

Prevalence of 12-Month Alcohol Use, High-Risk Drinking, and *DSM-IV* Alcohol Use Disorder in the United States, 2001-2002 to 2012-2013

Results From the National Epidemiologic Survey on Alcohol and Related Conditions

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IMPORTANCE Lack of current and comprehensive trend data derived from a uniform, reliable, and valid source on alcohol use, high-risk drinking, and *DSM-IV* alcohol use disorder (AUD) represents a major gap in public health information.

OBJECTIVE To present nationally representative data on changes in the prevalences of 12-month alcohol use, 12-month high-risk drinking, 12-month *DSM-IV* AUD, 12-month *DSM-IV* AUD among 12-month alcohol users, and 12-month *DSM-IV* AUD among 12-month high-risk drinkers between 2001-2002 and 2012-2013.

DESIGN, SETTING, AND PARTICIPANTS The study data were derived from face-to-face interviews conducted in 2 nationally representative surveys of US adults: the National Epidemiologic Survey on Alcohol and Related Conditions, with data collected from April 2001 to June 2002, and the National Epidemiologic Survey on Alcohol and Related Conditions III, with data collected from April 2012 to June 2013. Data were analyzed in November and December 2016.

MAIN OUTCOMES AND MEASURES Twelve-month alcohol use, high-risk drinking, and *DSM-IV* AUD.

RESULTS The study sample included 43 093 participants in the National Epidemiologic Survey on Alcohol and Related Conditions and 36 309 participants in the National Epidemiologic Survey on Alcohol and Related Conditions III. Between 2001-2002 and 2012-2013, 12-month alcohol use, high-risk drinking, and *DSM-IV* AUD increased by 11.2%, 29.9%, and 49.4%, respectively, with alcohol use increasing from 65.4% (95% CI, 64.3%-66.6%) to 72.7% (95% CI, 71.4%-73.9%), high-risk drinking increasing from 9.7% (95% CI, 9.3%-10.2%) to 12.6% (95% CI, 12.0%-13.2%), and *DSM-IV* AUD increasing from 8.5% (95% CI, 8.0%-8.9%) to 12.7% (95% CI, 12.1%-13.3%). With few exceptions, increases in alcohol use, high-risk drinking, and *DSM-IV* AUD between 2001-2002 and 2012-2013 were also statistically significant across sociodemographic subgroups. Increases in all of these outcomes were greatest among women, older adults, racial/ethnic minorities, and individuals with lower educational level and family income. Increases were also seen for the total sample and most sociodemographic subgroups for the prevalences of 12-month *DSM-IV* AUD among 12-month alcohol users from 12.9% (95% CI, 12.3%-17.5%) to 17.5% (95% CI, 16.7%-18.3%) and 12-month *DSM-IV* AUD among 12-month high-risk drinkers from 46.5% (95% CI, 44.3%-48.7%) to 54.5% (95% CI, 52.7%-56.4%).

CONCLUSIONS AND RELEVANCE Increases in alcohol use, high-risk drinking, and *DSM-IV* AUD in the US population and among subgroups, especially women, older adults, racial/ethnic minorities, and the socioeconomically disadvantaged, constitute a public health crisis. Taken together, these findings portend increases in many chronic comorbidities in which alcohol use has a substantial role.

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Alcohol use and specifically high-risk drinking, which often leads to alcohol use disorder (AUD), are significant contributors to the burden of disease in the United States and worldwide.¹⁻⁷ High-risk drinking and AUD are important risk factors for morbidity and mortality from fetal alcohol spectrum disorders,⁸ hypertension,⁹ cardiovascular diseases,¹⁰⁻¹⁵ stroke,¹⁶ liver cirrhosis,^{17,18} several types of cancer¹⁹⁻²³ and infections,²⁴⁻²⁶ pancreatitis,^{27,28} type 2 diabetes,²⁹ and various injuries.³⁰ High-risk drinking and AUD are disabling,^{31,32} are associated with numerous psychiatric comorbidities^{33,34} and impaired productivity and interpersonal functioning, and place psychological and financial burdens on society as a whole and on those who misuse alcohol, their families, friends, and coworkers,³⁵⁻³⁷ as well as through motor vehicle crashes, violence, and property crime.^{38,39}

In view of the seriousness of the numerous physical and psychiatric harms of high-risk drinking and AUD, regular and detailed monitoring of their trends over time is imperative for the health of the nation. Historically, reliable national survey data on alcohol use, high-risk drinking, and AUD were not available before the early 1970s.⁴⁰ The few national trend surveys conducted between the early 1970s to the early 1990s showed stability or decreases in trends for 12-month alcohol use, various measures of high-risk drinking, and social consequence and alcohol dependence symptoms.⁴¹⁻⁴⁴ Between the early 1990s and the early 2000s, 12-month alcohol consumption increased from 44.0%⁴⁵ to 65.4%,⁴⁶ 12-month high-risk drinking increased from approximately 8.0%^{47,48} to 9.7%,⁴⁹ and DSM-IV⁵⁰ AUD increased from 7.4%⁴⁵ to 8.5%.³²

Lack of current and comprehensive trend data derived from a uniform source on alcohol use, high-risk drinking, and DSM-IV AUD since the early 2000s represents a major gap in public health information. Tracking patterns of alcohol consumption and AUD is essential to test temporal models of alcohol consumption behaviors and alcohol-related morbidity and mortality and to estimate the effectiveness of policy changes related to alcohol use (eg, taxes and treatment entitlements). Furthermore, monitoring of alcohol consumption patterns and AUD over time within important sociodemographic subgroups of the US population is critical for planning and targeting prevention and intervention programs.

