

Original Investigation

Epidemiology of *DSM-5* Alcohol Use Disorder

Results From the National Epidemiologic Survey on Alcohol and Related Conditions III

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IMPORTANCE National epidemiologic information from recently collected data on the new *DSM-5* classification of alcohol use disorder (AUD) using a reliable, valid, and uniform data source is needed.

OBJECTIVE To present nationally representative findings on the prevalence, correlates, psychiatric comorbidity, associated disability, and treatment of *DSM-5* AUD diagnoses overall and according to severity level (mild, moderate, or severe).

DESIGN, SETTING, AND PARTICIPANTS We conducted face-to-face interviews with a representative US noninstitutionalized civilian adult (≥ 18 years) sample (N = 36 309) as the 2012-2013 National Epidemiologic Survey on Alcohol and Related Conditions III (NESARC-III). Data were collected from April 2012 through June 2013 and analyzed in October 2014.

MAIN OUTCOMES AND MEASURES Twelve-month and lifetime prevalences of AUD.

RESULTS Twelve-month and lifetime prevalences of AUD were 13.9% and 29.1%, respectively. Prevalence was generally highest for men (17.6% and 36.0%, respectively), white (14.0% and 32.6%, respectively) and Native American (19.2% and 43.4%, respectively), respondents, and younger (26.7% and 37.0%, respectively) and previously married (11.4% and 27.1%, respectively) or never married (25.0% and 35.5%, respectively) adults. Prevalence of 12-month and lifetime severe AUD was greatest among respondents with the lowest income level (1.8% and 1.5%, respectively). Significant disability was associated with 12-month and lifetime AUD and increased with the severity of AUD. Only 19.8% of respondents with lifetime AUD were ever treated. Significant associations were found between 12-month and lifetime AUD and other substance use disorders, major depressive and bipolar I disorders, and antisocial and borderline personality disorders across all levels of AUD severity, with odds ratios ranging from 1.2 (95% CI, 1.08-1.36) to 6.4 (95% CI, 5.76-7.22). Associations between AUD and panic disorder, specific phobia, and generalized anxiety disorder were modest (odds ratios ranged from 1.2 (95% CI, 1.01-1.43) to 1.4 (95% CI, 1.13-1.67) across most levels of AUD severity).

CONCLUSIONS AND RELEVANCE Alcohol use disorder defined by *DSM-5* criteria is a highly prevalent, highly comorbid, disabling disorder that often goes untreated in the United States. The NESARC-III data indicate an urgent need to educate the public and policy makers about AUD and its treatment alternatives, to destigmatize the disorder, and to encourage those who cannot reduce their alcohol consumption on their own, despite substantial harm to themselves and others, to seek treatment.

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Alcohol use disorders (AUDs) are among the most prevalent mental disorders worldwide.¹⁻⁴ Alcohol use disorders are highly disabling^{5,6} and associated with many physical and psychiatric comorbidities⁶⁻⁸; they also contribute substantially to global morbidity and mortality.^{9,10} Alcohol use disorders impair productivity and interpersonal functioning and place psychological and financial burdens on those who misuse alcohol, on their families, friends, and coworkers,¹¹ and, through motor vehicle crashes, violence, and property crime,¹² on society as a whole.

Published national estimates of AUD prevalence are based on *DSM-IV* criteria (abuse and/or dependence).¹³ In the 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) conducted by the National Institute on Alcohol Abuse and Alcoholism, 12-month and lifetime prevalences were 8.5% and 30.3%, respectively.⁶ In the 2001-2003 National Comorbidity Survey Replication from the National Institute of Mental Health, corresponding rates were 4.4% and 18.8%, respectively.^{2,14} Lower rates in the National Comorbidity Survey Replication reflect deviation from *DSM-IV* criteria by skipping dependence questions when respondents endorsed no abuse criteria, which caused about one-third of 12-month and 15% of lifetime cases of alcohol dependence to be missed.¹⁵ In the 2013 National Survey on Drug Use and Health from the Substance Abuse and Mental Health Services Administration, 12-month prevalence of AUD was 7.0%.¹⁶ The National Survey on Drug Use and Health did not address lifetime diagnoses, disability, or the full range of psychiatric comorbidities.

In view of the seriousness of AUDs, current epidemiologic data are needed. This need is especially critical given the changes to the AUD diagnostic criteria in *DSM-5*,¹⁷ including elimination of separate abuse and dependence diagnoses, the combination of the criteria into a single AUD diagnosis, elimination of legal problems, addition of craving to the criteria set, a diagnostic threshold of at least 2 criteria, and establishment of a severity metric based on the criteria count.¹⁸

We therefore provide, to our knowledge, the first nationally representative information on the prevalence, comorbidity, correlates, associated disability, and treatment of *DSM-5* AUD from the National Institute on Alcohol Abuse and Alcoholism 2012-2013 NESARC-III.¹⁹ We also assessed *DSM-IV* criteria for AUD to examine changes in prevalence.

