, defined as use of half-pack per day or more of cigarettes and ≥ 6 drinks in the past 30 days. Among male students, heavy co-use of cigarettes and alcohol declined from a peak of 4.9% in 1977 to 0.8% in 2010; among female students, heavy co-use of cigarettes and alcohol declined from more than 3.0% in 1977 to 0.2% in 2010. However, the association between cigarette smoking and alcohol use, particularly heavy smoking and drinking, increased over the study period; that is, the prevalence of co-use was higher than expected than if smoking and drinking behaviors were independent of one another. As the authors note:

These findings suggest that, as tobacco use, alcohol use, and their co-use has declined among 12th graders in the U.S., the segment of the population that engage in smoking and drinking co-use has become increasingly differentiated from the general population of high school seniors. In other words, rather than being more reflective of the population prevalence of smoking and drinking, those who engage in both tobacco use and alcohol use are increasingly driven either by a common disposition for using both or a causal connection between the two behaviors.^{115,p.645}

An analysis of 2017–2019 MTF data for students in 8th, 10th, and 12th grade ($N = 51,872$) assessed the association between cigarette and e-cigarette use and alcohol use.¹¹⁶ In this sample, past-30-day use of cigarettes, e-cigarettes, or both tobacco products (compared to no tobacco product use) was strongly associated with greater likelihood of past 2-week binge drinking ($aOR = 2.80\text{--}36.53$). As the authors noted, “While all levels of nicotine use are linked to cannabis use and binge drinking outcomes, associations between vaping-only or smoking + vaping and these behaviors are high, especially at the highest levels of binge drinking.”^{116,p.1077} Finally, a study analyzing MTF data from 2014 found that students in 8th, 10th, and 12th grade who used >1 tobacco product were the most likely to also engage in alcohol use (and other substance use) and to be addicted to these substances.¹¹⁷ For example, among 12th grade students who used 2 or more nicotine products (e.g., cigarettes, e-cigarettes, and/or other nicotine products), 79.4% reported alcohol use (adjusted odds ratio [aOR] = 11.5, 95% confidence interval [CI] = 8.3–15.9, vs. no current nicotine product use). Among 12th grade students who used only cigarettes, 70.4% ($aOR = 4.5$, 95% $CI = 3.8\text{--}12.4$, vs. no current nicotine product use) reported alcohol use, and among those who reported only use of e-cigarettes, 60.7% reported alcohol use ($aOR = 6.9$, 95% $CI = 3.2\text{--}6.3$, vs. no current nicotine product use). Alcohol use was far lower (25.1%) among 12th grade students who reported no use of cigarettes, e-cigarettes, or other nicotine products. In sum, while use of tobacco and use of alcohol by adolescents has declined substantially over time, co-use of tobacco and alcohol is still more prevalent among adolescents than would be expected from the individual declines in use prevalence for each substance.¹¹⁷

Conway and colleagues (2018)¹¹⁸ analyzed data from Wave 1 (2013–2014) of the PATH study, to understand the co-occurrence of tobacco product use, substance use, and mental health conditions among adolescents ages 12–17 ($N = 13,617$). In adjusted analysis, use of any tobacco product or specific tobacco products (cigarettes, e-cigarettes, cigars, pipe, hookah, smokeless tobacco, and snus) was associated with significantly higher odds of use of alcohol relative to non-use. For example, adolescents who reported ever smoking cigarettes were 5 times more likely to report ever using alcohol compared to adolescents who never smoked cigarettes ($aOR = 5.6$, $95\% CI = 4.8–6.5$). Longitudinal data from the PATH study were also used to determine initiation and correlates of initiation for cigarettes and other tobacco products among adolescent (ages 12–17) participants in PATH Wave 1 (2013–2014) and PATH Wave 4 (2016–2018).¹¹⁹ By Wave 4, nearly one-third (32.5%) of adolescents who never used tobacco at Wave 1 had initiated tobacco use; prior use of other tobacco products and ever use of alcohol were associated with initiation of cigarette, e-cigarette, cigar, and hookah at Wave 4. Pérez and colleagues (2021)¹²⁰ analyzed data from Waves 1 through 5 of the PATH study (2013–2019) to estimate the age of initiating past-30-day use of multiple tobacco products (cigarettes with either e-cigarettes or cigarillos) and binge drinking. By age 21, 4.4% ($95\% CI, 3.7\%–5.2\%$) of adolescents initiated use of cigarettes, e-cigarettes, and binge drinking, and 2.0% ($95\% CI, 1.2\%–2.8\%$) of adolescents initiated use of cigarettes, cigarillos, and binge drinking (participants could fall into both groups). Lastly, Silveira and colleagues (2018),¹²¹ analyzing data from Waves 1 (2013–2014) and Waves 2 (2014–2015) of the PATH study, documented bidirectional associations between tobacco and alcohol use among adolescents ages 12–17, specifically that ever use of e-cigarettes, cigars, or hookah predicted later alcohol use, and ever alcohol use predicted later tobacco use of any tobacco product and of cigarettes, e-cigarettes, any cigars, traditional cigars, cigarillos, filtered cigars, pipes, hookah, any smokeless tobacco, or snus individually.

A study using the 2018 NSDUH adult data ($N = 43,026$) examined the association between adult binge drinking and the age of initiating smokeless tobacco use, defined as early (less than age 18) or late (age 18 or older).¹²² In this study, both early initiation of smokeless tobacco use and early initiation of alcohol use were significantly associated with increased likelihood of adult binge drinking.

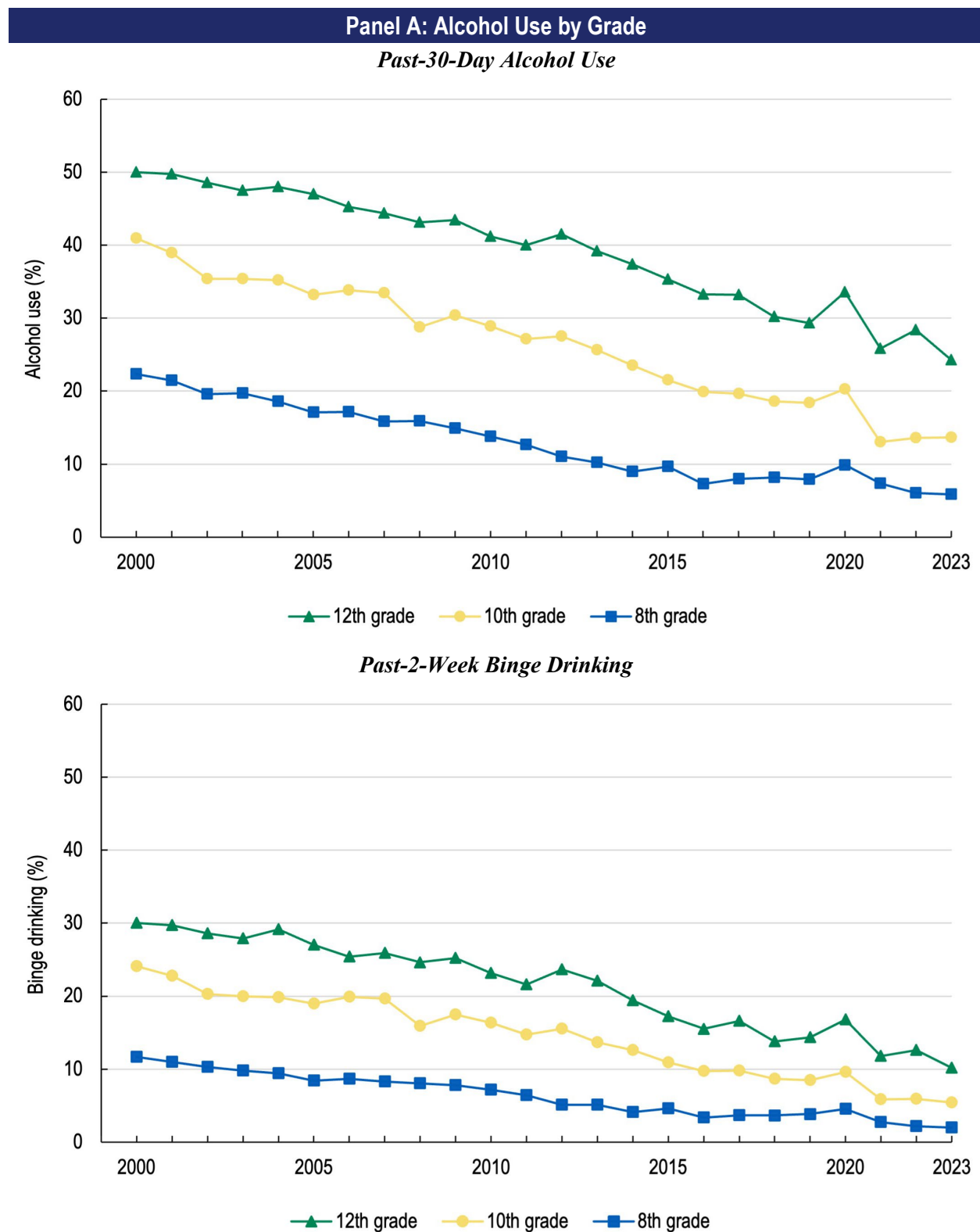
Monitoring the Future Analysis: Tobacco and Alcohol Co-Use Over Time Among 8th, 10th, and 12th Grade Students

New analyses of 2000–2023 MTF data were conducted to describe trends over time in co-use of tobacco and alcohol among students in 8th, 10th, and 12th grade. Figure 2.2 shows trends in current (past-30-day) use of tobacco (nicotine vaping, cigarettes, large cigars, and smokeless tobacco) and current (past-30-day) alcohol use, as well as trends in co-use of tobacco and alcohol and co-occurrence of tobacco use and past-2-week binge drinking (see Appendix Tables 2D.1, 2D.2, 2D.3). Across all 3 grades, past-30-day alcohol use and past-2-week binge drinking declined fairly steadily over time (Panel A: Alcohol Use by Grade). Overall, co-use of alcohol with nicotine vaping was the most common tobacco-alcohol co-use pattern observed among 8th, 10th, and 12th grade students. In 2017, the MTF study revised its questions on vaping to include separate questions on vaping of nicotine, cannabis, and “just flavoring.” Nicotine vaping among students in all 3 grades (8, 10, and 12), rose steadily from 2017 to 2019 and then began to slowly decline (Panel B: Nicotine Vaping and Co-Use with Alcohol by Grade). Trends in co-use of

alcohol and nicotine vaping and binge drinking and nicotine vaping roughly followed trends in students' nicotine vaping. In 2023, a total of 9.9% (95% CI, 7.9%–12.3%) of 12th grade students, 6.2% (95% CI, 5.2%–7.3%) of 10th grade students, and 2.3% (95% CI, 1.7%–3.2%) of 8th grade students reported current (past-30-day) co-use of alcohol with nicotine vaping. About one-half of students who reported past-30-day nicotine vaping and alcohol co-use also reported past-2-week binge drinking, and 5.5% (95% CI = 4.2%–7.0%) of students in 12th grade, 3.2% (95% CI = 2.5%–4.0%) of students in 10th grade, and 1.1% (95% CI = 0.7%–1.7%) of students in 8th grade reported binge drinking and nicotine vaping.

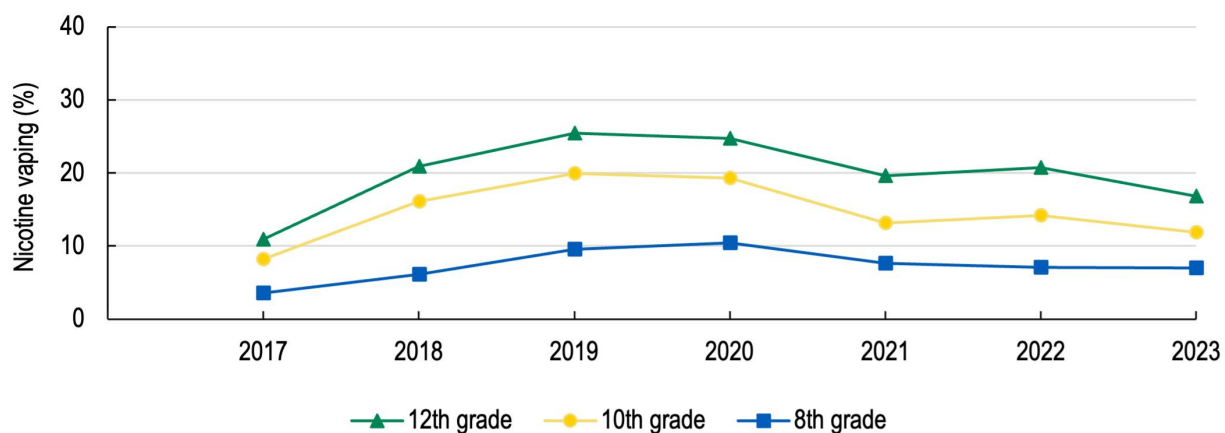
Co-use of cigarettes and cigars with alcohol declined over time, while co-use of smokeless tobacco over time varied. Consistent declines in cigarette smoking and co-use of cigarettes with alcohol, as well as in cigarette smoking combined with binge drinking, were also observed across the 3 grades from 2000 to 2023 (Panel C: Cigarette Smoking and Co-Use with Alcohol by Grade). Indeed, by 2023, less than 3% of students (1.5% [95% CI = 1.0%–2.1%] in 10th grade and 2.1% [95% CI = 1.3–3.2%] in 12th grade) reported co-use of cigarettes with alcohol. Among students in 10th and 12th grade, large cigar smoking declined from 2014 to 2023; co-use of large cigars and alcohol varied over time but also declined since 2014 (Panel D: Large Cigar Smoking and Co-Use with Alcohol by Grade). Among students in 8th grade, large cigar smoking and co-use of large cigars with alcohol was low (<1.0% of students in 2023), but little change in these behaviors was seen since 2014. Variation in the prevalence of smokeless tobacco use, co-use of smokeless tobacco and alcohol, and co-occurrence of smokeless tobacco use with binge drinking was seen from 2000 to 2023 among students in 10th and 12th grade; in contrast, students in 8th grade showed small but steady decreases in all 3 behaviors over time (Panel E: Smokeless Tobacco Use and Co-Use with Alcohol by Grade).

Figure 2.2 Co-Use Prevalence Over Time Among Students in 8th, 10th, and 12th Grade (2000–2023 Monitoring the Future Study)

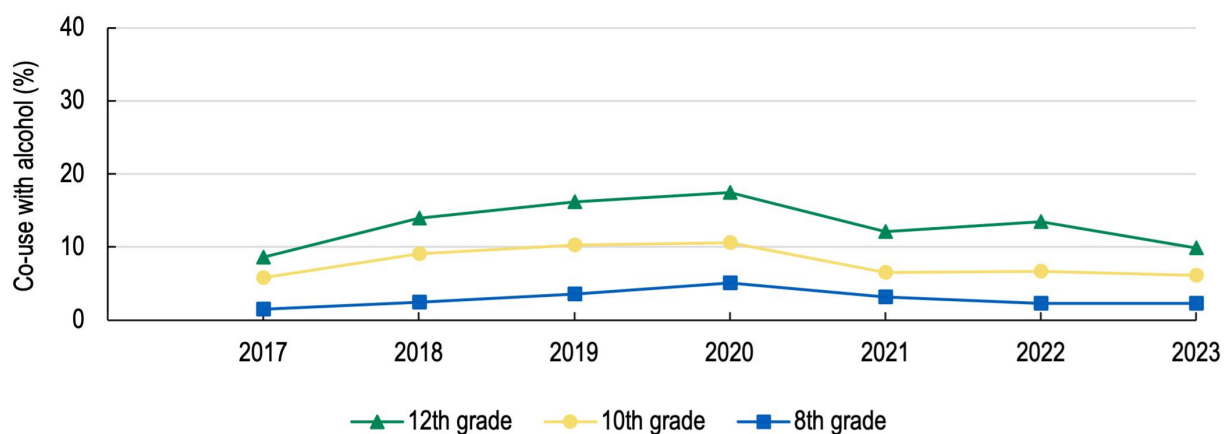


Panel B: Nicotine Vaping and Co-Use with Alcohol by Grade

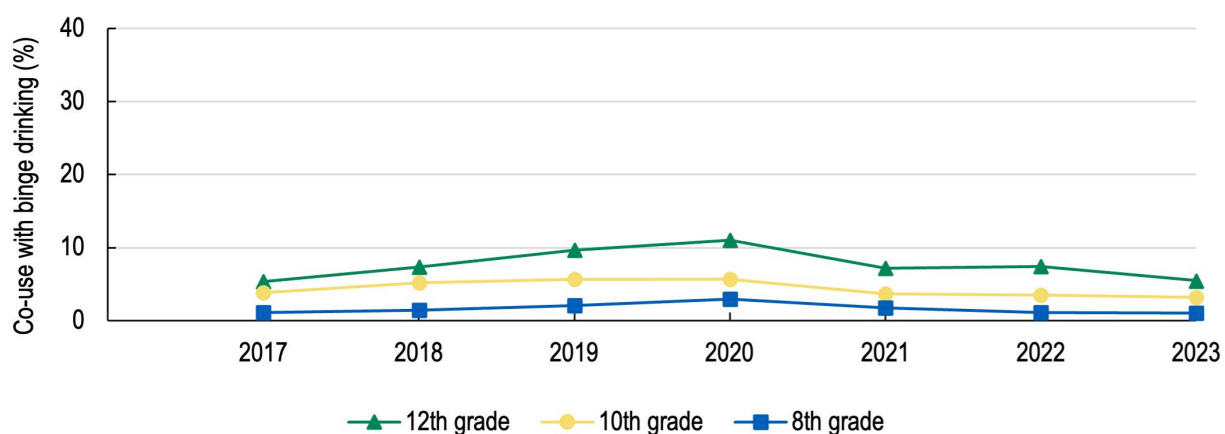
Past-30-Day Nicotine Vaping



Co-Use: Past-30-Day Nicotine Vaping With Past-30-Day Alcohol Use

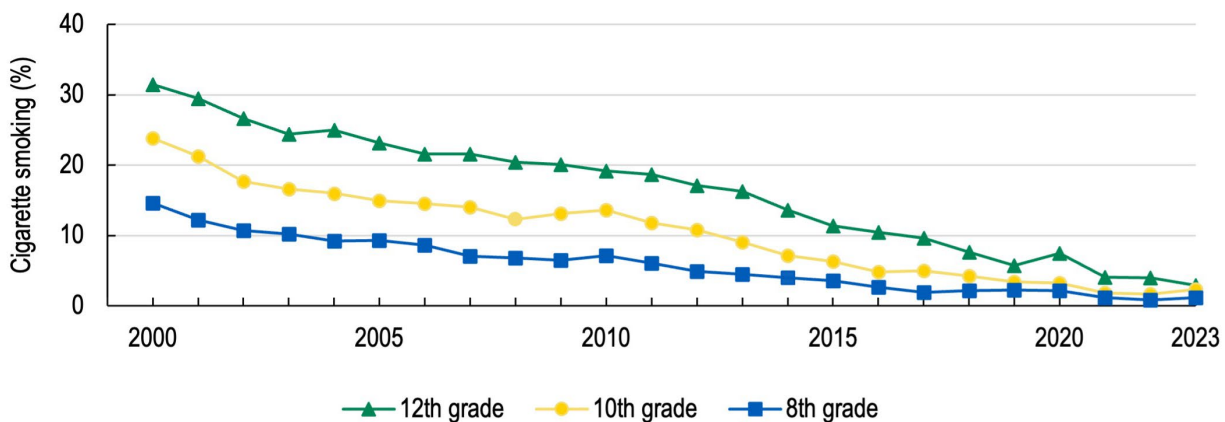


Co-Use: Past-30-Day Nicotine Vaping With Past-2-Week Binge Drinking

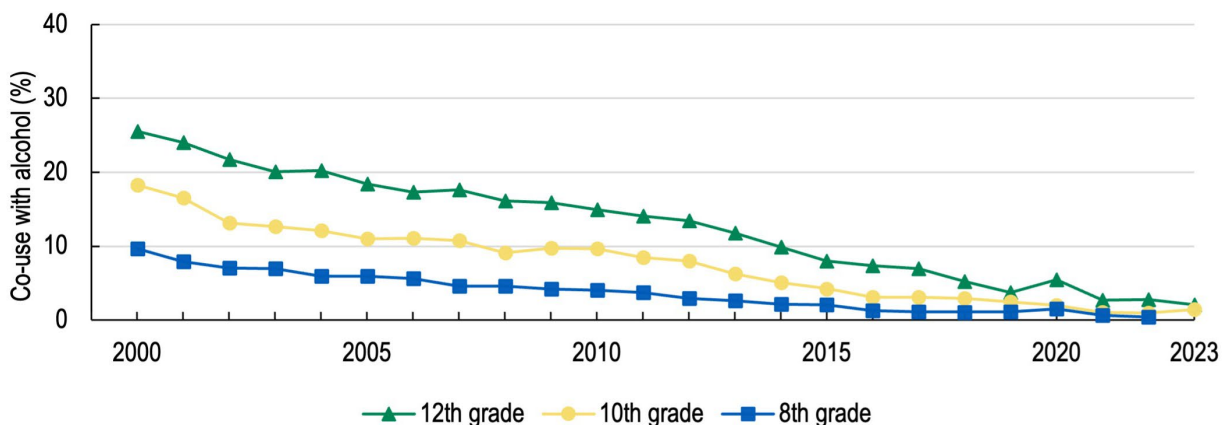


Panel C: Cigarette Smoking and Co-Use with Alcohol by Grade

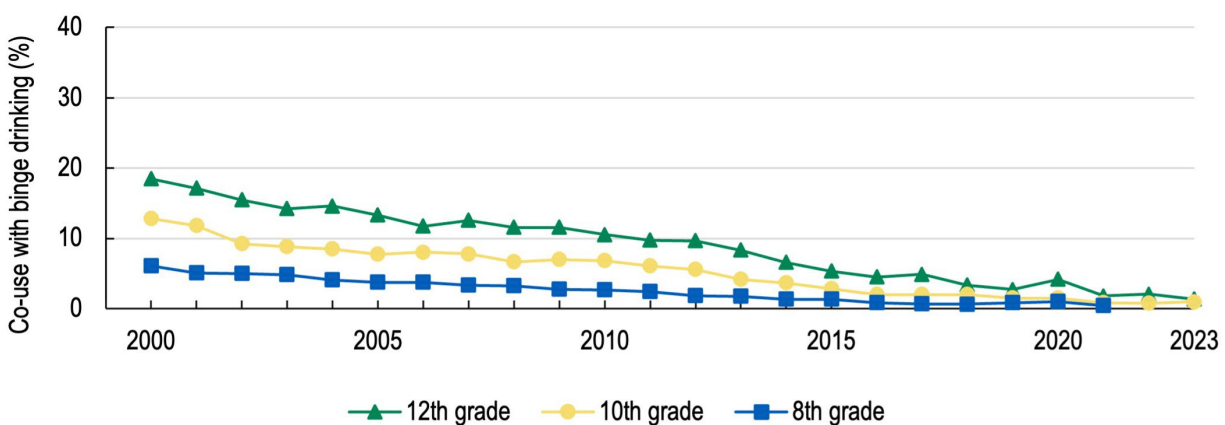
Past-30-Day Cigarette Smoking



Co-Use: Past-30-Day Cigarette Smoking With Past-30-Day Alcohol Use

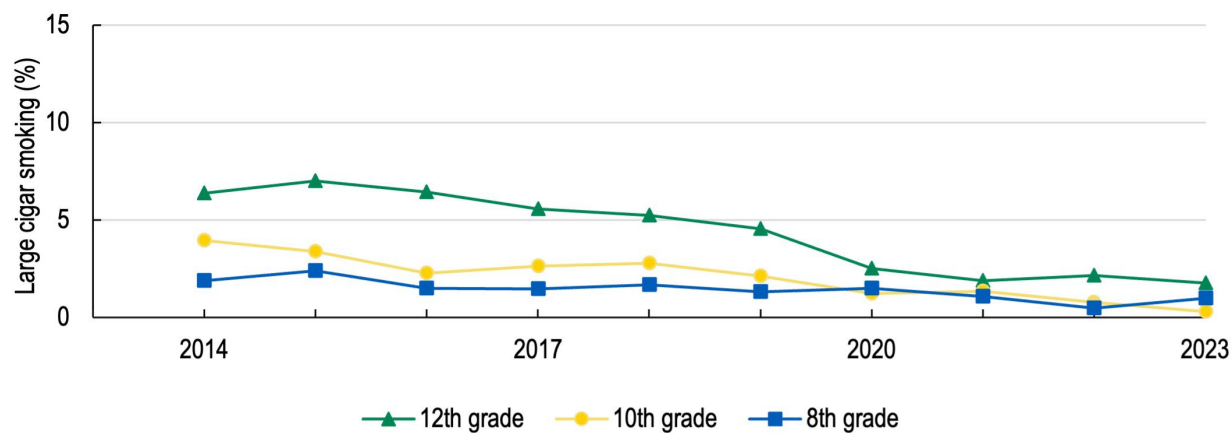


Co-Use: Past-30-Day Cigarette Smoking With Past-2-Week Binge Drinking

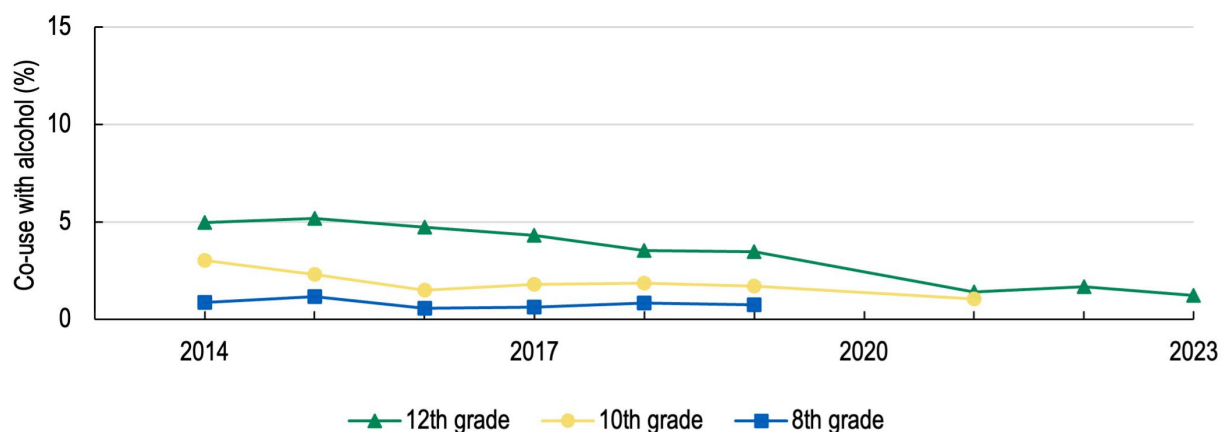


Panel D: Large Cigar Smoking and Co-Use with Alcohol by Grade

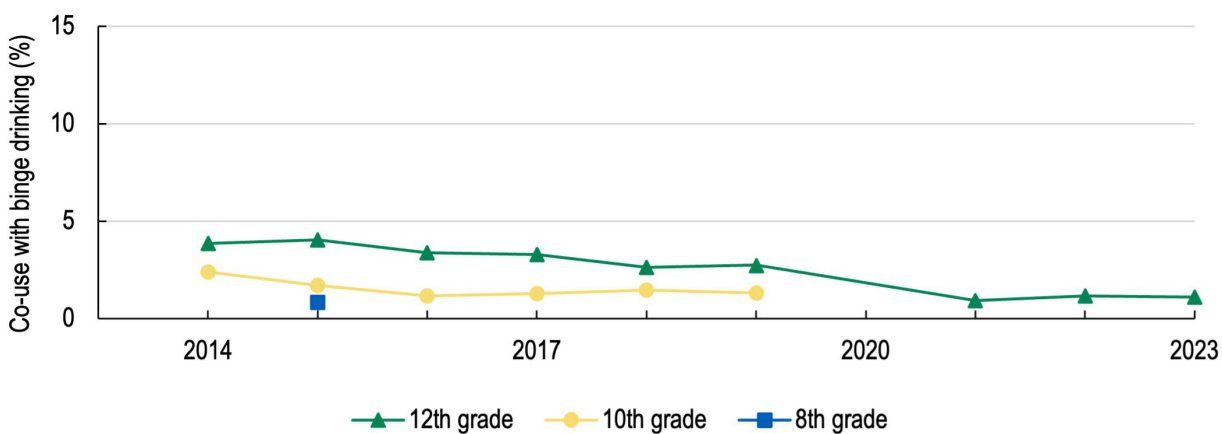
Past-30-Day Large Cigar Smoking



Co-Use: Past-30-Day Large Cigar Smoking With Past-30-Day Alcohol Use

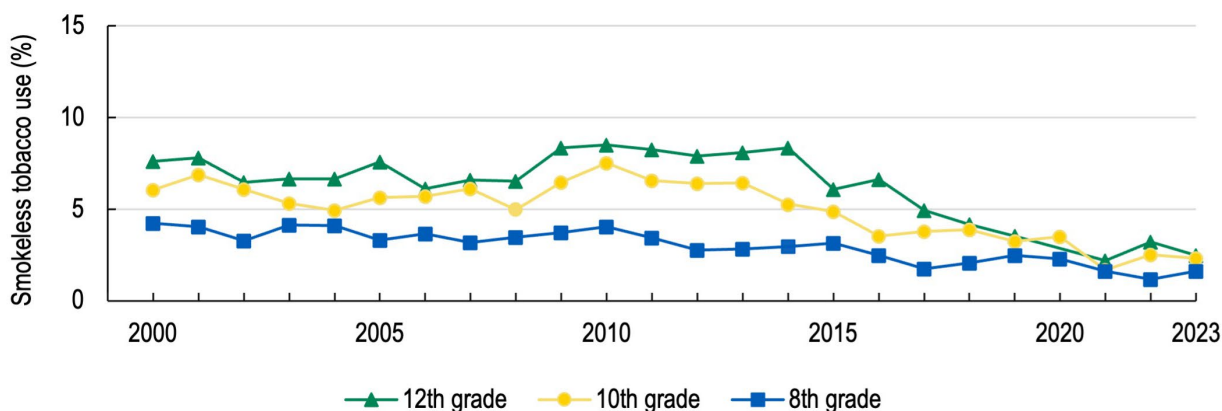


Co-Use: Past-30-Day Large Cigar Smoking With Past-2-Week Binge Drinking

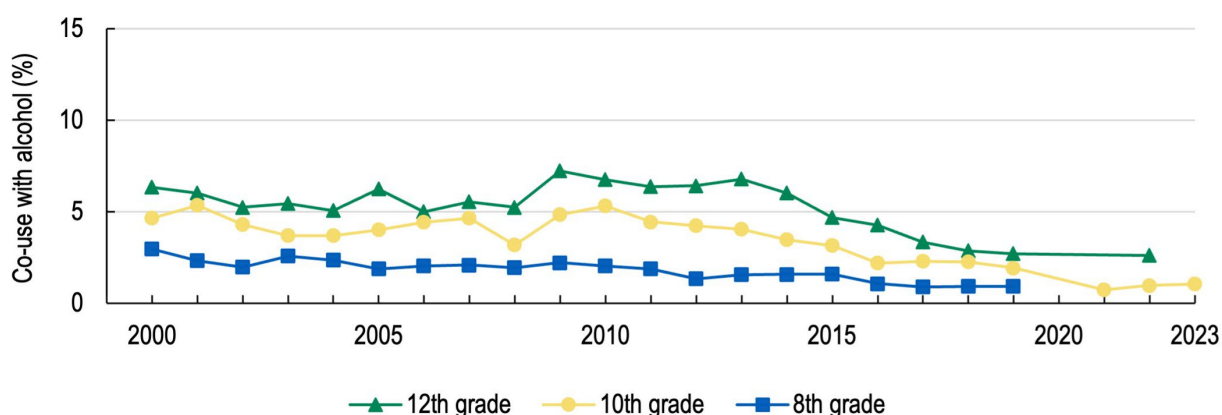


Panel E: Smokeless Tobacco Use and Co-Use with Alcohol by Grade

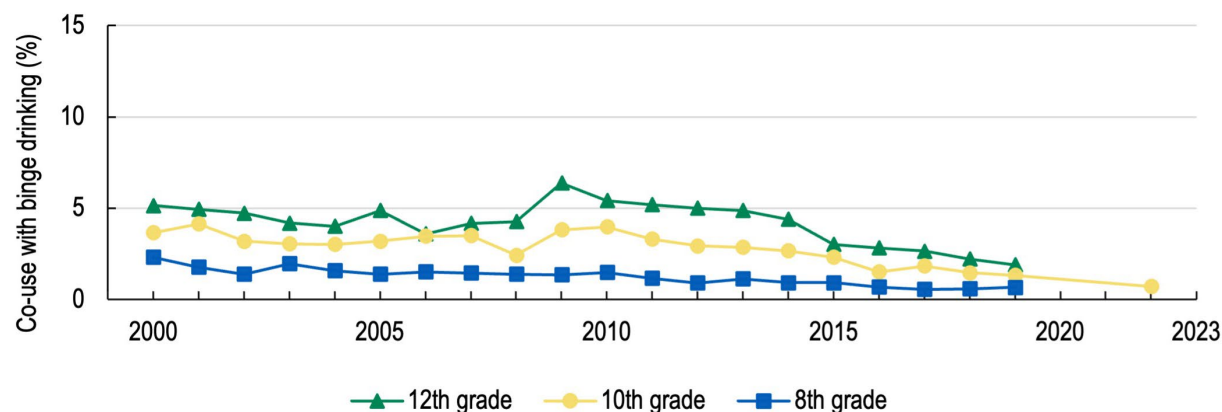
Past-30-Day Smokeless Tobacco Use



Co-Use: Past-30-Day Smokeless Tobacco Use With Past-30-Day Alcohol Use



Co-Use: Past-30-Day Smokeless Tobacco Use With Past-2-Week Binge Drinking



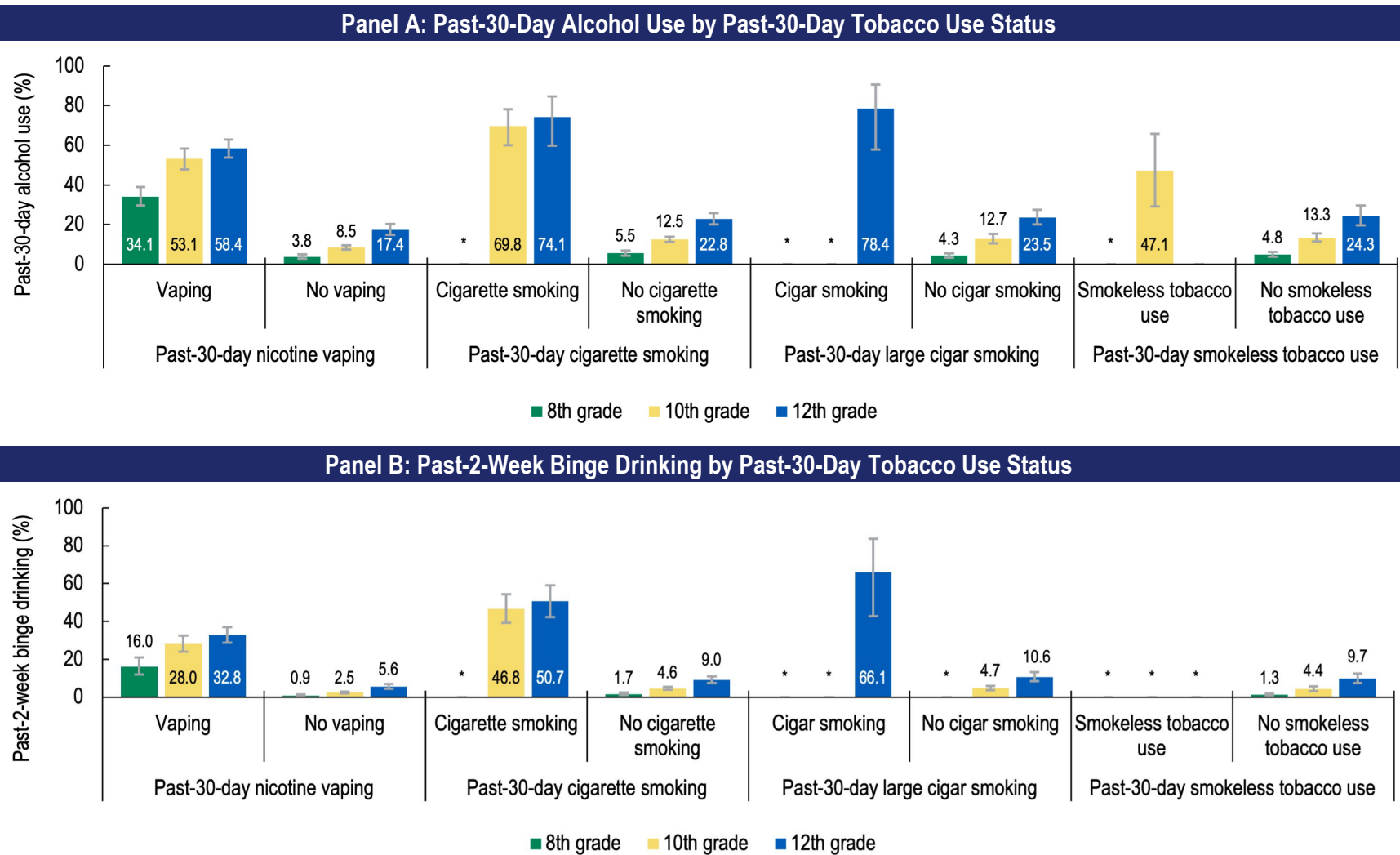
Note. For full data, see Appendix Tables 2D.1, 2D.2, and 2D.3. Some estimates for certain years and grade levels are suppressed due to small sample size. The large cigar question was first asked in 2014. The nicotine vaping question was first asked in 2017. *Binge drinking* is defined as drinking 5 or more drinks in a row over the past 2 weeks. *Tobacco product use* and *alcohol use* are defined as use in the past 30 days. *Co-use* is defined as use of both tobacco and alcohol in the past 30 days, or use of tobacco in the past 30 days and reporting binge drinking in past 2 weeks.

Source: 2000–2023 Monitoring the Future study.

Monitoring the Future Analysis: Alcohol Use Among 8th, 10th, and 12th Grade Students Who Use Tobacco

In 2023, between 47.1% and 78.4% of students in 10th and 12th grade who reported past-30-day use of tobacco products also reported past-30-day alcohol use, as shown in Figure 2.3 (Appendix Table 2D.4). Regardless of grade, past-30-day alcohol use and past-2-week binge drinking levels were far lower among students who reported no past-30-day tobacco use than among their same-age counterparts who reported tobacco use. About one-third (34.1%, 95% CI = 29.5%–39.0%) of students in 8th grade and more than one-half of students in 10th grade (53.1%, 95% CI = 47.8%–58.3%) and 12th grade (58.4%, 95% CI = 53.7%–62.9%) who reported nicotine vaping also reported past-30-day alcohol use. More than two-thirds of students in 10th grade (69.8%, 95% CI = 59.9%–78.1%) and 12th grade (74.1%, 95% CI = 59.8%–84.7%) who reported past-30-day cigarette smoking also reported past-30-day alcohol use. Roughly one-half of the students in 10th grade (46.8%, 95% CI = 39.3%–54.4%) and 12th grade (50.7%, 95% CI = 42.2%–59.1%) who reported cigarette smoking also reported past-2-week binge drinking. Similarly, 16.0% (95% CI, 12.0%–21.1%) of students in 8th grade, 28.0% (95% CI, 24.0%–32.5%) in 10th grade, and 32.8% (95% CI, 28.8%–37.1%) in 12th grade who reported current nicotine vaping also reported binge drinking.

Figure 2.3 Alcohol Use by Tobacco Use Status Among Students in 8th, 10th, and 12th Grade (2023 Monitoring the Future Study)



Note. For full data, see Appendix Table 2D.4. Estimates of alcohol use and binge drinking among students in 8th grade who smoked cigarettes are suppressed due to small sample size. Binge drinking is defined as drinking 5 or more drinks in a row over the past 2 weeks. Alcohol use, cigarette smoking, and nicotine vaping are defined as use in the past 30 days.

*Groups with $n < 30$ are suppressed.

Source: 2023 Monitoring the Future study.

Summary: Co-Use of Tobacco and Alcohol Among Adolescents

Tobacco and alcohol use often begin in adolescence. Although the past several decades have seen steep declines in adolescent cigarette smoking, adolescent tobacco use reflects the diversity of the tobacco product marketplace. In particular, e-cigarettes have been the most commonly used tobacco product among adolescents since 2014, and use of multiple tobacco products (polytobacco use) is now common. Although adolescent alcohol use has also declined over the past few decades, alcohol remains the most common addictive substance used by adolescents, and hazardous alcohol use (e.g., binge drinking) among adolescents is not uncommon. Importantly, the proportion of adolescents using both tobacco and alcohol among those using either substance remains high, placing adolescents at risk from the combined effects of tobacco and alcohol.

Analysis of nationally representative studies of youth, including YRBS, MTF, NSDUH, and the PATH study, as well as new analyses of 2000–2023 MTF data conducted for this chapter, provide updated information on the close association between tobacco and alcohol use among adolescents. The literature documents the continued strong association between the use of diverse forms of tobacco products now available in the United States and alcohol use. Among adolescents, tobacco use is a risk factor for alcohol use and alcohol use is a risk factor for tobacco use. The risk for alcohol use and binge drinking is far greater among adolescents who use cigarettes, e-cigarettes, smokeless tobacco, or other tobacco products than among those who do not use a tobacco product. Most adolescents who use a tobacco product also drink alcohol; conversely, most adolescents who drink alcohol also use a tobacco product. Analysis of MTF data shows that, in 2023, co-use of alcohol with nicotine vaping was the most common tobacco-alcohol co-use pattern observed among 8th, 10th, and 12th grade students. Regardless of grade, past-30-day alcohol use and past-2-week binge drinking levels were far lower among students who reported no past-30-day tobacco use than among their same-age counterparts who reported tobacco use. Additionally, the literature strongly suggests that polytobacco use is an even stronger risk factor for alcohol use than use of one tobacco product or no use of tobacco products. This finding has important implications for prevention, given the increased frequency of polytobacco use among adolescents.

Co-Use of Tobacco and Alcohol Among Adults

Selected studies that use nationally representative data to estimate levels of tobacco and alcohol co-use among U.S. adults, or to examine trends in co-use over time, are described in this section.

Studies analyzing nationally representative data from the early to mid-2000s indicate that around one in five adults reported co-use of any tobacco product and alcohol in the past year.^{123,124} In the first wave of the nationally representative, National Institute on Alcohol Abuse and Alcoholism (NIAAA)-sponsored National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) conducted in 2001–2002, past-year co-use of alcohol and a tobacco product (cigarettes, cigars, pipes, and/or smokeless tobacco) was reported by 21.7% of adults ages 18 and older (27.5% of men; 16.4% of women).¹²³ A study using data from the 2012–2013 NESARC-III, which assessed co-use of alcohol and nicotine, found a similar prevalence of past-year co-use: 21.6% of adults reported use of alcohol and nicotine (25.0% of men; 18.2% of women), while 4.6% of adults reported use of alcohol, nicotine, and cannabis (6.0% of men; 3.2% of women).¹²⁴

NESARC data also indicate that cigarette smoking prevalence, nicotine dependence, and nicotine use disorders are higher among people with AUDs, and, conversely, diagnoses of AUDs are more prevalent among people who smoke.¹²³⁻¹³³ In the 2012–2013 NESARC, nearly one-half of adults with a past-year AUD reported cigarette smoking in the past year.^{131,133} Around one-third of adults with an AUD also reported nicotine dependence (2001–2002 NESARC),^{123,127} a nicotine use disorder (DSM-5 criteria; 2012–2013 NESARC),¹²⁴ or past-year daily smoking (2012–2013 NESARC).¹³³ A study using 2012–2013 NESARC data found that the odds of having any nicotine use disorder were higher (aOR = 2.47, 95% CI = 2.25–2.72) among those with an AUD than among those without an AUD.¹²⁵ Among young adult (ages 18–25) participants in the 2001–2002 NESARC, more than 30% of those who smoked in the past year reported a past-year AUD diagnosis, compared with 10.8% who did not smoke.¹²⁸ Finally, a study examining e-cigarette use among 2012–2013 NESARC participants found that those who used e-cigarettes in the past year had higher odds of having a past-year AUD (nondaily e-cigarette use aOR = 2.44, 95% CI = 2.09–2.84; daily e-cigarette use aOR = 1.89, 95% CI = 1.42–2.52) than those who did not use e-cigarettes, and those who used e-cigarettes and cigarettes nondaily had the highest odds of having a past-year AUD (aOR = 5.20, 95% CI = 3.77–7.17).¹³⁴

Using more recent data from Wave 1 of the PATH study (2013–2014), Cohn and colleagues (2018)¹³⁵ found that the prevalence of past-30-day co-use of tobacco and alcohol ranged from around 1% to 5% depending on the respondent’s age and type of tobacco product(s) used. Not using tobacco, alcohol, or cannabis was the most common use pattern overall (33.5% among young adults ages 18–24; 36.3% among adults ages 25 and older), followed by alcohol-only use (20.7% among young adults ages 18–24; 32.2% among adults ages 25 and older). Co-use of alcohol and cigarettes was the most common tobacco-alcohol co-use pattern with a prevalence of 3.7% among young adults ages 18–24 and 5.4% among adults ages 25 and older. Other tobacco-alcohol co-use patterns included use of alcohol with hookah (1.9% among young adults; 0.2% among adults ages 25 and older), alcohol with both cigarettes and e-cigarettes (1.3% among young adults; 1.4% among adults ages 25 and older), alcohol with both cigars and cigarettes (1.2% among young adults; 0.8% among adults ages 25 and older), alcohol with cigars (0.9% of young adults and 1.1% of adults ages 25 and older), and alcohol with other tobacco products (0.7% of young adults and 1.0% of adults ages 25 and older). However, estimates of tobacco and alcohol co-use prevalence in this study refer to exclusive use of particular products. For example, the estimated co-use prevalence of alcohol and cigarettes was defined as use of only alcohol and cigarettes, without use of any other tobacco or alcohol products (or cannabis).