Accordingly, this study presents data for 2001-2002 and 2012-2013 on the prevalences of 12-month alcohol use, high-risk drinking (defined as exceeding the daily drinking guidelines at least weekly in the past 12 months), and 12-month DSM-IV AUD overall and among important sociodemographic subgroups of the US population. We used data from the National Institute on Alcohol Abuse and Alcoholism's 2001-2002 Wave 1 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC)⁵¹ and 2012-2013 NESARC-III.⁵²

Methods

Sample

The 2012-2013 NESARC-III is a nationally representative, face-to-face interview survey of 36 309 US adults 18 years and older

Key Points

Question Have the 12-month prevalences of alcohol use, high-risk drinking, and DSM-IV alcohol use disorder increased between 2001-2002 and 2012-2013?

Findings In this study of data from face-to-face interviews conducted in 2 nationally representative surveys of US adults, including the National Epidemiologic Survey on Alcohol and Related Conditions (n = 43 093) and the National Epidemiologic Survey on Alcohol and Related Conditions III (n = 36 309), 12-month alcohol use (11.2%), high-risk drinking (29.9%), and DSM-IV alcohol use disorder (49.4%) increased for the total US population and, with few exceptions, across sociodemographic subgroups.

Meaning Substantial increases in alcohol use, high-risk drinking, and DSM-IV alcohol use disorder constitute a public health crisis and portend increases in chronic disease comorbidities in the United States, especially among women, older adults, racial/ethnic minorities, and the socioeconomically disadvantaged.

residing in households and selected group quarters,⁵² with respondents selected through multistage probability sampling. The data were collected from April 2012 to June 2013. Primary sampling units were counties or groups of contiguous counties, secondary sampling units were groups of US Census-defined blocks, and tertiary sampling units were households within sampled secondary sampling units within which eligible adult respondents were selected, with black, Asian or Pacific Islander, and Hispanic individuals oversampled. The household response rate was 72.0%, the person-level response rate was 84.0%, and the overall response rate was 60.0%, which were comparable with other current US national surveys.^{53,54} Data were adjusted for oversampling and nonresponse and were weighted to represent the US civilian population based on the 2012 American Community Survey.⁵⁵ Weighting adjustment compensated for nonresponse.⁵² Informed consent was electronically recorded, and respondents received \$90 for participation. The Combined Neuroscience Institutional Review Board of the National Institutes of Health and Westat Institutional Review Board approved the protocol and informed consent procedures.

The 2001-2002 NESARC was a nationally representative, face-to-face interview survey of 43 093 US adults, described elsewhere in detail.⁵¹ The data were collected from April 2001 to June 2002. The target population was the US adult population 18 years and older residing in households and selected group quarters. Primary sampling units consisted of counties or county equivalents from which eligible adults were selected, with black and Hispanic individuals, and young adults oversampled. The sampling frame response rate was 98.5%, the household response rate was 88.5%, and the person response rate was 93.0%, yielding an overall survey response rate of 81.0%. Data were adjusted for oversampling and nonresponse and were weighted to represent the civilian US population based on the 2000 Decennial Census.⁵⁶ The survey protocol, including written informed consent procedures, received full ethical review and approval from the US Census Bureau and the US Office of Management and Budget.

Assessments

The Alcohol Use Disorder and Associated Disabilities Interview Schedule–DSM-IV Version (AUDADIS-IV)⁵⁷ used in NESARC and the AUDADIS Fifth Edition Version⁵⁸ used in NESARC-III assessed any 12-month alcohol use with identical questions. Consistent with the US dietary guidelines,^{59,60} high-risk drinking was defined as drinking 4 or more standard drinks (a drink equals 14 g of pure alcohol) on any day for women and as drinking 5 or more standard drinks on any day for men. In this study, high-risk drinking was defined as exceeding the daily drinking limits at least weekly during the prior 12 months.

An individual was considered to have a DSM-IV AUD diagnosis if the respondent met criteria for alcohol dependence or abuse in the past 12 months. A diagnosis of dependence required 3 or more of the 7 DSM-IV dependence criteria, and a diagnosis of abuse required 1 or more of the 4 abuse criteria. Respondents with a 12-month abuse or dependence diagnosis were classified as having 12-month AUD.

Symptom items that assessed DSM-IV AUD diagnoses in NESARC and NESARC-III were virtually identical. However, 3 items were slightly reworded, and 3 additional abuse questions appeared in NESARC-III. Comparisons between DSM-IV 12-month AUD diagnoses with and without the additional questions yielded almost identical prevalences (8.5% and 8.2%, respectively, for NESARC and 12.7% and 12.2%, respectively, for NESARC-III), with near-perfect concordance ($\kappa = 0.97$ for NESARC and $\kappa = 0.98$ for NESARC-III), which suggested that trivial differences between AUD operationalizations were not responsible for the changes reported herein.

The test-retest reliability and validity of AUDADIS alcohol use, high-risk drinking, and DSM-IV AUD diagnoses are documented in clinical and general population national and international studies.⁶¹⁻⁷¹ The reliability and validity of alcohol use, high-risk drinking, and DSM-IV AUD and their associated criteria scales were fair to excellent.

Statistical Analysis

Data were analyzed in November and December 2016. Weighted cross-tabulations estimated the prevalence of alcohol use, high-risk drinking, and DSM-IV AUD in the total sample and in subgroups. For 2001-2002 and 2012-2013, the prevalences of 12-month DSM-IV AUD among 12-month alcohol users and 12-month DSM-IV AUD among 12-month high-risk drinkers were also examined. To account for the complex sample design of NESARC and NESARC-III, a software program (SUDAAN, version 11.0; Research Triangle Institute⁷²) was used to produce standard errors of the prevalence estimates for each survey. These data were used to test differences in prevalences between the surveys using 2-sided *t* tests for independent samples. *P* < .05 indicated significant differences in the estimates between surveys.