Methods

Sample

The NESARC-III target population was the US noninstitutionalized civilian population 18 years or older, including residents of selected group quarters (eg, group homes, workers' dormitories). As detailed elsewhere,¹⁹ we used probability sampling to select respondents randomly. Primary sampling units were individual counties or groups of contiguous counties; secondary sampling units, groups of US Census-defined blocks; and tertiary sampling units, households within the secondary sampling units. Finally, eligible adults within sampled households were randomly selected. We oversampled Hispanic, black, and Asian respondents,

and in households with at least 4 eligible individuals who were ethnic or racial minorities, 2 respondents were selected ($n = 1661$). The total sample size consisted of 36 309 respondents. The screener- and person-level response rates were 72.0% and 84.0%, respectively, yielding a total NESARC-III response rate of 60.1%, comparable to those of most current US national surveys.^{16,20} Data were collected from April 2012 through June 2013 and analyzed in October 2014.

Data were adjusted for oversampling (including selection of 2 persons in selected households) and screener- and person-level nonresponse, then weighted through poststratification analyses to represent the US civilian population based on the American Community Survey 2012.²¹ **Table 1** shows the weighted distribution of the NESARC-III population characteristics. These weighting adjustments were found to compensate adequately for nonresponse. When participants were compared with the total eligible sample, including nonrespondents, no significant differences were found in the percentages of Hispanic, black, or Asian respondents, population density, vacancy rate, proportion of the population in group quarters, or proportion of renters at the segment level. At the individual level, we found no differences in Hispanic ethnicity between respondents and the total eligible sample. Respondents included a slightly higher percentage of men (48.1% vs 46.2%), a greater percentage of those aged 60 to 69 years (13.7% vs 12.6%), and smaller percentages of those aged 40 to 49 (18.1% vs 18.3%) and 30 to 39 (16.7% vs 17.4%) years than in the eligible sample.

Interviewer field methods, detailed elsewhere,¹⁹ involved initial structured home study, in-person training, ongoing supervision, and random respondent callbacks to verify data. Oral informed consent was electronically recorded, and respondents received \$90.00 for survey participation. Protocols were approved by the institutional review boards of the National Institutes of Health and Westat (the contractor for the NESARC-III).

Diagnostic Interview

We used the Alcohol Use Disorder and Associated Disabilities Interview Schedule 5 (AUDADIS-5) from the National Institute on Alcohol Abuse and Alcoholism as the diagnostic interview.²² The AUDADIS-5 was designed to measure *DSM-5* criteria for AUDs, nicotine use disorder (NUD), specific drug use disorders (DUDs), and selected mood, anxiety, trauma-related, eating, and personality (PD) disorders.

Alcohol Use Disorders

Lifetime *DSM-5* AUD diagnoses required at least 2 of the 11 criteria in the 12 months preceding the interview or previously. Diagnoses before the past 12 months required clustering of at least 2 criteria within a 1-year period. Consistent with *DSM-5* criteria, AUD severity levels were classified as mild, moderate, or severe (2-3, 4-5, or ≥ 6 criteria, respectively). Lifetime alcohol abuse diagnoses based on *DSM-IV* criteria required at least 1 of the 4 abuse criteria in the 12 months preceding the interview or previously. Lifetime alcohol dependence based on *DSM-IV* criteria required at least 3 dependence criteria in the past 12 months or previously. Diagnoses before the past 12

months also required clustering of criteria within a 1-year period. Concordances between *DSM-IV* and *DSM-5* 12-month and lifetime AUDs in the NESARC-III were excellent ($\kappa = 0.76$ and $\kappa = 0.61$, respectively).²³

Symptom items ($n = 37$) that assessed *DSM-IV* AUD diagnoses in the NESARC and NESARC-III were virtually identical. However, 3 items were slightly reworded and 3 additional abuse questions appeared in the NESARC-III. Comparisons between *DSM-IV* 12-month AUD diagnoses with and without the additional questions yielded virtually identical prevalences (12.7% and 12.2%, respectively), with near-perfect concordance ($\kappa = 0.98$), which suggested that trivial differences between AUD operationalizations were not responsible for the changes reported herein.

Test-retest reliability of AUDADIS-5 and *DSM-5* AUD categorical diagnoses ($\kappa = 0.60$ and $\kappa = 0.62$, respectively) and dimensional criteria scales (intraclass correlation coefficient [ICC], 0.83 and 0.85, respectively) was substantial in a large general population sample.²⁴ Procedural validity of AUDADIS-5 and *DSM-5* AUD was assessed through blind clinical reappraisal using the clinician-administered, semi-structured Psychiatric Research Interview for Substance Use and Mental Disorders, *DSM-5* (PRISM-5) version.²⁵ The clinical reappraisal, conducted in a large general population sample,²⁶ showed fair to good concordance on AUDADIS-5 and PRISM-5 AUD diagnoses ($\kappa = 0.49$ and $\kappa = 0.62$, respectively) and excellent concordance (ICC, 0.81 and 0.85, respectively) for their dimensional counterparts.