Studies using NSDUH data have also examined co-use patterns among adults. Weinberger and colleagues (2019)¹³⁶ analyzed data from the 2002–2016 NSDUH to examine trends in cigarette smoking prevalence among people ages 12 and older with and without a past-year AUD. The prevalence of smoking decreased over time among both those with and without an AUD; however, in each year of the study, smoking was more than twice as common among people with an AUD than among those without an AUD. For example, in 2016, the prevalence of cigarette smoking was 37.8% among people with an AUD and 16.3% among those without an AUD. Additionally, the prevalence of smoking was higher among people with severe AUD (52.2%) than among those with mild AUD (34.6%) or moderate AUD (35.4%). Pham and colleagues (2024)¹³⁷ analyzed data from the 2010–2019 NSDUH to examine tobacco use and nicotine

dependence among people with no alcohol use, “low-risk” alcohol use ($\leq 7/14$ drinks per week for women/men), and “high-risk” alcohol use ($> 7/14$ drinks per week for women/men). In all study years, past-month tobacco use prevalence was consistently higher among people who used alcohol, compared to those who did not use alcohol. Prevalence of nicotine dependence was similar between the no alcohol use and low-risk alcohol use groups but higher in the high-risk alcohol use group. Among people who reported high-risk alcohol use, younger age (versus ages 65 or older) and being male (versus female) were associated with both increased odds of tobacco use and increased odds of nicotine dependence. Another study used NSDUH data (2002–2019) to examine co-use patterns of cigar smoking among adults.¹³⁸ In this study, one of the few to examine co-use of cigars with alcohol, past-year alcohol or substance use disorders were associated with an increased likelihood of past-30-day cigar smoking, compared to adults without such disorders (aORs from 1.70 to 3.26).

Osibogun and colleagues (2022)¹³⁹ used 2020 Behavioral Risk Factor Surveillance System (BRFSS) data to examine the relationship between heavy alcohol consumption (> 14 drinks/week for men; > 7 drinks/week for women) and current every or some day use of cigarettes, e-cigarettes, and dual use of cigarettes and e-cigarettes among adults ages 18 and older. Heavy alcohol consumption was higher among those who reported cigarette use (12.3%), e-cigarette use (13.3%), or dual use of cigarettes and e-cigarettes (14.7%) than among those who reported not using a tobacco product (3.2%). Heavy alcohol consumption was associated with higher odds of cigarette use, e-cigarette use, and dual use of cigarettes and e-cigarettes than no heavy alcohol consumption (aORs ranging from 3.02 to 4.78). Finally, a study using 2016–2017 BRFSS data found that adults who used smokeless tobacco were more likely to engage in heavy alcohol use (> 14 drinks/week for men; > 7 drinks/week for women) than adults who did not use smokeless tobacco (15% vs. 6%, respectively). Use of smokeless tobacco was associated with increased odds of heavy alcohol consumption (aOR 2.36, 95% CI = 2.17–2.56).¹⁴⁰

Several studies also looked specifically at co-use among young adults, typically defined as adults ages 18–26.¹⁴¹ This developmental period, which bridges adolescence and independent adulthood, brings numerous transitions, challenges, and obligations as young people complete their schooling, enter the workforce, and become more independent. As during adolescence, young adults may engage in health risk behaviors, with significant consequences for later life. Studies of young adults indicate that co-use of tobacco and alcohol is common, and that the number of cigarettes smoked is positively associated with number of drinks consumed.^{17,135,142,143} A 21-day diary study of college students ($N = 86$) found that co-use was predicted by number of drinks (aOR = 1.18; Beta = 0.16, standard error [SE] = 0.03) and being at a party (aOR = 3.57, Beta = 1.28, SE = 0.30) or at a bar (aOR = 2.17; Beta = 0.78, SE = 0.36) compared to other locations.¹⁷ Three times as many cigarettes were reported on drinking occasions, compared with not drinking (3.35 vs. 0.85 cigarettes), and an average of 5.16 drinks were consumed while smoking versus 4.05 consumed while not smoking.¹⁷ In a sample of 18- to 25-year-olds ($N = 1,405$) who reported cigarette and alcohol use in the past 30 days, cigarettes were smoked on 85.7% of the days on which binge drinking was reported.¹⁴² Those who reported binge drinking four or more days in the last month also reported smoking more cigarettes per day than those who reported zero binge drinking days. Further, a study of college students ($N = 341$) found that any cigarette smoking and e-cigarette use (versus no cigarette smoking or e-cigarette use) were associated with increased odds of same-day alcohol co-use (cigarette smoking:

aOR = 3.18, 95% CI = 2.45–4.12; e-cigarette use: aOR = 2.51, 95% CI = 2.05–3.06), and drinking alcohol (versus not drinking alcohol) was associated with increased odds of same-day cigarette smoking (aOR = 3.29, 95% CI = 2.53–4.29) and same-day e-cigarette use (aOR = 2.54, 95% CI = 2.08–3.10).¹⁴³

Box 2.2. Trends in Use and Co-Use of Tobacco and Alcohol During the COVID-19 Pandemic

A global outbreak of a novel human coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), began in December 2019. The outbreak was declared a pandemic by the World Health Organization in March 2020, and the United States also declared a national emergency in March 2020, which was lifted in May 2023.^{144,145} The pandemic resulted in lockdowns, closures, stay-at-home orders, social distancing recommendations, and restrictions on numerous activities to limit the spread of the virus, although the implementation of these policies varied considerably by jurisdiction.¹⁴⁶⁻¹⁴⁹ In the United States, the pandemic is estimated to have caused more than 1.2 million deaths between January 1, 2020, and May 31, 2025,¹⁴⁶ and caused significant economic and social disruption.^{150,151} The impact of the pandemic on excess mortality varied substantially within the population.¹⁵² The pandemic also increased social isolation, worsened physical and mental health, and disrupted health services, among many other consequences, with some subpopulations groups experiencing worse outcomes than others.¹⁵³⁻¹⁵⁵ Additionally, the pandemic affected surveillance, as surveys had to interrupt their procedures midstream, affecting analyses of trends over time.¹⁵⁶ There were also substantial and lingering effects on study participation and response rates.

A limited number of nationally representative studies have assessed the COVID-19 pandemic's impact on tobacco and alcohol co-use. A study using nationally representative PATH data examined changes in past-30-day tobacco and alcohol use prevalence (separately) between 2018–2019 and 2020 and found that prevalence of both tobacco use and alcohol use declined among adolescents ages 13–17.¹⁵⁷ Among adult PATH participants, tobacco use prevalence declined for all age groups between the two time periods. Alcohol use prevalence did not change except among those ages 21–24; in this age group, use increased from 60.2% to 65.2% between 2018–2019 and 2020. A study using data from the Adolescent Brain Cognitive Development (ABCD) Study, a prospective, longitudinal, nationwide cohort of children ages 9–10 years at enrollment, examined substance use among 7,842 adolescents who completed 3 assessments between May and August 2020.¹⁵⁸ Prevalence of past-30-day individual substance use remained fairly stable across the three assessments. Collapsing data across all timepoints, the study observed that 20% of adolescents reporting alcohol use also used tobacco products (cigarettes, e-cigarettes, cigar, hookah, pipe, or smokeless tobacco), and that 21% of adolescents reporting tobacco use also used alcohol. In another study, Bandi and colleagues (2022)¹⁵⁹ used BRFSS data to examine smoking cessation attempts by adults (ages 18 and older) during the COVID-19 pandemic and correlates of any changes in smoking cessation behavior from 2011 to 2020. Although the study did not investigate tobacco and alcohol co-use per se, the researchers reported that, for the first time since 2011, past-year smoking cessation attempts decreased (from 65.2% in 2019 to 63.2% in 2020), and that the decline in smoking cessation attempts did not vary by past-30-day heavy drinking status (self-report of >14 drinks/week among men and >7 drinks/week among women).

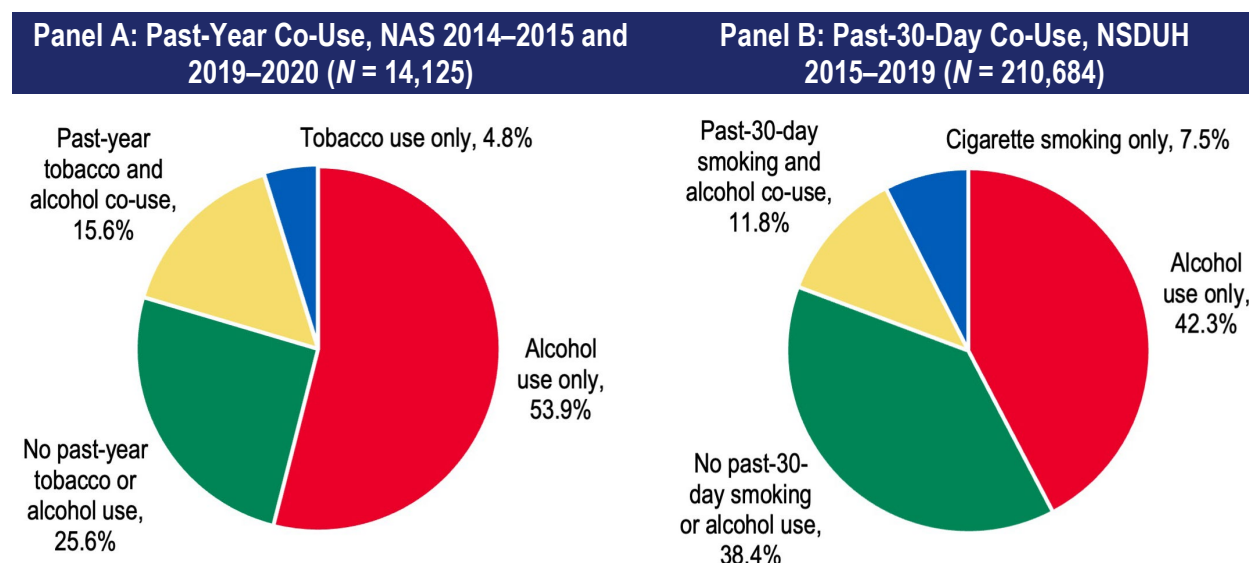
Continued efforts to improve surveillance of co-use of tobacco and alcohol in multiple demographic groups can inform public health efforts and determine whether pandemic-related changes in substance use patterns persist.

National Alcohol Surveys and National Survey on Drug Use and Health Analyses of Tobacco and Alcohol Co-Use

This section presents overall population tobacco and alcohol co-use prevalence and past-year and past-30-day alcohol use by tobacco/smoking status from new analyses of both the pooled 2014–2015 and 2019–2020 NAS and the pooled 2015–2019 NSDUH. Past-year average number of drinks consumed and alcohol use by setting, stratified by tobacco use status, are also presented based on data from NAS. Finally, this section describes NAS data on lifetime heavy drinking, defined as the number of days on which five or more drinks were consumed, by tobacco use status and cigarette pack years (the number of packs smoked per day multiplied by the number of years smoked). An overview of the demographics of the pooled 2014–2015 and 2019–2020 NAS is provided in Appendix Table 2D.5, and an overview of the participant demographics of the pooled 2015–2019 NSDUH is provided in Appendix Table 2D.6.

Overall, 15.6% (95% CI, 14.7%–16.6%) of NAS participants reported past-year co-use of tobacco and alcohol; 11.8% (95% CI, 11.7%–12.0%) of NSDUH participants reported past-30-day co-use of cigarettes and alcohol (Figure 2.4; Appendix Table 2D.7). More than one-half (53.9%, 95% CI = 52.7%–55.1%) of NAS participants and 42.3% (95% CI, 42.0%–42.6%) of NSDUH participants reported only alcohol use in the past year and past 30 days, respectively (Appendix Table 2D.7). Regarding only tobacco use, 4.8% (95% CI, 4.3%–5.4%) of NAS participants reported only past-year tobacco use (defined as use of tobacco products other than e-cigarettes), while 7.5% (95% CI, 7.3%–7.6%) of NSDUH participants reported only past-30-day cigarette smoking (Appendix Table 2D.7). Differences in levels of co-use between the NAS and NSDUH may be attributed to survey year, different measurement timeframes (past year in NAS; past month in NSDUH), tobacco product measured (cigarette smoking in NSDUH; tobacco products other than e-cigarettes in NAS), and other factors. Using the estimated U.S. adult population for 2019 (251 million)¹⁶⁰ these percentages indicate that approximately 39.2 million U.S. adults reported co-use of tobacco and alcohol in the past year and about 29.6 million in the past month.

Figure 2.4 Co-Use Prevalence in 2014–2015 and 2019–2020 National Alcohol Surveys (N = 14,125) and 2015–2019 National Survey on Drug Use and Health (N = 210,684) Among Adults Ages 18 and Older



Note. NAS = National Alcohol Surveys; NSDUH = National Survey on Drug Use and Health. For full data, see Appendix Table 2D.7. Tobacco use in the NAS is defined as use of tobacco products (other than e-cigarettes) in the past year.

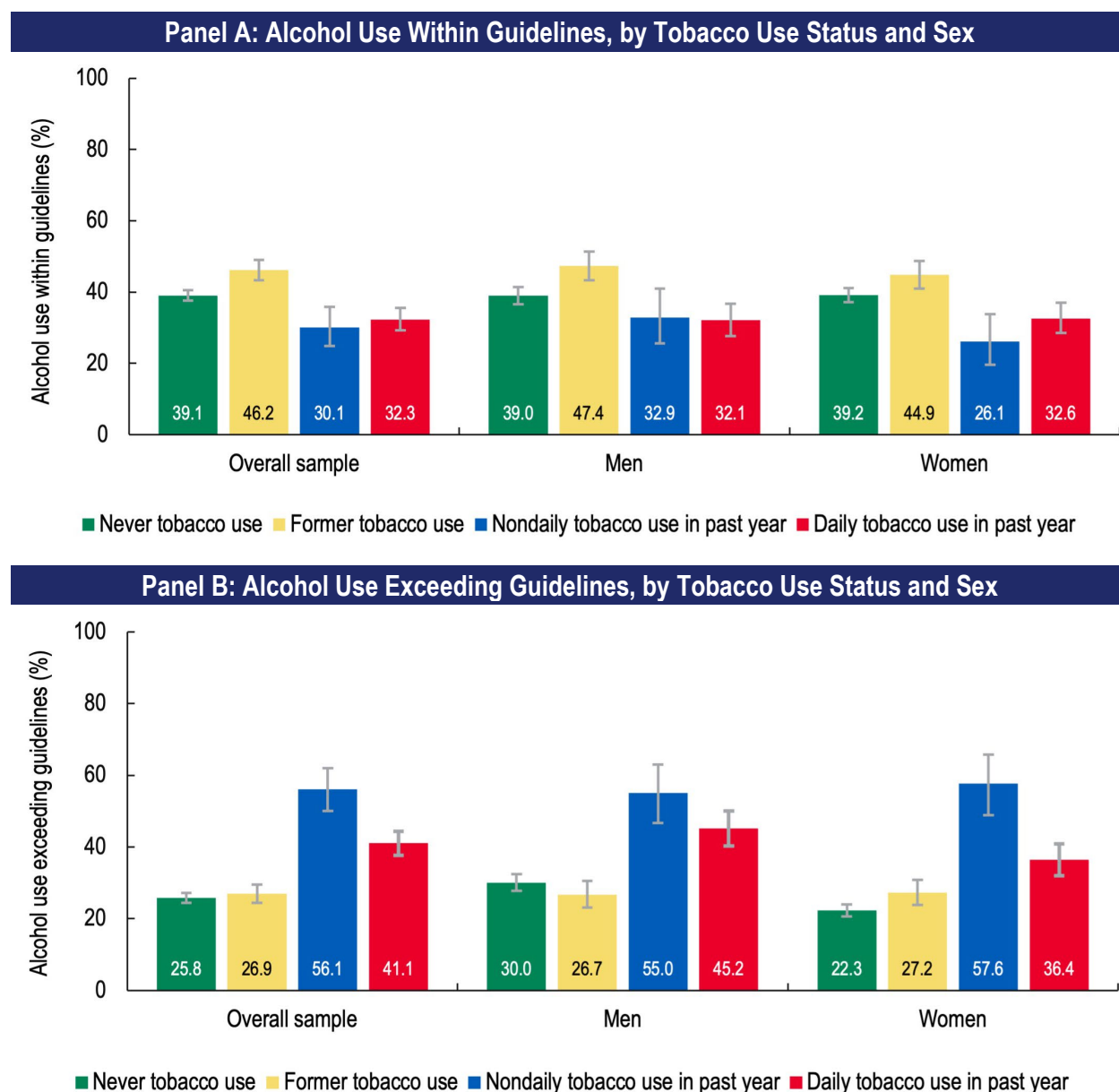
Source: 2014–2015 and 2019–2020 U.S. National Alcohol Surveys, 2015–2019 National Survey on Drug Use and Health.

National Alcohol Surveys Analysis: Past-Year Co-Use of Tobacco and Alcohol: Overall and by Age and Sex. Figure 2.5 (Appendix Tables 2D.8 and 2D.9) shows past-year alcohol use prevalence by past-year tobacco use status (never, former, nondaily, or daily) for the pooled NAS sample, for men and women, and by age group. There was a statistically significant bivariate association between tobacco use and alcohol use ($p < .001$). Overall, people who never used tobacco were the most likely to report no alcohol use (35.1%, 95% CI = 33.7%–36.6%). In contrast, people who used tobacco nondaily were the least likely to report no alcohol use (13.8%, 95% CI = 10.5%–18.0%), and the most likely to report alcohol use exceeding guidelines: more than one-half (56.1%, 95% CI = 50.0%–61.9%) of those who used tobacco nondaily reported alcohol use exceeding guidelines (55.0% of men [95% CI, 46.7%–63.0%]; 57.6% of women [95% CI, 48.9%–65.8%]). Among people who used tobacco daily, 41.1% (95% CI, 37.7%–44.4%) reported alcohol use exceeding guidelines (45.2% of men [95% CI, 40.4%–50.1%]; 36.4% of women [95% CI, 32.0%–40.9%]).

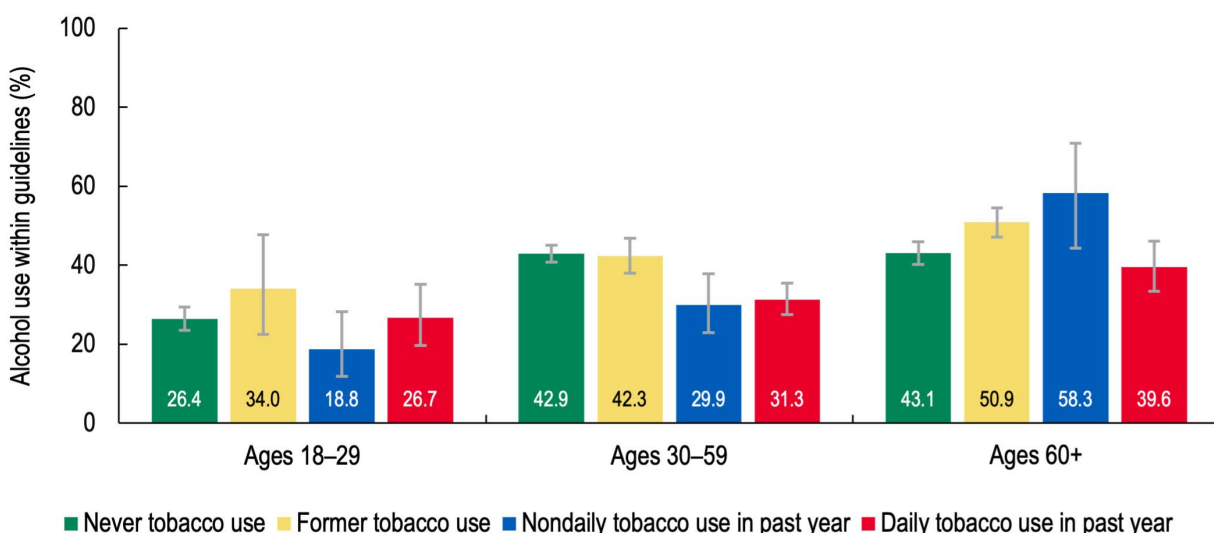
Across age groups, those who never used tobacco had the highest prevalence of reporting no alcohol use and the lowest prevalence of reporting alcohol use exceeding guidelines. Alcohol use exceeding guidelines declined with age and was lowest among those in the oldest age group who never used tobacco (9.6%, 95% CI = 8.1%–11.4%). Conversely, across age categories, people using tobacco had the highest prevalence of alcohol use exceeding guidelines. Among participants who reported any past-year tobacco use, prevalence of alcohol use exceeding guidelines was highest among those ages 18–29 (61.9%, 95% CI = 54.9%–68.4%), followed by those ages 30–59 (45.4%, 95% CI = 41.6%–49.3%), and lowest among those ages 60 and older (22.2%, 95% CI = 17.8%–27.4%). The prevalence of alcohol use exceeding guidelines was

higher than for individuals reporting never using tobacco products in each respective age category (ages 18–29: 40.4% [95% CI, 37.1%–43.8%]; ages 30–59: 26.5% [95% CI, 24.5%–28.5%]; ages 60 and older: 9.6% [95% CI, 8.1%–11.4%]). Furthermore, people ages 30–59 and ages 60 and older who formerly used tobacco had a higher prevalence of exceeding drinking guidelines (ages 30–59: 35.1%, 95% CI = 31.0%–39.5%; ages 60 and older: 17.5%, 95% CI = 14.7%–20.6%) than people who never used tobacco, albeit to a lesser extent than those who used tobacco in the past year. Similar patterns were evident for both men and women; however, alcohol use among women was generally lower than among men across age groups and tobacco use groups (Appendix Table 2D.9).

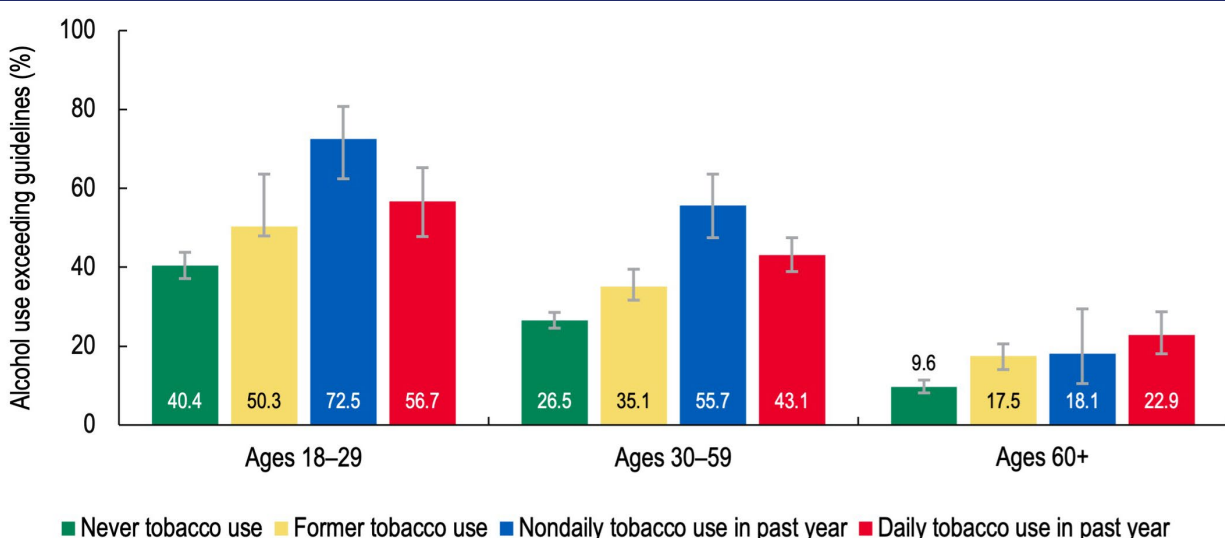
Figure 2.5 Past-Year Alcohol Use by Past-Year Tobacco Use Status (2014–2015 and 2019–2020 National Alcohol Surveys; $N = 14,125$)



Panel C: Alcohol Use Within Guidelines, by Tobacco Use Status and Age



Panel D: Alcohol Use Exceeding Guidelines, by Tobacco Use Status and Age



Note. For full data, see Appendix Tables 2D.8 and 2D.9. *Tobacco use* is defined as use of tobacco products other than e-cigarettes (due to survey question wording). *Nondaily* and *daily current tobacco use* are defined as use in the past year. *Former tobacco use* is defined as use within lifetime but not in the past year. *Never tobacco use* is defined as never use in lifetime. Alcohol use is measured in the past year. No past-year alcohol use is not shown in the charts. *Alcohol use exceeding guidelines* is defined as exceeding 7/14 drinks per week or 4/5 drinks per day for women/men, per the *Dietary Guidelines for Americans, 2020–2025*⁶⁵ and NIAAA's definition of heavy alcohol use.⁶⁶ Source: 2014–2015 and 2019–2020 U.S. National Alcohol Surveys.

The association between tobacco use and hazardous alcohol use was also statistically significant at the $p < .05$ level when looking at more specific definitions of hazardous alcohol use: 5+ drinking (defined as having had 5 or more drinks in a day) and HID (defined as having had at least 8 drinks in a day for women and 12 for men). Overall levels of past-year 5+ drinking and HID declined with age (Appendix Table 2D.10). Among individuals ages 60 and older, 7.3% (95% CI, 6.3%–8.5%) reported past-year 5+ drinking and 1.2% (95% CI, 0.8%–1.7%) reported past-year HID. Among women in the oldest age group, 2.8% (95% CI, 2.1%–3.8%) reported

past-year 5+ drinking and 0.7% (95% CI, 0.4%–1.1%) reported past-year HID. Despite these overall declines with age, across all age groups, people who used tobacco either daily or nondaily had the highest levels of 5+ drinking and HID, while people who never or formerly used tobacco had the lowest levels of these hazardous alcohol use behaviors (Appendix Table 2D.10). For example, people younger than 60 who used tobacco nondaily had more than twice the prevalence of consuming ≥ 5 drinks on any day in the past year compared to those who never used tobacco (64.8% [95% CI, 53.7%–74.5%] vs. 30.6% [95% CI, 27.5%–33.8%] among those ages 18–29; 43.0% [95% CI, 35.2%–51.2%] vs. 19.2% [95% CI, 17.4%–21.1%] among those ages 30–59). Although hazardous alcohol use did decline with age, it remained more prevalent among individuals reporting past-year tobacco use than individuals who reported never using tobacco products across all age groups.

National Alcohol Surveys Analysis: Past-Year Co-Use of Alcohol and E-Cigarettes.

Table 2.2 provides information about alcohol use prevalence by e-cigarette use status in the 2019–2020 NAS, which included questions on any past-year e-cigarette use; participants who reported e-cigarette use could also report never, former, or past-year use of cigarettes or other tobacco products. There was a statistically significant bivariate association between e-cigarette and alcohol use categories ($p < .001$). Overall, few participants reported use of e-cigarettes; 94.7% (95% CI, 93.9%–95.3%) reported no past-year e-cigarette use, 2.8% (95% CI, 2.4%–3.4%) reported monthly or semi-monthly e-cigarette use, and 2.5% (95% CI, 2.1%–3.0%) reported daily or nearly daily e-cigarette use (data not shown). Prevalence of e-cigarette use was similar among men and women, with 2.9% (95% CI, 2.2%–3.7%) of men and 2.2% (95% CI, 1.7%–2.9%) of women reporting daily or near daily e-cigarette use in the past year.

Among participants who used e-cigarettes, more than one-half reported alcohol use exceeding guidelines (54.1% [95% CI, 45.1%–62.9%] for those who used e-cigarettes monthly/semimonthly and 59.2% [95% CI, 49.9%–67.9%] for those who used e-cigarettes daily/nearly daily). Among all participants who used e-cigarettes, fewer than 1 in 5 reported no alcohol use (16.8% [95% CI, 11.1%–24.6%] among those who used e-cigarettes monthly/semimonthly and 13.8% [95% CI, 8.8%–20.9%] among those who used e-cigarettes daily/nearly daily). Stratifying NAS participants by age finds that, among people who used e-cigarettes, alcohol use exceeding guidelines was highest among those ages 18–29 (Appendix Table 2D.11).

Table 2.2 Past-Year Alcohol Use by Past-Year E-Cigarette Status in the 2019–2020 National Alcohol Survey (N = 8,308), Overall and by Sex (Row Percents)

E-cigarette use status (unweighted <i>n</i>) ^a	No past-year alcohol use ^b	Past-year alcohol use within guidelines	Past-year alcohol use exceeding guidelines	<i>p</i> value ^c
	Alcohol use: Weighted % (95% CI)			
Overall				
No e-cigarette use in past year (7,927)	29.0 (27.7, 30.3)	42.6 (41.2, 44.1)	28.4 (27.1, 29.7)	<.001
Monthly or semimonthly use in past year (204)	16.8 (11.1, 24.6)	29.1 (21.5, 38.0)	54.1 (45.1, 62.9)	
Daily or nearly daily use in past year (177)	13.8 (8.8, 20.9)	27.1 (19.9, 35.7)	59.2 (49.9, 67.9)	

Table 2.2 (continued)

E-cigarette use status (unweighted <i>n</i>) ^a	No past-year alcohol use ^b	Past-year alcohol use within guidelines	Past-year alcohol use exceeding guidelines	<i>p</i> value ^c
	Alcohol use: Weighted % (95% CI)			
Men				
No e-cigarette use in past year (3,200)	25.9 (24.0, 27.9)	43.4 (41.2, 45.7)	30.7 (28.6, 32.8)	<.001
Monthly or semimonthly use in past year (97)	13.7 (6.8, 25.6)	31.8 (21.1, 44.9)	54.5 (41.6, 66.7)	
Daily or nearly daily use in past year (83)	13.2 (6.5, 24.7)	29.0 (19.1, 41.5)	57.9 (44.8, 69.9)	
Women				
No e-cigarette use in past year (4,724)	31.7 (30.0, 33.6)	41.9 (40.1, 43.8)	26.3 (24.7, 28.0)	<.001
Monthly or semimonthly use in past year (107)	21.1 (13.0, 32.4)	25.2 (16.3, 36.7)	53.7 (41.8, 65.2)	
Daily or nearly daily use in past year (94)	14.5 (8.3, 24.1)	24.7 (15.5, 37.0)	60.8 (47.6, 72.6)	

Note. CI = confidence interval.

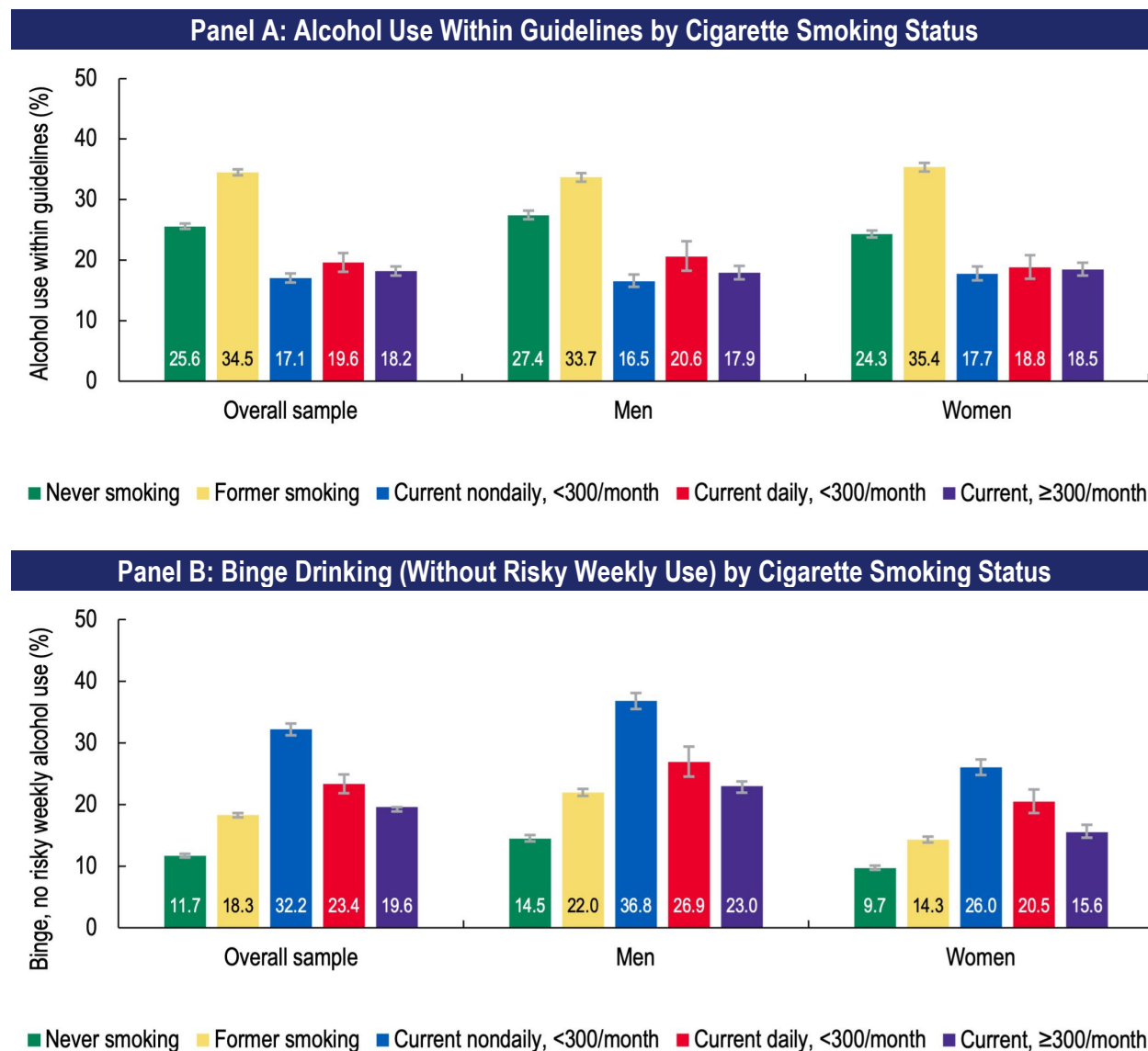
^aE-cigarette use is measured within the past year. ^bAlcohol use is measured within the past year. *Alcohol use exceeding guidelines* is defined as exceeding 7/14 drinks per week or 4/5 drinks per day for women/men, per the *Dietary Guidelines for Americans, 2020–2025*⁶⁵ and NIAAA's definition of heavy alcohol use.⁶⁶ ^c*p* value for bivariate association, obtained through a chi-squared test, between e-cigarette and alcohol use categories.

Source: 2019–2020 U.S. National Alcohol Survey.

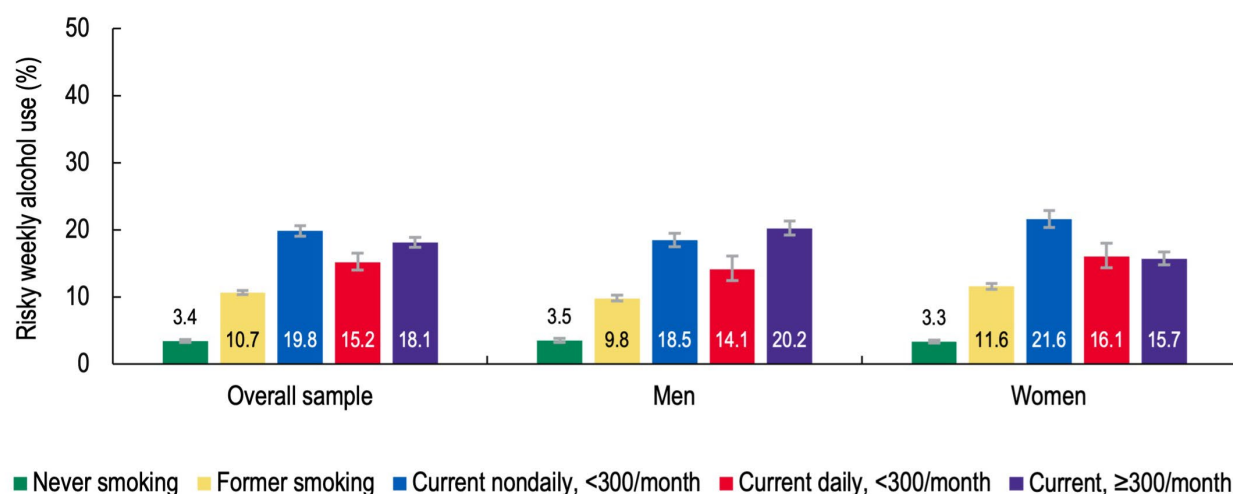
National Survey on Drug Use and Health Analysis: Past-30-Day Tobacco and Alcohol

Co-Use. Figures 2.6, 2.7, and 2.8, as well as Appendix Tables 2D.12, 2D.13, and 2D.14, present the prevalence of alcohol use by cigarette smoking, smokeless tobacco use, and cigar smoking status for the 2015–2019 NSDUH sample. Similar to the findings of the NAS analyses, there was a statistically significant association between tobacco use and alcohol use ($p < .001$). People who never or formerly used cigarettes, smokeless tobacco, or cigars were the least likely to report engaging in either binge drinking (without risky weekly use) or risky weekly use. In contrast, people who used cigarettes, smokeless tobacco, or cigars in the past 30 days were the most likely to report engaging in these alcohol use behaviors (binge drinking or risky weekly alcohol use). For example, those who reported nondaily smoking <300 cigarettes/month were the most likely to report past month binge drinking (without risky weekly alcohol use) (32.2%, 95% CI = 31.3%–33.1%) or risky weekly alcohol use (19.8%, 95% CI = 19.0%–20.6%). Prevalence of alcohol use exceeding guidelines was somewhat lower among those who smoked daily. Among those who reported daily smoking <300 cigarettes/month, the prevalence of binge drinking (without risky weekly use) was 23.4% (95% CI, 21.9%–24.9%), and the prevalence of risky weekly use was 15.2% (95% CI, 14.0%–16.5%). Among those who smoked ≥300 cigarettes/month, prevalence of binge drinking (without risky weekly use) was 19.6% (95% CI = 18.9%–20.3%) and prevalence of risky weekly use was 18.1% (95% CI = 17.4%–18.9%). Overall, among all NSDUH participants who reported past or current use of cigarettes, smokeless tobacco, or cigars, alcohol use exceeding guidelines (binge drinking and risky weekly use) was more prevalent than alcohol use within guidelines.

Figure 2.6 Past-30-Day Alcohol Use by Past-30-Day Cigarette Smoking Status, Overall and by Sex (2015–2019 National Survey on Drug Use and Health; *N* = 210,684)



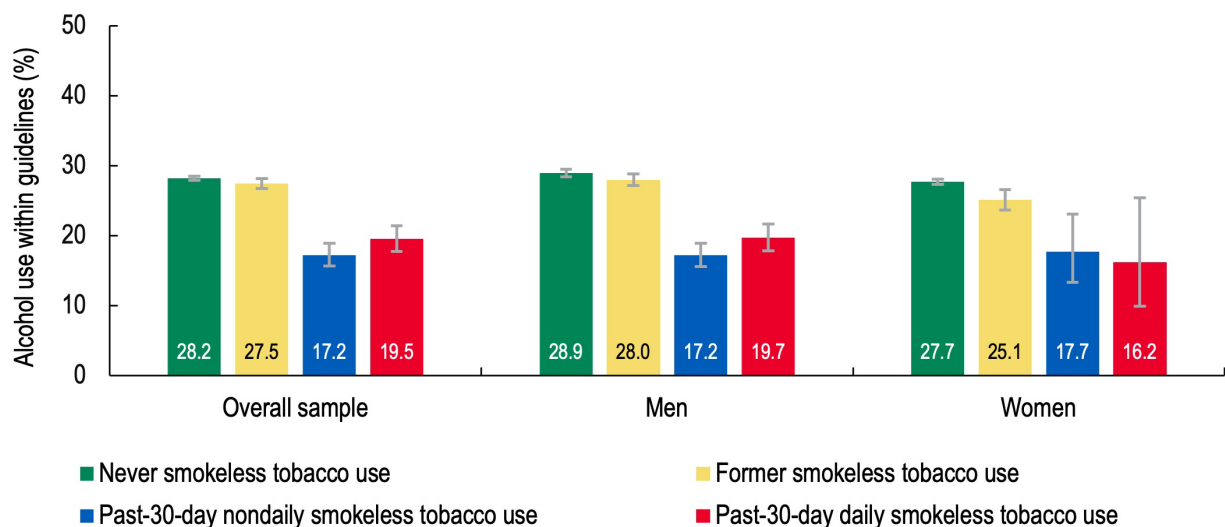
Panel C: Risky Weekly Alcohol Use by Cigarette Smoking Status



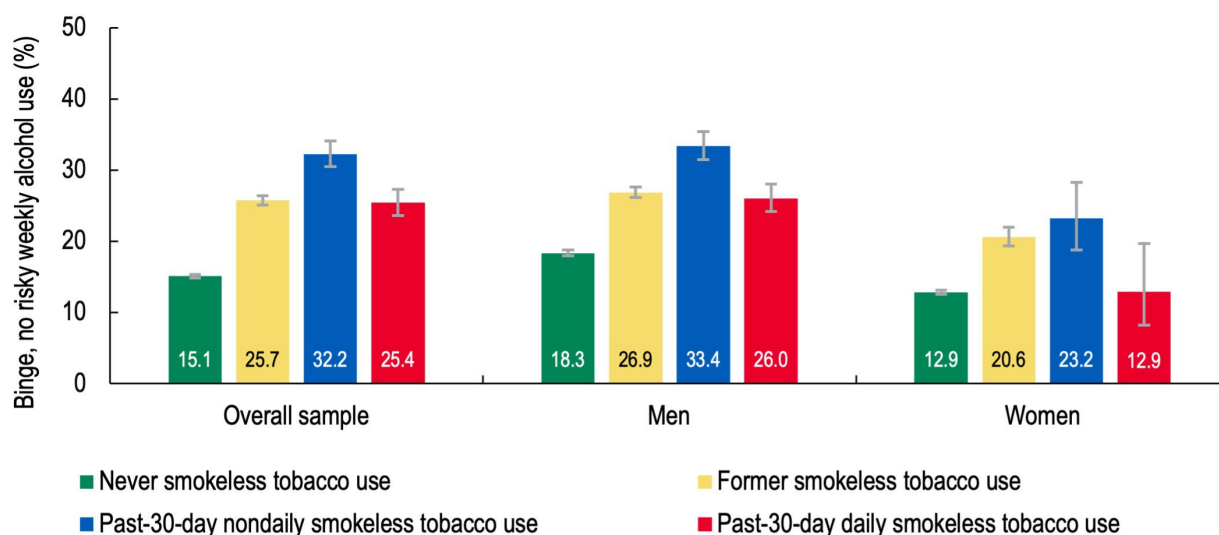
Note. For full data, see Appendix Table 2D.12. *Current cigarette smoking* is defined as use in the past 30 days and is presented by nondaily and daily frequency and number of cigarettes per month. Never and former alcohol use (not shown in the chart) are based on lifetime alcohol use and use in the past 30 days. Alcohol use within guidelines, binge, and risky weekly use are based on use in the past 30 days. *Alcohol use within guidelines* is defined as alcohol use without binge drinking or risky weekly use in the past 30 days. *Binge, no risky weekly use* is defined as drinking ≥4/5 drinks on an occasion for women/men without exceeding 7/14 drinks per week for women/men in the past 30 days. *Risky weekly use* is defined as drinking more than 7/14 drinks per week for women/men in the past 30 days. *Source:* 2015–2019 National Survey on Drug Use and Health.