Results

12-Month Alcohol Use

Twelve-month alcohol use significantly increased from 65.4% in 2001-2002 to 72.7% in 2012-2013, a relative percentage in-

crease of 11.2% (Table 1). Significant increases, seen across all sociodemographic subgroups, were particularly notable among women (15.8%), racial/ethnic minorities (from 17.2% among Hispanic to 29.1% among Asian or Pacific Islander individuals), adults 65 years and older (22.4%), and respondents with lower educational level and family income (range, 11.7%-22.3%).

12-Month High-Risk Drinking

The prevalence of 12-month high-risk drinking increased significantly between 2001-2002 and 2012-2013 from 9.7% to 12.6% (change, 29.9%) in the total population (Table 2). Significant increases in high-risk drinking were also seen for all sociodemographic subgroups except Native Americans and respondents residing in rural areas. Increases were most notable among women (57.9%), other racial/ethnic minorities (from 40.6% among Hispanic to 62.4% among black individuals), adults 65 years and older (65.2%), persons previously married (widowed, divorced, or separated) (31.9%) and married or cohabitating respondents (34.2%), those with a high school education (42.3%) and less than a high school education (34.7%), those earning incomes of \$19 999 or less (35.1%), and those residing in urban areas (35.1%).

12-Month DSM-IV AUD

The prevalence of 12-month DSM-IV AUD increased significantly from 8.5% to 12.7% (change, 49.4%) in the total population (Table 3). Significant increases in AUD were seen in all subgroups except Native Americans and those residing in rural areas. Notable increases were found among women (83.7%), racial/ethnic minorities (51.9% for Hispanic and 92.8% for black individuals), adults 65 years and older (106.7%), those with a high school education (57.8%) and less than a high school education (48.6%), those earning incomes of \$20 000 or less (65.9%), those living within 200% of the poverty threshold (range, 47.1%-55.8%), and those residing in urban areas (59.5%).

12-Month DSM-IV AUD Among 12-Month Alcohol Users

Twelve-month DSM-IV AUD among 12-month alcohol users significantly increased from 12.9% to 17.5% (change, 35.7%) in the total population (Table 4). Increases were significant during this time for all subgroups except Native Americans, respondents who were previously married, and those residing in rural areas. Notable increases were found among women (59.8%), those who were black (55.8%), Asian or Pacific Islander (36.2%), or Hispanic (29.5%), adults aged 45 to 64 years (61.9%) and 65 years and older (75.0%), those who were married or cohabiting (45.1%), those who had a high school education (41.2%), and those who resided in urban areas (44.8%).

12-Month DSM-IV AUD Among 12-Month High-Risk Drinkers

Twelve-month DSM-IV AUD among 12-month high-risk drinkers increased 17.2% from 46.5% in 2001-2002 to 54.5% in 2012-2013 (Table 5). Increases were significant for all sociodemographic subgroups except Native American, Asian or Pacific Islander, previously married respondents, those with less than a high school education, and those residing in rural areas, the

Table 1. Prevalence of and Percentage Change in 12-Month Alcohol Use by Sociodemographic Characteristics, 2001-2002 and 2012-2013

| Sociodemographic Characteristic | % (95% CI) | | % Change |
|---------------------------------|----------------------------------|---|----------|
| | NESARC 2001-2002 (n = 43 093) | NESARC-III 2012-2013 (n = 36 309) ^a | |
| Total | 65.4 (64.3-66.6) | 72.7 (71.4-73.9) | 11.2 |
| Sex | | | |
| Men | 71.8 (70.6-73.0) | 76.7 (75.5-77.9) | 6.8 |
| Women | 59.6 (58.0-61.1) | 69.0 (67.5-70.5) | 15.8 |
| Race/ethnicity | | | |
| White | 69.5 (68.2-70.8) | 75.3 (73.7-76.9) | 8.3 |
| Black | 53.2 (51.6-54.9) | 66.1 (63.8-68.3) | 24.2 |
| Native American | 58.2 (53.0-63.4) | 73.9 (69.1-78.1) | 27.0 |
| Asian or Pacific Islander | 48.4 (44.3-52.5) | 62.5 (59.4-65.5) | 29.1 |
| Hispanic | 59.9 (58.1-61.7) | 70.2 (68.8-71.7) | 17.2 |
| Age, y | | | |
| 18-29 | 73.1 (71.5-74.7) | 80.1 (78.8-81.3) | 9.6 |
| 30-44 | 71.9 (70.4-73.4) | 79.5 (78.1-80.8) | 10.6 |
| 45-64 | 64.3 (62.9-65.7) | 71.9 (70.3-73.5) | 11.8 |
| ≥65 | 45.1 (43.4-46.8) | 55.2 (52.8-57.6) | 22.4 |
| Marital status | | | |
| Married or cohabiting | 66.3 (65.0-67.6) | 73.1 (71.6-74.5) | 10.3 |
| Widowed, divorced, or separated | 56.8 (55.3-58.3) | 67.2 (65.4-68.9) | 18.3 |
| Never married | 70.1 (68.5-71.7) | 76.6 (75.1-78.0) | 9.3 |
| Educational level | | | |
| Less than high school | 46.4 (44.8-47.9) | 55.8 (53.5-58.1) | 20.3 |
| High school | 60.9 (59.5-62.3) | 68.0 (66.5-69.5) | 11.7 |
| Some college or higher | 73.3 (72.1-74.5) | 78.3 (77.1-79.5) | 6.8 |
| Family income, \$ | | | |
| 0-19 999 | 52.4 (51.1-53.6) | 64.1 (62.2-65.9) | 22.3 |
| 20 000-34 999 | 61.0 (59.5-62.4) | 68.5 (66.8-70.1) | 12.3 |
| 35 000-69 999 | 68.1 (66.7-69.4) | 73.4 (71.8-74.9) | 7.8 |
| ≥70 000 | 78.4 (76.8-80.0) | 81.0 (79.5-82.4) | 3.3 |
| Poverty threshold, % | | | |
| <100 | 52.1 (50.4-53.9) | 64.3 (62.5-66.0) | 23.4 |
| 100-200 | 55.2 (53.8-56.6) | 66.4 (64.4-68.3) | 20.3 |
| >200 | 71.3 (70.0-72.5) | 77.8 (76.5-79.0) | 9.1 |
| Urbanicity | | | |
| Urban | 67.2 (65.8-68.5) | 74.0 (72.9-75.1) | 10.1 |
| Rural | 58.4 (56.5-60.2) | 67.9 (64.8-70.9) | 16.3 |
| Region | | | |
| Northeast | 70.9 (67.2-74.4) | 77.1 (75.3-78.9) | 8.7 |
| Midwest | 69.9 (68.4-71.4) | 76.5 (74.5-78.5) | 9.4 |
| South | 59.0 (57.2-60.7) | 68.2 (66.0-70.4) | 15.6 |
| West | 66.1 (63.5-68.7) | 72.9 (69.8-75.7) | 10.3 |

Abbreviation: NESARC, National Epidemiologic Survey on Alcohol and Related Conditions.

^a $P < .05$ for all comparisons for 2001-2002 compared with 2012-2013.

Northeast, and the Midwest. Notable increases were seen for women (34.7%), those who were black (25.7%) or Hispanic (16.8%), respondents aged 45 to 64 years (34.8%) and 65 years and older (58.1%), and those residing in urban areas (21.1%).

Discussion

Between 2001-2002 and 2012-2013, the 12-month prevalence of alcohol use increased 11.2% in the United States from

65.4% to 72.7%. High-risk drinking increased almost 30% from 9.7% to 12.6%, representing approximately 20.2 million and 29.6 million Americans, respectively. There was a 49.4% increase in 12-month DSM-IV AUD during this time from 8.5% to 12.7% (representing approximately 17.6 million and 29.9 million Americans, respectively), much greater than the corresponding 14.8% increase in DSM-IV AUD observed between 1991-1992 (7.4%) and 2001-2002 (8.5%).⁷³ While the prevalences of AUD among both 12-month alcohol users and 12-month high-risk drinkers increased, the prevalence of AUD

Table 2. Prevalence of and Percentage Change in 12-Month High-Risk Drinking by Sociodemographic Characteristics, 2001-2002 and 2012-2013

| Sociodemographic Characteristic | % (95% CI) | | % Change |
|---------------------------------|----------------------------------|--------------------------------------|----------|
| | NESARC 2001-2002 (n = 43 093) | NESARC-III 2012-2013 (n = 36 309) | |
| Total | 9.7 (9.3-10.2) | 12.6 (12.0-13.2) ^a | 29.9 |
| Sex | | | |
| Men | 14.2 (13.4-14.9) | 16.4 (15.7-17.3) ^a | 15.5 |
| Women | 5.7 (5.3-6.1) | 9.0 (8.4-9.7) ^a | 57.9 |
| Race/ethnicity | | | |
| White | 10.0 (9.6-10.5) | 12.3 (11.6-13.0) ^a | 23.0 |
| Black | 9.3 (8.4-10.4) | 15.1 (14.0-16.2) ^a | 62.4 |
| Native American | 12.4 (9.6-15.8) | 17.4 (13.6-22.1) | 40.3 |
| Asian or Pacific Islander | 4.6 (3.5-6.0) | 7.2 (6.0-8.8) ^a | 56.5 |
| Hispanic | 9.6 (8.8-10.6) | 13.5 (12.5-14.6) ^a | 40.6 |
| Age, y | | | |
| 18-29 | 16.9 (15.7-18.2) | 19.3 (18.0-20.6) ^a | 14.2 |
| 30-44 | 10.8 (10.1-11.6) | 14.8 (14.0-15.7) ^a | 37.0 |
| 45-64 | 7.5 (6.9-8.2) | 11.2 (10.5-12.1) ^a | 49.3 |
| ≥65 | 2.3 (1.9-2.8) | 3.8 (3.2-4.4) ^a | 65.2 |
| Marital status | | | |
| Married or cohabiting | 7.3 (6.8-7.8) | 9.8 (9.2-10.5) ^a | 34.2 |
| Widowed, divorced, or separated | 9.1 (8.3-9.9) | 12.0 (11.1-13.0) ^a | 31.9 |
| Never married | 17.4 (16.3-18.6) | 20.3 (19.1-21.5) ^a | 16.7 |
| Educational level | | | |
| Less than high school | 9.5 (8.5-10.6) | 12.8 (11.6-14.0) ^a | 34.7 |
| High school | 10.4 (9.6-11.1) | 14.8 (13.9-15.9) | 42.3 |
| Some college or higher | 9.5 (9.0-10.0) | 11.6 (10.9-12.4) | 22.1 |
| Family income, \$ | | | |
| 0-19 999 | 11.1 (10.3-12.0) | 15.0 (13.9-16.3) ^a | 35.1 |
| 20 000-34 999 | 10.3 (9.5-11.2) | 12.6 (11.7-13.7) ^a | 22.3 |
| 35 000-69 999 | 9.3 (8.7-10.1) | 12.9 (12.1-13.7) ^a | 38.7 |
| ≥70 000 | 8.4 (7.7-9.2) | 10.5 (9.7-11.4) ^a | 25.0 |
| Poverty threshold, % | | | |
| <100 | 11.8 (10.8-13.0) | 14.2 (12.9-15.5) ^a | 20.3 |
| 100-200 | 9.7 (8.9-10.7) | 12.7 (11.7-13.7) ^a | 30.9 |
| >200 | 9.3 (8.8-9.8) | 12.1 (11.4-12.7) ^a | 30.1 |
| Urbanicity | | | |
| Urban | 9.7 (9.2-10.3) | 13.1 (12.5-13.7) ^a | 35.1 |
| Rural | 9.6 (8.9-10.5) | 10.8 (9.9-11.8) | 12.5 |
| Region | | | |
| Northeast | 9.3 (8.1-10.7) | 12.2 (11.5-12.9) ^a | 31.2 |
| Midwest | 11.2 (10.2-12.3) | 14.7 (12.9-16.6) ^a | 31.3 |
| South | 9.0 (8.4-9.7) | 12.1 (11.1-13.1) ^a | 34.4 |
| West | 9.7 (8.9-10.5) | 11.8 (11.0-12.7) ^a | 21.6 |

Abbreviation: NESARC, National Epidemiologic Survey on Alcohol and Related Conditions.