Figure 2.7 Past-30-Day Alcohol Use by Past-30-Day Smokeless Tobacco Use Status, Overall and by Sex (2015–2019 National Survey on Drug Use and Health; *N* = 210,931)

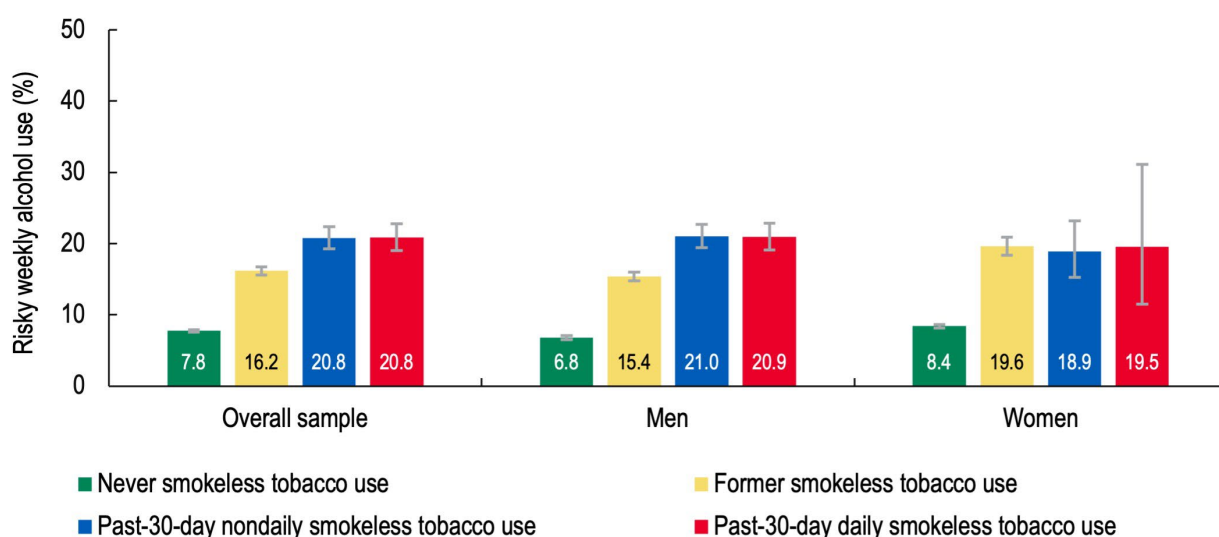
Panel A: Alcohol Use Within Guidelines by Smokeless Tobacco Use Status



Panel B: Binge Drinking (Without Risky Weekly Use) by Smokeless Tobacco Use Status



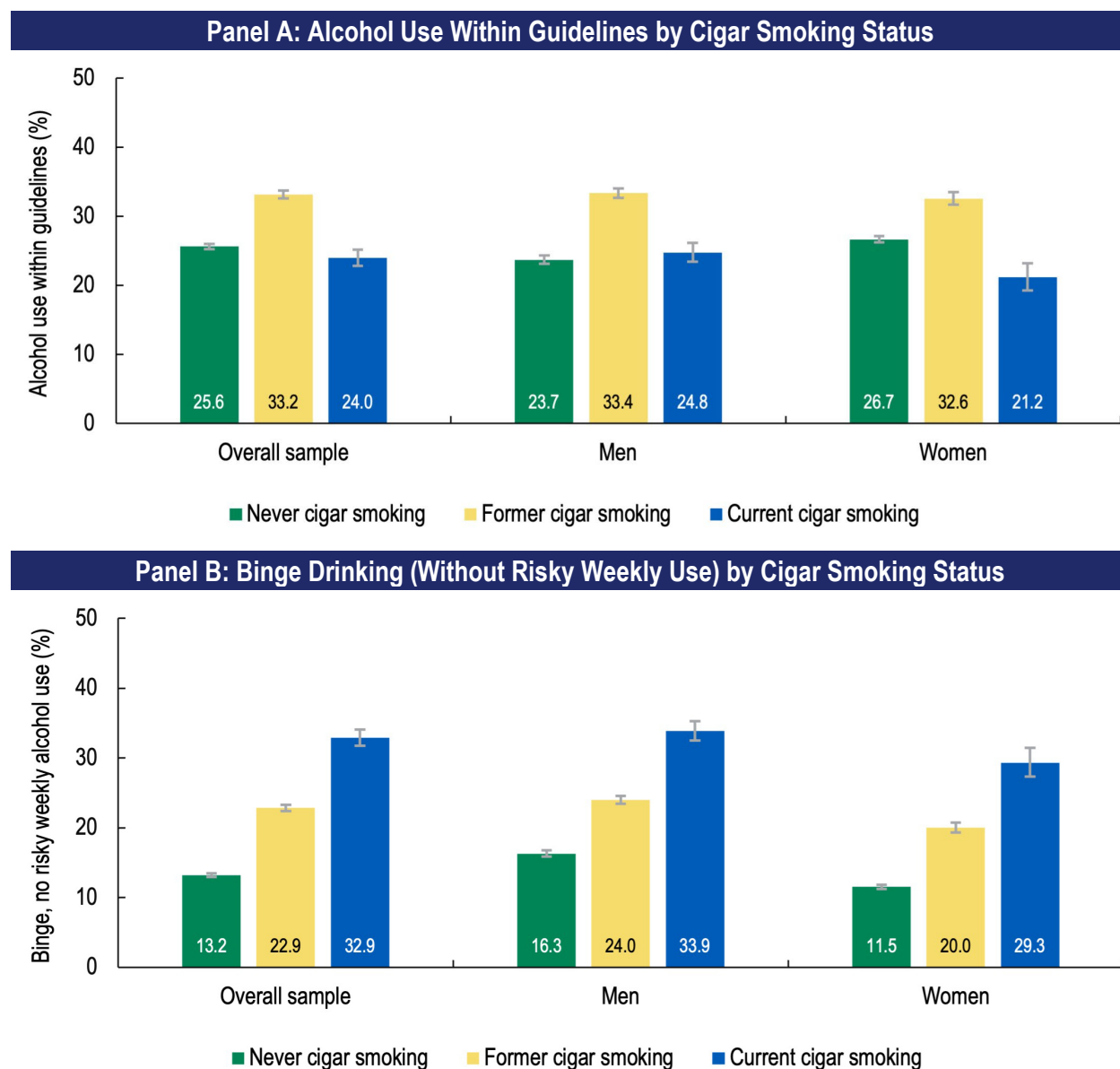
Panel C: Risky Weekly Alcohol Use by Smokeless Tobacco Use Status



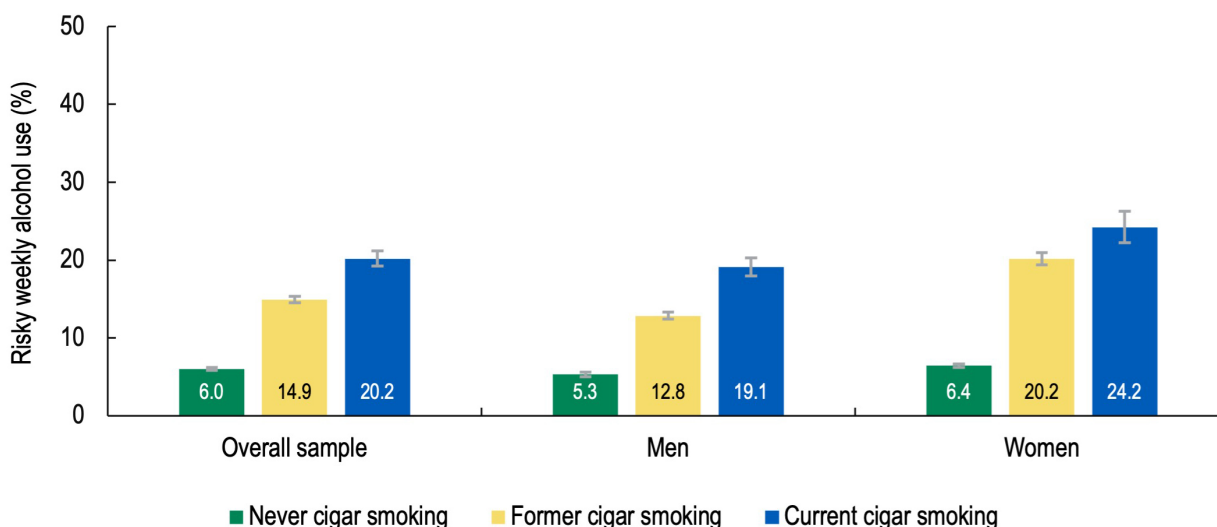
Note. For full data, see Appendix Table 2D.13. *Current use of smokeless tobacco* is defined as use in the past 30 days. Never and former alcohol use (not shown in the chart) are based on lifetime alcohol use and use in the past 30 days. Alcohol use within guidelines, binge, and risky weekly use are based on use in the past 30 days. *Alcohol use within guidelines* is defined as alcohol use without binge drinking or risky weekly use in the past 30 days. *Binge, no risky weekly use* is defined as drinking $\geq 4/5$ drinks on an occasion for women/men without exceeding 7/14 drinks per week for women/men in the past 30 days. *Risky weekly use* is defined as drinking more than 7/14 drinks per week for women/men in the past 30 days.

Source: 2015–2019 National Survey on Drug Use and Health.

Figure 2.8 Past-30-Day Alcohol Use by Past-30-Day Cigar Smoking Status, Overall and by Sex (2015–2019 National Survey on Drug Use and Health; $N = 210,958$)



Panel C: Risky Weekly Alcohol Use by Cigar Smoking Status



Note. For full data, see Appendix Table 2D.14. *Current cigar smoking* is defined as use in the past 30 days. Never and former alcohol use (not shown in the chart) are based on lifetime alcohol use and use in the past 30 days. Alcohol use within guidelines, binge, and risky weekly use are based on use in the past 30 days. *Alcohol use within guidelines* is defined as alcohol use without binge drinking or risky weekly use in the past 30 days. *Binge, no risky weekly use* is defined as drinking $\geq 4/5$ drinks on an occasion for women/men without exceeding 7/14 drinks per week for women/men in the past 30 days. *Risky weekly use* is defined as drinking more than 7/14 drinks per week for women/men in the past 30 days.

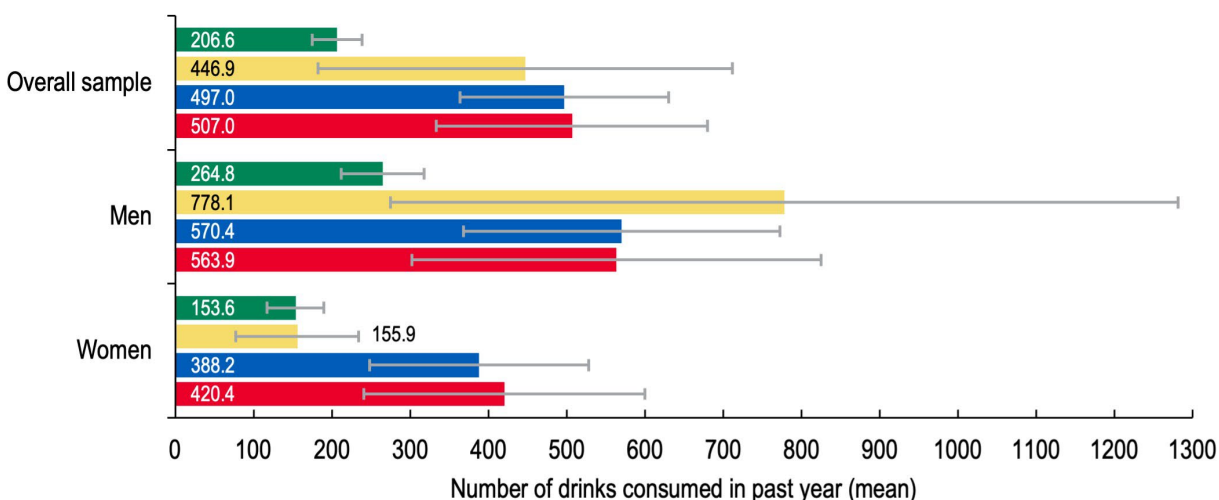
Source: 2015–2019 National Survey on Drug Use and Health.

National Alcohol Surveys Analysis: Volume of Past-Year Alcohol Consumption.

This subsection summarizes past-year volume of alcohol consumption and tobacco use status using data from the pooled 2014–2015 and 2019–2020 NAS. Higher levels of alcohol consumption are associated with increased risk of cancer (see chapter 4). Among both men and women across age categories, people who reported past-year tobacco use had the highest overall past-year alcohol consumption (mean number of alcoholic drinks consumed), while those who reported never tobacco use had the lowest amount of alcohol consumption ($p < .01$; Figure 2.9 and Appendix Table 2D.15). Regardless of age or tobacco use status, overall past-year consumption was higher among men than among women. Alcohol consumption was largely driven by beer and spirits, especially among people younger than 60.

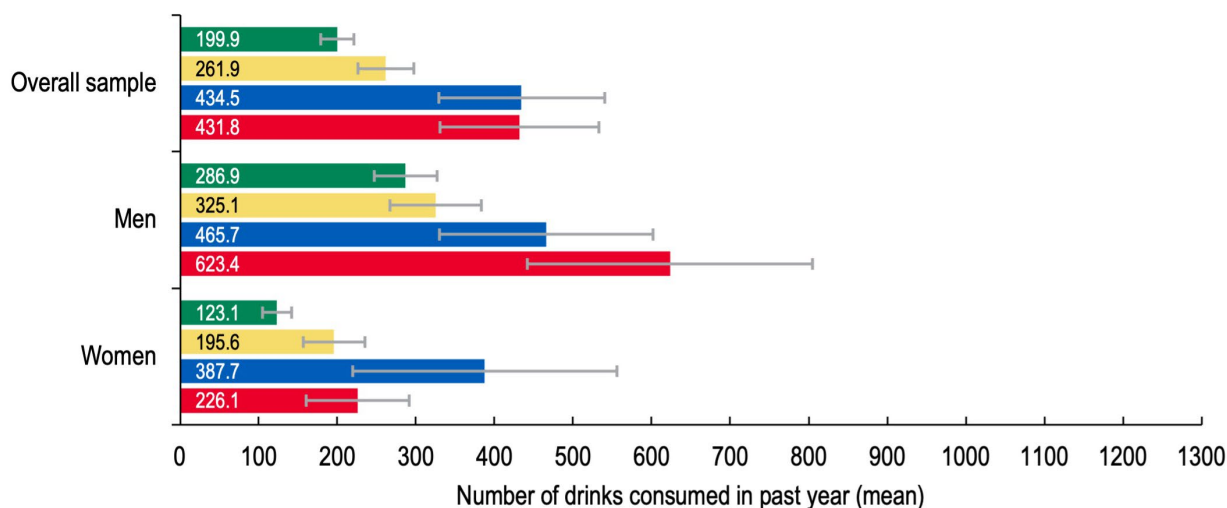
Figure 2.9 Average Number of Drinks Consumed in Past Year by Age, Past-Year Tobacco Use Status, and Sex (2014–2015 and 2019–2020 National Alcohol Surveys; $N = 14,125$)

Panel A: Average Number of Drinks Consumed in Past Year, Ages 18–29



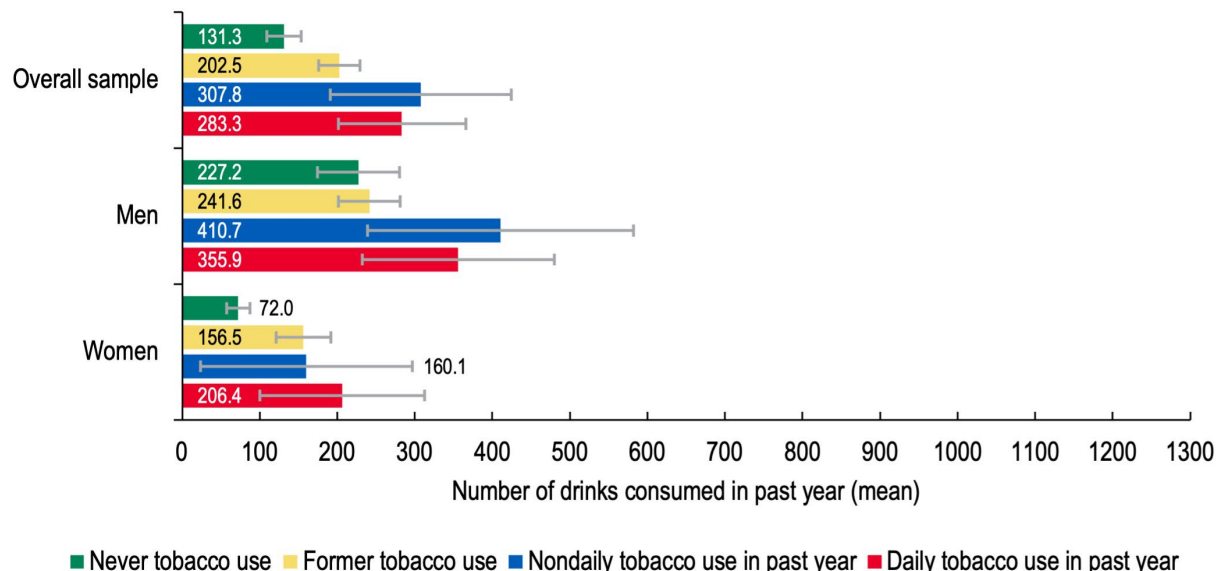
■ Never tobacco use ■ Former tobacco use ■ Nondaily tobacco use in past year ■ Daily tobacco use in past year

Panel B: Average Number of Drinks Consumed in Past Year, Ages 30–59



■ Never tobacco use ■ Former tobacco use ■ Nondaily tobacco use in past year ■ Daily tobacco use in past year

Panel C: Average Number of Drinks Consumed in Past Year, Ages 60 and Older



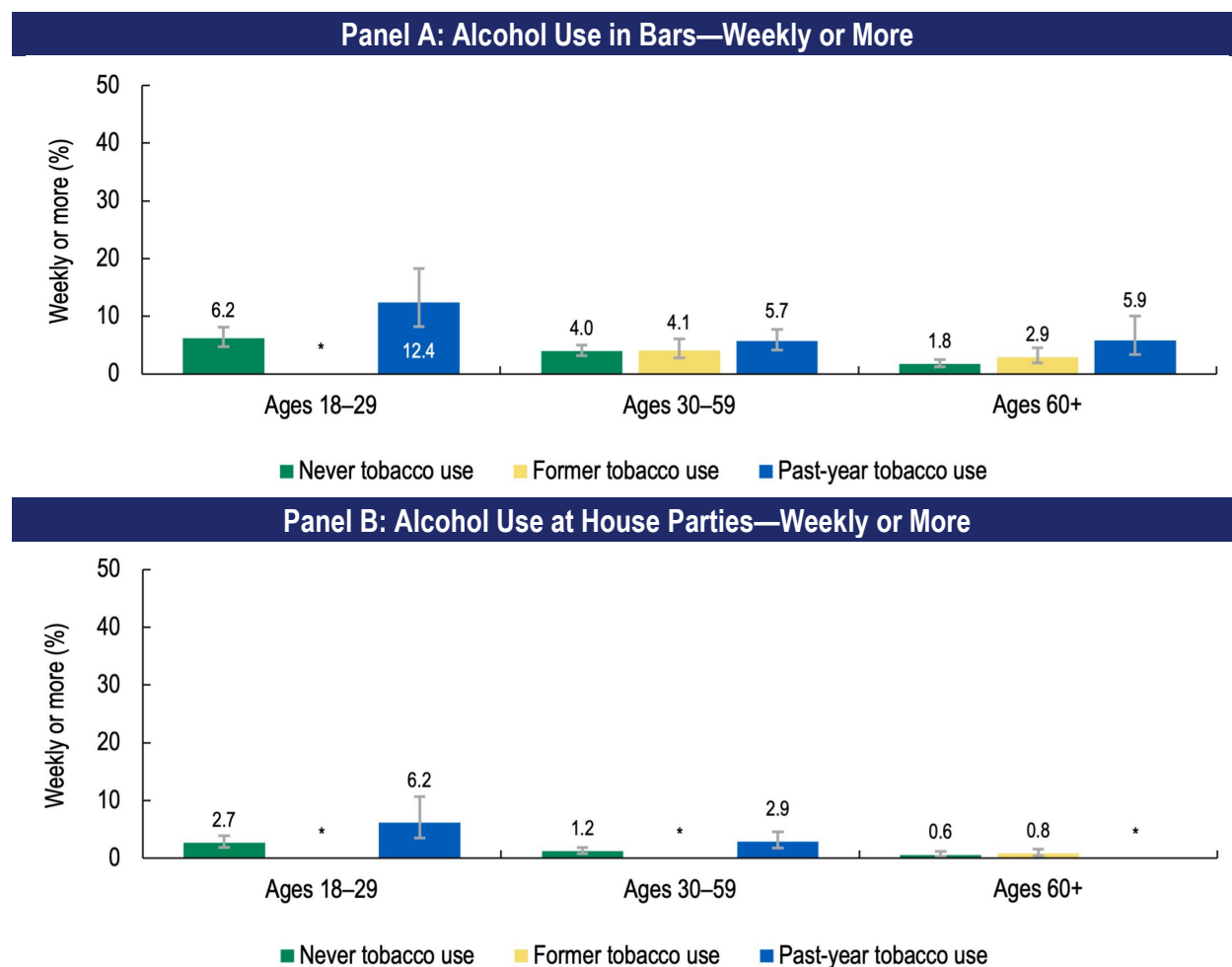
Note. For full data, see Appendix Table 2D.15. *Tobacco use* is defined as use of tobacco products other than e-cigarettes (due to survey question wording). *Current tobacco use* is defined as use in the past year. *Former tobacco use* is defined as use within lifetime but not in the past year. *Never tobacco use* is defined as never use in lifetime. Alcohol use is measured in the past year.

Source: 2014–2015 and 2019–2020 U.S. National Alcohol Surveys.

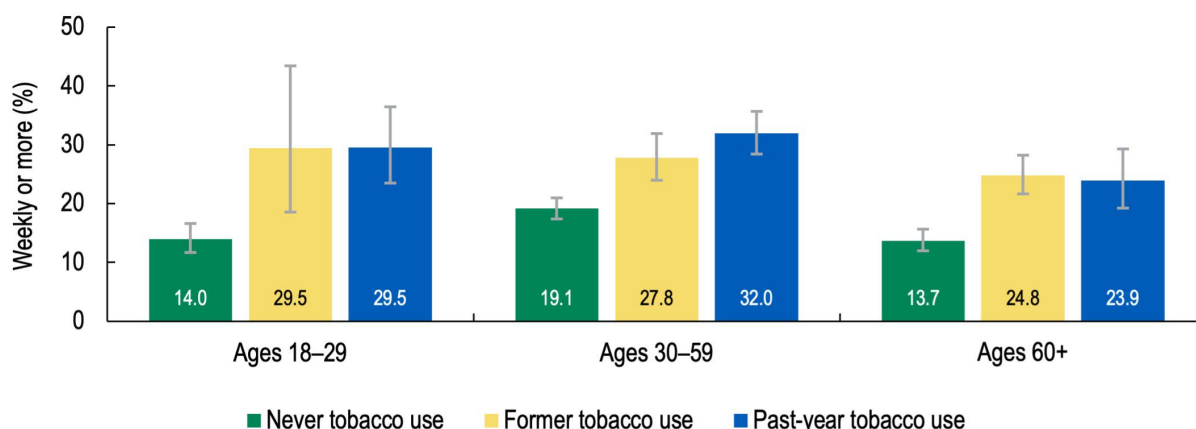
National Alcohol Surveys Analysis: Drinking Context. This subsection summarizes past-year alcohol use by setting and tobacco use status using data from the pooled 2014–2015 and 2019–2020 NAS. Drinking setting (i.e., bars/taverns, parties, or in the home) can influence tobacco and alcohol use.¹⁶¹⁻¹⁶⁴

Drinking context (bar, house party, or home) by tobacco use status is shown in Figure 2.10 and Appendix Table 2D.16. Regardless of tobacco use status, the home was the most common context for drinking weekly or more frequently, followed by bars and house parties. For all age groups, those who used tobacco in the past year had a greater likelihood of reporting weekly or more frequent alcohol use in the home than those who never used tobacco. Prevalence of weekly or more drinking at bars or house parties was low (<15% across age groups). Overall, there was a statistically significant bivariate association between tobacco use and drinking context categories ($p < .001$) except for drinking in bars among those ages 30–59).

Figure 2.10 Past-Year Alcohol Use by Setting on a Weekly Basis or More, by Past-Year Tobacco Use Status and Age (2014–2015 and 2019–2020 National Alcohol Surveys; $N = 14,125$)



Panel C: Alcohol Use at Home—Weekly or More



Note. For full data, see Appendix Table 2D.16. *Tobacco use* is defined as use of tobacco products other than e-cigarettes (due to survey question wording). *Current tobacco use* is defined as use in the past year. *Former tobacco use* is defined as use within lifetime but not in the past year. *Never tobacco use* is defined as never use in lifetime. Alcohol use is measured in the past year.

*Groups with $n < 10$ are suppressed.

Source: 2014–2015 and 2019–2020 U.S. National Alcohol Surveys.

Lifetime Co-Use of Tobacco and Alcohol

The literature search identified several prospective studies of mortality that reported measures of lifetime tobacco or alcohol use. Data on lifetime smoking and alcohol use from three studies of prospective risks of alcohol use demonstrate a strong association between cigarette consumption and heavy alcohol use.^{165–167} For example, in the 1984 and 1995 NAS, prevalence of current smoking (monthly or more in the past year) was 12.9% among lifetime alcohol abstainers, 24.3% among participants who formerly drank, and more than 50% among people who drank heavily (30–120 or more drinks per month for women and 60–120 or more drinks per month for men).¹⁶⁶ Among participants in the nationally representative 1988 NHIS who reported current drinking (12 or more drinks in the past year), current and former smoking were more strongly associated with increased frequency and quantity of drinking than never smoking.¹⁶⁵ In an analysis of pooled 1997–2014 NHIS data, participants who reported lifetime alcohol abstinence had the lowest prevalence of current smoking (9.0%), and those who reported current heavy drinking (>7 drinks/week for women and >14 drinks/week for men) had the highest prevalence of current smoking (46.0%).¹⁶⁷

National Alcohol Surveys Analysis: Lifetime Tobacco Use and Heavy Alcohol Use. Data from the pooled 2014–2015 and 2019–2020 NAS were used to analyze lifetime tobacco use, cigarette pack years, and lifetime heavy drinking, defined as lifetime 5+ drinking days (i.e., the number of days in which ≥ 5 drinks were consumed). The average number of lifetime 5+ drinking days by tobacco use status, age, and sex is shown in Table 2.3. Never tobacco use is associated with the fewest 5+ drinking days for all age groups and for both men and women. Across age groups, those who used tobacco had more lifetime 5+ drinking days than those who never used tobacco. Among those ages 30 and older, the number of lifetime 5+ drinking days was also higher among those reporting daily or nondaily tobacco use than among those reporting former tobacco use, and men tended to report more 5+ drinking days than women. Additionally, those ages 60 and older tended to report fewer lifetime 5+ drinking days than those ages 30–59, despite being

older. This may reflect a combination of cohort effects (e.g., the older birth cohort having had less heavy lifetime drinking),⁷⁸ higher mortality among people with the highest level of tobacco use and alcohol consumption,^{9,168} and age-related recall bias (i.e., older people may be less likely to recall or to accurately report any past heavy drinking).¹⁶⁹

Data from the 2014–2015 NAS were used to analyze lifetime 5+ drinking days by lifetime cigarette consumption (among people who formerly smoked or smoked in the past year), expressed as cigarette pack years (Table 2.4). Overall and for both men and women, zero pack years was the most common category. For participants who smoked, 0.1–20 cigarette pack years was most common, followed by those who reported 40.1 or more cigarette pack years and those who reported 20.1–40 cigarette pack years. For all age groups and for both men and women, those who never smoked had the lowest likelihood of being in the highest category for number of lifetime 5+ drinking days (≥ 500 for those ages 18–29; $\geq 1,000$ for those ages 30–59 and ages 60 or older). Across categories of cigarette pack years among those ages 30 and older, a greater percentage of men tended to reach the highest level of 5+ drinking days for their age group than women. Another notable feature of these data was the presence of a considerable proportion of adults, especially men, who reported 40.1 or more pack years of smoking and the highest level of 5+ drinking days for their age group.

Table 2.3 Average Number of Lifetime 5+ Drinking Days by Past-Year Tobacco Use Status in the 2014–2015 and 2019–2020 National Alcohol Surveys (N = 14,125), Overall and by Sex, Stratified by Age

Tobacco use status ^a	Ages 18–29			Ages 30–59			Ages 60 and older		
	Overall	Men	Women	Overall	Men	Women	Overall	Men	Women
	Mean number of lifetime 5+ drinking days ^b (95% CI)								
Never (8,926)	140.5 (113.8, 167.5)	184.2 (134.1, 234.3)	100.8 (77.4, 124.1)	505.4 (448.3, 562.5)	746.0 (638.4, 853.6)	293.1 (248.2, 337.9)	333.8 (255.9, 411.7)	668.8 (487.0, 850.6)	126.6 (76.6, 176.7)
Former (2,537)	724.8** (409.6, 1,040.1)	1,047.2** (465.1, 1,629.3)	448.6** (269.0, 628.3)	1,109.8** (967.0, 1,252.6)	1,430.1** (1,184.3, 1,675.8)	774.6** (648.8, 900.3)	892.2** (755.0, 1,029.4)	1,434.0** (1,200.9, 1,667.1)	266.2** (185.8, 346.5)
Current (past year) (2,427)	550.1** (413.3, 686.9)	604.2** (402.8, 805.6)	468.4* (309.3, 627.4)	1,702.5** (1,510.5, 1,894.5)	2,085.6** (1,818.9, 2,352.3)	1,265.2* (992.9, 1,537.5)	1,827.1** (1,456.9, 2,197.3)	2,636.3** (2,047.2, 3,225.3)	934.9** (571.4, 1,298.3)
Nondaily (601)	413.0** (287.0, 539.0)	385.4** (248.6, 522.1)	454.0** (218.2, 689.7)	1,233.3** (1,001.9, 1,464.7)	1,358.9** (1,051.0, 1,666.9)	1,045.5** (687.6, 1,403.4)	780.3* (311.9, 1,249.8)	943.4 (233.4, 1,653.4)	546.0** (98.0, 994.0)
Daily (1,826)	616.6** (425.9, 807.2)	709.1** (424.6, 993.6)	475.5** (268.9, 682.0)	1,807.5** (1,579.9, 2,035.1)	2,273.7** (1,953.1, 2,594.2)	1,306.1** (990.4, 1,621.8)	1,992.7** (1,574.0, 2,411.5)	2,943.5** (2,271.3, 3,615.7)	986.8** (580.5, 1,393.2)

Note. CI = confidence interval.

^aTobacco use is defined as use of tobacco products other than e-cigarettes (due to survey question wording). *Current tobacco use* is defined as use in the past year. *Former tobacco use* is defined as use within lifetime but not in the past year. *Never tobacco use* is defined as never use in lifetime. ^b*Lifetime 5+ drinking days* is defined as the number of days over lifetime in which participants reported drinking 5 or more drinks on 1 occasion.

* $p < .05$ for association comparing alcohol consumption among tobacco use categories (referent = Never), within each sex and age group. ** $p < .01$ for association comparing alcohol consumption among tobacco use categories (referent = Never), within each sex and age group.

Source: 2014–2015 and 2019–2020 U.S. National Alcohol Surveys.

Table 2.4 Lifetime Number of 5+ Drinking Days by Cigarette Smoking History (Pack Years) in the 2014–2015 National Alcohol Survey (*N* = 5,632), Overall and by Sex, Stratified by Age (Row Percents)

Cigarette pack years (unweighted <i>n</i>)	Ages 18–29				Ages 30–59				Ages 60 and older			
	0	0.1–499	≥500	<i>p</i> value ^a	0	0.1–999	≥1,000	<i>p</i> value	0	0.1–999	≥1,000	<i>p</i> value
	Lifetime number of 5+ drinking days ^b —Weighted % (95% CI)											
Overall												
0 (3,325)	50.8 (44.8, 56.7)	39.7 (33.9, 45.7)	9.6 (6.6, 13.8)	<.001	45.7 (42.1, 49.4)	39.6 (36.0, 43.4)	14.6 (12.0, 17.7)	<.001	77.6 (73.5, 81.1)	14.4 (11.5, 17.8)	8.1 (5.8, 11.2)	<.001
0.1–20 (1,204)	15.8 (9.8, 24.5)	49.3 (38.9, 59.7)	34.9 (25.6, 45.6)		19.6 (15.8, 24.0)	38.3 (32.9, 44.1)	42.1 (36.6, 47.9)		59.0 (51.4, 66.1)	18.9 (13.8, 25.4)	22.1 (16.2, 29.4)	
20.1–40 (382)	*	*	*		17.1 (10.5, 26.7)	35.3 (25.6, 46.5)	47.5 (37.1, 58.2)		34.6 (26.4, 43.8)	31.5 (23.1, 41.5)	33.9 (25.0, 44.1)	
≥40.1 (630)	27.0 (13.4, 47.0)	47.7 (29.9, 66.2)	25.3 (12.5, 44.4)		21.2 (14.8, 29.5)	35.8 (27.2, 45.5)	43.0 (33.7, 52.8)		41.6 (34.5, 49.1)	25.8 (20.0, 32.6)	32.6 (25.7, 40.3)	
Men												
0 (1,171)	47.0 (38.3, 55.9)	39.6 (31.2, 48.7)	13.4 (8.4, 20.7)	<.001	31.3 (26.3, 36.7)	45.8 (40.0, 51.7)	23.0 (18.3, 28.5)	<.001	60.1 (52.3, 67.5)	21.2 (15.9, 27.6)	18.7 (13.0, 26.2)	<.001
0.1–20 (514)	14.0 (6.7, 27.0)	46.9 (32.8, 61.5)	39.1 (26.0, 54.0)		11.5 (7.6, 17.1)	36.0 (28.3, 44.5)	52.5 (44.1, 60.7)		36.8 (26.4, 48.7)	21.9 (13.6, 33.2)	41.3 (30.1, 53.5)	
20.1–40 (189)	*	*	*		12.4 (5.5, 25.7)	29.6 (17.6, 45.1)	58.0 (42.9, 71.8)		18.0 (10.5, 29.2)	31.2 (20.3, 44.7)	50.8 (37.7, 63.8)	
≥40.1 (360)	*	53.9 (30.5, 75.7)	*		12.3 (6.5, 22.0)	39.2 (28.2, 51.5)	48.5 (36.6, 60.6)		28.7 (20.8, 38.3)	26.3 (18.9, 35.4)	44.9 (35.3, 55.0)	
Women												
0 (2,154)	53.8 (45.7, 61.8)	39.7 (32.1, 48.0)	6.4 (3.4, 11.9)	<.001	58.3 (53.5, 63.0)	34.3 (29.8, 39.1)	7.4 (5.2, 10.3)	<.001	86.7 (82.3, 90.1)	10.8 (7.7, 15.0)	2.5 (1.3, 4.9)	<.001
0.1–20 (690)	17.9 (9.5, 31.2)	52.0 (37.4, 66.4)	30.1 (18.1, 45.5)		27.5 (21.5, 34.4)	40.6 (33.1, 48.5)	31.9 (25.0, 39.7)		76.5 (67.7, 83.5)	16.6 (10.9, 24.5)	6.9 (3.2, 14.1)	
20.1–40 (193)	*	*	*		22.1 (11.9, 37.4)	41.4 (27.1, 57.3)	36.5 (23.5, 51.8)		58.7 (44.1, 71.9)	32.0 (20.0, 47.1)	9.3 (3.6, 22.1)	
≥40.1 (256)	*	*	*		39.7 (26.1, 55.1)	28.8 (16.9, 44.5)	31.5 (18.8, 47.9)		63.5 (52.4, 73.3)	25.0 (16.7, 35.6)	11.5 (6.4, 19.8)	

Note. CI = confidence interval.

^a*p* value for bivariate association, obtained through a chi-squared test, between pack year and alcohol use categories, within each sex and age group. ^bLifetime 5+ drinking days is defined as the number of days over lifetime in which participants reported drinking 5 or more drinks on 1 occasion.

*Cells with *n* < 10 are suppressed.

Source: 2014–2015 U.S. National Alcohol Survey.

Summary: Tobacco and Alcohol Co-Use Among Adults

New analyses of the pooled 2014–2015 and 2019–2020 NAS and 2015–2019 NSDUH find slightly lower levels of tobacco and alcohol co-use than found in earlier studies using 2001–2002 and 2012–2013 NESARC data (which reported co-use prevalence of more than 20%).^{123,124} Overall, 15.6% (95% CI = 14.7%–16.6%) of NAS participants reported past-year co-use of tobacco and alcohol, and 11.8% (95% CI = 11.7%–12.0%) of NSDUH participants reported past-30-day co-use of cigarettes and alcohol. The lower estimate in NSDUH than in NAS could be due to differences survey year, measurement timeframes of use assessed (past 30-days vs. past year), types of tobacco products assessed (e.g., cigarettes vs. any non-e-cigarette tobacco product) and other factors.

The literature and analyses of 2014–2015 and 2019–2020 NAS data and 2015–2019 NSDUH data document a strong association between tobacco use and alcohol use. Similar to previous studies,^{125,128,134,139} new analyses of the NAS and NSDUH found a higher prevalence of both any alcohol use and alcohol use exceeding guidelines among adults reporting use of tobacco, particularly those who used tobacco nondaily, than among those who reported never use of tobacco. More than one-half of NAS and NSDUH participants who reported nondaily tobacco use also reported hazardous alcohol use patterns (alcohol use exceeding guidelines, binge drinking, or risky weekly alcohol use). Among NSDUH participants reporting nondaily cigarette smoking, prevalence of past-30-day alcohol use exceeding guidelines was 52.0% (binge drinking, no risk weekly use: 32.2%, 95% CI = 31.3%–33.1%; risky weekly use: 19.8%, 95% CI = 19.0%–20.6%). Among NAS participants who reported using tobacco daily or nondaily in the past year, alcohol use was higher among adults ages 18–29 than among adults in other age groups and higher among men than among women. Overall prevalence of past-year use of alcohol exceeding guidelines was 56.1% (95% CI, 50.0%–61.9%) among participants who used tobacco nondaily in the past year. Specific thresholds of alcohol use exceeding guidelines, including 5+ drinking and high-intensity drinking, also reflect generally higher prevalence of these behaviors among adults reporting daily and nondaily tobacco use compared to adults reporting never using tobacco. Importantly, a fairly large proportion of adults, particularly men, report 40.1 or more pack years of smoking and the highest level of 5+ drinking days for their age group. This population is an especially important target for smoking cessation efforts.

A study of young adult participants in the 2002–2003 NESARC found that those who smoked nondaily had a higher likelihood of hazardous drinking than those who did not smoke,¹²⁸ aligning with the findings from the NSDUH and NAS data. Analysis of 2014–2015 and 2019–2020 NAS data finds that alcohol use at bars or house parties was particularly prevalent among adults ages 18–29 who reported past-year tobacco use. The association between nondaily tobacco use and alcohol use may be attributed in part to social smoking (i.e., smoking in the context of parties, bars, or nightclubs).

Analysis of the 2019–2020 NAS finds that alcohol use was common among adults who reported use of e-cigarettes in the past year. Compared to those who reported no e-cigarette use, adults who reported using e-cigarettes, whether monthly/semimonthly or daily/nearly daily, were less likely to report no past-year alcohol use and more likely to report past-year alcohol use exceeding guidelines. For example, among adults who reported daily or nearly daily e-cigarette

use, 59.2% reported alcohol use exceeding guidelines, compared with 28.4% of adults reporting no e-cigarette use. This analysis was limited by small sample size, but it does suggest that these tobacco-alcohol co-use patterns may extend across tobacco products.

Analyses of 2014–2015 and 2019–2020 NAS data found that, regardless of tobacco use status, men consume a higher average number of drinks per year than women. Among men ages 18–29, past-year drinks consumed was highest among those who reported former tobacco use. In contrast, among men ages 30 and older, past-year drinks consumed was highest among those who reported past-year tobacco use. Men also reported having a higher number of lifetime 5+ drinking days than women across all age groups and tobacco use categories except for women ages 18–29 who reported nondaily tobacco use.

Chapter Summary

Tobacco and alcohol products have long been among the most common addictive and carcinogenic substances used by adults and adolescents in the United States. Epidemiologic surveillance of patterns of use of these products, individually and together, contributes to the understanding of patterns of morbidity and mortality from cancer and serious diseases.

Nationally representative surveys provide self-reported data on alcohol use, tobacco use, and their co-use among U.S. adolescents, young adults, and older adults (this monograph defines co-use as use of tobacco and alcohol during the same reference period). Epidemiologic surveillance of tobacco and alcohol co-use is limited by reliance on self-reported data, which may underestimate use, and the fact that many surveys lack detailed measures of use for both tobacco and alcohol. Additionally, surveys do not always align with respect to the measures used; in particular, whether alcohol and/or tobacco use is defined as use in the past 30 days or past year, and the specific definition of hazardous alcohol use. Social desirability bias influences self-report of behaviors and could well influence self-report of tobacco and alcohol differently among different groups of people. The existing literature on tobacco and alcohol co-use is relatively limited, particularly as it regards nationally representative data. To address this gap, new analyses of three nationally representative surveys (Monitoring the Future, National Alcohol Surveys, and National Survey on Drug Use and Health) were conducted. The analysis of 2000–2023 Monitoring the Future study data examined co-use of tobacco and alcohol over time among U.S. students in 8th, 10th, and 12th grade. The 2015–2019 National Survey on Drug Use and Health analyses focused on past-30-day measures of co-use to estimate co-use prevalence and alcohol use prevalence by tobacco use status. The 2014–2015 and 2019–2020 National Alcohol Surveys analyses allowed estimates of co-use and alcohol use by tobacco use status that included more detailed information about past-year drinking, such as beverage-specific numbers of drinks consumed, frequency of drinking in different drinking contexts, and high-intensity drinking. Importantly, the National Alcohol Surveys were the only identified population survey that included detailed measures of lifetime accumulated cigarette smoking and alcohol use. Co-use of tobacco and alcohol is strongly influenced by short- and long-term trends in the use of each substance. Over many decades, overall adult cigarette smoking has declined significantly; among adults who smoke, the proportion who smoke nondaily (opposed to daily) has increased over time.

The marketplace for tobacco and alcohol products is more diverse than in the past, especially for tobacco. The tobacco product marketplace includes products such as e-cigarettes, heated tobacco products, and nicotine pouches, and can be expected to continue to evolve. The alcohol marketplace has always included products differing widely in alcohol content, but many new flavors and formulations across beer, wine, and spirits product types have been introduced in recent decades. This complicates efforts to measure the type and amount of alcohol used. Although overall alcohol consumption has declined over time, albeit at a far slower pace than cigarette smoking, alcohol is still the most common substance used by adults and adolescents.

Adolescence, commonly defined as the period from age 10 to age 19, is characterized by increasing autonomy, identification with peers, experimentation, and risk-taking; health risk behaviors often cluster during this important developmental period. Substance use, including tobacco and alcohol use, is commonly initiated in adolescence. (Although adolescents may also initiate cannabis use in conjunction with alcohol and/or tobacco use, cannabis use is beyond the scope of this monograph). Analysis of nationally representative surveys show that alcohol use and cigarette smoking, and their co-use among adolescents, have declined over the last few decades. However, the literature and a new analysis of Monitoring the Future study data confirm a continued close association between adolescent cigarette and alcohol use and extend this relationship to a wide variety of tobacco products, including cigarettes, e-cigarettes, cigars, and smokeless tobacco. Based on data from the 2023 Monitoring the Future study, more than two-thirds of 10th and 12th grade students who reported past-30-day cigarette smoking also reported past-30-day alcohol use and roughly one-half who reported past-30-day cigarette smoking also reported past-2-week binge drinking. Among 10th and 12th grade students who reported past-30-day nicotine vaping, more than one-half also reported past-30-day alcohol use, and about one-third reported past-2-week binge drinking. Additionally, use of more than one tobacco product appeared to place adolescents at higher risk for alcohol use and binge drinking than use of only one tobacco product.

The literature and new analysis of National Alcohol Surveys and National Survey on Drug Use and Health confirms the strong relationship between tobacco and alcohol use among adults. Data indicates that approximately 12%–16% of adults ages 18 and older engage in co-use of tobacco and alcohol products. This is lower than the percentage of adults who report use of only alcohol (roughly 42%–54%), higher than use of only cigarettes or tobacco products (roughly 5%–8%), and lower than no use of either substance (26%–38%). Nonetheless, 12%–16% represents as many as 1 in 8 U.S. adults, indicating that co-use of tobacco and alcohol products is not uncommon. Any past-year alcohol use was reported by 76% of National Alcohol Surveys participants who used tobacco in the past year, and any past-30-day alcohol use was reported by more than one-half of National Survey on Drug Use and Health participants who smoked cigarettes in the past 30 days.