^a $P < .05$ for 2001-2002 compared with 2012-2013.

among high-risk drinkers (46.5% in 2001-2002 and 54.5% in 2012-2013) was much greater than the prevalence of AUD among 12-month users (12.9% in 2001-2002 and 17.5% in 2012-2013), highlighting the critical role of high-risk drinking in the increase in AUD between 2001-2002 and 2012-2013, which was 49.4%.⁴⁶⁻⁴⁸ The smaller increase in 12-month high-risk drinking (21.3%) and the larger increase in 12-month alcohol use (48.6%) seen between the early 1900s and the early 2000s were associated with a much lower increase in AUD (14.9%), again

underscoring the more important influence of increases in high-risk drinking relative to alcohol use on increases in AUD.

Increases shown in 12-month alcohol use and high-risk drinking are consistent with other surveys during the same period. The National Health Interview Survey showed a 6.0% increase in 12-month alcohol use,^{74,75} while the National Survey on Drug Use and Health showed a 9.1% increase in 12-month alcohol use.^{76,77} Trends in drinking 5 or more drinks at least once in the past year increased 17.8% in the National

Table 3. Prevalence of and Percentage Change in 12-Month DSM-IV Alcohol Use Disorder by Sociodemographic Characteristics, 2001-2002 and 2012-2013

| Sociodemographic Characteristic | % (95% CI) | | % Change |
|---------------------------------|----------------------------------|--------------------------------------|----------|
| | NESARC 2001-2002 (n = 43 093) | NESARC-III 2012-2013 (n = 36 309) | |
| Total | 8.5 (8.0-8.9) | 12.7 (12.1-13.3) ^a | 49.4 |
| Sex | | | |
| Men | 12.4 (11.7-13.1) | 16.7 (15.8-17.6) ^a | 34.7 |
| Women | 4.9 (4.5-5.3) | 9.0 (8.5-9.6) ^a | 83.7 |
| Race/ethnicity | | | |
| White | 8.9 (8.4-9.5) | 13.1 (12.3-13.9) ^a | 47.2 |
| Black | 6.9 (6.1-7.7) | 13.3 (11.9-14.8) ^a | 92.8 |
| Native American | 12.1 (9.3-15.6) | 16.6 (12.7-21.5) | 37.2 |
| Asian or Pacific Islander | 4.5 (3.5-5.9) | 8.0 (6.7-9.5) ^a | 77.8 |
| Hispanic | 7.9 (6.8-9.2) | 12.0 (11.1-12.9) ^a | 51.9 |
| Age, y | | | |
| 18-29 | 16.2 (15.1-17.4) | 23.4 (21.9-24.9) ^a | 44.4 |
| 30-44 | 9.7 (9.0-10.5) | 14.3 (13.3-15.3) ^a | 47.4 |
| 45-64 | 5.4 (4.9-6.0) | 9.8 (9.1-10.5) ^a | 81.5 |
| ≥65 | 1.5 (1.2-1.8) | 3.1 (2.6-3.7) ^a | 106.7 |
| Marital status | | | |
| Married or cohabiting | 6.0 (5.6-6.5) | 9.7 (9.0-10.3) ^a | 61.7 |
| Widowed, divorced, or separated | 8.1 (7.3-9.0) | 10.6 (9.8-11.5) ^a | 30.9 |
| Never married | 15.9 (14.7-17.1) | 22.4 (20.9-23.9) ^a | 40.9 |
| Educational level | | | |
| Less than high school | 7.0 (6.2-8.0) | 10.4 (9.3-11.7) ^a | 48.6 |
| High school | 8.3 (7.6-9.0) | 13.1 (12.2-14.0) ^a | 57.8 |
| Some college or higher | 9.0 (8.4-9.6) | 13.0 (12.3-13.8) ^a | 44.4 |
| Family income, \$ | | | |
| 0-19 999 | 8.8 (7.9-9.7) | 14.6 (13.4-15.9) ^a | 65.9 |
| 20 000-34 999 | 8.9 (8.2-9.7) | 12.3 (11.3-13.4) ^a | 38.2 |
| 35 000-69 999 | 8.1 (7.4-8.8) | 12.3 (11.5-13.1) ^a | 51.9 |
| ≥70 000 | 8.3 (7.6-9.1) | 12.0 (11.2-12.8) ^a | 44.6 |
| Poverty threshold, % | | | |
| <100 | 9.4 (8.3-10.5) | 14.3 (13.0-15.6) ^a | 52.1 |
| 100-200 | 7.7 (6.9-8.5) | 12.0 (11.1-12.9) ^a | 55.8 |
| >200 | 8.5 (8.0-9.0) | 12.5 (11.8-13.2) ^a | 47.1 |
| Urbanicity | | | |
| Urban | 8.4 (7.8-8.9) | 13.4 (12.8-14.0) ^a | 59.5 |
| Rural | 8.8 (8.0-9.7) | 10.2 (9.0-11.5) | 15.9 |
| Region | | | |
| Northeast | 7.8 (6.7-9.0) | 11.9 (10.9-12.9) ^a | 52.6 |
| Midwest | 10.6 (9.3-11.9) | 14.8 (13.2-16.5) ^a | 39.6 |
| South | 7.3 (6.6-8.0) | 11.5 (10.5-12.7) ^a | 57.5 |
| West | 8.8 (7.9-9.7) | 13.3 (12.2-14.5) ^a | 51.1 |

Abbreviation: NESARC, National Epidemiologic Survey on Alcohol and Related Conditions.

^a $P < .05$ for 2001-2002 compared with 2012-2013.

Health Interview Survey.⁷⁸ Parallel increases were also seen in per capita alcohol consumption based on alcohol sales data, which rose 6.4%.⁷⁹ The marked increases in high-risk drinking and DSM-IV AUD between 2001-2002 and 2012-2013 also mirror recent sharp increases in morbidity and mortality from diseases and injuries in which alcohol use has a substantial role or deceleration of previously seen declines. Most important, mortality rates of all cardiovascular diseases and stroke decelerated between 2000-2001 and 2011-2014 after 3 decades of decline.^{80,81} Morbidity and mortality rates of hypertension

increased,^{82,83} as did hypertensive emergencies seen in emergency departments (EDs).⁸⁴ Age-specific death rates of liver cirrhosis, especially alcohol-related liver cirrhosis, rose dramatically between 2009 and 2013 for the first time since the early 1970s.⁸⁵ Although increases in age-adjusted rates of type 2 diabetes^{86,87} since 2000 have largely been attributed to more overweight and obesity,^{88,89} increases in high-risk drinking during this time may have contributed, an issue that merits further investigation. During the same period, alcohol-related ED visits associated with falls increased, and the total number of

Table 4. Prevalence of and Percentage Change in 12-Month DSM-IV Alcohol Use Disorder Among 12-Month Alcohol Users by Sociodemographic Characteristics, 2001-2002 and 2012-2013

| Sociodemographic Characteristic | % (95% CI) | | % Change |
|---------------------------------|----------------------------------|--------------------------------------|----------|
| | NESARC 2001-2002 (n = 43 093) | NESARC-III 2012-2013 (n = 36 309) | |
| Total | 12.9 (12.3-17.5) | 17.5 (16.7-18.3) ^a | 35.7 |
| Sex | | | |
| Men | 17.2 (16.3-18.2) | 21.7 (20.6-22.9) ^a | 26.2 |
| Women | 8.2 (7.5-8.9) | 13.1 (12.4-13.8) ^a | 59.8 |
| Race/ethnicity | | | |
| White | 12.8 (12.1-13.6) | 17.4 (16.4-18.4) ^a | 35.9 |
| Black | 12.9 (11.6-14.3) | 20.1 (18.2-22.2) ^a | 55.8 |
| Native American | 20.8 (16.3-26.0) | 22.5 (17.3-28.7) | 8.2 |
| Asian or Pacific Islander | 9.4 (7.3-11.9) | 12.8 (10.9-15.1) ^a | 36.2 |
| Hispanic | 13.2 (11.4-15.2) | 17.1 (15.9-18.3) ^a | 29.5 |
| Age, y | | | |
| 18-29 | 22.2 (20.7-23.7) | 29.2 (27.5-31.0) ^a | 31.5 |
| 30-44 | 13.5 (12.5-14.6) | 17.9 (16.8-19.2) ^a | 32.6 |
| 45-64 | 8.4 (7.6-9.3) | 13.6 (12.7-14.6) ^a | 61.9 |
| ≥65 | 3.2 (2.6-4.0) | 5.6 (4.8-6.6) ^a | 75.0 |
| Marital status | | | |
| Married or cohabiting | 9.1 (8.5-9.8) | 13.2 (12.4-14.1) ^a | 45.1 |
| Widowed, divorced, or separated | 14.2 (12.9-15.7) | 15.8 (14.7-17.1) | 11.3 |
| Never married | 22.6 (20.9-24.4) | 29.2 (27.6-30.9) ^a | 29.2 |
| Educational level | | | |
| Less than high school | 15.2 (13.4-17.2) | 18.7 (16.7-20.9) ^a | 23.0 |
| High school | 13.6 (12.4-14.8) | 19.2 (18.0-20.5) ^a | 41.2 |
| Some college or higher | 12.2 (11.5-13.0) | 16.7 (15.8-17.6) ^a | 36.9 |
| Family income, \$ | | | |
| 0-19 999 | 16.7 (15.2-18.3) | 22.8 (21.2-24.4) ^a | 36.5 |
| 20 000-34 999 | 14.7 (13.5-15.9) | 17.9 (16.6-19.3) ^a | 21.8 |
| 35 000-69 999 | 11.8 (11.0-12.8) | 16.7 (15.7-17.8) ^a | 41.5 |
| ≥70 000 | 10.6 (9.7-11.5) | 14.8 (13.8-15.8) ^a | 39.6 |
| Poverty threshold, % | | | |
| <100 | 17.9 (16.1-20.0) | 22.2 (20.5-24.0) ^a | 24.0 |
| 100-200 | 13.9 (12.6-15.4) | 18.0 (16.9-19.2) ^a | 29.5 |
| >200 | 11.9 (11.3-12.6) | 16.0 (15.2-16.9) ^a | 34.5 |
| Urbanicity | | | |
| Urban | 12.5 (11.7-13.2) | 18.1 (17.3-19.0) ^a | 44.8 |
| Rural | 15.1 (13.7-16.6) | 15.0 (13.5-16.7) | -0.7 |
| Region | | | |
| Northeast | 11.0 (9.7-12.4) | 15.4 (14.3-16.6) ^a | 40.0 |
| Midwest | 15.1 (13.4-17.0) | 19.3 (17.3-21.5) ^a | 27.8 |
| South | 12.3 (11.3-13.4) | 16.9 (15.7-18.2) ^a | 37.4 |
| West | 13.2 (12.0-14.6) | 18.3 (16.6-20.1) ^a | 38.6 |

Abbreviation: NESARC, National Epidemiologic Survey on Alcohol and Related Conditions.