The literature also finds a strong relationship between cigarette smoking and alcohol use disorders. Although the prevalence of smoking has decreased among adults with and without an alcohol use disorder, smoking is more than twice as common among people with an alcohol use disorder than among those without an alcohol use disorder. Smoking prevalence is also far

higher among adults with severe alcohol use disorder than among those with mild or moderate alcohol use disorder. Further, the literature finds a strong relationship between heavy alcohol consumption and use of diverse tobacco products, including cigarettes, e-cigarettes, and smokeless tobacco. New analysis of the pooled 2014–2015 and 2019–2020 National Alcohol Surveys and the 2015–2019 National Survey on Drug Use and Health provide more detailed information about patterns of co-use among adults ages 18 and older.

In particular, the analyses presented in this chapter show that individuals who do not use tobacco products are less likely to use alcohol or engage in hazardous drinking, whether defined as alcohol use exceeding guidelines, binge drinking, or other use patterns. Regardless of age, adults who reported never using tobacco products were among those most likely to report not using alcohol, and adults who reported never using tobacco products who did report using alcohol were the least likely to report exceeding guidelines. In contrast, adults who reported using tobacco products had the highest prevalence of alcohol use exceeding guidelines. A strong association was also found between tobacco use and hazardous alcohol use in the National Alcohol Surveys analysis, defined as either 5+ drinking days (days of drinking 5 or more drinks) or high intensity drinking (at least 8 drinks per day for women and 12 drinks per day for men). Overall, more than 40% of people who reported past-year tobacco use in the National Alcohol Surveys also reported past-year alcohol use exceeding guidelines. In the National Survey on Drug Use and Health, past-30-day binge drinking and/or risky weekly use was reported by more than one-half (52.0%) of people who smoked cigarettes nondaily <300 cigarettes/month, 38.6% of people who smoked daily <300 cigarettes/month, and 37.7% of people who smoked ≥ 300 cigarettes/month. In general, alcohol use was lower among women than men and declined substantially across age groups regardless of tobacco use status. Although both tobacco and alcohol use decline considerably with age, co-use of these products persists. For example, among adults ages 60 and older who reported past-year daily use of tobacco, more than 20% of these individuals also reported past-year alcohol use exceeding guidelines.

The National Alcohol Surveys began measuring e-cigarette use in 2019–2020. Although limited by small sample size, analysis of this data finds that most adults (>80%) who used e-cigarettes in the past year also reported use of alcohol. Additionally, more than one-half of the adults who co-used alcohol and e-cigarettes engaged in alcohol use that exceeds guidelines. Thus, as with cigarette use, new analyses suggest that e-cigarette use is strongly associated with both alcohol use and hazardous alcohol use.

Analysis of the 2015–2019 National Survey on Drug Use and Health allows for examination of patterns of alcohol use with cigarettes, smokeless tobacco, and cigars. These data confirm that adults who never (or formerly) smoked cigarettes, used smokeless tobacco, or smoked cigars are the least likely to also engage in alcohol use and hazardous alcohol use (binge drinking or risky weekly alcohol use). Among adults who report use of tobacco products, those who use tobacco nondaily are at particular risk of hazardous alcohol use, which is consistent with analyses of the National Alcohol Surveys indicating that, overall, the highest prevalence of past-year alcohol use exceeding guidelines was among people who reported nondaily tobacco use. Nondaily smoking is more prevalent than in the past,¹⁷⁰ and major shifts in the availability and use of new tobacco products in the 2000s and of the use of multiple tobacco products may continue, complicating the understanding of tobacco and alcohol co-use.

Lifetime measures of cumulative tobacco and alcohol use are strongly associated with one another. Analysis of the 2014–2015 National Alcohol Surveys showed that nearly one-half of those ages 30–59 who reported 20 or more pack years of smoking also reported more than 1,000 5+ drinking days. Men reported more 5+ drinking days than women. Among adults ages 30 and older, the highest mean number of accumulated 5+ drinking days was among people who used tobacco in the past year; those who formerly used tobacco also reported more 5+ drinking days than those who never used tobacco.

Tobacco and alcohol co-use is a complex and changing aspect of substance use behavior. Product types, policies, and social norms change over time, sometimes rapidly, resulting in changes in behavior related to both tobacco and alcohol. Notable trends include the decline in adolescent alcohol and cigarette use, dramatic increases in use of e-cigarettes and other emerging tobacco products, rising use of alcohol by women, and the increased proportion of nondaily tobacco use. This dynamic landscape results in a variety of challenges for timely, accurate, and comprehensive surveillance.

Research Needs

Data on multiple types of products is necessary. The tobacco product marketplace has expanded over time and can be expected to continue to evolve. Studies to address the potential association between new and emerging tobacco products (e.g., e-cigarettes, heated tobacco products, and nicotine pouches) and alcohol and to track usage patterns over time are a high priority.

Validation of self-reported information could improve understanding of co-use patterns. All nationally representative surveys rely on self-report. Although prone to underestimate levels of tobacco and alcohol use, self-report is generally considered a good reflection of actual use patterns. However, periodic validation to assess the degree of measurement error inherent in self-report is needed, especially as the tobacco and alcohol product marketplace and social norms regarding use of these products continue to evolve. Furthermore, continued efforts to measure existing biomarkers, and identify new biomarkers, especially of long-term use characteristics, could benefit the accuracy of estimates from surveillance and epidemiological studies.

Further understanding of co-use patterns through measurement of simultaneous co-use and lifetime exposure would be informative. Few nationally representative studies include sufficiently detailed measures of tobacco and alcohol use to adequately describe co-use of these two substances. Efforts to define best practices for measures of co-use should be conducted that address appropriate time windows and account for age and sex-related variation in patterns of co-use. Simultaneous co-use is a common behavior pattern, which may influence some disease risks. Similarly, studies are needed to determine co-use patterns over the life course to better understand accumulated exposure, which is especially relevant to risks for cancer. Because the health effects of co-use may vary over the life course, it is also important to measure the developmental stage at which co-use occurs, including when co-use is heaviest. Measures may range from simple measures, such as years of drinking and average number of drinks per day, to those that are more sensitive to the timing of varying patterns of drinking and other details relevant to cancer risk. An example of varying life course alcohol use patterns is the decades measure approach used in the NAS, in which participants report the frequency of any drinking

and heavy (5+) drinking in each decade (e.g., teens, 20s, 30s) since their self-reported age of initiating alcohol use. Moving forward, any measure can be adapted to assess usage patterns over the lifetime including beverage- and context-specific measures and maximum drinks in a day. Measuring both tobacco and alcohol use by decades would facilitate assessment of co-use during each decade and allow for assessment of co-use with cannabis and hazardous substances.

Measurement of use intensity and use over time would help to further understand co-use patterns. There is also a need for tobacco and tobacco and alcohol use measures that capture varying intensity of use over the life course, as individuals often vary their use over time. Some diary studies (e.g., employing timeline followback or ecological momentary assessment) find that more cigarettes are smoked on days when alcohol drinking occurs.^{14,15,17} However, to assess such patterns, measures must assess variability in the use of each product over time. One possibility is to follow the approach that has been used for alcohol and cannabis co-use and asking how often the substances are used together.¹⁷¹ However, additional methodologic work is needed.

Modeling patterns of co-use of tobacco and alcohol and alcohol alone is needed to account for covariance of different demographic and behavioral variables. Few studies have conducted model-based estimation of patterns of co-use from national and regional data in the United States. Such efforts, along with models of changes in co-use patterns in recent years, could inform public health efforts, addressing demographic and geographic differences and evaluation of natural experiments.

Further understanding of contextual aspects of co-use is needed. Measures of context of and motivations/expectations for heavy tobacco and alcohol use episodes would be useful to understanding external drivers of heavy co-use and could inform the development of potential interventions to reduce the frequency and/or intensity of heavy co-use episodes. Such measures could include location of co-use (bar/club, house party, home), co-use patterns of people (e.g., partner, friends, strangers) in different contexts, and reasons for co-using.

Conclusions

1. **Tobacco and alcohol products are the most commonly used addictive and carcinogenic substances.** Adults who use tobacco (including cigarettes, smokeless tobacco, or cigars) are more likely to engage in alcohol use than those who do not use tobacco. Similarly, adults who use alcohol are more likely to use tobacco products than those who do not use alcohol. These associations are observed across all age groups, and for both men and women, although use prevalence varies among population groups.
2. **Co-use of tobacco and alcohol is common among adults.** A total of 15.6% of adults reported the co-use of tobacco and alcohol in the past year, representing approximately 39 million people, and a total of 11.8% of adults reported co-use of cigarettes and alcohol in the past month, representing nearly 30 million people. Co-use patterns vary across population groups based on age, sex, and other factors.
3. **Among adolescents, tobacco use and alcohol use often occur together.** Most adolescents who use a tobacco product also drink alcohol, and most adolescents who drink alcohol also use a tobacco product. This relationship extends beyond cigarettes to smokeless tobacco, cigars, and e-cigarettes. In 2023, co-use of nicotine-containing

e-cigarettes and alcohol was the most common tobacco and alcohol co-use pattern among adolescents. The literature strongly suggests that use of multiple tobacco products is an even stronger risk factor for alcohol use than use of one tobacco product or no use of tobacco products.

4. **Prevalence of alcohol use within guidelines and risky weekly alcohol use are similar in men and women, but prevalence of binge drinking without risky weekly alcohol consumption is greater in men than women.** These differences are seen in people across tobacco use categories.
5. **Tobacco and alcohol co-use is influenced by changes in the patterns of use of the individual substances.** Over the past 50 years, cigarette smoking among adults and adolescents has declined to historically low levels, but non-cigarette tobacco products such as e-cigarettes and nicotine pouches have entered the marketplace and are particularly prevalent among adolescents. In contrast, within the same period, the overall level of adult alcohol use has remained relatively stable while alcoholic beverage choice preferences have shifted away from beer and towards wine and spirits. In adolescents, alcohol use has declined steadily in both boys and girls since the 1970s.
6. **Adults who report nondaily use of tobacco in the past year or past month report the highest prevalence of any alcohol use and alcohol use exceeding guidelines compared to other tobacco use groups.** More than one-half of adults who use tobacco nondaily report alcohol use exceeding the 2020–2025 U.S. Dietary Guidelines for alcohol use, such as episodes of binge drinking. This is particularly true for young adults, which may reflect use of both substances in social settings. For example, among people ages 18–29 years, 72.5% (95% CI, 62.4%–80.8%) of people who used tobacco nondaily in the past year and 56.7% (95% CI, 47.8%–65.1%) of people who used tobacco daily in the past year reported alcohol use exceeding guidelines.
7. **Fewer older adults (age 60 and older) than younger adults use tobacco products, but those who do are also likely to use alcohol and to engage in alcohol use exceeding guidelines.** The co-use of tobacco and alcohol among older adults has important clinical implications, because this age group has the highest risk for cancer. Older men have higher prevalence of alcohol use and alcohol use exceeding guidelines than older women.
8. **Among both adults and adolescents, never use of tobacco is associated with a lower prevalence of alcohol use and lower levels of alcohol use exceeding guidelines.** People who report formerly using a tobacco product are at intermediate risk of alcohol use, falling between those who have never used tobacco and those who report current use.
9. **Assessment of trends and patterns of tobacco and alcohol co-use can be improved.** Although several nationally representative surveys measure tobacco and alcohol co-use, these measures rely on self-report, vary in the level of detail and time window with which they assess each substance, and tend not to assess use of tobacco and alcohol over the life course. Better alignment of these measures will allow for improved assessment and health outcomes due to co-use.

Appendix 2A National Surveys With Tobacco and Alcohol Use Measures

Dataset	Description	Frequency	Population and methodology	Selected tobacco use measures	Selected alcohol use measures
Alcohol-focused surveys					
National Alcohol Survey (NAS)	Overview: The NAS is designed to assess trends in drinking in the national population, including drinking patterns and lifetime and current alcohol consumption. Sponsors: Alcohol Research Group, and the NIAAA	1964–present; conducted approximately every 5 years; 15 waves of data collection completed as of 2026	Sample: Nationally representative sample of U.S. noninstitutionalized adults Design: Cross-sectional Administration: Computer-assisted telephone interview	Lifetime use • Ever regular use of cigarettes, e-cigarettes, or other tobacco products (“tobacco cigarettes” or “any other kinds of tobacco;” e-cigarettes added in 2019–2020) • Age of initiation (not including e-cigarettes) • Use frequency when used tobacco most heavily • Time since last use Past year use • Use frequency in past 12 months (not including e-cigarettes in 2014–2015 and prior surveys) • Cigarettes per day	Lifetime use • Ever use • Largest number of drinks ever consumed at one time • Age of initiation • Frequency of drinking (overall and drinking 5+ drinks on an occasion) in 20s/30s/40s/50s/ Past-year use • Any use in past 12 months • Use frequency in past 12 months • Largest number of drinks consumed in a single day • Frequency of drinking 1 to ≥12 drinks in a single day • Frequency of drinking and typical number of drinks consumed at specific locations (bars, home, parties) Current use • Typical number of drinks consumed when drinking beer, wine, and liquor

Appendix 2A (continued)

Dataset	Description	Frequency	Population and methodology	Selected tobacco use measures	Selected alcohol use measures
National Epidemiologic Survey on Alcohol and Related Conditions (NESARC)	Overview: NESARC was designed to assess the prevalence of AUDs in the U.S. population. The survey includes questions about tobacco products including cigarettes, ENDS, cigars, pipes, and smokeless tobacco. Sponsor: NIAAA	Three waves: 2001–2002; 2004–2005; 2012–2013	Sample: Nationally representative sample of U.S. civilian, noninstitutionalized adults Design: Waves 1 and 2 longitudinal; Wave 3 cross-sectional Administration: Home-based, in-person interviews; saliva samples collected from Wave 3 respondents	Lifetime use • Ever use and ever daily use • Age of initiation • Time since last use • Typical use frequency and amount used in the year before quitting Past-year use • Any use in past 12 months • Typical use frequency and amount used in past 12 months Cessation behavior • Lifetime quit attempts • Quit attempts in past 12 months	Lifetime use • Ever use • Age of initiation • Time since last use • Typical frequency of drinking • Typical and largest number of drinks consumed during period when drank the most • Largest number of drinks consumed in a single day before age 18, and frequency of consuming 5+ drinks in a single day • Frequency of drinking 5+, 8+, and 12+ drinks in a single day for periods when drank the most Past-year use • Any use in past 12 months • Use frequency in past 12 months • Largest number of drinks consumed in a single day • Number of drinks consumed on drinking days • Frequency of drinking 4+ and 5+ drinks in <2 hours • Frequency of drinking 4+, 5+ 8+, and 12+ drinks in a single day • Frequency of drinking beer, wine, and liquor and typical drinking location (own home, friends'/relatives' homes, or public places)

Appendix 2A (continued)

Dataset	Description	Frequency	Population and methodology	Selected tobacco use measures	Selected alcohol use measures
Tobacco-focused surveys					
Population Assessment of Tobacco and Health (PATH)	Overview: PATH is a national longitudinal study of tobacco use and how it affects the health of people in the United States. The survey includes questions about use and perceptions of cigarettes, ENDS, hookah, cigars, and smokeless tobacco. Sponsors: NIDA, FDA	2013–present; 8 waves of data collection completed as of 2026	Sample: Nationally representative sample of U.S. civilian, noninstitutionalized population age 12 or older Design: Longitudinal cohort study with 2 cohorts Administration: Home-based, in-person interviews, telephone, and biospecimen collection	Lifetime use • Ever use • Ever fairly regular use and amount used • Age of initiation • Time since last use Past-year use • Any use in past 12 months • Every or some day use 12 months ago Past-30-day use • Any use in past 30 days • Number of days used • Amount used per day Current use • Every day or some day use • Amount used per day Cessation behavior • Complete quitting • Quit attempts in past 12 months • Use of other tobacco products to quit smoking cigarettes	Lifetime use • Ever use • Age of initiation Past year use • Any use in past 12 months Past-30-day use • Any use in past 30 days • Number of drinking days • Number of drinks consumed on drinking days Family alcohol use • Alcoholism/problem drinking among blood relatives

Appendix 2A (continued)

Dataset	Description	Frequency	Population and methodology	Selected tobacco use measures	Selected alcohol use measures
National Youth Tobacco Survey (NYTS)	Overview: NYTS provides nationally representative data about middle and high school youths' tobacco-related beliefs, attitudes, behaviors, and exposure to pro- and anti-tobacco influences. The survey includes questions about cigarettes, ENDS, hookah, cigars, smokeless tobacco, pipes, HTPs (added in 2020), and nicotine pouches (added in 2021). Sponsor: CDC, FDA beginning in 2011.	1999–2009: Biennial 2011–present: Annual, ongoing	Sample: Nationally representative sample of middle and high school students (6th–12th grade) Design: Cross-sectional Administration: School-based through 2020; web-based and completed at school, home, or elsewhere starting in 2021	Lifetime use • Ever use • Age of initiation • Time since last use Past-30-day use • Any use in past 30 days • Number of days used • Amount used per day Cessation behavior • Quit attempts in past 12 months	None

Appendix 2A (continued)

Dataset	Description	Frequency	Population and methodology	Selected tobacco use measures	Selected alcohol use measures
Tobacco Use Supplement to the Current Population Survey (TUS-CPS)	Overview: TUS-CPS is a survey of tobacco use that is administered as part of the U.S. Census Bureau's Current Population Survey every 3–4 years. The survey includes questions about cigarettes, cigars, pipes, smokeless tobacco, ENDS (added in 2011), HTPs (added in 2022), and nicotine pouches (added in 2022). Sponsors: NCI, U.S. Census Bureau, FDA (beginning in 2014)	1992–present; conducted every 3 to 4 years	Sample: Nationally representative sample of U.S. civilian, noninstitutionalized adults (adolescents ages 15–17 were included in 1992–2006 cycles) Design: Cross-sectional Administration: Telephone survey or in-person interviews	Lifetime use • Age of initiation • Amount smoked when smoked every day • Years used • Time since quitting Past-year use • Every day or some day use in past 12 months • Days smoked per month and cigarettes per day in past 12 months Past-30-day use • Number of days used Current use • Every day or some day use • Cigarettes per day Cessation behavior • Quit attempts in past 12 months	None

Appendix 2A (continued)

Dataset	Description	Frequency	Population and methodology	Selected tobacco use measures	Selected alcohol use measures
Health behavior surveys					
National Longitudinal Study of Adolescent to Adult Health (Add Health)	Overview: Add Health is a longitudinal, nationally representative study of adolescents who were in 7th–12th grade in 1994–1995. It includes data on respondents' social, economic, psychological, and physical well-being, as well as contextual data on families, neighborhoods, communities, and schools. Sponsors: NICHD, with co-funding from other agencies and foundations	5 waves, data collected approximately every 6–7 years: Wave I (1994–1995), Wave II (1996), Wave III (2001–2002), Wave IV (2008–2009), Wave V (2016–2018)	Sample: Nationally representative sample of adolescents in 7th–12th grade Design: Longitudinal Administration: School- and home-based interviews and biospecimen collection	Lifetime use • Ever use • Ever regular use of cigarettes • Age of initiation Past-30-day use • Number of days used (cigarettes, cigar, pipe, smokeless tobacco, ENDS) • Cigarettes per day Cessation behavior • Ever tried to quit or cut down use • Ever quit or cut down use for at least 1 month	Lifetime use • Ever use • Age of initiation Past year use • Number of drinking days • Number of drinks consumed on drinking days • Number of binge drinking days (drinking at least 5 drinks in a row) Past-30-day use • Number of drinking days • Number of drinks consumed on drinking days Cessation behavior • Ever tried to quit or cut down use • Ever quit or cut down use for at least 1 month
Behavioral Risk Factor Surveillance System (BRFSS)	Overview: BRFSS collects state data annually about U.S. residents regarding their health-related risk behaviors, chronic health conditions, and use of preventive services. Sponsors: CDC, state health departments	1984–present: Annual; ongoing	Sample: Representative sample of U.S. adults Design: Cross-sectional Administration: Telephone survey	Lifetime use • Ever use (cigarettes, ENDS) Current use • Every day or some day use (cigarettes, smokeless tobacco, ENDS)	Past-30-day use • Number of drinking days per week/month • Number of drinks consumed on drinking days • Number of binge drinking days (drinking at least 4/5 drinks on an occasion for women/men) • Largest number of drinks consumed on an occasion

Appendix 2A (continued)

Dataset	Description	Frequency	Population and methodology	Selected tobacco use measures	Selected alcohol use measures
Health Information National Trends Survey (HINTS)	Overview: HINTS collects nationally representative data about the American public's use of cancer-related information Sponsor: NCI	2003–2009: Biennial (2009 was Puerto Rico only) 2011–2015; 2017–2020: Annual 2022–present: Biennial	Sample: Nationally representative sample of U.S. civilian, noninstitutionalized adults Design: Cross-sectional Administration: 2003, 2005: Telephone only; 2007: Telephone and mailed questionnaires; 2009–present: Mailed questionnaires only	Lifetime use • Ever use of cigarettes • Ever use of cigars, smokeless tobacco, pipe, hookah (2015, 2017 surveys) • Ever use of ENDS (2017–present surveys) • Ever use of heated tobacco products (2020 survey) • Time since quit smoking cigarettes (2003, 2005, 2007, 2013, 2015, 2017 surveys) • Ever smoked cigarettes every day for 6 months (2005, 2007 surveys) Past-year use • Every day or some day use of cigarettes 12 months ago (2005 survey) Past-30-day use • Number of days smoked cigarettes (2005, 2007 surveys) • Number of cigarettes per day (current smokers–2003, 2005, 2007, 2013 surveys; former smokers–2003, 2005, 2007 surveys) • Number of days used e-cigarettes (2019 survey)	Past-30-day use • Number of drinking days per week (2011, 2018–2020, 2022 surveys) • Number of drinks per drinking day (2011, 2020, 2022 surveys) • Average number of drinks per week (2018–2020, 2022 surveys) • Number of binge drinking days (drinking at least 4/5 drinks on an occasion for women/men) (2020, 2022 surveys)

Appendix 2A (continued)

Dataset	Description	Frequency	Population and methodology	Selected tobacco use measures	Selected alcohol use measures
				Current use • Every day or some day use of cigarettes • Every day or some day use of cigars, smokeless tobacco (2015, 2017 surveys) • Every day or some day use of ENDS (2017–present surveys) • Current use of heated tobacco products (2020 survey) • Cigarettes per day (2003, 2005, 2007, 2013 surveys) Cessation behavior • Quit smoking for ≥ 1 day in past 12 months (2005, 2012–2014, 2017, 2019 surveys)	
Monitoring the Future (MTF)	Overview: MTF is an annual, ongoing study of beliefs, attitudes, and behavior of American secondary school students, college students, and young adults. The survey includes questions about cigarettes, ENDS, and smokeless tobacco. Sponsors: NIDA, University of Michigan	1975–present; Annual, ongoing	Sample: Nationally representative sample of 8th, 10th, and 12th grade students Design: Cross-sectional and longitudinal Administration: Group-administered school-based survey Follow-up surveys are mailed to a randomly selected sample from each senior class, with biennial follow-up until age 30, and every 5 years thereafter.	Lifetime use • Ever use Past-year use • Any use in past year Past-30-day use • Any use in past 30 days • Daily use of cigarettes or smokeless tobacco • Daily use of ENDS (added in 2017) • Smoking 1/2 pack of cigarettes or more per day	Lifetime use • Ever use Past-year use • Any use in past year Past-30-day use • Any use in past 30 days • Daily use • Drinking ≥ 5, 10, and 15 drinks in a row in the past 2 weeks

Appendix 2A (continued)

Dataset	Description	Frequency	Population and methodology	Selected tobacco use measures	Selected alcohol use measures
National Health and Nutrition Examination Survey (NHANES)	Overview: NHANES is a program of studies to assess the health and nutritional status of adults and children in the United States. The survey combines interviews and physical examinations. The survey includes questions about cigarettes, pipes, cigars, smokeless tobacco, hookah, and ENDS. Sponsor: CDC	1999–present; biennial	Sample: Nationally representative sample of the U.S. civilian, noninstitutionalized population (newborns and older) Design: Cross-sectional Administration: Home-based interviews and physical examination by physicians in mobile examination centers	Lifetime use • Ever use (cigarettes, cigars, ENDS, smokeless tobacco) • Age of initiation (cigarettes) • Time since quitting (cigarettes) • Cigarettes per day before quitting Past-30-day use • Number of days used (cigarettes) • Cigarettes per day Current use • Every day or some day use • Use in past 5 days (cigarettes, cigars, ENDS, smokeless tobacco) • Number of days used in past 5 days • Number of times used in past 5 days	Lifetime use • Ever use • Ever drinking ≥5 drinks every day Past year use • Use frequency in past 12 months (days per week, month, or year) • Average number of drinks per day on drinking days • Frequency of binge drinking (drinking at least 5 drinks in a day) • Frequency of binge drinking (≥5 drinks) within a 2-hour period • Frequency of drinking 8 or more drinks in a single day • Frequency of drinking 12 or more drinks in a single day Past-30-day use • Frequency of binge drinking days (drinking at least 5 drinks on an occasion)

Appendix 2A (continued)

Dataset	Description	Frequency	Population and methodology	Selected tobacco use measures	Selected alcohol use measures
National Health Interview Survey (NHIS)	Overview: NHIS is conducted annually to monitor the health of the U.S. population. The survey collects and analyzes data on a broad range of health topics, including tobacco use, by various demographic and socioeconomic characteristics. Tobacco use questions include questions about cigarettes, cigars, pipes, smokeless tobacco, hookah, and ENDS. Sponsor: CDC	1957–present; annual, ongoing Tobacco use questions have been asked annually since 1997. Questions about smoking history and cessation are included on a rotating basis. Alcohol questions were asked annually from 1997 to 2018. Alcohol questions will be asked on a rotating basis from 2019 onward.	Sample: Representative sample of the U.S. civilian, noninstitutionalized population. In the 2019 NHIS and later, a sample adult and sample child are selected from each household; information about the child is collected from a parent or knowledgeable adult. Design: Cross-sectional Administration: Home-based interviews	Lifetime use • Ever use • Age of initiation of cigarette smoking (rotating question) • Time since quitting (rotating question) Past-30-day use • Number of days smoked (cigarettes, cigars, ENDS) • Number of cigarettes per day Current use • Every day or some day use (cigarettes, cigars, pipes, smokeless tobacco, ENDS) Cessation behavior • Tried to quit in past year (rotating question) • Use of ENDS to quit smoking (rotating question)	<i>Rotating questions:</i> Lifetime use • Ever use • Drinking ≥12 drinks in any year Past year use • Number of drinking days (per week, month, or year) • Number of drinks consumed on drinking days • Any past year binge drinking (drinking ≥4/5 drinks in a day for women/men) Past-30-day use • Any past-30-day use • Number of binge drinking days (drinking ≥4/5 drinks on an occasion for women/men)

Appendix 2A (continued)

Dataset	Description	Frequency	Population and methodology	Selected tobacco use measures	Selected alcohol use measures
National Longitudinal Surveys (NLS)	Overview: The NLS are a set of surveys designed to gather information about labor market activities and other life events. The surveys include questions about lifetime and current cigarette smoking. Sponsor: Bureau of Labor Statistics	1967–present; 5 total cohorts; data collected annually or biennially depending on survey year Surveys ongoing for 2 cohorts: Studies of the 1980–1984 birth cohort [NLSY97], 1957–1964 birth cohort [NLSY79], and children of the 1957–1964 cohort [NLSY79 Child and Young Adult] are still ongoing.	Sample: Nationally representative sample of youth or mature adults representing specific birth cohorts. Design: Longitudinal Administration: In-person and/or telephone-based interviews	Lifetime use • Ever use of cigarettes • Age of initiation (cigarettes) • Use of cigarettes since date of last interview • Months or years since last smoked daily (NLSY79 only) Past-30-day use • Number of days smoked cigarettes • Number of cigarettes per day	Lifetime use • Ever use • Age of initiation • Alcohol use since date of last interview Past-30-day use • Any use in past month • Number of drinking days • Number of drinks consumed on drinking days • Number of days consumed ≥ 5 or 6 drinks on an occasion
National Survey on Drug Use and Health (NSDUH)	Overview: NSDUH is an annual survey that provides national and state-level data on the use of tobacco, alcohol, illicit drugs (including nonmedical use of prescription drugs) and mental health in the United States. The survey includes questions about cigarettes, ENDS, smokeless tobacco, cigars, and pipes. Sponsor: SAMHSA	1971–present; Annual, ongoing	Sample: Nationally representative sample of U.S. civilian, noninstitutionalized population age 12 or older Design: Cross-sectional Administration: Before 2020: home-based interviews; 2020–present: Home-based and web-based interviews	Lifetime use • Ever use • Ever daily use of cigarettes • Age of initiation (tobacco product use; daily use of cigarettes) • Time since last use Past-30-day use • Number of days used • Number of cigarettes per day	Lifetime use • Ever use • Age of initiation • Ever binge drinking (drinking at least 4/5 drinks on an occasion for women/men) Past year use • Number of drinking days Past-30-day use • Number of drinking days • Number of drinks consumed on drinking days • Number of binge drinking days (drinking at least 4/5 drinks on an occasion for women/men)

Appendix 2A (continued)

Dataset	Description	Frequency	Population and methodology	Selected tobacco use measures	Selected alcohol use measures
Pregnancy Risk Assessment Monitoring System (PRAMS)	Overview: PRAMS collects state-specific data on maternal attitudes, behaviors, and experiences before, during, and after pregnancy. The system collects data from questionnaires as well as birth certificates. Sponsors: CDC, state health departments	1988–present; ongoing	Sample: Population-based sample of people who delivered live infants, representing more than 80% of U.S. live births. Data are weighted by jurisdiction and are not nationally representative. Design: Cross-sectional Administration: Self-administered, mailed questionnaire; interviewer-administered telephone survey; online through a web survey module (starting 2023)	Lifetime use - Cigarette smoking, ENDS use in past 2 years Past-year use - Number of cigarettes per day and ENDS use frequency (every day/some day) in 3 months before pregnancy - Number of cigarettes per day and ENDS use frequency (every day/some day) in last 3 months of pregnancy Current use - Number of cigarettes now smoked per day Cessation behavior - Use of ENDS to quit or reduce smoking	Past year use - Any alcohol use during first, second, and third trimester of pregnancy - Any consumption of ≥ 4 drinks in a 2-hour period during first, second, and third trimester of pregnancy

Appendix 2A (continued)

Dataset	Description	Frequency	Population and methodology	Selected tobacco use measures	Selected alcohol use measures
Youth Risk Behavior Survey (YRBS)	Overview: YRBS is conducted biennially to monitor priority health-risk behaviors and the prevalence of obesity and asthma among adolescents and young adults. The survey includes questions about cigarettes, cigars, smokeless tobacco, and ENDS. Sponsor: CDC	1991–present; Biennially	Sample: Nationally representative sample of high school students (9th–12th grade) Design: Cross-sectional Administration: Self-administered school-based survey	Lifetime use • Ever use • Age of initiation Past-30-day use • Number of days used • Number of cigarettes per day	Lifetime use • Ever use • Total drinking days (only 2017 and earlier surveys) • Age of initiation Past-30-day use • Number of drinking days • Number of binge drinking days • Number of drinks on the occasion the respondent drank the most

Note. AUD = alcohol use disorder; CDC = Centers for Disease Control and Prevention; ENDS = electronic nicotine delivery systems; FDA = Food and Drug Administration; HTPs = heated tobacco products; NCI = National Cancer Institute; NIAAA = National Institute on Alcohol Abuse and Alcoholism; NICHD = National Institute of Child Health and Human Development; NIDA = National Institute on Drug Abuse; SAMHSA = Substance Abuse and Mental Health Services Administration.

Source: Alcohol Research Group n.d., 2014,^{62,172} Bureau of Labor Statistics n.d., 2023,¹⁷³⁻¹⁷⁷ CDC 2013, 2017, 2018, 2022, 2023, 2024,¹⁷⁸⁻²⁰⁰ Hyland et al. 2017,²⁰¹ CSR Incorporated 2022,³¹ Inter-University Consortium for Political and Social Research 2021, 2023, 2024,²⁰²⁻²⁰⁷ NCI n.d., 2023, 2024,²⁰⁸⁻²¹² NIAAA n.d., 2022, 2024,^{213,214} NIDA n.d.,²¹⁵ Office of Disease Prevention and Health Promotion n.d.,²¹⁶ Office on Smoking and Health 2020, 2021, 2022,²¹⁷⁻²²⁰ Piesse et al. 2021,²²¹ SAMHSA n.d.,^{63,222,223} University of Michigan 2024,^{61,224} University of North Carolina, Carolina Population Center n.d.²²⁵⁻²²⁷

Appendix 2B Literature Search Strategy

The following search terms were used in PubMed, Google Scholar, Ovid, and Scopus between June 2023 and September 2024 to identify literature regarding co-use of tobacco and alcohol in the general population.

- Alcohol, drinking, beer, wine, spirits, drinker, drinking patterns
- Tobacco, cigarette, smoking, smoker, co-use, simultaneous use, co-use, co-user, tobacco product, e-cigarette, vaping, polysubstance use

Additional studies published after 2024 were incorporated into the chapter based on their relevance.

Appendix 2C Methods—Monitoring the Future Study, National Alcohol Surveys, and National Survey on Drug Use and Health Analyses

The Monitoring the Future Study

Monitoring the Future (MTF) is a nationally representative, classroom-based survey of U.S. students in 8th, 10th, and 12th grade. The survey uses multistage random sampling to select a sample of students in approximately 100 public and private high schools and middle schools. The survey is conducted annually and began with collecting data from high school seniors in 1975 and expanded to students in 8th and 10th grade in 1991. Additional information regarding the MTF methodology is available from the University of Michigan.²²⁸

Monitoring the Future Tobacco Use Measures

Tobacco use measures in the MTF focused on past-30-day use of cigarettes, large cigars, smokeless tobacco, and nicotine vaping.

Cigarette Smoking Status. Past-30-day cigarette smoking status was based on responses to the question “How frequently have you smoked cigarettes during the past 30 days?” with answer categories “not at all,” “less than one cigarette per day,” “one to five cigarettes per day,” “about one-half pack per day,” “one pack per day,” “one and one-half packs per day,” and “two packs or more per day.”

Large Cigar Smoking Status. Past-30-day large cigar smoking status was based on a question parallel to the cigarette smoking question.

Smokeless Tobacco Use Status. Past-30-day smokeless tobacco use status was based on a question parallel to the cigarette question.

Nicotine Vaping Status. Past-30-day nicotine vaping status was based on a question parallel to the cigarette question.

Monitoring the Future Alcohol Use Measures

Alcohol use measures in the MTF focused on past-30-day alcohol use and binge drinking in the past 2 weeks.

Alcohol Use Status. Past-30-day alcohol use was based on responses to the question, “On how many occasions (if any) have you used alcohol during the last 30 days?” with answer categories of 0, 1–2, 3–5, 6–9, 10–19, 20–39, and 40 or more occasions.

Binge Drinking. Binge drinking was defined as drinking 5 or more drinks in a row over the past 2 weeks.

The National Alcohol Surveys

The National Alcohol Survey (NAS) is a population-based survey, representative of noninstitutionalized adults ages 18 or older within all 50 states and the District of Columbia. Conducted at approximately 5-year intervals, NAS has the longest time frame of any nationally

representative survey, with more detailed alcohol use pattern and heavy alcohol use measures than other surveys. NAS is unique in including life course measures of both tobacco and alcohol use as well as measures of current alcohol use in specific contexts, such as bars and the frequencies of high-intensity drinking (HID) occasions. The 2014–2015 and 2019–2020 NAS were conducted by the Alcohol Research Group (ARG) with funding from the National Institute on Alcohol Abuse and Alcoholism (NIAAA). The 2014–2015 NAS was conducted through telephone interviews of participants recruited through dual-frame landline and mobile phone random digit dialing (RDD). The 2019–2020 NAS consisted of two probability samples: a mobile phone RDD sample with telephone interviews and an address-based sample with online surveys. These probability samples were supplemented with a nonprobability sample drawn from an existing web panel. Additionally, targeted oversampling of Black and Hispanic/Latino participants allowed for subgroup comparisons. Additional information regarding the NAS methodology is available from the ARG.⁶²

National Alcohol Surveys Tobacco Use Measures

The NAS analyses included a measure of tobacco use status (based on lifetime and past 12-month use) and a measure of lifetime cigarette pack years.

Current Tobacco Use. Current tobacco use was categorized by tobacco use status and frequency. Participants were classified as never using tobacco if they responded “no” to the question, “Have you ever smoked cigarettes or used any other kind of tobacco, including e-cigarettes, on a regular basis in your life?” Frequency of tobacco use was asked only of those who reported ever tobacco use in lifetime. Participants were asked how often they smoked cigarettes or used any other kinds of tobacco (not including e-cigarettes) in the past 12 months with the options: daily or nearly daily, 1 to 4 days per week, once every 2 to 3 weeks, once every month or so, less often than that, or never within the past 12 months. Former tobacco use was a “yes” response to the lifetime use question and no reported tobacco use within the past 12 months. Current tobacco use (i.e., past-year tobacco use) was defined as reporting tobacco use within the past 12 months. Due to small cell sizes, categories were collapsed into nondaily current tobacco use (those who reported using tobacco 1 to 4 days per week, once every 2 to 3 weeks, once every month or so, or less often than that), and daily current tobacco use (those who reported using tobacco daily or nearly daily).

Frequency of e-cigarette use was assessed only in the 2019–2020 NAS and was asked separately from use of cigarettes or other tobacco products. Use of e-cigarettes in 2019–2020 NAS was categorized as daily or nearly daily, monthly, or semimonthly (monthly or less, or weekly or nearly weekly), and no use in the past year.

Lifetime Cigarette Smoking. Pack years were calculated to measure lifetime cigarette exposure (among people who formerly smoked or smoked in the past year). This measure was created using participants’ current age, age of smoking onset, and average number of cigarettes per day (standardized to packs by dividing by 20). To calculate pack years, the number of packs smoked per day was multiplied by the number of years smoked. Based on previously established cutoff points,²²⁹ participants were categorized into 1 of 4 groups: 0 pack years, 0.1–20 pack years, 20.1–40 pack years, and ≥ 40.1 pack years. As all NAS analyses were age stratified, alternative

cutoff points were examined for those ages 18–29 as these previously established thresholds likely translate to different risk levels among younger individuals. Due to limited data availability, this measure was only calculated for the 2014–2015 NAS.

National Alcohol Surveys Alcohol Use Measures

The NAS analyses included several measures of alcohol use in the past 12 months, and 1 measure of lifetime alcohol use.

Past-Year Alcohol Use. The NAS analyses included three primary measures of past-year alcohol use:

- **Drinking within guidelines:** 3 categories—no alcohol use in past year, alcohol use within guidelines (consuming ≤ 7 drinks per week for women and ≤ 14 drinks per week for men), and alcohol use exceeding guidelines (consuming > 7 drinks per week for women and > 14 drinks per week for men) per the *Dietary Guidelines for Americans, 2020–2025*⁶⁵ and NIAAA’s definition of heavy alcohol use⁶⁶
- **5+ drinking:** Consuming 5 or more drinks on any given day (binary yes/no variable)
- **HID:** Consuming ≥ 8 drinks on any given day for women and ≥ 12 drinks on any given day for men (binary yes/no variable)

In addition, past-year volume of consumption and frequency of drinking by context were also analyzed.

- **Volume.** Volume of consumption was represented as the number of standard drinks consumed within the past year. This was calculated using the average number and type of drinks (beer, wine, or spirits) consumed each drinking day and the frequency of drinking days in the past year.
- **Frequency of drinking by context.** Participants reported frequency of drinking (never, monthly or less, weekly or more) within the past year for the following drinking contexts: bars, taverns, or cocktail lounges; party in someone’s home; and quiet evening at home.

Lifetime Alcohol Use. Lifetime number of 5+ drinking days was estimated using decades questions about the frequency of 5+ drinking days (for example, “How often did you have five or more drinks on one occasion during your teens/20s/30s/40s/50s?” Response options were every day or nearly every day, at least once a week, at least once a month (but less than 1/week), at least once a year (but less than 1/month), less than once a year, and never).

The National Survey on Drug Use and Health

The National Survey on Drug Use and Health (NSDUH) is a nationally representative survey of the U.S. noninstitutionalized civilian population, not including people with no permanent residence or living in college dormitories, group homes, or 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 participants ages 12 or older. Adolescents ages 12–17 and adults 18–25 are oversampled. The NSDUH uses a combination of computer-assisted personal

interviewing and audio-computer–assisted self-interviewing. The large size of the NSDUH allows for analyses of population subgroups. Chapter 3 presents analyses of subgroups by race and/or ethnicity, educational attainment, income, sexual minority status, presence of chronic health conditions, and military veteran status. A detailed description of NSDUH survey methodology is available from the Substance Abuse and Mental Health Services Administration.²³⁰

The 2015–2019 NSDUH included only limited information on lifetime use of tobacco and alcohol but have information on the frequency and quantity of alcohol consumption and cigarette smoking in the past 30 days as well as the frequency of binge drinking days in the past 30 days. The 2015–2019 survey years were the most recent comparable 5-year series available at the time these analyses were conducted due to methodological changes during the COVID-19 period that prevent comparisons with earlier years. Pooled data were necessary for less represented subgroups (e.g., people from sexual minority groups, people with health conditions).

National Survey on Drug Use and Health Tobacco Use Measures

Tobacco use measures in the NSDUH analyses focused on current (past-30-day) use and former and never lifetime use of cigarettes, cigars, and smokeless tobacco.

Cigarette Smoking Status. Cigarette smoking status measures were based on questions on lifetime, past-year, and past-30-day use. Current smoking was defined as having smoked on at least 1 day in the past 30 days. Lifetime use, use frequency, and typical number of cigarettes per day were used to categorize cigarette smoking as never smoking (no lifetime use), former smoking (did not smoke in the past 30 days), or current smoking. Among those who reported current smoking, 3 groups were created: nondaily smoking of <300 cigarettes per month (<10 cigarettes per day on average), daily smoking of <300 cigarettes per month, and ≥300 cigarettes per month (≥10 cigarettes per day on average, whether daily or nondaily smoking). The average number of cigarettes per month was calculated as the number of days participant reported smoking in the past 30 days (ranging from 1 to 30, in response to the question “During the past 30 days, on how many days did you smoke part or all of a cigarette?”) multiplied by the middle value of the average number of cigarettes smoked per day (“On the days you smoked cigarettes during the past 30 days, how many cigarettes did you smoke per day, on average”), as indicated below:

1. Less than one cigarette per day; middle value: 0.5 cigarettes
2. 1 cigarette per day; middle value: 1 cigarette
3. 2 to 5 cigarettes per day; middle value: 3 cigarettes
4. 6 to 15 cigarettes per day (about ½ pack); middle value: 10 cigarettes
5. 16 to 25 cigarettes per day (about 1 pack); middle value: 20 cigarettes
6. 26 to 35 cigarettes per day (about 1½ pack); middle value: 30 cigarettes
7. More than 35 cigarettes per day (about 2 packs or more); middle value: 40 cigarettes

Cigar Smoking Status. Current cigar smoking was defined as use of cigars (any kind, including big cigars, cigarillos, and little cigars) in the past 30 days. Lifetime use and use frequency were used to categorize cigar smoking status as never use (no lifetime use), former use (did not smoke cigars in the past 30 days), and current use (smoked cigars 1 or more days in the past 30 days).

Smokeless Tobacco Use Status. Current smokeless tobacco use was defined as use of smokeless tobacco (snuff, dip, chewing tobacco, or “snus”) in the past 30 days. Lifetime use and use frequency were used to categorize current smokeless tobacco use as never use (no lifetime use), former use (did not use smokeless tobacco in the past 30 days), nondaily use (used smokeless tobacco 1 to 29 days in the past 30 days), and daily use (used smokeless tobacco all 30 days in the past 30 days).

National Survey on Drug Use and Health Alcohol Use Measures

Alcohol use measures in the NSDUH analyses focused on past-30-day use and former and never lifetime use.