^a $P < .05$ for 2001-2002 compared with 2012-2013.

care hours doubled, along with the intensity of care (eg, advanced imaging) received.⁹⁰ Mortality among alcohol-affected drivers who were simultaneously distracted also increased between 2005 and 2009 by 63%.⁹¹

Increases in high-risk drinking and AUD among women (57.9% and 83.7%, respectively) relative to men (15.5% and 34.7%, respectively) were alarming, consistent with earlier studies⁹²⁻⁹⁶ demonstrating a narrowing of the gender gap in these drinking patterns and AUD between 1991-1992 and 2001-2002. Greater sensitivity to adverse health effects of heavy

drinking among women are potential biological factors influencing the convergence of rates between the sexes within the context of increasing rates of high-risk drinking and AUD.⁹⁷⁻⁹⁹

Drinking norms and values have become more permissive among women,^{100,101} along with increases in educational and occupational opportunities and rising numbers of women in the workforce,¹⁰² all of which may have contributed to increased high-risk drinking and AUD in women during the past decade. Stress associated with pursuing a career and raising a family may lead to increases in high-risk drinking and

Table 5. Prevalence of and Percent Change in 12-Month DSM-IV Alcohol Use Disorder Among 12-Month High-Risk Drinkers by Sociodemographic Characteristics, 2001-2002 and 2012-2013

| Sociodemographic Characteristic | % (95% CI) | | % Change |
|---------------------------------|----------------------------------|--------------------------------------|----------|
| | NESARC 2001-2002 (n = 43 093) | NESARC-III 2012-2013 (n = 36 309) | |
| Total | 46.5 (44.3-48.7) | 54.5 (52.7-56.4) ^a | 17.2 |
| Sex | | | |
| Men | 50.7 (47.9-53.4) | 57.4 (55.0-59.8) ^a | 13.2 |
| Women | 36.9 (33.4-40.5) | 49.7 (46.8-52.6) ^a | 34.7 |
| Race/ethnicity | | | |
| White | 47.3 (44.5-50.0) | 56.6 (54.1-59.0) ^a | 19.7 |
| Black | 40.4 (35.8-45.2) | 50.8 (46.9-54.6) ^a | 25.7 |
| Native American | 63.1 (51.0-73.8) | 55.2 (41.8-67.9) | -12.5 |
| Asian or Pacific Islander | 52.5 (38.5-66.2) | 55.0 (45.8-64.0) | 4.8 |
| Hispanic | 42.3 (37.4-47.4) | 49.4 (46.0-52.9) ^a | 16.8 |
| Age, y | | | |
| 18-29 | 56.6 (53.0-60.2) | 64.6 (61.0-68.0) ^a | 14.1 |
| 30-44 | 45.0 (41.6-48.4) | 52.3 (49.2-55.4) ^a | 16.2 |
| 45-64 | 37.1 (33.0-41.3) | 50.0 (47.0-53.0) ^a | 34.8 |
| ≥65 | 19.8 (13.7-27.8) | 31.3 (24.8-38.7) ^a | 58.1 |
| Marital status | | | |
| Married or cohabiting | 38.1 (35.1-41.2) | 48.6 (45.7-51.5) ^a | 27.6 |
| Widowed, divorced, or separated | 50.8 (46.0-55.6) | 53.4 (50.0-56.8) | 5.1 |
| Never married | 55.0 (51.4-58.5) | 62.5 (58.9-66.0) ^a | 13.6 |
| Educational level | | | |
| Less than high school | 47.2 (42.0-52.4) | 51.4 (46.7-56.1) | 8.9 |
| High school | 46.6 (42.7-50.5) | 55.7 (52.6-58.8) ^a | 19.5 |
| Some college or higher | 46.3 (43.7-48.9) | 54.6 (52.0-57.3) ^a | 17.9 |
| Family income, \$ | | | |
| 0-19 999 | 49.3 (45.4-53.2) | 58.8 (55.2-62.4) ^a | 19.3 |
| 20 000-34 999 | 49.6 (45.2-53.9) | 55.7 (51.9-59.4) ^a | 12.3 |
| 35 000-69 999 | 43.4 (39.7-47.1) | 52.7 (49.4-56.0) ^a | 21.4 |
| ≥70 000 | 44.4 (40.0-48.9) | 51.2 (47.3-55.1) ^a | 15.3 |
| Poverty threshold, % | | | |
| <100 | 48.7 (43.4-54.0) | 58.2 (54.3-62.0) ^a | 19.5 |
| 100-200 | 46.2 (41.7-50.8) | 55.2 (51.4-59.0) ^a | 19.5 |
| >200 | 46.0 (43.5-48.6) | 52.9 (50.4-55.4) ^a | 15.0 |
| Urbanicity | | | |
| Urban | 45.5 (43.0-48.0) | 55.1 (53.0-57.1) ^a | 21.1 |
| Rural | 50.7 (46.2-55.1) | 52.2 (47.0-57.4) | 3.0 |
| Region | | | |
| Northeast | 46.4 (42.2-50.6) | 51.7 (47.6-55.8) | 11.4 |
| Midwest | 48.6 (43.4-53.9) | 54.4 (49.9-58.9) | 11.9 |
| South | 44.9 (41.3-48.6) | 53.8 (50.9-56.7) ^a | 19.8 |
| West | 46.4 (41.8-51.2) | 58.1 (54.4-61.8) ^a | 25.2 |

Abbreviation: NESARC, National Epidemiologic Survey on Alcohol and Related Conditions.

^a $P < .05$ for 2001-2002 compared with 2012-2013.

AUD^{103,104} among women, results that were consistent with substantial increases in these patterns of alcohol use among married individuals and those residing in urban areas found in this study. A narrowing of the gender gap in high-risk drinking and AUD may portend substantial future increases in the types of alcohol-related morbidity and mortality to which women are more vulnerable, especially breast cancer^{105,106} and liver cirrhosis,^{17,18,107} as well as increases in fetal alcohol spectrum disorder and exposure to violence.¹⁰⁸ Women are also

more likely than men to take prescription drugs¹⁰⁹ that can increase the risk of severe adverse reactions when combined with alcohol.

Older adults have had consistently lower rates than others of alcohol use, high-risk drinking, and AUD over the past 40 years.^{32,40,45} However, between 2001-2002 and 2012-2013, increases in alcohol use (22.4%), high-risk drinking (65.2%), and AUD (106.7%) among older adults were substantial and unprecedented relative to earlier surveys.⁷³ Older

adults are at higher risk for disability, morbidity, and mortality from many alcohol-related chronic diseases^{110,111} that have increased over the past 15 years.^{86,87} Older adults are at particular risk for falls and injuries,¹¹² and the unintentional injury death rate,¹¹³ ED-treated falls,¹¹⁴ hospitalized fall rates,¹¹⁵ and fall-related traumatic brain injury deaths¹¹⁶ have risen significantly over the past decade. Alcohol-interactive prescription medicine use is highly prevalent among older adults,^{117,118} especially among current drinkers,¹¹⁹ and recent trend data suggest that ED visits for adverse drug reactions involving alcohol use are on the rise.¹²⁰ Even if the rates among older adults remain stable, the projected increase in the size of this segment of the population (from 40 million in 2010 to 80 million in 2030)¹²¹ could produce a substantial increase in the absolute number of older adults with high-risk drinking and AUD, with concomitant increases in alcohol-related multimorbidities.¹²²

Between 2001-2002 and 2012-2013, increases in alcohol use, high-risk drinking, and AUD were generally much greater among minorities than among white individuals, results that are consistent with substantial increases among individuals with the lowest educational levels and family incomes seen in this study. Wealth inequality between minorities and whites has widened during and after the 2008 recession,^{123,124} possibly leading to increased stress and demoralization. Adversities that disproportionately affect racial/ethnic minorities include family income and educational disparities, unemployment, residential segregation, discrimination, decreased access to health care, and increased stigma associated with drinking.¹²⁵⁻¹²⁷ These disparities may have accumulated over recent years, leading to increased negative coping behaviors, such as high-risk drinking and the development of AUD.¹²⁵⁻¹³¹ Reasons for the widening of the racial/ethnic gap in alcohol use, high-risk drinking, and AUD are complex, historically rooted in racial/ethnic discrimination and persistent socioeconomic disadvantage both at the individual and community levels.¹³²⁻¹³⁷ Future research is warranted to understand the interplay of socioeconomic, psychosocial, cultural, and biological factors that have contributed to the widening of the racial/ethnic gap in alcohol use, high-risk drinking, and AUD in recent years, with particular attention to the development of subracial/subethnic prevention and intervention strategies.

Limitations and Strengths

Limitations of this study are noted. NESARC and NESARC-III lacked biological testing for substance use. Like other national surveys,^{53,54} some population segments were not covered in either survey (eg, the homeless and those who are incarcerated), potentially leading to underestimation of alcohol

use, high-risk drinking, and DSM-IV AUD. AUDADIS interviewers were not clinicians, but a NESARC-III validation substudy comparing AUDADIS and clinician diagnoses of 12-month AUD showed similar prevalence and good concordance.⁶⁸ The NESARC-III response rate was acceptable (60.1%) but was lower than that of NESARC (81.0%). Weighting that compensated for nonresponse facilitated comparisons between the surveys.^{51,52} The validity of increases shown between NESARC and NESARC-III is supported by their coherence with the other studies noted above showing increases in alcohol-related indicators over the same period.

These limitations are balanced by the numerous strengths of the Wave 1 NESARC and NESARC-III, including their large sample sizes and detailed measures of alcohol use, high-risk drinking, and DSM-IV AUD that have been extensively tested and validated,⁶¹⁻⁷¹ in addition to their rigorous epidemiologic study methods. These 2 surveys are also unique in providing a uniform source of alcohol information and AUD to examine trends over time.

Conclusions

Between 2001-2002 and 2012-2013, an increase in alcohol use, high-risk drinking, and AUD occurred in the total US population and across almost all sociodemographic subgroups, especially women, older adults, racial/ethnic minorities, and the socioeconomically disadvantaged. These increases constitute a public health crisis that may have been overshadowed by increases in much less prevalent substance use (marijuana, opiates, and heroin)¹³⁸⁻¹⁴⁰ during the same period. Treatment rates for AUD remain low (<10%)¹⁴¹ despite the significant rise in high-risk drinking and AUD and the existence of a broad spectrum of evidence-based and effective behavioral and pharmacological approaches.¹⁴²⁻¹⁵² The results of this study call for a broader effort to address the individual, biological, environmental, and societal factors that influence high-risk drinking and AUD and their considerable consequences and economic costs to society (\$250 billion)¹⁵³ to improve the health, safety, and well-being of the nation. The development of prevention and intervention strategies both at the population level and those targeted at high-risk subgroups of the population identified in this study¹⁵⁴⁻¹⁵⁹ will be paramount to achieving this goal. Most important, the findings herein highlight the urgency of educating the public, policymakers, and health care professionals about high-risk drinking and AUD,¹⁶⁰ destigmatizing these conditions and encouraging those who cannot reduce their alcohol consumption on their own, despite substantial harm to themselves and others, to seek treatment.

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