Alcohol Use Status. A measure of current drinking was based on self-reported alcoholic beverage consumption in the past 30 days. Drinking volume was calculated 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 drinking days (frequency of more than four or five drinks for women and men, respectively). As discussed in the “Measurement of Tobacco and Alcohol Co-Use” section, given participants’ tendencies to underestimate their own consumption, binge drinking days were incorporated into the volume calculation. For participants whose usual quantity was fewer than five drinks (for men) or four drinks (for women), volume was calculated using $(\text{frequency days} - \text{binge days}) * \text{usual quantity} + \text{binge days} * 6 \text{ drinks (women) or } 7 \text{ drinks (men)}$. For participants whose usual quantity was equal to or more than five or four drinks, volume was calculated by multiplying frequency days and usual quantity. This volume calculation was used to derive average weekly and daily consumption, and indicate whether participants exceeded U.S. risky weekly drinking guidelines, defined as more than 7 drinks/week for women or more than 14 drinks/week for men.^{65,66} To include participants who did not have information for usual binge drinking days, volume was measured using only frequency and usual quantity ($n = 660$). Current alcohol use was based on participants having reported use on at least 1 day in the past 30 days. Based on the calculations of daily and weekly consumption, participants were grouped into the following categories: “alcohol use within guidelines” (use within past 30 days, but without binge drinking and without exceeding risky weekly drinking guidelines); “binge, no risky weekly use” (binge drinking without exceeding risky weekly drinking guidelines); and “risky weekly use” (exceeding weekly drinking guidelines). Participants who responded “no” to the question “Have you ever, even once, had a drink of any type of alcoholic beverage?” were categorized to “never alcohol use.” Participants who responded “yes” to this lifetime use question but did not report use in the past 30 days were classified as “former alcohol use.”

Statistical Analysis

Weighted prevalence estimates were calculated for overall tobacco and alcohol use patterns in the MTF, NAS, and NSDUH analyses. Statistical analyses tested differences in alcohol use between tobacco use (NAS) and cigarette smoking (NSDUH) groups. For categorical variables, chi-squared tests were conducted to assess differences in alcohol use patterns among those with different tobacco-use patterns (NAS) or cigarette smoking patterns (NSDUH). For continuous variables in the NAS (i.e., lifetime number of 5+ drinking days, overall and beverage-specific volume consumption), Poisson regression was used to test for statistically significant differences, adjusting for survey cycle. To examine differences by subgroups, chi-squared tests and Poisson regressions were conducted separately for each subgroup. All analyses were conducted in Stata, version 17, and significance testing was conducted at the $\alpha = .05$ level.

Appendix 2D Monitoring the Future, National Alcohol Surveys, and National Survey on Drug Use and Health Tables

Table 2D.1 Past-30-Day Tobacco and Alcohol Use Among 8th Grade Students in the Monitoring the Future Study, 2000–2023

Year (unweighted N)	Alcohol		Nicotine vaping			Cigarette			Large cigar			Smokeless tobacco		
	Past-30-day alcohol use	Past-2-week binge drinking	Past-30-day nicotine vaping	Co-use with alcohol	Co-use with binge drinking	Past-30-day cigarette smoking	Co-use with alcohol	Co-use with binge drinking	Past-30-day large cigar smoking	Co-use with alcohol	Co-use with binge drinking	Past-30-day smokeless tobacco use	Co-use with alcohol	Co-use with binge drinking
Use prevalence: Weighted % (95% CI)														
2000 (17,311)	22.4 (20.7, 24.1)	11.7 (10.5, 12.9)	N/A	N/A	N/A	14.6 (13.2, 16.2)	9.6 (8.7, 10.7)	6.1 (5.4, 6.9)	N/A	N/A	N/A	4.2 (3.4, 5.2)	3.0 (2.4, 3.8)	2.3 (1.8, 3.0)
2001 (16,756)	21.5 (20.1, 23.0)	11.0 (10.0, 12.1)	N/A	N/A	N/A	12.2 (11.0, 13.5)	7.9 (7.1, 8.8)	5.1 (4.5, 5.7)	N/A	N/A	N/A	4.0 (3.1, 5.2)	2.3 (1.8, 3.0)	1.8 (1.4, 2.3)
2002 (15,489)	19.6 (18.2, 21.1)	10.3 (9.3, 11.4)	N/A	N/A	N/A	10.7 (9.5, 12.0)	7.0 (6.2, 8.0)	5.0 (4.3, 5.7)	N/A	N/A	N/A	3.3 (2.5, 4.3)	2.0 (1.4, 2.5)	1.4 (0.9, 2.1)
2003 (17,023)	19.7 (18.4, 21.2)	9.8 (8.9, 10.9)	N/A	N/A	N/A	10.2 (9.1, 11.5)	7.0 (6.1, 7.9)	4.8 (4.2, 5.6)	N/A	N/A	N/A	4.1 (3.5, 4.9)	2.6 (2.1, 3.2)	2.0 (1.5, 2.5)
2004 (17,413)	18.6 (17.5, 19.7)	9.4 (8.6, 10.3)	N/A	N/A	N/A	9.2 (8.2, 10.3)	5.9 (5.2, 6.7)	4.1 (3.5, 4.8)	N/A	N/A	N/A	4.1 (3.2, 5.3)	2.4 (1.8, 3.2)	1.6 (1.2, 2.1)
2005 (17,258)	17.1 (16.0, 18.3)	8.4 (7.7, 9.2)	N/A	N/A	N/A	9.3 (8.3, 10.4)	5.9 (5.2, 6.7)	3.8 (3.3, 4.3)	N/A	N/A	N/A	3.3 (2.5, 4.3)	1.9 (1.4, 2.5)	1.4 (1.0, 1.8)
2006 (17,026)	17.2 (15.9, 18.6)	8.7 (7.9, 9.6)	N/A	N/A	N/A	8.7 (7.7, 9.7)	5.6 (5.0, 6.4)	3.7 (3.3, 4.3)	N/A	N/A	N/A	3.7 (3.0, 4.4)	2.0 (1.6, 2.5)	1.5 (1.2, 1.9)
2007 (16,495)	15.9 (14.7, 17.1)	8.3 (7.5, 9.2)	N/A	N/A	N/A	7.1 (6.3, 7.9)	4.6 (4.0, 5.2)	3.3 (2.9, 3.8)	N/A	N/A	N/A	3.2 (2.6, 3.8)	2.1 (1.7, 2.6)	1.4 (1.1, 1.8)
2008 (16,253)	15.9 (14.6, 17.4)	8.1 (7.2, 9.0)	N/A	N/A	N/A	6.8 (6.1, 7.6)	4.6 (4.1, 5.1)	3.2 (2.9, 3.7)	N/A	N/A	N/A	3.5 (2.8, 4.3)	2.0 (1.5, 2.6)	1.4 (1.0, 1.8)
2009 (15,509)	14.9 (13.4, 16.6)	7.8 (6.8, 8.9)	N/A	N/A	N/A	6.5 (5.7, 7.3)	4.2 (3.6, 4.9)	2.7 (2.3, 3.3)	N/A	N/A	N/A	3.7 (3.0, 4.7)	2.2 (1.6, 3.1)	1.4 (1.0, 1.9)
2010 (15,769)	13.8 (12.5, 15.1)	7.2 (6.4, 8.1)	N/A	N/A	N/A	7.1 (6.2, 8.1)	4.1 (3.5, 4.7)	2.7 (2.2, 3.2)	N/A	N/A	N/A	4.1 (3.2, 5.1)	2.0 (1.5, 2.7)	1.5 (1.1, 2.1)
2011 (16,496)	12.7 (11.6, 13.9)	6.4 (5.7, 7.3)	N/A	N/A	N/A	6.1 (5.3, 7.0)	3.7 (3.2, 4.3)	2.4 (2.1, 2.9)	N/A	N/A	N/A	3.5 (2.8, 4.2)	1.9 (1.5, 2.4)	1.2 (0.9, 1.5)
2012 (15,678)	11.0 (10.0, 12.1)	5.1 (4.4, 5.9)	N/A	N/A	N/A	4.9 (4.2, 5.8)	2.9 (2.4, 3.5)	1.9 (1.6, 2.2)	N/A	N/A	N/A	2.8 (2.2, 3.4)	1.4 (1.0, 1.8)	0.9 (0.7, 1.2)
2013 (15,233)	10.2 (9.3, 11.3)	5.1 (4.5, 5.8)	N/A	N/A	N/A	4.5 (3.8, 5.3)	2.6 (2.2, 3.1)	1.8 (1.5, 2.2)	N/A	N/A	N/A	2.8 (2.2, 3.6)	1.6 (1.1, 2.2)	1.1 (0.8, 1.6)
2014 (15,195)	9.0 (8.2, 9.9)	4.1 (3.7, 4.7)	N/A	N/A	N/A	4.0 (3.4, 4.7)	2.2 (1.8, 2.7)	1.3 (1.0, 1.7)	1.9 (1.4, 2.5)	0.9 (0.6, 1.3)	*	3.0 (2.4, 3.6)	1.6 (1.2, 2.1)	0.9 (0.6, 1.4)
2015 (15,015)	9.7 (8.7, 10.8)	4.6 (4.1, 5.3)	N/A	N/A	N/A	3.6 (3.1, 4.2)	2.1 (1.7, 2.5)	1.3 (1.1, 1.6)	2.4 (1.9, 3.1)	1.2 (0.8, 1.6)	0.8 (0.6, 1.2)	3.2 (2.6, 3.9)	1.6 (1.2, 2.1)	0.9 (0.7, 1.3)
2016 (17,643)	7.3 (6.6, 8.0)	3.4 (2.9, 4.0)	N/A	N/A	N/A	2.6 (2.2, 3.2)	1.3 (1.0, 1.6)	0.8 (0.6, 1.1)	1.5 (1.1, 2.1)	0.6 (0.4, 0.8)	*	2.5 (2.0, 3.1)	1.1 (0.8, 1.5)	0.7 (0.5, 1.0)
2017 (16,010)	8.0 (7.2, 8.9)	3.7 (3.2, 4.2)	3.5 (2.9, 4.2)	1.5 (1.1, 2.0)	1.1 (0.8, 1.6)	1.9 (1.6, 2.2)	1.1 (0.9, 1.3)	0.7 (0.6, 0.9)	1.5 (1.1, 1.9)	0.6 (0.4, 0.9)	*	1.7 (1.4, 2.2)	0.9 (0.6, 1.2)	0.5 (0.4, 0.8)

Table 2D.1 (continued)

Year (unweighted N)	Alcohol		Nicotine vaping			Cigarette			Large cigar			Smokeless tobacco		
	Past-30-day alcohol use	Past-2-week binge drinking	Past-30-day nicotine vaping	Co-use with alcohol	Co-use with binge drinking	Past-30-day cigarette smoking	Co-use with alcohol	Co-use with binge drinking	Past-30-day large cigar smoking	Co-use with alcohol	Co-use with binge drinking	Past-30-day smokeless tobacco use	Co-use with alcohol	Co-use with binge drinking
	Use prevalence: Weighted % (95% CI)													
2018 (14,836)	8.2 (7.3, 9.1)	3.7 (3.2, 4.2)	6.1 (5.1, 7.4)	2.5 (1.9, 3.3)	1.4 (1.0, 2.0)	2.2 (1.7, 2.7)	1.1 (0.8, 1.4)	0.6 (0.5, 0.9)	1.7 (1.2, 2.3)	0.8 (0.5, 1.3)	*	2.1 (1.6, 2.7)	0.9 (0.7, 1.3)	0.6 (0.4, 0.9)
2019 (14,223)	7.9 (6.9, 9.1)	3.8 (3.2, 4.6)	9.6 (8.3, 11.1)	3.6 (2.9, 4.4)	2.1 (1.6, 2.6)	2.3 (1.7, 3.0)	1.1 (0.8, 1.7)	0.8 (0.5, 1.3)	1.3 (0.9, 2.0)	0.7 (0.5, 1.2)	*	2.5 (1.9, 3.2)	0.9 (0.6, 1.4)	0.7 (0.4, 1.2)
2020 (3,161)	9.9 (7.8, 12.5)	4.5 (3.2, 6.4)	10.5 (7.7, 14.1)	5.1 (3.4, 7.6)	3.0 (1.9, 4.6)	2.2 (1.5, 3.1)	1.5 (1.0, 2.3)	1.0 (0.7, 1.5)	1.5 (0.8, 2.9)	*	*	2.3 (1.6, 3.3)	*	*
2021 (11,446)	7.3 (6.3, 8.5)	2.8 (2.2, 3.4)	7.6 (6.4, 9.1)	3.2 (2.6, 3.9)	1.8 (1.3, 2.3)	1.1 (0.8, 1.6)	0.6 (0.4, 1.0)	0.4 (0.3, 0.7)	1.1 (0.7, 1.7)	*	*	1.6 (1.2, 2.3)	*	*
2022 (9,889)	6.0 (5.0, 7.2)	2.2 (1.8, 2.7)	7.1 (6.0, 8.3)	2.3 (1.8, 3.0)	1.1 (0.8, 1.5)	0.8 (0.6, 1.1)	0.4 (0.3, 0.6)	*	0.5 (0.2, 1.0)	*	*	1.2 (0.8, 1.6)	*	*
2023 (6,240)	5.9 (4.7, 7.4)	2.0 (1.4, 2.8)	7.0 (5.4, 9.0)	2.3 (1.7, 3.2)	1.1 (0.7, 1.7)	1.1 (0.8, 1.7)	*	*	1.0 (0.6, 1.7)	*	*	1.6 (1.0, 2.5)	*	*

Note. CI = confidence interval; N/A = not applicable. Data are visualized in Figure 2.2. *Alcohol use* and *tobacco product use* are defined as use in the past 30 days. *Binge drinking* is defined as drinking ≥ 5 drinks in a row over the past 2 weeks. The large cigar question was first asked in 2014. The nicotine vaping question was first asked in 2017. Questions about certain products were only asked of some students. For large cigars, *N* is one-third of *N* indicated across years. For smokeless tobacco, *N* is one-half of *N* indicated across years. For nicotine vaping, *N* is one-third of *N* indicated for 2017 and 2018, and two-thirds of *N* indicated in 2019.

*Cells with $n < 30$ are suppressed.

Source: 2000–2023 Monitoring the Future study.

Table 2D.2 Past-30-Day Tobacco and Alcohol Use Among 10th Grade Students in the Monitoring the Future Study, 2000–2023

Year (unweighted N)	Alcohol		Nicotine vaping			Cigarette			Large cigar			Smokeless tobacco		
	Past-30-day alcohol use	Past-2-week binge drinking	Past-30-day nicotine vaping	Co-use with alcohol	Co-use with binge drinking	Past-30-day cigarette smoking	Co-use with alcohol	Co-use with binge drinking	Past-30-day large cigar smoking	Co-use with alcohol	Co-use with binge drinking	Past-30-day smokeless tobacco use	Co-use with alcohol	Co-use with binge drinking
	Use prevalence: Weighted % (95% CI)													
2000 (14,576)	41.0 (39.0, 43.0)	24.1 (22.4, 25.9)	N/A	N/A	N/A	23.9 (22.3, 25.6)	18.3 (16.9, 19.7)	12.8 (11.7, 14.0)	N/A	N/A	N/A	6.1 (5.0, 7.3)	4.7 (3.9, 5.6)	3.7 (3.0, 4.5)
2001 (14,286)	39.0 (37.4, 40.5)	22.8 (21.4, 24.3)	N/A	N/A	N/A	21.3 (19.6, 23.1)	16.5 (15.1, 18.0)	11.8 (10.7, 13.0)	N/A	N/A	N/A	6.9 (5.7, 8.2)	5.4 (4.5, 6.4)	4.1 (3.4, 5.0)
2002 (14,683)	35.4 (33.6, 37.3)	20.3 (19.0, 21.7)	N/A	N/A	N/A	17.7 (16.3, 19.1)	13.1 (12.1, 14.3)	9.2 (8.5, 10.1)	N/A	N/A	N/A	6.1 (5.1, 7.3)	4.3 (3.5, 5.2)	3.2 (2.6, 3.9)
2003 (16,244)	35.4 (33.5, 37.3)	20.0 (18.5, 21.6)	N/A	N/A	N/A	16.6 (15.4, 18.0)	12.6 (11.6, 13.8)	8.8 (8.0, 9.7)	N/A	N/A	N/A	5.3 (4.4, 6.4)	3.7 (3.0, 4.6)	3.0 (2.4, 3.8)
2004 (16,839)	35.2 (33.2, 37.3)	19.9 (18.3, 21.5)	N/A	N/A	N/A	16.0 (14.6, 17.5)	12.1 (10.9, 13.3)	8.5 (7.5, 9.5)	N/A	N/A	N/A	4.9 (4.0, 6.0)	3.7 (3.0, 4.5)	3.0 (2.4, 3.8)
2005 (16,711)	33.2 (31.4, 35.1)	19.0 (17.6, 20.5)	N/A	N/A	N/A	14.9 (13.7, 16.2)	11.0 (10.1, 12.0)	7.7 (7.0, 8.5)	N/A	N/A	N/A	5.6 (4.7, 6.7)	4.0 (3.3, 4.9)	3.2 (2.6, 3.9)
2006 (16,620)	33.8 (32.1, 35.6)	19.9 (18.6, 21.3)	N/A	N/A	N/A	14.5 (13.3, 15.8)	11.1 (10.2, 12.1)	8.0 (7.3, 8.8)	N/A	N/A	N/A	5.7 (4.9, 6.7)	4.4 (3.7, 5.2)	3.5 (2.9, 4.1)
2007 (16,398)	33.4 (31.7, 35.2)	19.6 (18.2, 21.2)	N/A	N/A	N/A	14.0 (12.9, 15.2)	10.8 (9.8, 11.8)	7.8 (7.0, 8.6)	N/A	N/A	N/A	6.1 (5.2, 7.2)	4.7 (3.9, 5.6)	3.5 (2.9, 4.2)
2008 (15,518)	28.8 (27.3, 30.3)	16.0 (14.7, 17.3)	N/A	N/A	N/A	12.3 (11.2, 13.4)	9.1 (8.3, 10.0)	6.6 (6.0, 7.4)	N/A	N/A	N/A	5.0 (4.1, 6.0)	3.2 (2.6, 4.0)	2.4 (1.9, 3.1)
2009 (16,320)	30.4 (28.8, 32.0)	17.5 (16.2, 18.7)	N/A	N/A	N/A	13.1 (12.0, 14.4)	9.7 (8.9, 10.7)	7.0 (6.3, 7.8)	N/A	N/A	N/A	6.5 (5.4, 7.7)	4.9 (4.0, 5.9)	3.8 (3.1, 4.6)
2010 (15,586)	28.9 (27.4, 30.5)	16.3 (15.3, 17.5)	N/A	N/A	N/A	13.6 (12.4, 14.8)	9.7 (8.8, 10.6)	6.8 (6.2, 7.5)	N/A	N/A	N/A	7.5 (6.3, 8.9)	5.3 (4.4, 6.4)	4.0 (3.3, 4.8)
2011 (15,382)	27.2 (25.6, 28.8)	14.7 (13.6, 15.9)	N/A	N/A	N/A	11.8 (10.7, 13.0)	8.5 (7.6, 9.4)	6.1 (5.4, 6.8)	N/A	N/A	N/A	6.6 (5.6, 7.7)	4.4 (3.8, 5.3)	3.3 (2.8, 3.9)
2012 (15,428)	27.6 (25.9, 29.2)	15.6 (14.3, 16.9)	N/A	N/A	N/A	10.8 (9.6, 12.0)	8.0 (7.1, 9.0)	5.6 (4.9, 6.3)	N/A	N/A	N/A	6.4 (5.4, 7.5)	4.2 (3.5, 5.1)	2.9 (2.4, 3.6)
2013 (13,262)	25.7 (24.0, 27.4)	13.7 (12.4, 15.1)	N/A	N/A	N/A	9.1 (8.0, 10.4)	6.3 (5.4, 7.2)	4.2 (3.6, 4.9)	N/A	N/A	N/A	6.4 (5.5, 7.5)	4.1 (3.4, 4.9)	2.9 (2.3, 3.5)
2014 (13,341)	23.5 (21.8, 25.3)	12.6 (11.4, 14.0)	N/A	N/A	N/A	7.2 (6.3, 8.1)	5.1 (4.4, 5.9)	3.7 (3.1, 4.3)	3.9 (3.2, 4.8)	3.0 (2.4, 3.8)	2.4 (1.8, 3.1)	5.3 (4.3, 6.4)	3.5 (2.8, 4.4)	2.7 (2.0, 3.4)
2015 (16,147)	21.5 (19.9, 23.2)	10.9 (9.8, 12.1)	N/A	N/A	N/A	6.3 (5.5, 7.2)	4.2 (3.6, 5.0)	2.9 (2.4, 3.4)	3.4 (2.8, 4.2)	2.3 (1.8, 3.0)	1.7 (1.3, 2.3)	4.9 (4.1, 5.8)	3.2 (2.6, 3.8)	2.3 (1.9, 2.9)
2016 (15,230)	19.9 (18.4, 21.6)	9.7 (8.8, 10.8)	N/A	N/A	N/A	4.9 (4.2, 5.7)	3.1 (2.6, 3.7)	2.0 (1.7, 2.4)	2.3 (1.7, 3.0)	1.5 (1.1, 2.1)	1.2 (0.8, 1.7)	3.5 (2.8, 4.5)	2.2 (1.6, 3.0)	1.5 (1.1, 2.1)
2017 (14,171)	19.7 (18.0, 21.5)	9.8 (8.8, 11.0)	8.2 (6.6, 10.2)	5.8 (4.6, 7.3)	3.8 (3.0, 4.9)	5.0 (4.3, 5.9)	3.1 (2.5, 3.8)	2.0 (1.6, 2.6)	2.6 (2.1, 3.3)	1.8 (1.3, 2.5)	1.3 (0.9, 1.9)	3.8 (3.1, 4.6)	2.3 (1.8, 2.9)	1.8 (1.4, 2.4)
2018 (15,144)	18.6 (17.0, 20.4)	8.7 (7.6, 9.9)	16.1 (13.9, 18.6)	9.1 (7.6, 10.9)	5.2 (4.2, 6.4)	4.2 (3.5, 5.2)	2.9 (2.4, 3.6)	2.0 (1.6, 2.6)	2.8 (2.2, 3.6)	1.9 (1.4, 2.5)	1.5 (1.1, 2.0)	3.9 (3.2, 4.8)	2.3 (1.8, 2.9)	1.5 (1.1, 2.0)

Table 2D.2 (continued)

Year (unweighted N)	Alcohol		Nicotine vaping			Cigarette			Large cigar			Smokeless tobacco		
	Past-30-day alcohol use	Past-2-week binge drinking	Past-30-day nicotine vaping	Co-use with alcohol	Co-use with binge drinking	Past-30-day cigarette smoking	Co-use with alcohol	Co-use with binge drinking	Past-30-day large cigar smoking	Co-use with alcohol	Co-use with binge drinking	Past-30-day smokeless tobacco use	Co-use with alcohol	Co-use with binge drinking
Use prevalence: Weighted % (95% CI)														
2019 (14,595)	18.4 (16.5, 20.5)	8.5 (7.3, 9.8)	19.9 (17.8, 22.3)	10.3 (8.8, 12.0)	5.6 (4.8, 6.7)	3.4 (2.7, 4.3)	2.5 (1.9, 3.4)	1.5 (1.1, 2.0)	2.1 (1.5, 2.9)	1.7 (1.1, 2.6)	1.3 (0.8, 2.1)	3.2 (2.6, 4.1)	1.9 (1.4, 2.7)	1.3 (0.9, 2.0)
2020 (4,890)	20.3 (16.7, 24.4)	9.6 (7.7, 11.9)	19.3 (15.9, 23.2)	10.6 (8.4, 13.2)	5.7 (4.4, 7.2)	3.2 (2.5, 4.2)	2.0 (1.4, 2.7)	1.5 (1.1, 2.2)	1.2 (0.7, 2.2)	*	*	3.5 (2.4, 5.1)	*	*
2021 (11,792)	13.1 (11.4, 15.0)	5.9 (5.0, 6.9)	13.1 (11.2, 15.4)	6.5 (5.5, 7.7)	3.7 (3.0, 4.4)	1.8 (1.5, 2.2)	1.1 (0.8, 1.4)	0.8 (0.6, 1.1)	1.3 (0.8, 2.1)	1.0 (0.6, 1.8)	*	1.7 (1.3, 2.2)	0.7 (0.5, 1.1)	*
2022 (11,950)	13.6 (12.0, 15.3)	5.9 (5.1, 6.9)	14.2 (12.1, 16.6)	6.7 (5.7, 7.9)	3.5 (2.9, 4.3)	1.7 (1.2, 2.3)	1.0 (0.7, 1.4)	0.7 (0.5, 1.0)	0.8 (0.5, 1.2)	*	*	2.5 (2.0, 3.1)	1.0 (0.7, 1.4)	0.7 (0.5, 1.1)
2023 (8,494)	13.7 (12.1, 15.4)	5.4 (4.6, 6.5)	11.9 (10.6, 13.4)	6.2 (5.2, 7.3)	3.2 (2.5, 4.0)	2.3 (1.8, 3.1)	1.5 (1.0, 2.1)	1.0 (0.7, 1.4)	0.3 (0.2, 0.5)	*	*	2.3 (1.7, 3.2)	1.1 (0.6, 2.0)	*

Note. CI = confidence interval; N/A = Not applicable. Data are visualized in Figure 2.2. *Alcohol use* and *tobacco product use* are defined as use in the past 30 days. *Binge drinking* is defined as drinking ≥ 5 drinks in a row over the past 2 weeks. The large cigar question was first asked in 2014. The nicotine vaping question was first asked in 2017. Questions about certain products were only asked of some students. For large cigars, *N* is one-third of *N* indicated across years. For smokeless tobacco, *N* is one-half of *N* indicated across years. For nicotine vaping, *N* is one-third of *N* indicated for 2017 and 2018, and two-thirds of *N* indicated in 2019.

*Cells with *n* < 30 are suppressed.

Source: 2000–2023 Monitoring the Future study.

Table 2D.3 Past-30-Day Tobacco and Alcohol Use Among 12th Grade Students in the Monitoring the Future Study, 2000–2023

Year (unweighted N)	Alcohol		Nicotine vaping			Cigarette			Large cigar			Smokeless tobacco		
	Past-30-day alcohol use	Past-2-week binge drinking	Past-30-day nicotine vaping	Co-use with alcohol	Co-use with binge drinking	Past-30-day cigarette smoking	Co-use with alcohol	Co-use with binge drinking	Past-30-day large cigar smoking	Co-use with alcohol	Co-use with binge drinking	Past-30-day smokeless tobacco use	Co-use with alcohol	Co-use with binge drinking
	Use prevalence: Weighted % (95% CI)													
2000 (13,286)	50.0 (47.6, 52.5)	30.0 (27.7, 32.4)	N/A	N/A	N/A	31.4 (29.2, 33.7)	25.5 (23.6, 27.5)	18.4 (16.9, 20.1)	N/A	N/A	N/A	7.6 (6.0, 9.7)	6.3 (4.9, 8.1)	5.1 (3.9, 6.8)
2001 (13,304)	49.8 (47.2, 52.3)	29.7 (27.6, 32.0)	N/A	N/A	N/A	29.5 (27.3, 31.7)	24.0 (22.1, 26.2)	17.1 (15.5, 18.9)	N/A	N/A	N/A	7.8 (6.5, 9.4)	6.0 (4.9, 7.4)	4.9 (3.9, 6.2)
2002 (13,544)	48.6 (46.1, 51.0)	28.6 (26.4, 30.9)	N/A	N/A	N/A	26.7 (24.8, 28.6)	21.8 (20.0, 23.7)	15.5 (14.0, 17.1)	N/A	N/A	N/A	6.5 (5.2, 8.0)	5.2 (4.1, 6.6)	4.7 (3.7, 6.1)
2003 (15,200)	47.5 (45.4, 49.7)	27.9 (25.9, 30.0)	N/A	N/A	N/A	24.4 (22.6, 26.3)	20.1 (18.5, 21.8)	14.2 (12.9, 15.7)	N/A	N/A	N/A	6.7 (5.3, 8.3)	5.4 (4.4, 6.7)	4.2 (3.3, 5.3)
2004 (15,222)	48.0 (45.8, 50.3)	29.2 (27.2, 31.2)	N/A	N/A	N/A	25.0 (23.4, 26.7)	20.2 (18.8, 21.8)	14.6 (13.4, 15.9)	N/A	N/A	N/A	6.7 (5.4, 8.2)	5.1 (4.0, 6.5)	4.0 (3.0, 5.3)
2005 (15,378)	47.0 (44.6, 49.4)	27.1 (25.0, 29.2)	N/A	N/A	N/A	23.2 (21.5, 25.0)	18.4 (16.9, 20.1)	13.3 (12.0, 14.8)	N/A	N/A	N/A	7.6 (6.2, 9.3)	6.3 (5.0, 7.8)	4.9 (3.8, 6.2)
2006 (14,814)	45.3 (42.3, 48.3)	25.4 (23.1, 27.9)	N/A	N/A	N/A	21.6 (19.9, 23.3)	17.3 (15.9, 18.8)	11.7 (10.5, 13.0)	N/A	N/A	N/A	6.1 (4.9, 7.6)	5.0 (3.9, 6.3)	3.6 (2.7, 4.7)
2007 (15,132)	44.4 (41.3, 47.5)	25.9 (23.4, 28.5)	N/A	N/A	N/A	21.6 (19.9, 23.4)	17.6 (16.0, 19.3)	12.5 (11.2, 14.0)	N/A	N/A	N/A	6.6 (5.4, 8.0)	5.6 (4.5, 6.8)	4.2 (3.3, 5.3)
2008 (14,577)	43.1 (41.0, 45.3)	24.6 (22.9, 26.5)	N/A	N/A	N/A	20.4 (19.0, 21.9)	16.1 (14.9, 17.5)	11.6 (10.5, 12.7)	N/A	N/A	N/A	6.5 (5.2, 8.2)	5.2 (4.2, 6.5)	4.3 (3.3, 5.4)
2009 (14,268)	43.5 (40.7, 46.3)	25.2 (23.1, 27.5)	N/A	N/A	N/A	20.1 (18.5, 21.9)	15.9 (14.6, 17.3)	11.5 (10.5, 12.6)	N/A	N/A	N/A	8.4 (6.9, 10.1)	7.2 (5.8, 9.0)	6.4 (5.0, 8.1)
2010 (15,127)	41.2 (38.6, 43.9)	23.2 (21.1, 25.4)	N/A	N/A	N/A	19.2 (17.8, 20.7)	14.9 (13.7, 16.2)	10.5 (9.5, 11.7)	N/A	N/A	N/A	8.5 (7.1, 10.2)	6.7 (5.4, 8.3)	5.4 (4.3, 6.9)
2011 (14,855)	40.0 (38.1, 42.0)	21.6 (20.0, 23.3)	N/A	N/A	N/A	18.7 (17.0, 20.4)	14.1 (12.8, 15.5)	9.7 (8.7, 10.9)	N/A	N/A	N/A	8.3 (6.6, 10.3)	6.4 (5.0, 8.1)	5.2 (4.0, 6.7)
2012 (14,343)	41.5 (39.4, 43.6)	23.7 (21.9, 25.6)	N/A	N/A	N/A	17.1 (15.5, 18.9)	13.4 (12.1, 14.9)	9.6 (8.5, 10.8)	N/A	N/A	N/A	7.9 (6.4, 9.7)	6.4 (5.2, 8.0)	5.0 (3.9, 6.4)
2013 (13,180)	39.2 (36.7, 41.7)	22.1 (20.2, 24.1)	N/A	N/A	N/A	16.3 (14.9, 17.8)	11.8 (10.8, 12.9)	8.3 (7.5, 9.2)	N/A	N/A	N/A	8.1 (6.6, 9.9)	6.8 (5.5, 8.4)	4.9 (3.9, 6.1)
2014 (13,015)	37.4 (35.1, 39.8)	19.4 (17.9, 21.1)	N/A	N/A	N/A	13.6 (12.4, 14.9)	9.9 (8.8, 11.0)	6.6 (5.8, 7.4)	6.4 (5.4, 7.6)	5.0 (4.1, 6.0)	3.9 (3.1, 4.8)	8.4 (6.5, 10.7)	6.0 (4.6, 7.8)	4.4 (3.1, 6.2)
2015 (13,730)	35.3 (32.9, 37.9)	17.2 (15.4, 19.2)	N/A	N/A	N/A	11.4 (10.3, 12.5)	8.0 (7.1, 8.9)	5.3 (4.7, 6.1)	7.0 (6.0, 8.2)	5.2 (4.3, 6.2)	4.0 (3.2, 5.0)	6.1 (4.9, 7.6)	4.7 (3.7, 6.0)	3.0 (2.2, 4.2)
2016 (12,600)	33.2 (30.9, 35.6)	15.5 (14.1, 17.1)	N/A	N/A	N/A	10.5 (9.4, 11.7)	7.3 (6.5, 8.3)	4.5 (3.9, 5.3)	6.5 (5.4, 7.7)	4.7 (3.8, 5.9)	3.4 (2.7, 4.3)	6.6 (5.3, 8.2)	4.3 (3.2, 5.7)	2.8 (2.0, 4.1)
2017 (13,522)	33.2 (31.0, 35.5)	16.6 (14.8, 18.6)	11.0 (9.2, 13.0)	8.6 (7.1, 10.4)	5.4 (4.3, 6.6)	9.7 (8.5, 11.0)	7.0 (6.0, 8.1)	4.9 (4.1, 5.8)	5.6 (4.5, 6.9)	4.3 (3.4, 5.4)	3.3 (2.6, 4.2)	4.9 (3.8, 6.4)	3.3 (2.4, 4.7)	2.6 (1.8, 3.9)
2018 (14,502)	30.2 (28.1, 32.3)	13.8 (12.3, 15.5)	20.9 (17.7, 24.5)	13.9 (11.6, 16.7)	7.4 (5.8, 9.3)	7.6 (6.7, 8.8)	5.3 (4.5, 6.2)	3.3 (2.8, 4.0)	5.2 (4.4, 6.2)	3.5 (2.8, 4.4)	2.6 (2.1, 3.4)	4.2 (3.2, 5.4)	2.9 (2.1, 4.0)	2.2 (1.5, 3.2)

Table 2D.3 (continued)

Year (unweighted N)	Alcohol		Nicotine vaping			Cigarette			Large cigar			Smokeless tobacco		
	Past-30-day alcohol use	Past-2-week binge drinking	Past-30-day nicotine vaping	Co-use with alcohol	Co-use with binge drinking	Past-30-day cigarette smoking	Co-use with alcohol	Co-use with binge drinking	Past-30-day large cigar smoking	Co-use with alcohol	Co-use with binge drinking	Past-30-day smokeless tobacco use	Co-use with alcohol	Co-use with binge drinking
Use prevalence: Weighted % (95% CI)														
2019 (13,713)	29.3 (27.2, 31.5)	14.4 (12.8, 16.1)	25.5 (22.7, 28.4)	16.2 (14.1, 18.5)	9.7 (8.2, 11.4)	5.7 (4.9, 6.7)	3.7 (3.1, 4.5)	2.7 (2.2, 3.3)	4.5 (3.7, 5.6)	3.5 (2.7, 4.4)	2.7 (2.1, 3.6)	3.5 (2.6, 4.8)	2.7 (1.9, 3.9)	1.9 (1.2, 2.9)
2020 (3,770)	33.6 (28.0, 39.7)	16.8 (12.7, 21.8)	24.7 (19.4, 30.9)	17.5 (13.2, 22.8)	11.0 (7.9, 15.2)	7.5 (4.4, 12.5)	5.5 (3.1, 9.5)	4.2 (2.2, 7.7)	2.5 (1.4, 4.5)	*	*	*	*	*
2021 (9,022)	25.8 (22.3, 29.8)	11.8 (9.8, 14.2)	19.6 (16.9, 22.6)	12.1 (10.0, 14.6)	7.2 (5.8, 9.0)	4.1 (2.7, 6.2)	2.7 (1.8, 3.9)	1.8 (1.2, 2.7)	1.9 (1.3, 2.7)	1.4 (0.9, 2.1)	0.9 (0.6, 1.5)	2.2 (1.5, 3.3)	*	*
2022 (9,599)	28.4 (25.1, 31.9)	12.6 (10.7, 14.8)	20.7 (18.2, 23.5)	13.5 (11.4, 15.9)	7.4 (6.1, 9.0)	4.0 (3.1, 5.1)	2.8 (2.1, 3.8)	2.0 (1.5, 2.7)	2.1 (1.6, 2.9)	1.7 (1.2, 2.2)	1.2 (0.8, 1.7)	3.2 (2.2, 4.7)	2.6 (1.8, 3.9)	*
2023 (7,584)	24.3 (21.1, 27.7)	10.2 (8.3, 12.4)	16.9 (13.9, 20.3)	9.9 (7.9, 12.3)	5.5 (4.2, 7.0)	2.9 (2.2, 3.9)	2.1 (1.3, 3.2)	1.3 (0.9, 2.0)	1.8 (1.0, 3.0)	1.2 (0.6, 2.4)	1.1 (0.5, 2.6)	2.5 (1.4, 4.2)	*	*

Note. CI = confidence interval; N/A = not applicable. Data are visualized in Figure 2.2. *Alcohol use* and *tobacco product use* are defined as use in the past 30 days. *Binge drinking* is defined as drinking ≥ 5 drinks in a row over the past 2 weeks. The large cigar question was first asked in 2014. The nicotine vaping question was first asked in 2017. Questions about certain products were only asked of some students. For large cigars and smokeless tobacco, *N* is one-sixth of *N* indicated across years. For nicotine vaping, *N* is one-third of *N* indicated in 2017 and 2018, and two-thirds of *N* indicated in 2019.

*Cells with *n* < 30 are suppressed.

Source: 2000–2023 Monitoring the Future study.

Table 2D.4 Past-30-Day Alcohol Use by Tobacco Use Status and Grade Among Students in the Monitoring the Future Study, 2023

Tobacco use status	Past-30-day alcohol use	Past-2-week binge drinking
	Use prevalence: Weighted % (95% CI)	
Nicotine vaping status		
8th Grade		
No past-30-day nicotine vaping	3.8 (2.8, 5.0)	0.9 (0.5, 1.5)
Past-30-day nicotine vaping	34.1 (29.5, 39.0)	16.0 (12.0, 21.1)
10th Grade		
No past-30-day nicotine vaping	8.5 (7.5, 9.6)	2.5 (2.1, 3.1)
Past-30-day nicotine vaping	53.1 (47.8, 58.3)	28.0 (24.0, 32.5)
12th Grade		
No past-30-day nicotine vaping	17.4 (14.7, 20.4)	5.6 (4.4, 7.1)
Past-30-day nicotine vaping	58.4 (53.7, 62.9)	32.8 (28.8, 37.1)
Cigarette smoking status		
8th Grade		
No past-30-day cigarette smoking	5.5 (4.4, 7.0)	1.7 (1.1, 2.4)
Past-30-day cigarette smoking	*	*
10th Grade		
No past-30-day cigarette smoking	12.5 (11.1, 14.0)	4.6 (3.8, 5.4)
Past-30-day cigarette smoking	69.8 (59.9, 78.1)	46.8 (39.3, 54.4)
12th Grade		
No past-30-day cigarette smoking	22.8 (20.1, 25.9)	9.0 (7.4, 11.0)
Past-30-day cigarette smoking	74.1 (59.8, 84.7)	50.7 (42.2, 59.1)
Cigar smoking status		
8th Grade		
No past-30-day cigar smoking	4.3 (3.4, 5.5)	*
Past-30-day cigar smoking	*	*
10th Grade		
No past-30-day cigar smoking	12.7 (10.4, 15.3)	4.7 (3.8, 5.9)
Past-30-day cigar smoking	*	*

Table 2D.4 (continued)

Tobacco use status	Past-30-day alcohol use	Past-2-week binge drinking
	Use prevalence: Weighted % (95% CI)	
12th Grade		
No past-30-day cigar smoking	23.5 (20.0, 27.4)	10.6 (8.5, 13.2)
Past-30-day cigar smoking	78.4 (57.9, 90.6)	66.1 (42.7, 83.6)
Smokeless tobacco use status		
8th Grade		
No past-30-day smokeless tobacco use	4.8 (3.7, 6.2)	1.3 (0.8, 2.0)
Past-30-day smokeless tobacco use	*	*
10th Grade		
No past-30-day smokeless tobacco use	13.3 (11.5, 15.4)	4.4 (3.3, 5.7)
Past-30-day smokeless tobacco use	47.1 (29.2, 65.8)	*
12th Grade		
No past-30-day smokeless tobacco use	24.3 (19.6, 29.6)	9.7 (7.5, 12.5)
Past-30-day smokeless tobacco use	*	*

Note. CI = confidence interval. Data are visualized in Figure 2.3. *Alcohol use* and *tobacco product use* are defined as use in the past 30 days. *Binge drinking* is defined as drinking ≥ 5 drinks in a row over the past 2 weeks.

*Cells with $n < 30$ are suppressed.

Source: 2023 Monitoring the Future study.

Table 2D.5 Characteristics of Participants in the 2014–2015 and 2019–2020 National Alcohol Surveys (N = 14,125)

	Overall		Men		Women	
	N	Weighted % (95% CI)	n	Weighted % (95% CI)	n	Weighted % (95% CI)
Total	14,125	100.0	5,702	48.2 (47.0, 49.4)	8,417	51.8 (50.6, 53.0)
Age						
18–29	2,433	19.6 (18.6, 20.7)	1,032	20.4 (18.9, 22.0)	1,401	18.9 (17.6, 20.3)
30–59	7,153	52.8 (51.5, 54.0)	2,791	53.6 (51.8, 55.5)	4,361	52.0 (50.4, 53.6)
≥60	4,438	27.6 (26.6, 28.7)	1,853	26.0 (24.5, 27.5)	2,583	29.1 (27.7, 30.6)
Race or ethnicity^a						
White	7,183	64.7 (63.6, 65.8)	3,003	65.1 (63.4, 66.8)	4,180	64.4 (62.9, 65.9)
Black or African American	3,096	12.5 (11.9, 13.3)	1,119	11.7 (10.7, 12.8)	1,977	13.4 (12.4, 14.3)
Hispanic, Latino/a, or of Spanish origin	2,795	14.9 (14.1, 15.7)	1,102	15.3 (14.1, 16.6)	1,692	14.5 (13.5, 15.5)
Other	1,051	7.9 (7.2, 8.6)	478	7.8 (6.8, 9.0)	568	7.8 (6.9, 8.7)
Education						
High school or less	4,156	35.2 (34.0, 36.4)	1,631	34.7 (32.9, 36.6)	2,524	35.6 (34.0, 37.2)
Some college	4,245	34.9 (33.7, 36.1)	1,621	33.8 (32.1, 35.7)	2,623	35.8 (34.3, 37.4)
College degree	5,690	30.0 (28.9, 31.0)	2,438	31.5 (29.9, 33.1)	3,252	28.6 (27.2, 29.9)
Tobacco use status^b						
Never	8,998	60.4 (59.2, 61.6)	3,347	56.4 (54.5, 58.2)	5,648	64.2 (62.6, 65.7)
Former	2,559	18.9 (17.9, 19.8)	1,157	20.2 (18.7, 21.7)	1,401	17.6 (16.4, 18.9)
Current (past-year)	2,432	20.7 (19.7, 21.8)	1,137	23.4 (21.8, 25.2)	1,295	18.2 (16.9, 19.6)
Nondaily	601	4.2 (3.7, 4.7)	311	5.2 (4.4, 6.1)	290	3.3 (2.7, 3.9)
Daily	1,831	16.5 (15.6, 17.5)	826	18.2 (16.7, 19.9)	1,005	14.9 (13.7, 16.2)
Cigarette pack years^c						
0 pack years	3,392	56.7 (54.7, 58.7)	1,188	51.2 (48.1, 54.2)	2,204	61.9 (59.3, 64.5)
0.1–20 pack years	1,204	23.5 (21.8, 25.2)	514	23.9 (21.4, 26.7)	690	23.0 (20.8, 25.4)
20.1–40 pack years	382	7.2 (6.3, 8.3)	189	8.5 (7.0, 10.3)	193	6.1 (4.9, 7.5)
≥40.1 pack years	654	12.5 (11.3, 14.0)	368	16.4 (14.3, 18.8)	286	8.9 (7.5, 10.6)

Table 2D.5 (continued)

	Overall		Men		Women	
	<i>N</i>	Weighted % (95% CI)	<i>n</i>	Weighted % (95% CI)	<i>n</i>	Weighted % (95% CI)
Alcohol use (past year)^d						
No alcohol use	4,531	31.2 (30.0, 32.3)	1,610	27.4 (25.7, 29.0)	2,918	34.7 (33.1, 36.2)
Alcohol use within guidelines	5,564	38.9 (37.7, 40.1)	2,337	39.1 (37.3, 40.9)	3,227	38.7 (37.2, 40.3)
Alcohol use exceeding guidelines	3,676	30.0 (28.8, 31.2)	1,635	33.6 (31.8, 35.4)	2,041	26.6 (25.1, 28.1)
Lifetime 5+ drinking days^e						
0.00	7,231	44.8 (43.6, 46.0)	2,122	31.8 (30.2, 33.5)	5,104	56.8 (55.1, 58.4)
0.1–500	3,832	30.1 (28.1, 31.2)	1,780	33.1 (31.3, 34.8)	2,102	27.4 (25.9, 28.9)
500+	3,012	25.1 (24.1, 26.3)	1,800	35.1 (33.3, 36.9)	1,211	15.9 (14.7, 17.1)
Hazardous alcohol use (past-year)						
No past-year 5+ drinking ^f	11,513	78.3 (77.2, 79.3)	4,194	69.4 (67.6, 71.1)	7,314	86.6 (85.4, 87.7)
Past-year 5+ drinking	2,608	21.7 (20.7, 22.8)	1,505	30.6 (28.9, 32.4)	1,102	13.4 (12.3, 14.6)
No past-year HID ^g	13,378	94.0 (93.3, 94.6)	5,400	93.3 (92.3, 94.3)	7,978	94.6 (93.8, 95.3)
Past-year HID	741	6.0 (5.5, 6.7)	302	6.7 (5.7, 7.7)	439	5.4 (4.7, 6.2)

Note. CI = confidence interval; HID = high intensity drinking.

^aWhite and Black participants are non-Hispanic. ^bTobacco use is defined as use of products other than e-cigarettes (due to survey question wording). *Current tobacco use* is defined as use in the past year. *Former tobacco use* is defined as use within lifetime but not in the past year. *Never tobacco use* is defined as never use in lifetime. ^cPack years data are available only for the 2014–2015 NAS.

^dAlcohol use is measured in the past year. *Alcohol use exceeding guidelines* is defined as exceeding 7/14 drinks per week or drinking $\geq 4/5$ drinks per day for women/men, per the *Dietary Guidelines for Americans, 2020–2025*⁶⁵ and NIAAA's definition of heavy alcohol use.⁶⁶ ^e*Lifetime 5+ drinking days* is defined as the number of days over lifetime in which participants reported drinking 5 or more drinks on 1 occasion. ^fAlcohol use is measured in the past year. *5+ drinks* is defined as consuming 5 or more drinks in 1 day. ^gAlcohol use is measured in the past year. *HID* is defined as drinking $\geq 8/12$ drinks in one day for women/men.

Source: 2014–2015 and 2019–2020 U.S. National Alcohol Surveys.

Table 2D.6 Characteristics of Participants in the 2015–2019 National Survey on Drug Use and Health (N = 214,505)

	Overall		Men		Women	
	N	Weighted % (95 % CI)	n	Weighted % (95% CI)	n	Weighted % (95% CI)
Total	214,505	100.0	99,769	48.3 (47.9, 48.6)	114,736	51.8 (51.4, 52.1)
Race or ethnicity^a						
White	128,924	63.9 (63.6, 64.2)	60,618	64.3 (63.9, 64.8)	68,306	63.4 (63.0, 63.9)
Black	27,081	11.9 (11.7, 12.1)	11,885	11.1 (10.9, 11.4)	15,196	12.5 (12.3, 12.8)
Hispanic	37,015	16.0 (15.8, 16.3)	17,053	16.5 (16.2, 16.9)	19,962	15.6 (15.3, 15.9)
Multirace	7,041	1.7 (1.6, 1.8)	3,286	1.6 (1.5, 1.7)	3,755	1.8 (1.7, 1.9)
American Indian, Alaska Native, Native Hawaiian, or Other Pacific Islander	4,169	0.9 (0.9, 1.0)	1,981	0.9 (0.8, 1.0)	2,188	0.9 (0.9, 1.0)
Asian	10,275	5.6 (5.4, 5.8)	4,946	5.5 (5.2, 5.7)	5,329	5.7 (5.5, 6.0)
Education						
High school or less	84,913	37.6 (37.3, 37.9)	43,401	39.9 (39.5, 40.4)	41,512	35.3 (34.9, 35.7)
Some college	71,981	30.8 (30.6, 31.1)	31,091	28.8 (28.4, 29.2)	40,890	32.8 (32.3, 33.2)
College degree	57,611	31.6 (31.3, 31.9)	25,277	31.3 (30.8, 31.7)	32,334	31.9 (31.5, 32.3)
Age category						
18–25	69,916	13.9 (13.8, 14.1)	33,739	14.5 (14.3, 14.7)	36,177	13.4 (13.2, 13.6)
26–34	44,016	16.0 (15.8, 16.2)	20,219	16.4 (16.2, 16.7)	23,797	15.4 (15.3, 15.8)
35–49	56,566	24.7 (24.4, 24.9)	25,740	25.1 (24.7, 25.4)	30,826	24.3 (24.0, 24.6)
50–64	25,213	25.3 (25.0, 25.6)	11,605	25.3 (24.8, 25.8)	13,608	25.3 (24.9, 25.7)
65+	18,794	20.2 (19.9, 20.5)	8,466	18.8 (18.3, 19.2)	10,328	21.5 (21.1, 21.9)
Income						
<\$20,000	42,934	16.3 (16.1, 16.5)	17,661	14.1 (13.8, 14.4)	25,273	18.3 (18.0, 18.6)
\$20,000–\$49,999	66,946	29.5 (29.2, 29.7)	30,479	28.3 (27.9, 28.7)	36,467	30.5 (30.1, 30.9)
\$50,000–\$74,999	33,515	16.0 (15.8, 16.2)	16,006	16.2 (15.9, 16.6)	17,509	15.8 (15.5, 16.1)
≥\$75,000	71,110	38.3 (38.0, 38.6)	35,623	41.3 (40.9, 41.8)	35,487	35.4 (35.0, 35.8)
Metropolitan status^b						
Nonmetropolitan	42,006	14.2 (14.0, 14.4)	19,601	14.1 (13.8, 14.4)	22,405	14.2 (13.9, 14.5)
Metropolitan	172,499	85.9 (85.7, 86.1)	80,168	85.9 (85.6, 86.2)	92,331	85.8 (85.5, 86.1)

Table 2D.6 (continued)

	Overall		Men		Women	
	N	Weighted % (95 % CI)	n	Weighted % (95% CI)	n	Weighted % (95% CI)
Sexual orientation						
Heterosexual	195,385	95.0 (94.8, 95.1)	93,506	95.9 (95.8, 96.1)	101,879	94.1 (83.9, 94.2)
Lesbian, gay, or bisexual	15,007	5.0 (4.9, 5.2)	4,698	4.1 (3.9, 4.2)	10,309	6.0 (5.8, 6.1)
Veteran status^c						
Not a veteran	202,629	91.4 (91.2, 91.6)	89,391	83.6 (83.3, 84.0)	113,238	98.6 (98.5, 98.7)
Veteran	11,876	8.6 (8.4, 8.8)	10,378	16.4 (16.0, 16.8)	1,498	1.4 (1.3, 1.5)
Health condition^d						
Cancer	7,635	6.3 (6.1, 6.5)	2,831	5.4 (5.2, 5.6)	4,804	7.2 (6.9, 7.4)
Hypertension	26,188	19.6 (19.3, 19.9)	11,531	18.2 (17.8, 18.6)	14,657	20.9 (20.5, 21.3)
Heart condition	14,151	10.5 (10.3, 10.8)	7,008	11.7 (11.4, 12.1)	7,143	9.5 (9.2, 9.7)
Diabetes	14,539	10.7 (10.4, 10.9)	6,379	10.7 (10.3, 11.0)	8,160	10.7 (10.4, 11.0)
Mental distress^e						
None/low (Score of 0–4 on Kessler K6 nonspecific distress scale)	131,014	68.1 (67.8, 68.4)	64,351	70.9 (70.5, 71.3)	66,663	65.5 (65.1, 65.9)
Moderate (Score of 5–12 on Kessler K6 nonspecific distress scale)	66,045	26.1 (25.8, 26.3)	28,823	24.2 (23.8, 24.6)	37,222	27.8 (27.4, 28.2)
Severe (Score of 13–24 on Kessler K6 nonspecific distress scale)	17,446	5.8 (5.7, 6.0)	6,595	4.9 (4.7, 5.1)	10,851	6.8 (6.6, 6.9)
Cigarette smoking status^f						
Never	86,348	38.8 (38.5, 39.1)	35,154	33.2 (32.7, 33.6)	51,194	44.0 (43.5, 44.4)
Former	79,438	41.8 (41.5, 42.1)	39,236	45.0 (44.5, 45.4)	40,202	38.8 (38.4, 39.3)
Current (past-30-day)	48,321	19.5 (19.2, 19.7)	25,148	21.9 (21.5, 22.2)	23,173	17.2 (16.9, 17.5)
Current nondaily smoking, <300 cigarettes/ month	21,015	7.7 (7.5, 7.8)	11,664	9.1 (8.8, 9.3)	9,351	6.4 (6.2, 6.5)
Current daily smoking, <300 cigarettes/month	6,105	2.4 (2.3, 2.4)	2,605	2.2 (2.1, 2.3)	3,500	2.5 (2.4, 2.6)
Current daily or nondaily smoking, ≥300 cigarettes/month	21,201	9.4 (9.3, 9.6)	10,879	10.6 (10.3, 10.9)	10,322	8.3 (8.1, 8.6)

Table 2D.6 (continued)

	Overall		Men		Women	
	N	Weighted % (95 % CI)	n	Weighted % (95% CI)	n	Weighted % (95% CI)
Smokeless tobacco use status						
Never	173,048	83.0 (82.8, 83.2)	66,928	70.5 (70.1, 70.9)	106,120	94.7 (94.5, 94.8)
Former	32,054	13.7 (13.5, 13.9)	24,390	23.2 (22.8, 23.5)	7,664	4.8 (4.6, 5.0)
Current (past-30-day) nondaily use	5,304	1.7 (1.7, 1.8)	4,626	3.2 (3.1, 3.4)	678	0.4 (0.3, 0.4)
Current (past-30-day) daily use	4,013	1.6 (1.5, 1.7)	3,789	3.2 (3.1, 3.3)	224	0.1 (0.1, 0.1)
Cigar smoking status						
Never	138,181	65.6 (65.3, 65.9)	49,260	48.4 (47.9, 48.8)	88,921	81.6 (81.3, 81.9)
Former	63,395	29.7 (29.4, 30.0)	41,161	43.9 (43.5, 44.4)	22,234	16.4 (16.1, 16.7)
Current (past-30-day) cigar smoking	12,867	4.7 (4.6, 4.8)	9,319	7.7 (7.5, 8.0)	3,548	2.0 (1.9, 2.1)
Alcohol use (past 30 days)^a						
Never	30,427	14.2 (14.0, 14.5)	12,697	11.3 (11.0, 11.6)	17,730	17.0 (16.7, 17.3)
Former	63,147	31.6 (31.3, 31.9)	27,158	30.0 (29.5, 30.4)	35,989	33.2 (32.8, 33.6)
Past-30-day alcohol use within guidelines	52,558	27.8 (27.5, 28.1)	23,930	28.1 (27.6, 28.5)	28,628	27.5 (27.1, 27.9)
Past-30-day binge, no risky weekly use	43,212	17.0 (16.8, 17.2)	23,958	21.0 (20.7, 21.4)	19,254	13.3 (13.0, 13.5)
Past-30-day risky weekly use	21,666	9.3 (9.2, 9.5)	10,195	9.7 (9.4, 9.9)	11,471	9.0 (8.8, 9.3)

Note. CI = confidence interval.

^aCategories other than Hispanic are non-Hispanic. *Multirace* is defined as two or more races. ^bNSDUH categorizes participants' counties of residence as large metropolitan, small metropolitan, and nonmetropolitan; large and small metropolitan counties were defined as metropolitan in this analysis. ^c*Veterans* are participants who indicated they are "now separated or retired from the military". ^d*Health conditions* are defined as a condition that a doctor or other health care professional has ever told participants that they had, including "cancer," "any kind of heart condition or heart disease," "diabetes or sugar diabetes," and "hypertension, also called high blood pressure." ^e*Mental distress* levels are based on scores on the Kessler K6 nonspecific distress scale, where a score of 0–4 = none/low, 5–12 = moderate, and 13–24 = severe. ^f*Cigarette smoking, smokeless tobacco use, and cigar smoking* are defined as use in the past 30 days. *Former smoking, smokeless tobacco use, and cigar smoking* are defined as use within lifetime but not in the past 30 days. *Never smoking, smokeless tobacco use, and cigar smoking* are defined as never use in lifetime. ^g*Never and former alcohol use* are defined based on lifetime alcohol use and use in the past 30 days. Alcohol use within guidelines, binge, and risky weekly use are based on use in the past 30 days. *Alcohol use within guidelines* is defined as alcohol use without binge drinking or risky weekly use in the past 30 days. *Binge, no risky weekly use* is defined as drinking ≥4/5 drinks on an occasion for women/men without exceeding 7/14 drinks per week for women/men in the past 30 days. *Risky weekly use* is defined as drinking more than 7/14 drinks per week for women/men in the past 30 days.

Source: 2015–2019 National Survey on Drug Use and Health.

Table 2D.7 Co-Use Prevalence in the Past Year in 2014–2015 and 2019–2020 National Alcohol Surveys (*N* = 14,125) and in the Past Month in the 2015–2019 National Survey on Drug Use and Health (*N* = 210,684)

Co-use status (unweighted <i>n</i>)	Weighted % (95% CI)
NAS 2014–2015 and 2019–2020	
No past-year tobacco or alcohol use (3,938)	25.6 (24.6, 26.7)
Alcohol use only in past year (7,755)	53.9 (52.7, 55.1)
Tobacco use only in past year (593)	4.8 (4.3, 5.4)
Co-use of tobacco and alcohol in past year (1,839)	15.6 (14.7, 16.6)
NSDUH 2015–2019	
No past-30-day cigarette smoking or alcohol use (76,540)	38.4 (38.0, 38.7)
Alcohol use only in the past month (86,934)	42.3 (42.0, 42.6)
Cigarette smoking only in the past month (16,814)	7.5 (7.3, 7.6)
Co-use of cigarettes and alcohol in the past month (30,396)	11.8 (11.7, 12.0)

Note. CI = confidence interval; NAS = National Alcohol Surveys; NSDUH = National Survey on Drug Use and Health. Data are visualized in Figure 2.4. *Tobacco use* in NAS is defined as use of products other than e-cigarettes (due to survey question wording). *Tobacco and alcohol use* in the NAS are defined as use in the past year. *Cigarette smoking and alcohol use* in the NSDUH are defined as use in the past 30 days.

Source: 2014–2015 and 2019–2020 U.S. National Alcohol Surveys, 2015–2019 National Survey on Drug Use and Health.

Table 2D.8 Past-Year Alcohol Use by Tobacco Use Status in the 2014–2015 and 2019–2020 National Alcohol Surveys (N = 14,125), Overall and by Sex (Row Percents)

Tobacco use status ^a (unweighted <i>n</i>)	No past-year alcohol use ^b	Past-year alcohol use within guidelines	Past-year alcohol use exceeding guidelines	<i>p</i> value ^c
	Alcohol use: Weighted % (95% CI)			
Overall				
Overall (13,639)	31.2 (30.0, 32.3)	38.9 (37.7, 40.1)	30.0 (28.8, 31.2)	
Never (8,768)	35.1 (33.7, 36.6)	39.1 (37.6, 40.6)	25.8 (24.4, 27.2)	<.001
Former (2,489)	26.9 (24.6, 29.4)	46.2 (43.4, 49.0)	26.9 (24.4, 29.6)	
Current (past-year) (2,382)	24.0 (21.6, 26.6)	31.9 (29.2, 34.7)	44.1 (41.2, 47.1)	
Nondaily (592)	13.8 (10.5, 18.0)	30.1 (24.9, 35.9)	56.1 (50.0, 61.9)	
Daily (1,790)	26.6 (23.8, 29.6)	32.3 (29.3, 35.5)	41.1 (37.7, 44.4)	
Men				
Overall (5,523)	27.4 (25.7, 29.0)	39.1 (37.3, 40.9)	33.6 (31.8, 35.4)	
Never (3,280)	31.0 (28.8, 33.3)	39.0 (36.7, 41.4)	30.0 (27.7, 32.4)	<.001
Former (1,130)	25.9 (22.6, 29.6)	47.4 (43.4, 51.4)	26.7 (23.1, 30.5)	
Current (past-year) (1,113)	20.4 (17.3, 23.8)	32.2 (28.4, 36.3)	47.4 (43.2, 51.6)	
Nondaily (305)	12.1 (8.0, 17.9)	32.9 (25.6, 41.1)	55.0 (46.7, 63.0)	
Daily (808)	22.7 (19.0, 26.9)	32.1 (27.7, 36.8)	45.2 (40.4, 50.1)	
Women				
Overall (8,061)	34.7 (33.1, 36.2)	38.7 (37.2, 40.3)	26.6 (25.1, 28.1)	
Never (5,487)	38.6 (36.6, 40.5)	39.2 (37.3, 41.1)	22.3 (20.6, 24.0)	<.001
Former (1,359)	27.9 (24.8, 31.3)	44.9 (41.0, 48.8)	27.2 (23.8, 30.9)	
Current (past-year) (1,269)	28.3 (24.8, 32.2)	31.4 (27.8, 35.3)	40.2 (36.2, 44.4)	
Nondaily (287)	16.3 (11.2, 23.0)	26.1 (19.7, 33.9)	57.6 (48.9, 65.8)	
Daily (982)	31.0 (26.9, 35.4)	32.6 (28.5, 37.0)	36.4 (32.0, 40.9)	

Note. CI = confidence interval. Data are visualized in Figure 2.5.

^aTobacco use is defined as use of tobacco products other than e-cigarettes (due to survey question wording). *Current tobacco use* is defined as use in the past year. *Former tobacco use* is defined as use within lifetime but not in the past year. *Never tobacco use* is defined as never use in lifetime. ^bAlcohol use is measured in the past year. *Alcohol use exceeding guidelines* is defined as exceeding 7/14 drinks per week or drinking ≥4/5 drinks per day for women/men, per the *Dietary Guidelines for Americans, 2020–2025*⁶⁵ and NIAAA's definition of heavy alcohol use.⁶⁶ ^cp value for bivariate association, obtained through a chi-squared test, between tobacco use categories (never, former, and current [past-year]) and alcohol use categories within each sex and age group.

Source: 2014–2015 and 2019–2020 U.S. National Alcohol Surveys.

Table 2D.9 Past-Year Alcohol Use by Tobacco Use Status in the 2014–2015 and 2019–2020 National Alcohol Surveys (N = 14,125), Overall and by Sex, Stratified by Age (Row Percents)

Tobacco use status ^a (weighted <i>n</i>)	Ages 18–29				Ages 30–59				Ages 60 and older			
	No past-year alcohol use ^b	Past-year alcohol use within guidelines	Past-year alcohol use exceeding guidelines	<i>p</i> value ^c	No past-year alcohol use	Past-year alcohol use within guidelines	Past-year alcohol use exceeding guidelines	<i>p</i> value	No past-year alcohol use	Past-year alcohol use within guidelines	Past-year alcohol use exceeding guidelines	<i>p</i> value
	Alcohol use: Weighted % (95% CI)											
Overall												
Overall (13,548)	27.7 (25.2, 30.4)	26.4 (23.8, 29.0)	45.9 (42.9, 48.9)		27.6 (26.1, 29.2)	40.1 (38.4, 41.8)	32.3 (30.6, 34.0)		40.2 (38.1, 42.3)	45.6 (43.5, 47.7)	14.2 (12.8, 15.8)	
Never (8,699)	33.2 (30.1, 36.5)	26.4 (23.5, 29.5)	40.4 (37.1, 43.8)	<.001	30.6 (28.6, 32.6)	42.9 (40.8, 45.1)	26.5 (24.5, 28.5)	<.001	47.3 (44.4, 50.3)	43.1 (40.2, 45.9)	9.6 (8.1, 11.4)	<.001
Former (2,470)	15.6 (8.3, 27.5)	34.0 (22.5, 47.8)	50.3 (37.0, 63.6)		22.5 (19.0, 26.5)	42.3 (38.0, 46.8)	35.1 (31.0, 39.5)		31.7 (28.4, 35.1)	50.9 (47.2, 54.6)	17.5 (14.7, 20.6)	
Current (past-year) (2,379)	14.1 (9.9, 19.6)	24.1 (18.6, 30.5)	61.9 (54.9, 68.4)		23.5 (20.5, 26.8)	31.1 (27.6, 34.8)	45.4 (41.6, 49.3)		35.6 (30.1, 41.5)	42.2 (36.5, 48.2)	22.2 (17.8, 27.4)	
Nondaily (592)	8.7 (4.9, 15.0)	18.8 (11.9, 28.3)	72.5 (62.4, 80.8)		14.4 (9.8, 20.8)	29.9 (23.0, 37.9)	55.7 (47.5, 63.6)		23.6 (14.0, 37.0)	58.3 (44.4, 71.0)	18.1 (10.5, 29.4)	
Daily (1,787)	16.7 (11.0, 24.5)	26.7 (19.6, 35.1)	56.7 (47.8, 65.1)		25.5 (22.0, 29.4)	31.3 (27.4, 35.5)	43.1 (38.8, 47.5)		37.5 (31.4, 44.0)	39.6 (33.4, 46.1)	22.9 (18.0, 28.7)	
Men												
Overall (5,500)	26.5 (23.0, 30.4)	25.5 (21.9, 29.4)	48.0 (43.7, 52.4)		24.9 (22.7, 27.2)	38.4 (35.9, 41.0)	36.7 (34.1, 39.3)		33.0 (30.0, 36.2)	51.4 (48.2, 54.7)	15.5 (13.4, 17.9)	
Never (3,263)	34.5 (29.9, 39.5)	24.3 (20.3, 28.8)	41.2 (36.3, 46.3)	<.001	27.2 (24.3, 30.3)	41.6 (38.3, 45.0)	31.2 (28.0, 34.6)	<.001	37.1 (32.6, 41.7)	50.9 (46.3, 55.5)	12.1 (9.5, 15.2)	.01
Former (1,125)	*	31.9 (16.9, 51.9)	67.3 (47.4, 82.4)		22.8 (17.6, 29.0)	41.8 (35.4, 48.4)	35.4 (29.3, 42.1)		30.7 (26.2, 35.6)	53.5 (48.3, 58.5)	15.8 (12.5, 19.9)	
Current (past-year) (1,112)	11.7 (7.0, 18.8)	27.2 (19.6, 36.5)	61.1 (51.5, 69.9)		21.0 (17.0, 25.6)	28.9 (24.1, 34.2)	50.1 (44.6, 55.6)		28.7 (21.3, 37.4)	47.8 (39.3, 56.5)	23.5 (17.2, 31.1)	
Nondaily (305)	*	18.2 (9.9, 31.0)	74.1 (60.6, 84.2)		15.5 (9.2, 25.2)	30.9 (21.3, 42.5)	53.6 (42.3, 64.6)		*	76.2 (59.9, 87.2)	*	
Daily (807)	13.6 (7.4, 23.7)	31.6 (21.4, 43.8)	54.8 (42.7, 66.5)		22.4 (17.8, 27.8)	28.4 (23.0, 34.5)	49.2 (42.9, 55.5)		32.3 (23.8, 42.1)	42.6 (33.4, 52.2)	25.2 (18.1, 33.9)	

Table 2D.9 (continued)

Tobacco use status ^a (weighted <i>n</i>)	Ages 18–29				Ages 30–59				Ages 60 and older			
	No past-year alcohol use ^b	Past-year alcohol use within guidelines	Past-year alcohol use exceeding guidelines	<i>p</i> value ^c	No past-year alcohol use	Past-year alcohol use within guidelines	Past-year alcohol use exceeding guidelines	<i>p</i> value	No past-year alcohol use	Past-year alcohol use within guidelines	Past-year alcohol use exceeding guidelines	<i>p</i> value
	Alcohol use: Weighted % (95% CI)											
Women												
Overall (8,048)	29.0 (25.4, 32.8)	27.3 (23.9, 31.0)	43.8 (39.8, 47.8)		30.2 (28.2, 32.3)	41.8 (39.6, 44.0)	28.0 (26.0, 30.1)		46.2 (43.4, 49.1)	40.7 (37.9, 43.5)	13.1 (11.2, 15.3)	
Never (5,436)	32.0 (27.9, 36.5)	28.3 (24.4, 32.6)	39.6 (35.2, 44.2)	<.001	33.7 (31.1, 36.4)	44.1 (41.4, 46.8)	22.2 (20.0, 24.6)	<.001	53.7 (49.9, 57.4)	38.2 (34.7, 41.8)	8.1 (6.3, 10.4)	<.001
Former (1,345)	28.2 (15.2, 46.2)	35.8 (20.3, 54.9)	36.1 (21.8, 53.3)		22.3 (17.9, 27.3)	42.9 (37.1, 49.0)	34.8 (29.5, 40.6)		32.7 (28.3, 37.5)	47.9 (42.7, 53.2)	19.3 (15.1, 24.4)	
Current (past-year) (1,267)	17.6 (10.8, 27.4)	19.3 (13.1, 27.6)	63.0 (52.8, 72.1)		26.3 (21.9, 31.3)	33.5 (28.7, 38.7)	40.1 (35.0, 45.5)		43.2 (35.5, 51.2)	36.0 (28.8, 43.9)	20.8 (15.1, 28.1)	
Nondaily (287)	*	19.6 (9.7, 35.7)	70.2 (53.8, 82.7)		12.7 (7.3, 21.3)	28.5 (19.9, 39.0)	58.7 (47.6, 69.1)		43.8 (25.7, 63.7)	32.6 (18.5, 50.7)	23.6 (11.7, 41.8)	
Daily (980)	21.4 (12.2, 34.8)	19.2 (11.9, 29.5)	59.4 (46.8, 70.9)		28.9 (23.8, 34.6)	34.5 (29.0, 40.3)	36.6 (31.1, 42.6)		43.1 (34.8, 51.8)	36.4 (28.6, 45.1)	20.5 (14.3, 28.5)	

Note. CI = confidence interval. Data are visualized in Figure 2.5.

^aTobacco use is defined as use of tobacco products other than e-cigarettes (due to survey question wording). *Current tobacco use* is defined as use in the past year. *Former tobacco use* is defined as use within lifetime but not in the past year. *Never tobacco use* is defined as never use in lifetime. ^bAlcohol use is measured in the past year. *Alcohol use exceeding guidelines* is defined as exceeding 7/14 drinks per week or drinking at least 4/5 drinks per day for women/men, per the *Dietary Guidelines for Americans, 2020–2025*⁶⁵ and NIAAA's definition of heavy alcohol use.⁶⁶ ^c*p* value for bivariate association, obtained through a chi-squared test, between tobacco use categories (never, former, and current [past-year]) and alcohol use categories within each sex and age group.

*Cells with *n* < 10 are suppressed.

Source: 2014–2015 and 2019–2020 U.S. National Alcohol Surveys.

Table 2D.10 Past-Year Hazardous Alcohol Use by Tobacco Use Status in the 2014–2015 and 2019–2020 National Alcohol Surveys (N = 14,125), Overall and by Sex, Stratified by Age (Row Percents)

Tobacco use status ^a (weighted <i>n</i>)	Ages 18–29						Ages 30–59						Ages 60 and older					
	5+ drinking ^b			HID ^c			5+ drinking			HID			5+ drinking			HID		
	No past-year 5+ drinking	Past-year 5+ drinking	<i>p</i> value ^d	No past-year HID	Past-year HID	<i>p</i> value	No past-year 5+ drinking	Past-year 5+ drinking	<i>p</i> value	No past-year HID	Past-year HID	<i>p</i> value	No past-year 5+ drinking	Past-year 5+ drinking	<i>p</i> value	No past-year HID	Past-year HID	<i>p</i> value
	Alcohol use: Weighted % (95% CI)																	
Overall																		
Overall (13,887)	63.7 (60.8, 66.5)	36.3 (33.5, 39.2)		87.6 (85.5, 89.5)	12.4 (10.5, 14.5)		76.0 (74.5, 77.5)	24.0 (22.5, 25.5)		93.7 (92.8, 94.5)	6.3 (5.5, 7.2)		92.7 (91.5, 93.7)	7.3 (6.3, 8.5)		98.8 (98.3, 99.2)	1.2 (0.8, 1.7)	
Never (8,925)	69.4 (66.2, 72.5)	30.6 (27.5, 33.8)	<.001	90.9 (88.8, 92.6)	9.1 (7.4, 11.2)	<.001	80.8 (78.9, 82.6)	19.2 (17.4, 21.1)	<.001	95.4 (94.3, 96.3)	4.6 (3.7, 5.7)	<.001	95.5 (94.3, 96.5)	4.5 (3.5, 5.7)	<.001	99.2 (98.7, 99.5)	0.8 (0.5, 1.3)	<.001
Former (2,536)	61.2 (47.8, 73.2)	38.8 (26.8, 52.2)		92.3 (86.1, 95.8)	7.7 (4.2, 13.9)		75.0 (71.0, 78.6)	25.0 (21.4, 29.0)		95.3 (93.1, 96.8)	4.7 (3.2, 6.9)		91.3 (89.0, 93.1)	8.7 (6.9, 11.0)		99.1 (98.2, 99.5)	0.9 (0.5, 1.8)	
Current (past-year) (2,426)	46.5 (39.7, 53.6)	53.5 (46.4, 60.3)		76.9 (70.5, 82.3)	23.1 (17.7, 29.5)		64.1 (60.3, 67.7)	35.9 (32.3, 39.7)		88.2 (85.6, 90.4)	11.8 (9.6, 14.4)		86.2 (81.7, 89.6)	13.8 (10.4, 18.3)		97.0 (94.4, 98.4)	3.0 (1.6, 5.6)	
Nondaily (601)	35.2 (25.5, 46.3)	64.8 (53.7, 74.5)		79.8 (69.7, 87.2)	20.2 (12.8, 30.3)		57.0 (48.8, 64.8)	43.0 (35.2, 51.2)		87.7 (81.2, 92.2)	12.3 (7.8, 18.8)		90.4 (80.6, 95.5)	9.6 (4.5, 19.4)		98.9 (95.3, 99.8)	*	
Daily (1,825)	52.0 (43.3, 60.7)	48.0 (39.3, 56.7)		75.5 (67.1, 82.3)	24.5 (17.7, 32.9)		65.7 (61.4, 69.7)	34.3 (30.3, 38.6)		88.3 (85.4, 90.8)	11.7 (9.2, 14.6)		85.5 (80.5, 89.3)	14.5 (10.7, 19.5)		96.7 (93.7, 98.3)	3.3 (1.7, 6.3)	
Men																		
Overall (5,613)	55.6 (51.3, 59.8)	44.4 (40.2, 48.7)		88.4 (85.2, 91.0)	11.6 (9.0, 14.8)		65.8 (63.2, 68.4)	34.2 (31.6, 36.8)		92.8 (91.2, 94.1)	7.2 (5.9, 8.8)		87.4 (85.2, 89.4)	12.6 (10.6, 14.8)		98.2 (97.2, 98.9)	1.8 (1.1, 2.8)	
Never (3,330)	61.7 (56.7, 66.5)	38.3 (33.5, 43.3)	<.001	91.1 (87.5, 93.7)	8.9 (6.3, 12.5)	.002	70.3 (67.0, 73.4)	29.7 (26.6, 33.0)	<.001	94.1 (92.0, 95.7)	5.9 (4.3, 8.0)	<.001	90.8 (88.0, 93.0)	9.2 (7.0, 12.0)	.002	98.4 (97.0, 99.1)	1.6 (0.9, 3.0)	.049
Former (1,149)	38.0 (21.9, 57.3)	62.0 (42.7, 78.1)		95.1 (84.2, 98.6)	*		67.8 (61.4, 73.7)	32.2 (26.3, 38.6)		95.9 (92.1, 98.0)	4.1 (2.0, 7.9)		87.1 (83.2, 90.1)	12.9 (9.9, 16.8)		99.0 (97.5, 99.6)	*	
Current (past-year) (1,134)	43.4 (34.3, 53.0)	56.6 (47.0, 65.7)		80.5 (72.0, 87.0)	19.5 (13.0, 28.0)		54.2 (48.7, 59.6)	45.8 (40.4, 51.3)		87.9 (84.1, 90.9)	12.1 (9.1, 15.9)		80.1 (72.7, 85.9)	19.9 (14.1, 27.3)		96.2 (91.3, 98.4)	3.8 (1.6, 8.7)	
Nondaily (311)	27.7 (17.4, 41.2)	72.3 (58.8, 82.6)		86.2 (75.9, 92.6)	13.8 (7.4, 24.1)		48.4 (37.4, 59.4)	51.6 (40.6, 62.6)		89.7 (81.5, 94.5)	10.3 (5.5, 18.5)		87.5 (71.8, 95.1)	*		99.4 (95.6, 99.9)	*	
Daily (823)	50.9 (39.0, 62.7)	49.1 (37.3, 61.0)		77.8 (66.0, 86.4)	22.2 (13.6, 34.0)		55.8 (49.5, 61.9)	44.2 (38.1, 50.5)		87.4 (82.9, 90.8)	12.6 (9.2, 17.1)		78.7 (70.3, 85.3)	21.3 (14.7, 29.7)		95.6 (89.9, 98.1)	4.4 (1.9, 10.1)	

Table 2D.10 (continued)

Tobacco use status ^a (weighted <i>n</i>)	Ages 18–29						Ages 30–59						Ages 60 and older					
	5+ drinking ^b			HID ^c			5+ drinking			HID			5+ drinking			HID		
	No past-year 5+ drinking	Past-year 5+ drinking	<i>p</i> value ^d	No past-year HID	Past-year HID	<i>p</i> value	No past-year 5+ drinking	Past-year 5+ drinking	<i>p</i> value	No past-year HID	Past-year HID	<i>p</i> value	No past-year 5+ drinking	Past-year 5+ drinking	<i>p</i> value	No past-year HID	Past-year HID	<i>p</i> value
	Alcohol use: Weighted % (95% CI)																	
Women																		
Overall (8,272)	71.9 (68.2, 75.4)	28.1 (24.6, 31.8)	<.001	86.8 (83.9, 89.3)	13.2 (10.7, 16.1)	<.001	85.9 (84.2, 87.3)	14.1 (12.7, 15.8)	<.001	94.6 (93.5, 95.5)	5.4 (4.5, 6.5)	<.001	97.2 (96.2, 97.9)	2.8 (2.1, 3.8)	<.001	99.3 (98.9, 99.6)	0.7 (0.4, 1.1)	
Never (5,594)	76.4 (72.4, 80.0)	23.6 (20.0, 27.6)		90.7 (88.0, 92.8)	9.3 (7.2, 12.0)		90.1 (88.4, 91.6)	9.9 (8.4, 11.6)		96.6 (95.4, 97.4)	3.4 (2.6, 4.6)		98.5 (97.1, 99.2)	1.5 (0.8, 2.9)		99.8 (99.4, 99.9)	*	
Former (1,386)	81.1 (67.2, 90.0)	18.9 (10.0, 32.8)		89.9 (80.3, 95.0)	10.1 (5.0, 19.7)		82.5 (77.9, 86.3)	17.5 (13.7, 22.1)		94.6 (91.6, 96.6)	5.4 (3.4, 8.4)		96.6 (94.8, 97.8)	3.4 (2.2, 5.2)		99.1 (97.8, 99.7)	*	
Current (past-year) 1,292)	51.3 (41.2, 61.3)	48.7 (38.7, 58.8)		71.4 (61.2, 79.8)	28.6 (20.2, 38.8)		75.4 (70.5, 79.7)	24.6 (20.3, 29.5)		88.6 (84.8, 91.6)	11.4 (8.4, 15.2)		92.8 (88.3, 95.7)	7.2 (4.3, 11.7)		97.9 (95.3, 99.1)	*	
Nondaily (290)	46.3 (29.5, 64.0)	53.7 (36.0, 70.5)		70.3 (51.3, 84.2)	29.7 (15.8, 48.7)		69.9 (58.3, 79.4)	30.1 (20.6, 41.7)		84.7 (72.7, 92.0)	15.3 (8.0, 27.3)		94.5 (82.5, 98.4)	*		98.2 (88.1, 99.8)	*	
Daily (1,002)	53.7 (41.5, 65.6)	46.3 (34.4, 58.5)		72.0 (59.4, 81.8)	28.0 (18.2, 40.6)		76.4 (70.9, 81.1)	23.6 (18.9, 29.1)		89.4 (85.3, 92.4)	10.6 (7.6, 14.7)		92.6 (87.5, 95.7)	7.4 (4.3, 12.5)		97.8 (94.9, 99.1)	*	

Note. CI = confidence interval; HID = high intensity drinking.

^aTobacco use is defined as use of tobacco products other than e-cigarettes (due to survey question wording). *Current tobacco use* is defined as use in the past year. *Former tobacco use* is defined as use within lifetime but not in the past year. *Never tobacco use* is defined as never use in lifetime. ^bAlcohol use is measured in the past year. *5+ drinks* is defined as consuming 5 or more drinks in 1 day. ^cAlcohol use is measured in the past year. *HID* is defined as drinking at $\geq 8/12$ drinks in one day for women/men. ^d*p* value for bivariate association, obtained through a chi-squared test, between tobacco use categories (never, former, and current [past-year]) and alcohol use categories within each sex and age group.

*Cells with *n* < 10 are suppressed.

Source: 2014–2015 and 2019–2020 U.S. National Alcohol Surveys.

Table 2D.11 Past-Year Alcohol Use by E-Cigarette Status in the 2019–2020 National Alcohol Survey (N = 8,096), Overall and by Sex, Stratified by Age (Row Percents)

E-cigarette use status ^a (weighted <i>n</i>)	Ages 18–29				Ages 30–59				Ages 60 and older			
	No past-year alcohol use ^b	Alcohol use within guidelines	Alcohol use exceeding guidelines	<i>p</i> value ^c	No past-year alcohol use	Alcohol use within guidelines	Alcohol use exceeding guidelines	<i>p</i> value	No past-year alcohol use	Alcohol use within guidelines	Alcohol use exceeding guidelines	<i>p</i> value
	Alcohol use: Weighted % (95% CI)											
Overall												
No e-cigarette use in past year (7,918)	29.7 (26.8, 32.7)	30.9 (27.9, 34.0)	39.5 (36.4, 42.7)	<.001	26.3 (24.6, 28.1)	42.9 (40.9, 44.9)	30.8 (29.0, 32.7)	<.001	33.1 (30.5, 35.8)	49.5 (46.7, 52.3)	17.3 (15.3, 19.6)	.02
Monthly or semi-monthly use in past year(204)	*	23.1 (11.9, 40.0)	67.6 (51.7, 80.3)		18.8 (11.4, 29.6)	33.2 (23.0, 45.2)	48.0 (36.4, 59.8)		*	*	*	
Daily or nearly daily use in past year (177)	*	23.1 (13.1, 37.6)	66.1 (51.6, 78.1)		15.0 (7.8, 26.9)	30.8 (20.9, 42.9)	54.2 (41.8, 66.2)		*	*	*	
Men												
No e-cigarette use in past year (3,199)	30.3 (25.9, 35.1)	29.8 (25.2, 34.7)	40.0 (35.2, 45.0)	<.001	24.9 (22.3, 27.8)	41.6 (38.5, 44.8)	33.5 (30.5, 36.6)	.19	24.7 (21.5, 28.2)	56.0 (52.0, 59.9)	19.3 (16.3, 22.7)	.35
Monthly or semi-monthly use in past year (97)	*	*	69.2 (43.6, 86.7)		*	36.0 (22.4, 52.3)	47.5 (32.0, 63.4)		*	*	*	
Daily or nearly daily use in past year (83)	*	*	69.6 (49.2, 84.4)		*	33.6 (19.8, 50.9)	49.1 (31.8, 66.6)		*	*	*	

Table 2D.11 (continued)

E-cigarette use status ^a (weighted <i>n</i>)	Ages 18–29				Ages 30–59				Ages 60 and older			
	No past-year alcohol use ^b	Alcohol use within guidelines	Alcohol use exceeding guidelines	<i>p</i> value ^c	No past-year alcohol use	Alcohol use within guidelines	Alcohol use exceeding guidelines	<i>p</i> value	No past-year alcohol use	Alcohol use within guidelines	Alcohol use exceeding guidelines	<i>p</i> value
	Alcohol use: Weighted % (95% CI)											
Women												
No e-cigarette use in past year (4,718)	29.1 (25.5, 32.9)	32.0 (28.2, 36.0)	39.0 (35.1, 43.0)	.01	27.6 (25.4, 29.9)	44.1 (41.6, 46.5)	28.4 (26.2, 30.6)	.002	40.2 (36.5, 44.1)	44.1 (40.3, 47.9)	15.7 (13.1, 18.7)	.002
Monthly or semi-monthly in past year (107)	*	15.7 (7.3, 30.6)	65.7 (46.9, 80.6)		22.4 (11.5, 39.2)	28.8 (15.6, 46.8)	48.8 (32.6, 65.2)		*	*	*	
Daily or nearly daily use in past year (94)	*	23.3 (10.9, 43.0)	60.1 (40.7, 76.8)		*	27.6 (14.8, 45.5)	60.1 (42.9, 75.1)		*	*	*	

Note. CI = confidence interval.

^aE-cigarette use is measured within the past year. ^bAlcohol use is measured in the past year. *Alcohol use exceeding guidelines* is defined as exceeding 7/14 drinks per week or drinking $\geq 4/5$ drinks per day for women/men, per the *Dietary Guidelines for Americans, 2020–2025*⁶⁵ and NIAAA's definition of heavy alcohol use.⁶⁶ ^c*p* value for bivariate association, obtained through a chi-squared test, between e-cigarette and alcohol use categories within each sex and age group.

*Cells with *n* < 10 are suppressed.

Source: 2019–2020 U.S. National Alcohol Survey.

Table 2D.12 Current (Past-30-Day) Alcohol Use by Cigarette Smoking Status in the 2015–2019 National Survey on Drug Use and Health (N = 210,684), Overall and by Sex (Row Percents)

Cigarette smoking status ^a (unweighted <i>n</i>)	Never alcohol use ^b	Former alcohol use	Past-30-day alcohol use within guidelines ^c	Past-30-day binge, no risky weekly use ^d	Past-30-day risky weekly use ^e	<i>p</i> value ^f
	Alcohol use: Weighted % (95% CI)					
Overall						
Overall (210,684)	14.2 (14.0, 14.5)	31.6 (31.3, 31.9)	27.8 (27.5, 28.1)	17.0 (16.8, 17.2)	9.3 (9.2, 9.5)	<.001
Never (85,223)	29.6 (29.1, 30.1)	29.7 (29.3, 30.2)	25.6 (25.1, 26.0)	11.7 (11.4, 12.0)	3.4 (3.2, 3.6)	
Former (78,251)	3.9 (3.7, 4.1)	32.7 (32.3, 33.2)	34.5 (34.0, 35.0)	18.3 (17.9, 18.7)	10.7 (10.3, 11.0)	
Current (past-30-day) nondaily smoking, <300 cigarettes/month, (20,406)	6.3 (5.8, 6.8)	24.6 (23.7, 25.6)	17.1 (16.3, 17.8)	32.2 (31.3, 33.1)	19.8 (19.0, 20.6)	
Current (past-30-day) daily smoking, <300 cigarettes/month (5,964)	6.7 (5.8, 7.8)	35.1 (33.3, 37.0)	19.6 (18.1, 21.2)	23.4 (21.9, 24.9)	15.2 (14.0, 16.5)	
Current (past-30-day) daily or nondaily smoking, ≥300 cigarettes/month (20,840)	5.1 (4.6, 5.6)	39.0 (38.1, 40.0)	18.2 (17.4, 18.9)	19.6 (18.9, 20.3)	18.1 (17.4, 18.9)	
Men						
Overall (97,753)	11.2 (11.0, 11.5)	29.9 (29.5, 30.4)	28.1 (27.7, 28.5)	21.0 (20.7, 21.4)	9.7 (9.4, 10.0)	<.001
Never (34,639)	25.9 (25.3, 26.6)	28.6 (27.9, 29.4)	27.4 (26.7, 28.2)	14.5 (14.0, 15.0)	3.5 (3.2, 3.8)	
Former (38,592)	3.4 (3.1, 3.7)	31.2 (30.5, 31.9)	33.7 (33.0, 34.4)	22.0 (21.4, 22.5)	9.8 (9.4, 10.2)	
Current (past-30-day) nondaily smoking, <300 cigarettes/month (11,312)	5.6 (5.0, 6.3)	22.6 (21.4, 23.8)	16.5 (15.6, 17.6)	36.8 (35.5, 38.1)	18.5 (17.5, 19.5)	
Current (past-30-day) daily smoking, <300 cigarettes/month (2,537)	5.8 (4.6, 7.4)	32.5 (29.9, 35.3)	20.6 (18.3, 23.1)	26.9 (24.6, 29.4)	14.1 (12.4, 16.0)	
Current (past-30-day) daily or nondaily smoking, ≥300 cigarettes/month (10,673)	4.5 (3.9, 5.2)	34.4 (33.1, 35.7)	17.9 (16.8, 19.0)	23.0 (21.9, 24.1)	20.2 (19.2, 21.3)	

Table 2D.12 (continued)

Cigarette smoking status ^a (unweighted <i>n</i>)	Never alcohol use ^b	Former alcohol use	Past-30-day alcohol use within guidelines ^c	Past-30-day binge, no risky weekly use ^d	Past-30-day risky weekly use ^e	<i>p</i> value ^f
	Alcohol use: Weighted % (95% CI)					
Women						
Overall (112,931)	17.0 (16.7, 17.3)	33.2 (32.8, 33.6)	27.6 (27.2, 28.0)	13.3 (13.0, 13.5)	9.0 (8.8, 9.3)	<.001
Never (50,584)	32.2 (31.5, 32.8)	30.5 (29.9, 31.1)	24.3 (23.7, 24.8)	9.7 (9.4, 10.1)	3.3 (3.1, 3.6)	
Former (39,659)	4.4 (4.0, 4.7)	34.4 (33.7, 35.1)	35.4 (34.7, 36.1)	14.3 (13.9, 14.8)	11.6 (11.1, 12.0)	
Current (past-30-day) nondaily smoking, <300 cigarettes/month (9,094)	7.3 (6.5, 8.2)	27.4 (26.0, 28.8)	17.7 (16.6, 18.9)	26.0 (24.8, 27.3)	21.6 (20.4, 22.9)	
Current (past-30-day) daily smoking, <300 cigarettes/month (3,427)	7.5 (6.1, 9.1)	37.2 (34.8, 39.7)	18.8 (16.9, 20.8)	20.5 (18.6, 22.4)	16.1 (14.3, 18.0)	
Current (past-30-day) daily or nondaily smoking, ≥300 cigarettes/month (10,167)	5.8 (5.1, 6.6)	44.4 (43.1, 45.8)	18.5 (17.4, 19.6)	15.6 (14.7, 16.5)	15.7 (14.8, 16.7)	

Note. CI = confidence interval. Data are visualized in Figure 2.6.

^aCurrent cigarette smoking is defined as use in the past 30 days. ^bNever and former alcohol use are based on lifetime alcohol use and use in the past 30 days. Alcohol use within guidelines, binge, and risky weekly use are based on use in the past 30 days. ^cAlcohol use within guidelines is defined as alcohol use without binge drinking or risky weekly use in the past 30 days. ^dBinge, no risky weekly use is defined as drinking ≥4/5 drinks on an occasion for women/men without exceeding 7/14 drinks per week for women/men in the past 30 days. ^eRisky weekly use is defined as drinking >7/14 drinks per week for women/men in the past 30 days. ^f*p* value for bivariate association, obtained through a chi-squared test, between cigarette smoking and alcohol use categories within each sex group.

Source: 2015–2019 National Survey on Drug Use and Health.

Table 2D.13 Current (Past-30-Day) Alcohol Use by Smokeless Tobacco Use Status in the 2015–2019 National Survey on Drug Use and Health (N = 210,931), Overall and by Sex (Row Percents)

Smokeless tobacco use status ^a (unweighted <i>n</i>)	Never alcohol use ^b	Former alcohol use	Past-30-day alcohol use within guidelines ^c	Past-30-day binge, no risky weekly use ^d	Past-30-day risky weekly use ^e	<i>p</i> value ^f
	Alcohol use: Weighted % (95% CI)					
Overall						
Overall (210,931)	14.2 (14.0, 14.5)	31.6 (31.3, 31.9)	27.8 (27.5, 28.1)	17.0 (16.8, 17.2)	9.3 (9.2, 9.5)	<.001
Never (170,331)	16.5 (16.3, 16.8)	32.4 (32.1, 32.7)	28.2 (27.9, 28.5)	15.1 (14.9, 15.3)	7.8 (7.6, 7.9)	
Former (31,502)	2.4 (2.2, 2.7)	28.2 (27.5, 29.0)	27.5 (26.7, 28.2)	25.7 (25.1, 26.4)	16.2 (15.6, 16.7)	
Current (past-30-day) nondaily use (5,167)	6.8 (5.7, 8.1)	23.0 (21.3, 24.8)	17.2 (15.7, 18.9)	32.2 (30.5, 34.1)	20.8 (19.3, 22.4)	
Current (past-30-day) daily use (3,931)	3.9 (3.0, 5.0)	30.3 (28.3, 32.51)	19.5 (17.7, 21.4)	25.4 (23.6, 27.3)	20.8 (19.1, 22.8)	
Men						
Overall (97,905)	11.3 (11.0, 11.5)	30.0 (29.5, 30.4)	28.1 (27.6, 28.5)	21.1 (20.7, 21.4)	9.7 (9.4, 9.9)	<.001
Never (65,717)	14.8 (14.5, 15.2)	31.1 (30.6, 31.6)	28.9 (28.4, 29.5)	18.3 (17.9, 18.8)	6.8 (6.5, 7.1)	
Former (23,976)	2.2 (1.9, 2.5)	27.6 (26.8, 28.4)	28.0 (27.1, 28.8)	26.9 (26.1, 27.7)	15.4 (14.8, 16.0)	
Current (past-30-day) nondaily use (4,503)	6.1 (5.0, 7.4)	22.3 (20.5, 24.2)	17.2 (15.6, 18.9)	33.4 (31.5, 35.4)	21.0 (19.4, 22.7)	
Current (past-30-day) daily use (3,709)	3.3 (2.5, 4.4)	30.1 (27.9, 32.3)	19.7 (17.9, 21.7)	26.0 (24.2, 28.0)	20.9 (19.1, 22.9)	
Women						
Overall (113,026)	17.0 (16.7, 17.3)	33.2 (32.8, 33.6)	27.5 (27.1, 27.9)	13.3 (13.0, 13.5)	9.0 (8.8, 9.3)	<.001
Never (104,614)	17.7 (17.3, 18.0)	33.3 (32.9, 33.8)	27.7 (27.3, 28.1)	12.9 (12.6, 13.1)	8.4 (8.2, 8.7)	
Former (7,526)	3.7 (3.0, 4.6)	30.9 (29.3, 32.6)	25.1 (23.6, 26.6)	20.6 (19.4, 22.0)	19.6 (18.4, 20.9)	
Current (past-30-day) nondaily use (664)	12.2 (8.4, 17.4)	28.0 (22.7, 33.9)	17.7 (13.4, 23.1)	23.2 (18.8, 28.3)	18.9 (15.3, 23.2)	
Current (past-30-day) daily use (222)	15.2 (8.3, 26.1)	36.2 (26.5, 47.2)	16.2 (9.9, 25.4)	12.9 (8.2, 19.7)	19.5 (11.6, 31.1)	

Note. CI = confidence interval. Data are visualized in Figure 2.7.

^aCurrent smokeless tobacco use is defined as use in the past 30 days. ^bNever and former alcohol use are based on lifetime alcohol use and use in the past 30 days. Alcohol use within guidelines, binge, and risky weekly use are based on use in the past 30 days. ^cAlcohol use within guidelines is defined as alcohol use without binge drinking or risky weekly use in the past 30 days. ^dBinge, no risky weekly use is defined as drinking $\geq 4/5$ drinks on an occasion for women/men without exceeding 7/14 drinks per week for women/men in the past 30 days. ^eRisky weekly use is defined as drinking $>7/14$ drinks per week for women/men in the past 30 days. ^fp value for bivariate association, obtained through a chi-squared test, between smokeless tobacco and alcohol use categories within each sex group.

Source: 2015–2019 National Survey on Drug Use and Health.

Table 2D.14 Current (Past-30-Day) Alcohol Use by Cigar Smoking Status in the 2015–2019 National Survey on Drug Use and Health (N = 210,958), Overall and by Sex (Row Percents)

Cigar smoking status ^a (unweighted <i>n</i>)	Never alcohol use ^b	Former alcohol use	Past-30-day alcohol use within guidelines ^c	Past-30-day binge, no risky weekly use ^d	Past-30-day risky weekly use ^e	<i>p</i> value ^f
	Alcohol use: Weighted % (95% CI)					
Overall						
Overall (210,958)	14.2 (14.0, 14.5)	31.6 (31.3, 31.9)	27.8 (27.5, 28.1)	17.0 (16.8, 17.2)	9.3 (9.2, 9.5)	<.001
Never (136,021)	20.5 (20.2, 20.8)	34.6 (34.2, 35.0)	25.6 (25.3, 26.0)	13.2 (13.0, 13.5)	6.0 (5.8, 6.2)	
Former (62,392)	2.1 (1.9, 2.3)	27.0 (26.4, 27.5)	33.2 (32.6, 33.7)	22.9 (22.4, 23.3)	14.9 (14.5, 15.3)	
Current (past-30-day) cigar smoking (12,545)	3.3 (2.8, 3.7)	19.7 (18.6, 20.8)	24.0 (22.8, 25.2)	32.9 (31.7, 34.1)	20.2 (19.2, 21.2)	
Men						
Overall (97,915)	11.3 (11.0, 11.6)	30.0 (29.5, 30.4)	28.1 (27.6, 28.5)	21.1 (20.7, 21.4)	9.7 (9.4, 9.9)	<.001
Never (48,324)	20.8 (20.3, 21.4)	33.8 (33.2, 34.5)	23.7 (23.1, 24.3)	16.3 (15.8, 16.8)	5.3 (5.0, 5.6)	
Former (40,493)	2.2 (1.9, 2.4)	27.6 (27.0, 28.3)	33.4 (32.7, 34.1)	24.0 (23.4, 24.6)	12.8 (12.4, 13.3)	
Current (past-30-day) cigar smoking (9,098)	3.2 (2.7, 3.8)	19.1 (17.9, 20.3)	24.8 (23.4, 26.2)	33.9 (32.5, 35.3)	19.1 (18.0, 20.3)	
Women						
Overall (113,043)	17.0 (16.7, 17.3)	33.2 (32.8, 33.6)	27.5 (27.1, 27.9)	13.3 (13.0, 13.5)	9.0 (8.8, 9.3)	<.001
Never (87,697)	20.3 (19.9, 20.8)	35.0 (34.6, 35.5)	26.7 (26.2, 27.1)	11.5 (11.3, 11.8)	6.4 (6.2, 6.7)	
Former (21,899)	1.9 (1.7, 2.3)	25.3 (24.4, 26.1)	32.6 (31.7, 33.5)	20.0 (19.3, 20.8)	20.2 (19.4, 21.0)	
Current (past-30-day) cigar smoking (3,447)	3.4 (2.6, 4.4)	21.9 (20.0, 24.0)	21.2 (19.3, 23.2)	29.3 (27.3, 31.5)	24.2 (22.2, 26.3)	

Note. CI = confidence interval. Data are visualized in Figure 2.8.

^aCurrent cigar smoking is defined as use in the past 30 days. ^bNever and former alcohol use are based on lifetime alcohol use and use in the past 30 days. Alcohol use within guidelines, binge, and risky weekly use are based on use in the past 30 days. ^cAlcohol use within guidelines is defined as alcohol use without binge drinking or risky weekly use in the past 30 days. ^dBinge, no risky weekly use is defined as drinking ≥4/5 drinks on an occasion for women/men without exceeding 7/14 drinks per week for women/men in the past 30 days. ^eRisky weekly use is defined as drinking >7/14 drinks per week for women/men in the past 30 days. ^fp value for bivariate association, obtained through a chi-squared test, between cigar smoking and alcohol use categories within each sex group.

Source: 2015–2019 National Survey on Drug Use and Health.

Table 2D.15 Average Past-Year Alcohol Consumption (Overall and Beverage-Specific) by Tobacco Use Status in the 2014–2015 and 2019–2020 National Alcohol Surveys (N = 14,125), Overall and by Sex, Stratified by Age

Tobacco use status ^a (unweighted <i>n</i>)	Ages 18–29				Ages 30–59				Ages 60 and older			
	Alcohol type				Alcohol type				Alcohol type			
	Overall	Beer	Wine	Spirits	Overall	Beer	Wine	Spirits	Overall	Beer	Wine	Spirits
	Mean number of drinks consumed in past year (95% CI)											
Overall												
Never (8,918)	206.6 (174.6, 238.5)	83.0 (66.2, 99.7)	48.7 (39.9, 57.4)	76.1 (62.1, 90.1)	199.9 (178.6, 221.2)	80.4 (70.4, 90.3)	56.6 (49.5, 63.6)	63.6 (53.1, 74.1)	131.3 (108.9, 153.8)	45.5 (33.4, 57.6)	50.7 (41.0, 60.5)	35.6 (24.2, 46.9)
Former (2,534)	446.9* (182.1, 711.7)	160.9 (57.2, 264.5)	63.5 (29.3, 97.6)	222.5 (45.7, 399.4)	261.9** (226.4, 297.4)	102.1* (81.7, 122.4)	69.3* (55.9, 82.7)	90.9** (71.1, 110.7)	202.5** (175.8, 229.3)	57.3 (44.0, 70.6)	72.2** (59.6, 84.8)	74.6** (57.7, 91.4)
Current (past-year) (2,423)	503.7** (379.1, 628.4)	247.9** (177.6, 318.2)	64.2* (46.8, 81.6)	191.7** (119.3, 264.1)	432.3** (347.6, 516.9)	218.6** (155.9, 281.3)	52.7 (42.5, 62.9)	164.4** (118.5, 210.4)	286.7** (214.0, 359.4)	99.1** (64.3, 133.8)	73.7 (43.6, 103.9)	114.8** (71.1, 158.6)
Nondaily (601)	497.0** (363.7, 630.4)	191.4** (118.6, 264.3)	93.1* (58.5, 127.7)	212.4** (129.1, 295.8)	434.5** (329.0, 539.9)	167.8** (118.7, 217.0)	101.9** (71.0, 132.9)	166.9** (102.0, 231.8)	307.8** (190.9, 424.7)	94.6* (39.2, 150.0)	79.1 (41.1, 117.1)	134.5** (62.4, 206.7)
Daily (1,822)	507.0** (333.7, 680.4)	275.2** (177.6, 372.8)	50.1 (31.0, 69.3)	181.7* (82.1, 281.3)	431.8** (330.9, 532.7)	230.0** (154.0, 306.0)	41.6* (31.6, 51.7)	163.9** (109.6, 218.2)	283.3** (201.1, 365.5)	99.8** (60.4, 139.1)	72.9 (38.4, 107.3)	111.7** (62.3, 161.1)
Men												
Never (3,326)	264.8 (211.9, 317.7)	125.3 (94.5, 156.0)	46.5 (34.4, 58.6)	95.8 (72.3, 119.3)	286.9 (247.1, 326.6)	131.9 (114.0, 149.7)	61.2 (49.2, 73.1)	94.3 (74.1, 114.6)	227.2 (174.5, 279.9)	97.8 (68.6, 127.0)	69.7 (48.9, 90.5)	60.4 (34.1, 86.8)
Former (1,149)	778.1* (274.6, 1,281.5)	235.4 (33.3, 437.5)	93.7 (35.2, 152.1)	449.0* (111.7, 786.3)	325.1 (267.2, 383.1)	149.6 (114.7, 184.5)	59.2 (41.6, 76.8)	116.4 (82.6, 150.2)	241.6 (201.8, 281.4)	93.4 (69.2, 117.6)	63.9 (49.0, 78.8)	86.1* (63.0, 109.3)
Current (past-year) (1,133)	566.0** (377.7, 754.3)	316.9** (211.6, 422.2)	47.7 (29.8, 65.5)	201.4* (96.6, 306.3)	590.9** (444.0, 737.9)	313.5** (202.8, 424.3)	47.0 (33.8, 60.3)	233.7** (153.2, 314.2)	364.3** (256.3, 472.2)	141.7* (90.9, 192.4)	75.0 (27.5, 122.5)	149.1** (85.2, 212.9)
Nondaily (311)	570.4** (368.3, 772.6)	238.8* (128.2, 349.5)	78.6* (40.9, 116.4)	252.9* (119.3, 386.6)	465.7* (329.9, 601.5)	223.8* (145.2, 302.4)	81.8 (47.4, 116.1)	164.1* (91.5, 236.7)	410.7* (239.1, 582.3)	144.8 (54.0, 235.6)	82.9 (31.2, 134.7)	183.0** (81.7, 284.2)
Daily (822)	563.9** (302.7, 825.1)	354.3** (208.7, 499.9)	32.8 (13.6, 52.0)	176.8 (35.8, 317.7)	623.4** (442.1, 804.7)	336.6** (199.1, 474.2)	37.9* (24.1, 51.7)	251.7** (152.3, 351.1)	355.9* (232.1, 479.6)	141.1* (83.4, 198.7)	73.5 (18.2, 128.9)	142.9* (69.7, 216.1)

Table 2D.15 (continued)

Tobacco use status ^a (unweighted <i>n</i>)	Ages 18–29				Ages 30–59				Ages 60 and older			
	Alcohol type				Alcohol type				Alcohol type			
	Overall	Beer	Wine	Spirits	Overall	Beer	Wine	Spirits	Overall	Beer	Wine	Spirits
	Mean number of drinks consumed in past year (95% CI)											
Women												
Never (5,591)	153.6 (117.0, 190.1)	45.0 (30.7, 59.4)	50.6 (38.1, 63.1)	58.1 (42.3, 74.0)	123.1 (104.7, 141.4)	34.7 (25.5, 43.9)	52.5 (44.4, 60.6)	36.4 (28.3, 44.5)	72.1 (57.0, 87.1)	13.1 (6.1, 20.0)	39.0 (30.0, 48.0)	20.2 (11.8, 28.6)
Former (1,384)	155.9 (77.4, 234.3)	95.4 (28.1, 162.7)	37.0 (4.5, 69.4)	23.5** (11.8, 35.3)	195.6** (156.3, 235.0)	52.15* (34.1, 70.2)	79.9 (59.8, 100.1)	64.1** (44.4, 83.7)	156.5** (121.4, 191.6)	16.53 (10.8, 22.3)	81.8** (61.2, 102.3)	58.7** (34.7, 82.8)
Current (past-year) (1,290)	409.7** (280.8, 538.7)	143.6** (69.1, 218.1)	89.1* (55.9, 122.3)	177.0** (87.9, 266.1)	251.4** (189.6, 313.3)	109.3** (69.3, 149.4)	59.1* (43.3, 74.9)	85.3** (52.8, 117.9)	200.9** (105.5, 296.3)	52.0 (5.6, 98.4)	72.34* (36.7, 107.3)	77.1* (17.7, 136.5)
Nondaily (290)	388.2** (248.5, 527.9)	121.3* (46.4, 196.2)	114.5* (51.9, 177.1)	152.4** (100.7, 204.1)	387.7** (219.3, 556.1)	84.8** (54.2, 115.3)	131.9** (76.3, 187.5)	171.0* (51.2, 290.8)	160.1 (23.3, 296.8)	21.7 (3.9, 39.6)	73.5 (18.1, 128.9)	65.0 (-32.9, 162.9)
Daily (1,000)	420.4** (240.6, 600.1)	154.6* (50.1, 259.2)	76.6 (38.7, 114.4)	189.1* (58.5, 319.8)	226.1** (160.5, 291.6)	114.0** (66.7, 161.2)	45.5 (30.9, 60.1)	69.2* (38.3, 100.0)	206.4* (99.9, 312.9)	56.0 (3.5, 108.5)	72.2 (32.4, 111.9)	78.7* (12.6, 144.8)

Note. CI = confidence interval. Data are visualized in Figure 2.9.

^aTobacco use is defined as use of tobacco products other than e-cigarettes (due to survey question wording). *Current tobacco use* is defined as use in the past year. *Former tobacco use* is defined as use within lifetime but not in the past year. *Never tobacco use* is defined as never use in lifetime.

* $p < .1$ for association comparing alcohol consumption among tobacco use categories (referent = Never), within each sex and age group. ** $p < .05$ for association comparing alcohol consumption among tobacco use categories (referent = Never), within each sex and age group. *** $p < .01$ for association comparing alcohol consumption among tobacco use categories (referent = Never), within each sex and age group.

Source: 2014–2015 and 2019–2020 U.S. National Alcohol Surveys.

Table 2D.16 Past-Year Drinking Context by Tobacco Use Status in the 2014–2015 and 2019–2020 National Alcohol Surveys (N = 14,125), Overall and by Sex, Stratified by Age (Row Percents)

Tobacco use status ^a (unweighted n)	Ages 18–29				Ages 30–59				Ages 60 and older			
	Frequency of past-year drinking by context ^b				Frequency of past-year drinking by context				Frequency of past-year drinking by context			
	Never	Monthly or less	Weekly or more	p value ^c	Never	Monthly or less	Weekly or more	p value ^c	Never	Monthly or less	Weekly or more	p value ^c
	Weighted % (95% CI)											
Overall												
Bar												
Never (8,926)	53.7 (50.4, 57.1)	40.1 (36.8, 43.4)	6.2 (4.7, 8.1)	<.001	53.2 (51.1, 55.4)	42.8 (40.7, 44.9)	4.0 (3.2, 5.0)	.07	76.0 (73.6, 78.2)	22.2 (20.0, 24.5)	1.8 (1.3, 2.5)	<.001
Former (2,537)	39.3 (27.7, 52.2)	55.2 (42.3, 67.5)	*		48.6 (44.2, 53.1)	47.3 (42.9, 51.7)	4.1 (2.7, 6.1)		67.9 (64.2, 71.3)	29.2 (25.9, 32.8)	2.9 (1.9, 4.6)	
Current (past-year) (2,427)	42.1 (35.3, 49.2)	45.5 (38.7, 52.5)	12.4 (8.2, 18.2)		53.9 (50.1, 57.7)	40.4 (36.7, 44.2)	5.7 (4.2, 7.8)		71.5 (65.9, 76.4)	22.7 (18.3, 27.7)	5.9 (3.4, 10.0)	
House parties												
Never (8,926)	49.3 (45.9, 52.6)	48.0 (44.7, 51.4)	2.7 (1.9, 3.9)	<.001	48.5 (46.4, 50.7)	50.2 (48.1, 52.4)	1.2 (0.8, 1.9)	<.001	63.0 (60.3, 65.7)	36.4 (33.7, 39.1)	0.6 (0.3, 1.1)	<.001
Former (2,537)	35.7 (24.9, 48.3)	61.6 (48.9, 72.9)	*		41.4 (37.1, 45.8)	58.2 (53.8, 62.4)	*		52.1 (48.5, 55.8)	47.0 (43.4, 50.7)	0.8 (0.4, 1.6)	
Current (past-year) (2,427)	34.6 (28.3, 41.4)	59.2 (52.2, 65.9)	6.2 (3.5, 10.6)		49.8 (46.0, 53.7)	47.3 (43.5, 51.1)	2.9 (1.8, 4.6)		63.2 (57.5, 68.6)	35.8 (30.5, 41.4)	*	
Home												
Never (8,926)	53.2 (49.8, 56.5)	32.8 (29.8, 36.1)	14.0 (11.7, 16.6)	<.001	46.9 (44.7, 49.0)	34.0 (32.0, 36.0)	19.1 (17.4, 21.0)	<.001	64.3 (61.5, 66.9)	22.1 (19.8, 24.5)	13.7 (11.9, 15.6)	<.001
Former (2,537)	36.4 (25.1, 49.3)	34.1 (23.1, 47.3)	29.5 (18.6, 43.4)		39.5 (35.3, 43.9)	32.7 (28.7, 37.0)	27.8 (24.0, 31.9)		52.7 (49.0, 56.3)	22.5 (19.6, 25.8)	24.8 (21.7, 28.2)	
Current (past-year) (2,427)	32.0 (25.9, 38.8)	38.5 (31.9, 45.5)	29.5 (23.5, 36.4)		44.1 (40.4, 48.0)	23.9 (20.8, 27.3)	32.0 (28.5, 35.7)		56.7 (50.8, 62.4)	19.4 (15.1, 24.6)	23.9 (19.2, 29.3)	
Men												
Bar												
Never (3,330)	54.6 (49.6, 59.5)	37.8 (33.0, 42.7)	7.6 (5.3, 10.9)	.008	47.6 (44.2, 51.0)	46.6 (43.2, 50.0)	5.9 (4.4, 7.8)	.62	68.7 (64.5, 72.6)	27.5 (23.7, 31.5)	3.8 (2.6, 5.6)	.13
Former (1,150)	23.7 (12.3, 40.6)	66.0 (47.5, 80.7)	*		48.9 (42.4, 55.5)	46.3 (39.9, 52.9)	4.8 (2.7, 8.1)		63.5 (58.4, 68.4)	31.8 (27.1, 36.9)	4.7 (2.8, 7.6)	
Current (past-year) (1,135)	44.0 (34.8, 53.7)	42.5 (33.5, 51.9)	13.5 (8.2, 21.4)		50.4 (45.0, 55.9)	42.5 (37.2, 48.0)	7.1 (4.8, 10.2)		65.4 (56.9, 73.1)	26.1 (19.5, 34.0)	8.5 (4.4, 15.8)	

Table 2D.16 (continued)

Tobacco use status ^a (unweighted n)	Ages 18–29				Ages 30–59				Ages 60 and older			
	Frequency of past-year drinking by context ^b				Frequency of past-year drinking by context				Frequency of past-year drinking by context			
	Never	Monthly or less	Weekly or more	p value ^c	Never	Monthly or less	Weekly or more	p value ^c	Never	Monthly or less	Weekly or more	p value ^c
	Weighted % (95% CI)											
House parties												
Never (3,330)	50.6 (45.6, 55.6)	45.0 (40.1, 50.0)	4.4 (2.8, 6.8)	.004	43.9 (40.6, 47.3)	54.2 (50.8, 57.6)	1.9 (1.1, 3.1)	.13	58.5 (54.0, 62.8)	41.0 (36.7, 45.5)	*	.12
Former (1,150)	26.0 (13.5, 44.2)	69.3 (50.3, 83.5)	*		41.8 (35.4, 48.4)	57.7 (51.1, 64.0)	*		51.5 (46.4, 56.6)	47.7 (42.6, 52.8)	*	
Current (past-year) (1,135)	33.9 (25.6, 43.4)	61.4 (51.9, 70.1)	4.7 (2.4, 9.1)		45.6 (40.2, 51.1)	51.3 (45.8, 56.7)	3.1 (1.8, 5.4)		58.1 (49.6, 66.1)	39.9 (32.0, 48.3)	*	
Home												
Never (3,330)	54.4 (49.3, 59.3)	29.2 (24.9, 34.0)	16.4 (12.8, 20.8)	<.001	41.4 (38.1, 44.8)	34.4 (31.2, 37.7)	24.2 (21.3, 27.3)	.11	55.9 (51.3, 60.3)	26.0 (22.2, 30.1)	18.2 (15.1, 21.7)	.10
Former (1,150)	27.1 (14.1, 45.7)	29.5 (15.6, 48.8)	43.3 (24.8, 63.9)		39.5 (33.3, 46.2)	28.2 (22.7, 34.4)	32.3 (26.5, 38.7)		51.8 (46.7, 56.9)	22.3 (18.3, 26.8)	26.0 (21.8, 30.6)	
Current (past-year) (1,135)	35.7 (27.2, 45.1)	34.6 (26.1, 44.2)	29.7 (21.7, 39.2)		41.5 (36.2, 46.9)	30.1 (25.2, 35.5)	28.4 (23.8, 33.6)		51.3 (42.9, 59.8)	22.6 (16.1, 30.6)	26.1 (19.4, 34.1)	
Women												
Bar												
Never (5,595)	53.0 (48.4, 57.5)	42.1 (37.7, 46.7)	4.9 (3.3, 7.3)	.03	58.2 (55.5, 60.8)	2.3 (1.6, 3.3)	39.5 (36.9, 42.2)	.02	80.5 (77.6, 83.1)	18.9 (16.4, 21.8)	0.6 (0.3, 1.1)	<.001
Former (1,386)	52.6 (35.8, 68.9)	45.9 (29.8, 62.9)	*		48.3 (42.5, 54.2)	48.3 (42.4, 54.1)	3.4 (1.9, 6.1)		72.6 (67.5, 77.1)	26.4 (21.9, 31.5)	1.0 (0.4, 2.4)	
Current (past-year) (1,292)	39.2 (29.9, 49.4)	50.1 (40.1, 60.2)	10.6 (5.0, 21.1)		57.9 (52.6, 63.0)	37.9 (33.0, 43.2)	4.2 (2.4, 7.1)		78.1 (71.3, 83.6)	18.9 (13.8, 25.3)	*	
House parties												
Never (5,595)	48.1 (43.6, 52.6)	50.8 (46.2, 55.3)	1.2 (0.7, 2.1)	<.001	52.6 (49.9, 55.3)	46.7 (44.0, 49.4)	0.7 (0.4, 1.4)	<.001	65.9 (62.4, 69.2)	33.5 (30.2, 37.0)	*	<.001
Former (1,386)	44.1 (28.5, 61.0)	55.0 (38.2, 70.8)	*		41.0 (35.4, 46.7)	58.7 (52.9, 64.2)	*		53.1 (47.9, 58.3)	46.0 (40.8, 51.2)	*	
Current (past-year) (1,292)	35.6 (26.8, 45.5)	56.0 (45.7, 65.7)	8.4 (3.6, 18.5)		54.6 (49.3, 59.9)	42.8 (37.6, 48.0)	2.6 (1.1, 5.9)		68.8 (61.2, 75.5)	31.2 (24.5, 38.8)	*	

Table 2D.16 (continued)

Tobacco use status ^a (unweighted <i>n</i>)	Ages 18–29				Ages 30–59				Ages 60 and older			
	<i>Frequency of past-year drinking by context^b</i>				<i>Frequency of past-year drinking by context</i>				<i>Frequency of past-year drinking by context</i>			
	Never	Monthly or less	Weekly or more		Never	Monthly or less	Weekly or more		Never	Monthly or less	Weekly or more	
Home												
Never (5,595)	52.1 (47.5, 56.6)	36.1 (31.9, 40.6)	11.8 (9.2, 15.0)	<.001	51.7 (49.0, 54.4)	33.6 (31.2, 36.2)	14.7 (12.8, 16.8)	.001	69.4 (66.0, 72.7)	19.7 (16.9, 22.7)	10.9 (8.9, 13.2)	<.001
Former (1,386)	44.3 (28.4, 61.5)	38.1 (23.0, 55.9)	17.6 (8.7, 32.4)		39.5 (33.9, 45.3)	37.4 (31.9, 43.3)	23.1 (18.5, 28.4)		54.0 (48.7, 59.1)	23.0 (18.7, 27.8)	23.1 (18.6, 28.2)	
Current (past-year) (1,292)	26.4 (18.6, 36.0)	44.4 (34.6, 54.6)	29.2 (20.7, 39.6)		47.2 (41.9, 52.5)	34.1 (29.3,39.3)	18.7 (14.9, 23.2)		62.5 (54.5, 69.9)	16.0 (11.0, 22.8)	21.5 (15.5, 28.9)	

Note. CI = confidence interval. Data are visualized in Figure 2.10.

^aTobacco use is defined as use of tobacco products other than e-cigarettes (due to survey question wording). *Current tobacco use* is defined as use in the past year. *Former tobacco use* is defined as use within lifetime but not in the past year. *Never tobacco use* is defined as never use in lifetime. ^bDrinking context is measured within the past year. ^c*p* value for bivariate association, obtained through a chi-squared test, between tobacco and alcohol use categories within each sex and age group.

*Cells with *n* < 10 are suppressed.

Source: 2014–2015 and 2019–2020 U.S. National Alcohol Surveys.

References

1. Greenfield TK, Kerr WC. Tracking alcohol consumption over time. *Alcohol Res Health*. 2003;27(1):30-8.
2. U.S. Department of Health and Human Services. *Smoking Cessation. A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2020.
3. U.S. Department of Health and Human Services. *Eliminating Tobacco-Related Disease and Death: Addressing Disparities—A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2024.
4. GBD 2021 Risk Factors Collaborators. Global burden and strength of evidence for 88 risk factors in 204 countries and 811 subnational locations, 1990-2021: a systematic analysis for the Global Burden of Disease Study 2021. *Lancet*. 2024;403(10440):2162-2203. doi:10.1016/s0140-6736(24)00933-4.
5. Islami F, Marlow EC, Thomson B, et al. Proportion and number of cancer cases and deaths attributable to potentially modifiable risk factors in the United States, 2019. *CA Cancer J Clin*. 2024;74(5):405-32. doi:10.3322/caac.21858.
6. Burton R, Fryers PT, Sharpe C, et al. The independent and joint risks of alcohol consumption, smoking, and excess weight on morbidity and mortality: a systematic review and meta-analysis exploring synergistic associations. *Public Health*. 2024;226:39-52. doi:10.1016/j.puhe.2023.10.035.
7. Hashibe M, Brennan P, Chuang SC, et al. Interaction between tobacco and alcohol use and the risk of head and neck cancer: pooled analysis in the International Head and Neck Cancer Epidemiology Consortium. *Cancer Epidemiol Biomarkers Prev*. 2009;18(2):541-50. doi:10.1158/1055-9965.Epi-08-0347.
8. Pelucchi C, Gallus S, Garavello W, Bosetti C, La Vecchia C. Cancer risk associated with alcohol and tobacco use: focus on upper aero-digestive tract and liver. *Alcohol Res Health*. February 2007;29(3):193-98. doi:10.1097/CEJ.0b013e3282f75e91.
9. U.S. Department of Health and Human Services. *The Health Consequences of Smoking: 50 Years of Progress. A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014. Printed with corrections, January 2014.
10. U.S. Department of Health and Human Services. Facing addiction in America: the Surgeon General's report on alcohol, drugs, and health. 2016 [cited 2026 Mar 27]. Available from: <https://www.hhs.gov/sites/default/files/facing-addiction-in-america-surgeon-generals-report.pdf>.
11. Jackson KM, Colby SM, Sher KJ. Daily patterns of conjoint smoking and drinking in college student smokers. *Psychol Addict Behav*. 2010;24(3):424-35. doi:10.1037/a0019793.
12. Kong AY, Kowitt SD, Halstead EO, Jarman KL, Ranney LM, Goldstein AO, et al. Rates and correlates of simultaneous use and mixing of alcohol, tobacco, and cannabis among adults who currently use alcohol and tobacco. *Addict Behav*. 2025;167:108334. doi:10.1016/j.addbeh.2025.108334.
13. Lipperman-Kreda S, Paschall MJ, Robert FS, Morrison CN. Places and social contexts associated with simultaneous use of alcohol, tobacco and marijuana among young adults. *Drug Alcohol Rev*. 2018;37(2):188-95. doi:10.1111/dar.12537.
14. Piasecki TM, Jahng S, Wood PK, et al. The subjective effects of alcohol-tobacco co-use: an ecological momentary assessment investigation. *J Abnorm Psychol*. 2011;120(3):557-71. doi:10.1037/a0023033.
15. Piasecki TM, McCarthy DE, Fiore MC, Baker TB. Alcohol consumption, smoking urge, and the reinforcing effects of cigarettes: an ecological study. *Psychol Addict Behav*. 2008;22(2):230-9. doi:10.1037/0893-164x.22.2.230.
16. Trim RS, Doran N. Simultaneous alcohol & tobacco use expectancies in young adult co-users. *Addict Behav*. 2018;77:96-99. doi:10.1016/j.addbeh.2017.10.002.
17. Witkiewitz K, Desai SA, Steckler G, Jackson KM, Bowen S, Leigh BC, Larimer ME. Concurrent drinking and smoking among college students: an event-level analysis. *Psychol Addict Behav*. 2012;26(3):649-54. doi:10.1037/a0025363.
18. Wycoff AM, Motschman CA, Griffin SA, Helle AC, Piasecki TM, Trull TJ. Simultaneous use of alcohol and cigarettes in a mixed psychiatric sample: Daily-life associations with smoking motives, craving, stimulation, sedation, and affect. *Psychol Addict Behav*. 2022;36(8):942-54. doi:10.1037/adb0000790.
19. Grant B. Age at smoking onset and its association with alcohol consumption and DSM-IV alcohol abuse and dependence: results from the National Longitudinal Alcohol Epidemiologic Survey. *J Subst Abuse*. 1998;10(1):59-73. doi:10.1016/s0899-3289(99)80141-2.

20. Gruzca R, Bierut L. Cigarette smoking and the risk for alcohol use disorders among adolescent drinkers. *Alcohol Clin Exp Res*. 2006;30(12):2046-54. doi:10.1111/j.1530-0277.2006.00255.x.
21. Hurt R, Offord K, Croghan I, Gomez-Dahl L, Kottke T, Morse R, et al. Mortality following inpatient addictions treatment. Role of tobacco use in a community-based cohort. *JAMA*. 1996;275(14):1097-1103. doi:10.1001/jama.275.14.1097.
22. Callaghan RC, Gatley JM, Sykes J, Taylor L. The prominence of smoking-related mortality among individuals with alcohol- or drug-use disorders. *Drug Alcohol Rev*. 2018;37(1):97-105. doi:10.1111/dar.12475.
23. Gatley JM, Callaghan RC. Tobacco-related mortality among individuals with alcohol or drug use disorders. In: Preedy VR, editor. *Neuropathology of drug addictions and substance misuse*. Academic Press; 2016:104-114.
24. Buckley C, Brennan A, Kerr WC, Probst C, Puka K, Purshouse RC, et al. Improved estimates for individual and population-level alcohol use in the United States, 1984-2020. *Int J Alcohol Drug Res*. 2022;10(1):24-33. doi:10.7895/ijadr.383.
25. Greenfield TK, Kerr WC. Alcohol measurement methodology in epidemiology: recent advances and opportunities. *Addiction*. 2008;103(7):1082-99. doi:10.1111/j.1360-0443.2008.02197.x.
26. Patrick ME, Azar B. High-intensity drinking. *Alcohol Res*. 2018;39(1):49-55.
27. Greenfield TK, Patterson D, Karriker-Jaffe KJ, Kerr WC, Gilder DA, Ehlers CL. childhood experiences and high-intensity drinking among American Indian and Alaska Native Adults: findings from the 2000-2015 National Alcohol Surveys. *J Stud Alcohol Drugs*. 2021;82(5):564-75. doi:10.15288/jsad.2021.82.564.
28. Patrick ME, Terry-McElrath YM. Drinking motives and drinking consequences across days: differences and similarities between moderate, binge, and high-intensity drinking. *Alcohol Clin Exp Res*. 2021;45(5):1078-90. doi:10.1111/acer.14591.
29. Greenfield TK, Lui CK, Cook WK, et al. High Intensity Drinking (HID) assessed by maximum is an important pattern measure adding predictive value in a majority of higher and lower income societies for modeling alcohol-related problems. *Int J Environ Res Public Health*. 2023;20(4):3748. doi:10.3390/ijerph20043748.
30. Boakye E, Erhabor J, Obisesan O, et al. Comprehensive review of the national surveys that assess e-cigarette use domains among youth and adults in the United States. *Lancet Reg Health Am*. 2023;23:100528. doi:10.1016/j.lana.2023.100528.
31. CSR Incorporated. Alcohol epidemiologic data dictionary. 2022 [cited 2026 Mar 27]. Available at: <https://www.niaaa.nih.gov/sites/default/files/2022Data-Directory.pdf>.
32. Kilian C, Manthey J, Carr S, Hanschmidt F, Rehm J, Speerforck S, et al. Stigmatization of people with alcohol use disorders: an updated systematic review of population studies. *Alcohol Clin Exp Res*. 2021;45(5):899-911. doi:10.1111/acer.14598.
33. Morris J, Schomerus G. Why stigma matters in addressing alcohol harm. *Drug Alcohol Rev*. 2023;42(5):1264-8. doi:10.1111/dar.13660.
34. Stuber J, Galea S, Link BG. Smoking and the emergence of a stigmatized social status. *Soc Sci Med*. 2008;67(3):420-30. doi:10.1016/j.socscimed.2008.03.010.
35. Williamson TJ, Riley KE, Carter-Harris L, Ostroff JS. Changing the language of how we measure and report smoking status: implications for reducing stigma, restoring dignity, and improving the precision of scientific communication. *Nicotine Tob Res*. 2020;22(12):2280-82. doi:10.1093/ntr/ntaa141.
36. Dejong K, Olyaei A, Lo JO. Alcohol use in pregnancy. *Clin Obstet Gynecol*. 2019;62(1):142-55. doi:10.1097/grf.0000000000000414.
37. Dietz PM, Homa D, England LJ, Burley K, Tong VT, Dube SR, et al. Estimates of nondisclosure of cigarette smoking among pregnant and nonpregnant women of reproductive age in the United States. *Am J Epidemiol*. 2011;173(3):355-9. doi:10.1093/aje/kwq381.
38. U.S. National Cancer Institute. *Treating Smoking in Cancer Patients: An Essential Component of Cancer Care*. National Cancer Institute Tobacco Control Monograph 23. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; 2022.
39. Curry L, Richardson A, Xiao H, Niaura R. Nondisclosure of smoking status to health care providers among current and former smokers in the United States. *Health Educ Behav*. 2013;40(3):266-73. doi:10.1177/1090198112454284.
40. Petruzella S, Bochner BH, Kenney J, et al. Examining the accuracy of self-reported smoking-related exposure among recently diagnosed nonmuscle invasive bladder cancer patients. *J Urol*. 2021;205(5):1321-25. doi:10.1097/ju.0000000000001571.
41. Stuber J, Galea S. Who conceals their smoking status from their health care provider? *Nicotine Tob Res*. 2009;11(3):303-7. doi:10.1093/ntr/ntn024.

42. Connor Gorber S, Schofield-Hurwitz S, Hardt J, Levasseur G, Tremblay M. The accuracy of self-reported smoking: a systematic review of the relationship between self-reported and cotinine-assessed smoking status. *Nicotine Tob Res.* 2009;11(1):12-24. doi:10.1093/ntr/ntn010.
43. Hatziandreu EJ, Pierce JP, Fiore MC, Grise V, Novotny TE, Davis RM. The reliability of self-reported cigarette consumption in the United States. *Am J Public Health.* 1989;79(8):1020-3. doi:10.2105/ajph.79.8.1020.
44. Liber AC, Warner KE. Has underreporting of cigarette consumption changed over time? estimates derived from US national health surveillance systems between 1965 and 2015. *Am J Epidemiol.* 2018;187(1):113-9. doi:10.1093/aje/kwx196.
45. Patrick DL, Cheadle A, Thompson DC, Diehr P, Koepsell T, Kinne S. The validity of self-reported smoking: a review and meta-analysis. *Am J Public Health.* 1994;84(7):1086-93. doi:10.2105/ajph.84.7.1086.
46. Soulakova JN, Hartman AM, Liu B, Willis GB, Augustine S. Reliability of adult self-reported smoking history: data from the tobacco use supplement to the current population survey 2002-2003 cohort. *Nicotine Tob Res.* 2012;14(8):952-60. doi:10.1093/ntr/ntn313.
47. Li Z, Benowitz-Fredericks C, Ling PM, Cohen JE, Thrul J. Assessing young adults' ENDS use via ecological momentary assessment and a smart Bluetooth enabled ENDS device. *Nicotine Tob Res.* 2021;23(5):842-48. doi:10.1093/ntr/ntaa205.
48. Grüner Nielsen D, Andersen K, Sogaard Nielsen A, Juhl C, Mellentin A. Consistency between self-reported alcohol consumption and biological markers among patients with alcohol use disorder - a systematic review. *Neurosci Biobehav Rev.* 2021;124:370-85. doi:10.1016/j.neubiorev.2021.02.006.
49. Hammarlund R, Crapanzano KA, Luce L, Mulligan L, Ward KM. Review of the effects of self-stigma and perceived social stigma on the treatment-seeking decisions of individuals with drug- and alcohol-use disorders. *Subst Abuse Rehabil.* 2018;9:115-36. doi:10.2147/sar.S183256.
50. Keyes KM, Hatzenbuehler ML, McLaughlin KA, Link B, Olfson M, Grant BF, et al. Stigma and treatment for alcohol disorders in the United States. *Am J Epidemiol.* 2010;172(12):1364-72. doi:10.1093/aje/kwq304.
51. Northcote J, Livingston M. Accuracy of self-reported drinking: observational verification of 'last occasion' drink estimates of young adults. *Alcohol Alcohol.* 2011;46(6):709-13. doi:10.1093/alcalc/agr138.
52. Del Boca FK, Darkes J. The validity of self-reports of alcohol consumption: state of the science and challenges for research. *Addiction.* 2003;98 Suppl 2:1-12. doi:10.1046/j.1359-6357.2003.00586.x.
53. Rice C. Retest reliability of self-reported daily drinking: form 90. *J Stud Alcohol Drugs.* 2007;68(4):615-8. doi:10.15288/jsad.2007.68.615.
54. Simons JS, Wills TA, Emery NN, Marks RM. Quantifying alcohol consumption: Self-report, transdermal assessment, and prediction of dependence symptoms. *Addict Behav.* 2015;50:205-12. doi:10.1016/j.addbeh.2015.06.042.
55. Rehm J, Irving H, Ye Y, Kerr WC, Bond J, Greenfield TK. Are lifetime abstainers the best control group in alcohol epidemiology? On the stability and validity of reported lifetime abstinence. *Am J Epidemiology.* 2008;168(8):866-71. doi:10.1093/aje/kwn093.
56. Tevik K, Bergh S, Selbæk G, Johannessen A, Helvik AS. A systematic review of self-report measures used in epidemiological studies to assess alcohol consumption among older adults. *PLoS One.* 2021;16(12):e0261292. doi:10.1371/journal.pone.0261292.
57. Kerr WC, Greenfield TK. Distribution of alcohol consumption and expenditures and the impact of improved measurement on coverage of alcohol sales in the 2000 National Alcohol Survey. *Alcohol Clin Exp Res.* 2007;31(10):1714-22. doi:10.1111/j.1530-0277.2007.00467.x.
58. National Institute on Alcohol Abuse and Alcoholism. The 1984 National Minimum Drinking Age Act [Internet]. [cited 2026 Mar 27]. Available from: <https://web.archive.org/web/20250206191548/https://alcoholpolicy.niaaa.nih.gov/the-1984-national-minimum-drinking-age-act>.
59. Food and Drug Administration. Tobacco 21 [Internet]. [cited 2026 Mar 27]. Available at: <https://www.fda.gov/tobacco-products/retail-sales-tobacco-products/tobacco-21>.
60. Cotti C, DeCicca P, Nesson E. The effects of tobacco 21 laws on smoking and vaping: evidence from panel data and biomarkers. *J Health Econ.* 2024;98:102932. doi:10.1016/j.jhealeco.2024.102932.
61. University of Michigan. About MTF [Internet]. [cited 2026 Mar 27]. Available from: <https://monitoringthefuture.org/about>.
62. Alcohol Research Group. National Alcohol Surveys. [cited 2026 Mar 27]. Available from: <https://arg.org/center/national-alcohol-surveys>.

63. Substance Abuse and Mental Health Services Administration. National Survey on Drug Use and Health (NSDUH). [cited 2026 Mar 27]. Available at: <https://www.samhsa.gov/data/data-we-collect/nsduh-national-survey-drug-use-and-health>.
64. Ryan H, Trosclair A, Gfroerer J. Adult current smoking: differences in definitions and prevalence estimates--NHIS and NSDUH, 2008. *J Environ Public Health*. 2012;2012:918368. doi:10.1155/2012/918368.
65. U.S. Department of Agriculture, U.S. Department of Health and Human Services. Dietary guidelines for Americans, 2020-2025. 2020 [cited 2026 Mar 27]. Available from: https://www.dietaryguidelines.gov/sites/default/files/2020-12/Dietary_Guidelines_for_Americans_2020-2025.pdf.
66. National Institute on Alcohol Abuse and Alcoholism. Drinking levels defined [Internet]. 2023 [cited 2026 Mar 27]. Available from: <https://www.niaaa.nih.gov/alcohol-health/overview-alcohol-consumption/moderate-binge-drinking>.
67. National Cancer Institute. Cancer Trends Progress Report - Adult Tobacco Use [Internet]. [cited 2026 Mar 27]. Available from: https://progressreport.cancer.gov/prevention/tobacco/adult_smoking.
68. National Center for Health Statistics. Percentage of current cigarette smoking for adults aged 18 and over (95% confidence intervals), United States, 2019—2024 [Internet]. [cited 2026 Mar 27]. Available from: https://wwwn.cdc.gov/NHISDataQueryTool/SHS_adult/index.html.
69. Holford TR, Meza R, Warner KE, Meernik C, Jeon J, Moolgavkar SH, Levy DT. Tobacco control and the reduction in smoking-related premature deaths in the United States, 1964-2012. *JAMA*. 2014;311(2):164-71. doi:10.1001/jama.2013.285112.
70. Moolgavkar SH, Holford TR, Levy DT, et al. Impact of reduced tobacco smoking on lung cancer mortality in the United States during 1975-2000. *J Natl Cancer Inst*. 2012;104(7):541-8. doi:10.1093/jnci/djs136.
71. Farrelly MC, Chaloupka FJ, Berg CJ, et al. Taking stock of tobacco control program and policy science and impact in the United States. *J Addict Behav Ther*. 2017;1(2):8.
72. Inoue-Choi M, Christensen CH, Rostron BL, Cosgrove CM, Reyes-Guzman C, Apelberg B, et al. Dose-response association of low-intensity and nondaily smoking with mortality in the United States. *JAMA Netw Open*. 2020;3(6):e206436. doi:10.1001/jamanetworkopen.2020.6436.
73. Cornelius ME, Loretan CG, Jamal A, Davis Lynn BC, Mayer M, Alcantara IC, et al. Tobacco product use among adults - United States, 2021. *MMWR Morb Mortal Wkly Rep*. 2023;72(18):475-83. doi:10.15585/mmwr.mm7218a1.
74. O'Connor R, Schneller LM, Felicione NJ, Talhout R, Goniewicz ML, Ashley DL. Evolution of tobacco products: recent history and future directions. *Tob Control*. 2022;31(2):175-82. doi:10.1136/tobaccocontrol-2021-056544.
75. National Institute on Alcohol Abuse and Alcoholism. What is a standard drink [Internet]? 2025 [cited 2026 Mar 27]. Available from: <https://www.niaaa.nih.gov/alcohols-effects-health/what-standard-drink>.
76. Gruzca RA, Sher KJ, Kerr WC, et al. Trends in adult alcohol use and binge drinking in the early 21st century United States: A meta-analysis of six national survey series. *Alcohol Clin Exp Res*. October 2018;42(10):1939-50. doi:10.1111/acer.13859.
77. Keyes KM, Jager J, Mal-Sarkar T, Patrick ME, Rutherford C, Hasin D. Is there a recent epidemic of women's drinking? A critical review of national studies. *Alcohol Clin Exp Res*. July 2019;43(7):1344-59. doi:10.1111/acer.14082.
78. Kerr WC, Greenfield TK, Bond J, Ye Y, Rehm J. Age-period-cohort modeling of alcohol volume and heavy drinking days in the US National Alcohol Surveys: divergence in younger and older adult trends. *Addiction*. 2009;104(1):27-37. doi:10.1111/j.1360-0443.2008.02391.x.
79. Kerr WC, Greenfield TK, Ye Y, Bond J, Rehm J. Are the 1976-1985 birth cohorts heavier drinkers? Age-period-cohort analyses of the National Alcohol Surveys 1979-2010. *Addiction*. 2013;108(6):1038-48. doi:10.1111/j.1360-0443.2012.04055.x.
80. Kerr WC, Greenfield TK, Bond J, Ye Y, Rehm J. Age, period and cohort influences on beer, wine and spirits consumption trends in the U.S. National Surveys. *Addiction*. 2004;99(9):1111-20. doi:10.1111/j.1360-0443.2004.00820.x.
81. Esser MB, Sherk A, Liu Y, Naimi TS. Deaths from excessive alcohol use - United States, 2016-2021. *MMWR Morb Mortal Wkly Rep*. 2024;73(8):154-61. doi:10.15585/mmwr.mm7308a1.
82. White AM, Castle IP, Powell PA, Hingson RW, Koob GF. Alcohol-related deaths during the COVID-19 Pandemic. *JAMA*. 2022;327(17):1704-06. doi:10.1001/jama.2022.4308.

83. Substance Abuse and Mental Health Services Administration. Key substance use and mental health indicators in the United States: Results from the 2024 National Survey on Drug Use and Health. [cited 2026 Mar 27]. Available from: <https://www.samhsa.gov/data/sites/default/files/reports/rpt56287/2024-nsduh-annual-national-report.pdf>.
84. Slater ME, Alpert HR. Surveillance report #121 - apparent per capita alcohol consumption: national, state, and regional trends, 1977-2022. CSR, Incorporated. [cited 2026 Mar 27]. Available from: https://www.researchgate.net/publication/380782768_SURVEILLANCE_REPORT_121_-_APPARENT_PER_CAPITA_ALCOHOL_CONSUMPTION_NATIONAL_STATE_AND_REGIONAL_TRENDS_1977-2022.
85. Kerr WC, Brown S, Greenfield TK. National and state estimates of the mean ethanol content of beer sold in the US and their impact on per capita consumption estimates: 1988 to 2001. *Alcohol Clin Exp Res*. 2004;28(10):1524-32. doi:10.1097/01.ALC.0000141641.72726.C1.
86. Kerr WC, Greenfield TK, Tujague J. Estimates of the mean alcohol concentration of the spirits, wine, and beer sold in the United States and per capita consumption: 1950–2002. *Alcohol Clin Exp Res*. 2006;30(9):1583-91. doi:10.1111/j.1530-0277.2006.00190.x.
87. Kerr WC, Greenfield TK, Tujague J, Brown SE. The alcohol content of wine consumed in the U.S. and per capita consumption: new estimates reveal different trends. *Alcohol Clin Exp Res*. 2006;30(3):516-22. doi:10.1111/j.1530-0277.2006.00065.x.
88. Kerr WC. Ethanol content of beer sold in the United States: variation over time, across states and by individual drinks. In: Preedy VR, editor. *Beer in Health and Disease Prevention*. Academic Press; 2008:255-264.
89. Martinez P, Kerr WC, Subbaraman M, Roberts SCM. New estimates of the mean ethanol content of beer, wine, and spirits sold in the United States show a greater increase in per capita alcohol consumption than previous estimates. *Alcohol Clin Exp Res*. 2019;43(3):509-21. doi:10.1111/acer.13958.
90. Centers for Disease Control and Prevention. Compressed Mortality File: Years 1968-1978 with ICD-8 Codes, 1979-1998 with ICD-9 Codes and 1999-2016 with ICD-10 Codes. [cited 2026 Mar 27]. Available from: <https://wonder.cdc.gov/wonder/help/cmfile.html#Compressed%20Mortality%20File:%C2%A0Population%20Data>.
91. Federal Trade Commission. Federal Trade Commission cigarette report for 2021. [cited 2026 Mar 27]. Available from: https://www.ftc.gov/system/files/ftc_gov/pdf/p114508cigarettereport2021.pdf.
92. United States Census Bureau. Explore Census data [Internet]. [cited 2026 Mar 27]. Available from: <https://data.census.gov>.
93. World Health Organization. Adolescent health [Internet]. [cited 2026 Mar 27]. Available from: https://www.who.int/health-topics/adolescent-health#tab=tab_1.
94. Jaworska N, MacQueen G. Adolescence as a unique developmental period. *J Psychiatry Neurosci*. 2015;40(5):291-3. doi:10.1503/jpn.150268.
95. Klimstra TA, van Doeselaar L. 18 - Identity formation in adolescence and young adulthood. In: Specht J, editor. *Personality Development Across the Lifespan*. Academic Press; 2017:293-308.
96. Sawyer SM, Azzopardi PS, Wickremarathne D, Patton GC. The age of adolescence. *Lancet Child Adolesc Health*. 2018;2(3):223-8. doi:10.1016/s2352-4642(18)30022-1.
97. Yuan M, Cross SJ, Loughlin SE, Leslie FM. Nicotine and the adolescent brain. *J Physiol*. 2015;593(16):3397-412. doi:10.1113/jp270492.
98. Akasaki M, Ploubidis GB, Dodgeon B, Bonell CP. The clustering of risk behaviours in adolescence and health consequences in middle age. *J Adolesc*. 2019;77:188-197. doi:10.1016/j.adolescence.2019.11.003.
99. Meader N, King K, Moe-Byrne T, et al. A systematic review on the clustering and co-occurrence of multiple risk behaviours. *BMC Public Health*. 2016;16(1):657. doi:10.1186/s12889-016-3373-6.
100. U.S. Department of Health and Human Services. *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2012.
101. Whitaker V, Oldham M, Boyd J, Fairbrother H, Curtis P, Meier P, Holmes J. Clustering of health-related behaviours within children aged 11–16: a systematic review. *BMC Public Health*. 2021/01/14 2021;21(1):137. doi:10.1186/s12889-020-10140-6.
102. National Institute on Alcohol Abuse and Alcoholism. [cited 2026 Mar 27]. Get the facts about underage drinking. Available from: <https://www.niaaa.nih.gov/publications/brochures-and-fact-sheets/underage-drinking>.

103. Miller JW, Naimi TS, Brewer RD, Jones SE. Binge drinking and associated health risk behaviors among high school students. *Pediatr.* 2007;119(1):76-85. doi:10.1542/peds.2006-1517.
104. Connor JP, Stjepanović D, Le Foll B, Hoch E, Budney AJ, Hall WD. Cannabis use and cannabis use disorder. *Nat Rev Dis Primers.* 2021;7(1):16. doi:10.1038/s41572-021-00247-4.
105. Hoots BE, Li J, Hertz MF, Esser MB, Rico A, Zavala EY, Jones CM. Alcohol and other substance use before and during the COVID-19 pandemic among high school students - Youth Risk Behavior Survey, United States, 2021. *MMWR Suppl.* 2023;72(1):84-92. doi:10.15585/mmwr.su7201a10.
106. Schlienz NJ, Lee DC. Co-use of cannabis, tobacco, and alcohol during adolescence: policy and regulatory implications. *Int Rev Psychiatry.* 2018;30(3):226-237. doi:10.1080/09540261.2018.1465399.
107. Johnston LD, Meich RA, O'Malley PM, Bachman JG, Schulenberg JE, Patrick ME. 2021 Overview - key findings on adolescent drug use. 2022 [cited 2026 Mar 27]. Available from: <https://monitoringthefuture.org/wp-content/uploads/2022/08/mtf-overview2021.pdf>.
108. Jamal A, Park-Lee E, Birdsey J, et al. Tobacco product use among middle and high school students - National Youth Tobacco Survey, United States, 2024. *MMWR Morb Mortal Wkly Rep.* 2024;73(41):917-924. doi:10.15585/mmwr.mm7341a2.
109. Birdsey J, Cornelius M, Jamal A, et al. Tobacco product use among U.S. middle and high school students - National Youth Tobacco Survey, 2023. *MMWR Morb Mortal Wkly Rep.* 2023;72(44):1173-1182. doi:10.15585/mmwr.mm7244a1.
110. Miech RA, Johnston LD, Patrick ME, O'Malley PM, Bachman JG. Monitoring the Future National Survey results on drug use, 1975-2023: overview and detailed results for secondary school students. 2023 [cited 2026 Mar 27]. Available from: <https://monitoringthefuture.org/wp-content/uploads/2023/12/mtf2023.pdf>.
111. Gfroerer J, Bose J, Kroutil L, Lopez M, Kann L. Methodological considerations in estimating adolescent substance use. American Statistical Association: Survey Research Methods. 2012. [cited 2026 Mar 27]. Available from: http://www.asasrms.org/Proceedings/y2012/Files/304796_73741.pdf.
112. Weerakoon SM, Henson-Garcia M, Abraham A, Vidot DC, Messiah SE, Opara I. Adolescent polysubstance use and co-occurring weapon carrying, bullying victimization, and depressive symptomology: patterns and differences in the United States. *Child Psychiatry Hum Dev.* 2023. doi:10.1007/s10578-023-01573-2.
113. Gilbert PA, Kava CM, Afifi R. High-school students rarely use e-cigarettes alone: A sociodemographic analysis of polysubstance use among adolescents in the United States. *Nicotine Tob Res.* 2020;23(3):505-510. doi:10.1093/ntr/ntaa037.
114. Creamer MR, Portillo GV, Clendennen SL, Perry CL. Is adolescent poly-tobacco use associated with alcohol and other drug use? *Am J Health Behav.* 2016;40(1):117-22. doi:10.5993/ajhb.40.1.13.
115. Daw J, Nowotny K, Boardman J. Changing patterns of tobacco and alcohol co-use by gender in the United States, 1976-2010. *Demogr Res.* 2013;28(22):637-648. doi:10.4054/demres.2013.28.22.
116. Kreski NT, Ankrum H, Cerdá M, et al. Nicotine vaping and co-occurring substance use among adolescents in the United States from 2017-2019. *Subst Use Misuse.* 2023;58(9):1075-1079. doi:10.1080/10826084.2023.2188462.
117. Richter L, Pugh BS, Smith PH, Ball SA. The co-occurrence of nicotine and other substance use and addiction among youth and adults in the United States: implications for research, practice, and policy. *Am J Drug Alcohol Abuse.* 2017;43(2):132-145. doi:10.1080/00952990.2016.1193511.
118. Conway KP, Green VR, Kasza KA, et al. Co-occurrence of tobacco product use, substance use, and mental health problems among youth: findings from wave 1 (2013-2014) of the Population Assessment of Tobacco and Health (PATH) study. *Addict Behav.* 2018;76:208-217. doi:10.1016/j.addbeh.2017.08.009.
119. Cooper M, Day HR, Ren C, et al. Correlates of tobacco product initiation among youth and young adults between waves 1-4 of the Population Assessment of Tobacco and Health (PATH) study (2013-2018). *Addict Behav.* Nov 2022;134:107396. doi:10.1016/j.addbeh.2022.107396.
120. Pérez A, Kuk AE, Bluestein MA, Sia HMS, Chen B. Age of initiation of dual tobacco use and binge drinking among youth (12-17 years old): findings from the Population Assessment of Tobacco and Health (PATH) study. *Int J Environ Res Public Health.* 2021;18(24). doi:10.3390/ijerph182412985.
121. Silveira ML, Conway KP, Green VR, et al. Longitudinal associations between youth tobacco and substance use in waves 1 and 2 of the Population Assessment of Tobacco and Health (PATH) Study. *Drug Alcohol Depend.* 2018;191:25-36. doi:10.1016/j.drugalcdep.2018.06.018.
122. Dai Z, Wang K. The association between early onset of alcohol, smokeless tobacco and marijuana use with adult binge drinking in United States. *Sci Rep.* 2023;13(1):187. doi:10.1038/s41598-023-27571-x.

123. Falk DE, Yi H-y, Hiller-Sturmhöfel S. An epidemiologic analysis of co-occurring alcohol and tobacco use and disorders: findings from the National Epidemiologic Survey on Alcohol and Related Conditions. *Alcohol Res Health*. 2006;29(3):162-171.
124. Saha TD, Grant BF, Chou SP, Kerridge BT, Pickering RP, Ruan WJ. Concurrent use of alcohol with other drugs and DSM-5 alcohol use disorder comorbid with other drug use disorders: Sociodemographic characteristics, severity, and psychopathology. *Drug Alcohol Depend*. 2018;187:261-269. doi:10.1016/j.drugalcdep.2018.03.006.
125. Chou SP, Goldstein RB, Smith SM, et al. The epidemiology of DSM-5 nicotine use disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions-III. *J Clin Psychiatry*. 2016;77(10):1404-12. doi:10.4088/JCP.15m10114.
126. Grant BF, Goldstein RB, Saha TD, et al. Epidemiology of DSM-5 alcohol use disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions III. *JAMA Psychiatry*. 2015;72(8):757-66. doi:10.1001/jamapsychiatry.2015.0584.
127. Grant BF, Stinson FS, Dawson DA, et al. Prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry*. 2004;61(8):807-16. doi:10.1001/archpsyc.61.8.807.
128. Harrison EL, Desai RA, McKee SA. Nondaily smoking and alcohol use, hazardous drinking, and alcohol diagnoses among young adults: findings from the NESARC. *Alcohol Clin Exp Res*. 2008;32(12):2081-7. doi:10.1111/j.1530-0277.2008.00796.x.
129. Hasin DS, Stinson FS, Ogburn E, Grant BF. Prevalence, correlates, disability, and comorbidity of DSM-IV alcohol abuse and dependence in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry*. 2007;64(7):830-42. doi:10.1001/archpsyc.64.7.830.
130. Hingson RW, Zha W. Age of drinking onset, alcohol use disorders, frequent heavy drinking, and unintentionally injuring oneself and others after drinking. *Pediatr*. 2009;123(6):1477-84. doi:10.1542/peds.2008-2176.
131. Parker MA, Sigmon SC, Villanti AC. Higher smoking prevalence among United States adults with co-occurring affective and drug use diagnoses. *Addict Behav*. 2019;99:106112. doi:10.1016/j.addbeh.2019.106112.
132. Parker MA, Villanti AC. Relationship between comorbid drug use disorders, affective disorders, and current smoking. *Subst Use Misuse*. 2021;56(1):93-100. doi:10.1080/10826084.2020.1840591.
133. Smith PH, Chhipa M, Bystrick J, Roy J, Goodwin RD, McKee SA. Cigarette smoking among those with mental disorders in the U.S. population: 2012-2013 update. *Tob Control*. 2020;29(1):29-35. doi:10.1136/tobaccocontrol-2018-054268.
134. Roberts W, Moore KE, Peltier MR, Verplaetse TL, Oberleitner L, Hacker R, et al. Electronic cigarette use and risk of harmful alcohol consumption in the U.S. population. *Alcohol Clin Exp Res*. 2018;42(12):2385-93. doi:10.1111/acer.13889.
135. Cohn AM, Johnson AL, Rose SW, Pearson JL, Villanti AC, Stanton C. Population-level patterns and mental health and substance use correlates of alcohol, marijuana, and tobacco use and co-use in US young adults and adults: results from the population assessment for tobacco and health. *Am J Addict*. 2018;27(6):491-500. doi:10.1111/ajad.12766.
136. Weinberger AH, Pacek LR, Giovenco D, Galea S, Zvolensky MJ, Gbedemah M, Goodwin RD. Cigarette use among individuals with alcohol use disorders in the United States, 2002 to 2016: Trends overall and by race/ethnicity. *Alcohol Clin Exp Res*. 2019;43(1):79-90. doi:10.1111/acer.13922.
137. Pham H, Bui TC, Glass JE, Back SE, Le P. Trends in use of tobacco and cannabis across different alcohol consumption levels in the United States, 2010-19. *Alcohol Alcohol*. Nov 18 2024;60(1). doi:10.1093/alcalc/aga091.
138. Pacek LR, Sawdey MD, Nguyen KH, et al. Trends and associations of past-30-day cigar smoking in the U.S. by age, race/ethnicity, and sex, NSDUH 2002-2020. *Int J Environ Res Public Health*. 2023;20(18). doi:10.3390/ijerph20186716.
139. Osibogun O, Erinoso O, Gautam P, Bursac Z, Osibogun A. Marijuana use modifies the association between heavy alcohol consumption and tobacco use patterns among U.S. adults: findings from Behavioral Risk Factor Surveillance System, 2020. *Addict Behav*. 2022;135:107435. doi:10.1016/j.addbeh.2022.107435.
140. Jain V, Rifai MA, Naderi S, et al. Association of smokeless tobacco use with the use of other illicit drugs in the United States. *Am J Med*. 2021;134(1):e15-e19. doi:10.1016/j.amjmed.2020.05.034.
141. National Research Council. Investing in the health and well-being of young adults. 2015 [cited 2026 Mar 27]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK284787>.

142. Gubner NR, Delucchi KL, Ramo DE. Associations between binge drinking frequency and tobacco use among young adults. *Addict Behav.* 2016;60:191-196. doi:10.1016/j.addbeh.2016.04.019.
143. Sokolovsky AW, Rubenstein D, Gunn RL, White HR, Jackson KM. Associations of daily alcohol, cannabis, combustible tobacco, and e-cigarette use with same-day co-use and poly-use of the other substances. *Drug Alcohol Depend.* 2023;251:110922. doi:10.1016/j.drugalcdep.2023.110922.
144. Centers for Disease Control and Prevention. CDC museum COVID-19 timeline [Internet]. [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/museum/timeline/covid19.html>.
145. U.S Department of Health and Human Services. COVID-19 public health emergency [Internet]. [cited 2026 Mar 27]. Available from: <https://www.hhs.gov/coronavirus/covid-19-public-health-emergency/index.html>.
146. Centers for Disease Control and Prevention. COVID – Surveillance and Data Analytics [Internet]. [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/covid/php/surveillance/index.html>.
147. National Academy for State Health Policy. 2020 COVID-19 state restrictions, re-openings, and mask requirements [Internet]. [cited 2026 Mar 27]. Available from: <https://nashp.org/state-tracker/2020-covid-19-state-restrictions-re-openings-and-mask-requirements>.
148. National Academy for State Health Policy. 2021 COVID-19 state restrictions, re-openings, and mask requirements [Internet]. [cited 2026 Mar 27]. Available from: <https://nashp.org/state-tracker/2021-covid-19-state-restrictions-re-openings-and-mask-requirements>.
149. National Academy for State Health Policy. States' COVID-19 public health emergency declarations. [cited 2026 Mar 27]. Available from: <https://nashp.org/state-tracker/states-covid-19-public-health-emergency-declarations>.
150. Roman S, Cooke-Hull S, Dunfee M, Flaherty M, Haskell J, Holland V. The coronavirus pandemic's economic impact. 2022 [cited 2026 Mar 27]. Available from: <https://www2.census.gov/library/publications/2022/economics/coronavirus-pandemics-economic-impact.pdf>.
151. Tyson A, Lipka M, Deane C. 5 years later: America looks back at the impact of COVID-19. 2025 [cited 2026 Mar 27]. Available from: https://www.pewresearch.org/wp-content/uploads/sites/20/2025/02/PRC_2025.02.12_Covid-5-Year_REPORT.pdf.
152. Shiels MS, Haque AT, Haozous EA, et al. Racial and ethnic disparities in excess deaths during the COVID-19 pandemic, March to December 2020. *Ann Intern Med.* 2021;174(12):1693-1699. doi:10.7326/m21-2134.
153. Avena NM, Simkus J, Lewandowski A, Gold MS, Potenza MN. Substance use disorders and behavioral addictions during the COVID-19 pandemic and COVID-19-related restrictions. *Front Psychiatry.* 2021;12:653674. doi:10.3389/fpsyt.2021.653674.
154. Brooks JM, Patton C, Maroukel S, Perez AM, Levanda L. The differential impact of COVID-19 on mental health: Implications of ethnicity, sexual orientation, and disability status in the United States. *Front Psychol.* 2022;13:902094. doi:10.3389/fpsyg.2022.902094.
155. Parenteau AM, Boyer CJ, Campos LJ, et al. A review of mental health disparities during COVID-19: Evidence, mechanisms, and policy recommendations for promoting societal resilience. *Dev Psychopathol.* 2023;35(4):1821-1842. doi:10.1017/s0954579422000499.
156. Assistant Secretary for Planning and Evaluation. Issue paper - impact of the COVID-19 pandemic on major HHS data systems. [cited 2026 Mar 27]. Available from: <https://aspe.hhs.gov/sites/default/files/documents/20c83c3bba963a42d41db105c3dbe9ea/impact-of-pandemic-on-major-hhs-data-systems.pdf>.
157. Compton WM, Flannagan KSJ, Silveira ML, et al. Tobacco, alcohol, cannabis, and other drug use in the U.S. before and during the early phase of the COVID-19 pandemic. *JAMA Netw Open.* 2023;6(1):e2254566. doi:10.1001/jamanetworkopen.2022.54566.
158. Pelham WE, Tapert SF, Gonzalez MR, et al. Early adolescent substance use before and during the COVID-19 pandemic: a longitudinal survey in the ABCD study cohort. *J Adolesc Health.* 2021;69(3):390-397. doi:10.1016/j.jadohealth.2021.06.015.
159. Bandi P, Asare S, Majmundar A, et al. Changes in smoking cessation–related behaviors among US adults during the COVID-19 pandemic. *JAMA Network Open.* 2022;5(8):e2225149-e2225149. doi:10.1001/jamanetworkopen.2022.25149.
160. U.S. Census Bureau. S0101 - age and sex [Internet]. [cited 2026 Mar 27]. Available from: <https://data.census.gov/table/ACSST5Y2019.S0101?q=american%20community%20survey>.
161. Andreuccetti G, Carvalho HB, Ye Y, Bond J, Monteiro M, Borges G, Cherpitel CJ. Does beverage type and drinking context matter in an alcohol-related injury? Evidence from emergency department patients in Latin America. *Drug Alcohol Depend.* 2014;137:90-7. doi:10.1016/j.drugalcdep.2014.01.010.

162. Jiang N, Ling PM. Impact of alcohol use and bar attendance on smoking and quit attempts among young adult bar patrons. *Am J Public Health*. 2013;103(5):e53-61. doi:10.2105/ajph.2012.301014.
163. Nyaronga D, Greenfield TK, McDaniel PA. Drinking context and drinking problems among black, white, and Hispanic men and women in the 1984, 1995, and 2005 U.S. National Alcohol Surveys. *J Stud Alcohol Drugs*. 2009;70(1):16-26. doi:10.15288/jsad.2009.70.16.
164. Yang JJ, Lin HC, Ou TS, Tong Z, Li R, Piper ME, Buu A. The situational contexts and subjective effects of co-use of electronic cigarettes and alcohol among college students: an ecological momentary assessment (EMA) study. *Drug Alcohol Depend*. 2022;239:109594. doi:10.1016/j.drugalcdep.2022.109594.
165. Breslow RA, Graubard BI. Prospective study of alcohol consumption in the United States: quantity, frequency, and cause-specific mortality. *Alcohol Clin Exp Res*. 2008;32(3):1-9. doi:10.1111/j.1530-0277.2007.00595.x.
166. Kerr WC, Greenfield TK, Bond J, Ye Y, Rehm J. Racial and ethnic differences in all-cause mortality risk according to consumption patterns in the National Alcohol Surveys. *Am J Epidemiol*. 2011;174(7):769-778. doi:10.1093/aje/kwr147.
167. Tian Y, Liu J, Zhao Y, Jiang N, Liu X, Zhao G, Wang X. Alcohol consumption and all-cause and cause-specific mortality among US adults: prospective cohort study. *BMC Medicine*. 2023;21(1):208. doi:10.1186/s12916-023-02907-6.
168. Rehm J, Rovira P, Llamas-Falcón L, Shield KD. Dose-response relationships between levels of alcohol use and risks of mortality or disease, for all people, by age, sex, and specific risk factors. *Nutrients*. 2021;13(8). doi:10.3390/nu13082652.
169. Lemmens PH, Volovics L, Haan YD. Measurement of lifetime exposure to alcohol: data quality of a self-administered questionnaire and impact on risk assessment. *Contemp Drug Probl*. 1997;24(3):581-600.
170. Weinberger AH, Streck JM, Pacek LR, Goodwin RD. Nondaily cigarette smoking is increasing among people with common mental health and substance use problems in the United States: data from representative samples of U.S. adults, 2005-2014. *J Clin Psychiatry*. 2018;79(5). doi:10.4088/JCP.17m11945.
171. Subbaraman MS, Kerr WC. Simultaneous versus concurrent use of alcohol and cannabis in the National Alcohol Survey. *Alcohol Clin Exp Res*. 2015;39(5):872-879. doi:10.1111/acer.12698.
172. Alcohol Research Group. 2014-15 National Alcohol Survey (N13). 2016 [cited 2026 Mar 27]. Available from: https://arg.org/wp-content/uploads/2016/10/N13_Questionnaire_FINAL-from-ICF_not-searchable-Rev.pdf.
173. Bureau of Labor Statistics. National Longitudinal Surveys - NLSY97 - topical guide to the data - crime & substance use - cigarette use. [cited 2026 Mar 27]. Available from: <https://www.nlsinfo.org/content/cohorts/nlsy97/topical-guide/crime/cigarette-use>.
174. Bureau of Labor Statistics. National Longitudinal Surveys – NLSY97 - topical guide to the data – crime & substance use – alcohol use. [cited 2026 Mar 27]. Available from: <https://www.nlsinfo.org/content/cohorts/nlsy97/topical-guide/crime/alcohol-use>.
175. Bureau of Labor Statistics. Questionnaire public report – self-administered questionnaire – part 1 – National Longitudinal Survey of Youth 1997. 2024 [cited 2026 Mar 27]. Available from: <https://www.nlsinfo.org/sites/default/files/attachments/17036/NLSY97R17SAQ.html>.
176. Bureau of Labor Statistics. National Longitudinal Surveys - NLS FAQs. [cited 2026 Mar 27]. Available from: <https://www.bls.gov/nls/questions-and-answers.htm>.
177. Bureau of Labor Statistics. National Longitudinal Surveys - NLS cohorts (active). [cited 2026 Mar 27]. Available from: <https://www.bls.gov/nls/cohorts.htm>.
178. Centers for Disease Control and Prevention. Behavioral risk factor surveillance system - history. [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/brfss/factsheets/pdf/brfss-history.pdf>.
179. Centers for Disease Control and Prevention. About the National Health Interview Survey. [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/nchs/nhis/about/>.
180. Centers for Disease Control and Prevention. National Health Interview Survey alcohol topics for adults, by year. [cited 2026 Mar 27]. Available from: https://archive.cdc.gov/#/details?q=https://www.cdc.gov/nchs/data/nhis/alcohol/Alcohol_Topics_1977-2017.pdf&start=0&rows=10&url=https://www.cdc.gov/nchs/data/nhis/alcohol/Alcohol_Topics_1977-2017.pdf.
181. Centers for Disease Control and Prevention. National Health Interview Survey tobacco topics for adults, by year. [cited 2026 Mar 27]. Available from: https://archive.cdc.gov/#/details?url=https://www.cdc.gov/nchs/data/nhis/tobacco/TobHistTopics_65_forward.pdf.

182. Centers for Disease Control and Prevention. National Health Interview Survey - NHIS sample adult and child questionnaires. [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/nchs/data/nhis/Sample-Questionnaire-Brochure.pdf>.
183. Centers for Disease Control and Prevention. 2022 National Health Interview (NHIS) questionnaire. [cited 2026 Mar 27]. Available from: https://ftp.cdc.gov/pub/Health_Statistics/NCHS/Survey_Questionnaires/NHIS/2022/EnglishQuest-508.pdf.
184. Centers for Disease Control and Prevention. 2020 National Health Interview Survey (NHIS) questionnaire. [cited 2026 Mar 27]. Available from: https://ftp.cdc.gov/pub/Health_Statistics/NCHS/Survey_Questionnaires/NHIS/2020/EnglishQuest-508.pdf.
185. Centers for Disease Control and Prevention. About the National Health and Nutrition Examination Survey [Internet]. [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/nchs/nhanes/about/>.
186. Centers for Disease Control and Prevention. National Health and Nutrition Examination Survey: 1999-2022 survey content brochure. [cited 2026 Mar 27]. Available from: https://wwwn.cdc.gov/nchs/data/nhanes/survey_contents.pdf.
187. Centers for Disease Control and Prevention. Questionnaire data - continuous NHANES. [cited 2026 Mar 27]. Available from: <https://wwwn.cdc.gov/nchs/nhanes/search/datapage.aspx?Component=Questionnaire>.
188. Centers for Disease Control and Prevention. The BRFSS data user guide. [cited 2026 Mar 27]. Available from: https://www.cdc.gov/brfss/data_documentation/pdf/UserguideJune2013.pdf.
189. Centers for Disease Control and Prevention. National Health Interview Survey - overview of tobacco-related topics. [cited 2026 Mar 27]. Available from: https://archive.cdc.gov/#/details?url=https://www.cdc.gov/nchs/nhis/tobacco/tobacco_overview.htm.
190. Centers for Disease Control and Prevention. National Health Interview Survey - overview of alcohol-related topics. [cited 2026 Mar 27]. Available from: https://archive.cdc.gov/#/details?url=https://www.cdc.gov/nchs/nhis/alcohol/alcohol_overview.htm.
191. Centers for Disease Control and Prevention. National Youth Tobacco Survey (NYTS). [cited 2026 Mar 27]. Available from: https://web.archive.org/web/20240205051609/https://www.cdc.gov/tobacco/data_statistics/surveys/nyts/index.htm.
192. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System - survey data & documentation. [cited 2026 Mar 27]. Available from: https://www.cdc.gov/brfss/data_documentation/index.htm.
193. Centers for Disease Control and Prevention. 2022 BRFSS questionnaire. [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/brfss/questionnaires/pdf-ques/2022-BRFSS-Questionnaire-508.pdf>.
194. Centers for Disease Control and Prevention. YRBS questionnaire content 1991-2023. [cited 2026 Mar 27]. Available from: https://web.archive.org/web/20260319121615/https://www.cdc.gov/yrbs/files/2021/pdf/YRBS_Questionnaire_Content_1991-2023_508.pdf.
195. Centers for Disease Control and Prevention. Pregnancy Risk Assessment Monitoring System (PRAMS) - phase 9 core mail questionnaire - English. [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/prams/pdf/questionnaire/Phase-9-Core-Questionnaire-508.pdf>.
196. Centers for Disease Control and Prevention. About historical NYTS data and documentation. [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/tobacco/about-data/surveys/historical-nyts-data-and-documentation.html>.
197. Centers for Disease Control and Prevention. About surveys on alcohol use in the United States. [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/alcohol/about-data/surveillance-surveys>.
198. Centers for Disease Control and Prevention. About YRBSS. [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/healthyyouth/data/yrbs/overview.htm>.
199. Centers for Disease Control and Prevention. PRAMS questionnaires. [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/prams/php/questionnaires>.
200. Centers for Disease Control and Prevention. Pregnancy Risk Assessment Monitoring System (PRAMS) - data methodology [Internet]. [cited 2026 Mar 27]. Available from: https://www.cdc.gov/prams/php/methodology/?CDC_AAref_Val=https://www.cdc.gov/prams/methodology.htm.
201. Hyland A, Ambrose BK, Conway KP, et al. Design and methods of the Population Assessment of Tobacco and Health (PATH) Study. *Tob Control*. 2017;26(4):371-378. doi:10.1136/tobaccocontrol-2016-052934.

202. Inter-university Consortium for Political and Social Research. Methodology for the PATH study data tables and figures: waves 1-5 (2013-2019). [cited 2026 Mar 27]. Available from: <https://www.icpsr.umich.edu/files/NAHDAP/pathstudy/Methodology-PATH-TablesFigures-Waves1-5.pdf>.
203. Inter-university Consortium for Political and Social Research. Population Assessment of Tobacco and Health (PATH) Study [United States] public-use files (ICPSR 36498). [cited 2026 Mar 27]. Available from: <https://www.icpsr.umich.edu/web/NAHDAP/studies/36498/summary>.
204. Inter-university Consortium for Political and Social Research. Monitoring the Future: a continuing study of american youth (12th-grade survey), 2022 – BY22 subject area key and cross-time index (ICPSR 38882). [cited 2026 Mar 27]. Available from: https://www.icpsr.umich.edu/files/NAHDAP/documentation/doc38882-all_BY22_CrossTimeIndex.pdf.
205. Inter-university Consortium for Political and Social Research. Monitoring the Future: a continuing study of american youth (8th- and 10th-grade surveys), 2022 – BX22 subject area key and cross-time index (ICPSR 38883). [cited 2026 Mar 27]. Available from: https://www.icpsr.umich.edu/files/NAHDAP/documentation/doc38883-0001_BX22_CrossTimeIndex.pdf.
206. Inter-university Consortium for Political and Social Research. Population Assessment of Tobacco and Health (PATH) Study [United States] public-use files - ICPSR codebook for wave 4: adult questionnaire data. [cited 2026 Mar 27]. Available from: <https://www.icpsr.umich.edu/web/NAHDAP/studies/36498/datadocumentation>.
207. Inter-university Consortium for Political and Social Research. Population Assessment of Tobacco and Health (PATH) Study [United States] public-use files - ICPSR codebook for wave 6: adult questionnaire data. [cited 2026 Mar 27]. Available from: <https://www.icpsr.umich.edu/web/NAHDAP/studies/36498/datadocumentation>.
208. National Cancer Institute. All HINTS questions. [cited 2026 Mar 27]. Available from: <https://hints.cancer.gov/view-questions/all-hints-questions.aspx>.
209. National Cancer Institute. TUS data harmonization table. [cited 2026 Mar 27]. Available from: <https://cancercontrol.cancer.gov/sites/default/files/2021-06/TUS-CPS%201992-2019%20Codebook-508.pdf>.
210. National Cancer Institute. It starts by asking the right questions. [cited 2026 Mar 27]. Available from: https://hints.cancer.gov/docs/Hints_Factsheet_2023.pdf.
211. National Cancer Institute. TUS-CPS survey topics. [cited 2026 Mar 27]. Available from: <https://cancercontrol.cancer.gov/brp/tcrb/tus-cps/survey-topics>.
212. National Cancer Institute. TUS-CPS frequently asked questions. [cited 2026 Mar 27]. Available from: <https://cancercontrol.cancer.gov/brp/tcrb/tus-cps/frequently-asked-questions>.
213. National Institute on Alcohol Abuse and Alcoholism. NESARC-III - questionnaire. [cited 2026 Mar 27]. Available from: <https://www.niaaa.nih.gov/research/nesarc-iii/questionnaire>.
214. National Institute on Alcohol Abuse and Alcoholism. Alcohol epidemiologic data directory. [cited 2026 Mar 27]. Available from: <https://www.niaaa.nih.gov/sites/default/files/2022Data-Directory.pdf>.
215. National Institute on Drug Abuse. PATH study data access. [cited 2026 Mar 27] Available from: <https://nida.nih.gov/research/nida-research-programs-activities/population-assessment-tobacco-health-path-study/data-access>.
216. Office of Disease Prevention and Health Promotion. Tobacco Use Supplement to the Current Population Survey (TUS-CPS). [cited 2026 Mar 27]. Available from: <https://health.gov/healthypeople/objectives-and-data/data-sources-and-methods/data-sources/tobacco-use-supplement-current-population-survey-tus-cps>.
217. Office on Smoking and Health. National Youth Tobacco Survey (NYTS) 2020 questionnaire. [cited 2026 Mar 27]. Available from: https://www.cdc.gov/tobacco/data_statistics/surveys/nyts/pdfs/2020/2020-NYTS-Questionnaire-508.pdf.
218. Office on Smoking and Health. National Youth Tobacco Survey (NYTS) 2021 questionnaire. [cited 2026 Mar 27]. Available from: https://www.cdc.gov/tobacco/data_statistics/surveys/nyts/pdfs/2022-NYTS-Questionnaire-508.pdf.
219. Office on Smoking and Health. 2022 National Youth Tobacco Survey: methodology report. [cited 2026 Mar 27]. Available from: https://www.cdc.gov/tobacco/data_statistics/surveys/nyts/pdfs/2022-NYTS-Public-Use-Methods-Report-508.pdf.
220. Office on Smoking and Health. National Youth Tobacco Survey (NYTS) 2022 questionnaire. [cited 2026 Mar 27]. Available from: https://www.cdc.gov/tobacco/data_statistics/surveys/nyts/pdfs/2022-NYTS-Public-Use-Methods-Report-508.pdf.
221. Piesse A, Opsomer J, Dohrmann S, et al. Longitudinal uses of the Population Assessment of Tobacco and Health Study. *Tob Regul Sci*. 2021;7(1):3-16. doi:10.18001/trs.7.1.1.

222. Substance Abuse and Mental Health Services Administration. PUF variable crosswalk chart: 2021-2024 (xlsx). [cited 2026 Mar 27]. Available from: https://www.samhsa.gov/data/sites/default/files/2025-12/PUFComparability_2024.xlsx.
223. Substance Abuse and Mental Health Services Administration. PUF variable crosswalk chart: 2019 and prior (xlsx). [cited 2026 Mar 27]. Available from: https://www.samhsa.gov/data/sites/default/files/variable-crosswalk/ConcatPUFComparability_2019.xlsx.
224. University of Michigan. Supplementary tables and figures. [cited 2026 Mar 27]. Available from: <https://monitoringthefuture.org/results/data-access/tables-and-figures>.
225. University of North Carolina (UNC) Carolina Population Center. About Add Health. [cited 2026 Mar 27]. Available from: <https://addhealth.cpc.unc.edu/about/#additional-add-health-data>.
226. University of North Carolina (UNC) Carolina Population Center. Add Health - study design. [cited 2026 Mar 27]. Available from: <https://addhealth.cpc.unc.edu/documentation/study-design>.
227. University of North Carolina (UNC) Carolina Population Center. Add Health Codebook Explorer (ACE). [cited 2026 Mar 27]. Available from: <https://addhealth.cpc.unc.edu/documentation/codebook-explorer/#/>.
228. University of Michigan. About MTF. [cited 2026 Mar 27]. Available from: <https://monitoringthefuture.org/about>.
229. Lee Y, Shin M, Kweon S, et al. Cumulative smoking exposure, duration of smoking cessation, and peripheral arterial disease in middle-aged and older Korean men. *BMC Public Health*. 2011;11:94. doi:10.1186/1471-2458-11-94.
230. Substance Abuse and Mental Health Services Administration. 2019 National Survey on Drug Use and Health (NSDUH): methodological summary and definitions - NSDUH methodological report. [cited 2026 Mar 27]. Available from: <https://www.samhsa.gov/data/sites/default/files/reports/rpt29395/2019NSDUHMethodsSummDefs/2019NSDUHMethodsSummDefs082120.pdf>.