Test-retest reliability of AUDADIS-IV and *DSM-IV* AUD diagnoses was good to excellent in clinical and general population samples.²⁷⁻³¹ Convergent, discriminant, and construct validity of AUDADIS-IV AUD diagnoses were good to excellent,³²⁻³⁶ including in the World Health Organization/National Institutes of Health Study on Reliability and Validity (κ range, 0.60-0.70).³⁷⁻³⁹

Other Psychiatric Disorders

We derived 12-month and lifetime *DSM-5* diagnoses of NUD and other DUDs (sedative or tranquilizer, cannabis, amphetamine, cocaine, club drug, opioid, heroin, hallucinogen, and solvent or inhalant) similarly to the procedure used for diagnoses of AUD. The DUD diagnoses were aggregated to yield a diagnosis of any DUD. Test-retest reliabilities were fair to excellent for NUD (diagnoses in the past 12 months, $\kappa = 0.50$; diagnoses before the past 12 months, $\kappa = 0.87$) and DUD (κ range, 0.40-0.54) diagnoses and higher for their dimensional counterparts (ICCs, 0.45-0.84).²⁴ Concordance on NUD and DUD diagnoses in the AUDADIS-5 and PRISM-5 and in dimensional scales was fair to excellent (κ range, 0.36-0.66; ICCs, >0.68 [in general]).²⁶

We assessed 12-month and lifetime *DSM-5* mood, anxiety, trauma-related, eating, and PD diagnoses. Mood disorders included persistent depression and major depressive, bipolar I, and bipolar II disorders. Anxiety disorders included panic disorder, agoraphobia, generalized anxiety disorder, and social and specific phobias. Posttraumatic stress disorder, anorexia nervosa, bulimia nervosa, and binge-eating disorder in *DSM-5* were also assessed. Consistent with *DSM-5*, all these

Table 1. Characteristics of NESARC-III Respondents

Characteristic	Respondents, % (SE) ^a	Total ^b
Sex		
Male	48.1 (0.30)	15 862
Female	51.9 (0.30)	20 447
Race or ethnicity		
White	66.2 (0.77)	19 194
Black	11.8 (0.66)	7 766
Native American	1.6 (0.12)	511
Asian or Pacific Islander	5.7 (0.47)	1 801
Hispanic	14.7 (0.67)	7 037
Age, y		
18-29	21.7 (0.36)	8 126
30-44	25.7 (0.33)	10 135
45-64	35.0 (0.32)	12 242
≥65	17.6 (0.37)	5 806
Marital status		
Married or cohabiting	57.8 (0.51)	16 794
Widowed, separated, or divorced	19.7 (0.32)	9 423
Never married	22.5 (0.44)	10 092
Educational level		
Less than high school	13.0 (0.42)	5 490
High school	25.8 (0.51)	9 799
Some college or higher	61.2 (0.76)	21 020
Annual family income, \$		
0-19 999	22.8 (0.50)	10 631
20 000-34 999	18.9 (0.35)	7 854
35 000-69 999	27.2 (0.33)	9 562
≥70 000	31.1 (0.66)	8 262
Urbanicity		
Urban	78.8 (1.54)	30 193
Rural	21.3 (1.54)	6 116
Region		
Northeast	18.2 (0.51)	5 180
Midwest	21.5 (0.44)	7 566
South	37.1 (0.89)	14 532
West	23.2 (0.91)	9 031

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

^a Based on weighted data. Percentages have been rounded and may not total 100.

^b Based on unweighted data.

diagnoses excluded substance- and medical illness-induced disorders. Lifetime PDs from the *DSM-5* included antisocial, borderline, and schizotypal.

Test-retest reliability of AUDADIS-5 and *DSM-5* diagnoses of psychiatric disorders was fair to good (κ range, 0.35-0.54).²⁴ Reliability of associated *DSM-5* dimensional scales was greater (κ range, 0.50-0.79). Concordance between AUDADIS-5 and PRISM-5 diagnoses for these disorders was fair to good (κ range, 0.20-0.59), with good concordance (ICCs, >0.53 [in general]) for many corresponding dimensional scales.⁴⁰

Table 2. Prevalence of 12-Month and Lifetime DSM-5 Alcohol Use Disorder (AUD) by Sociodemographic Characteristics

Characteristic	Prevalence of AUD, % (SE) ^a							
	12-mo				Lifetime			
	Any (n = 5133)	Mild (n = 2624)	Moderate (n = 1186)	Severe (n = 1323)	Any (n = 10 001)	Mild (n = 2967)	Moderate (n = 2228)	Severe (n = 4806)
Total	13.9 (0.31)	7.3 (0.19)	3.2 (0.13)	3.4 (0.12)	29.1 (0.48)	8.6 (0.18)	6.6 (0.18)	13.9 (0.31)
Sex								
Male	17.6 (0.42)	9.1 (0.29)	4.1 (0.21)	4.5 (0.18)	36.0 (0.62)	9.9 (0.28)	7.7 (0.25)	18.3 (0.47)
Female	10.4 (0.34)	5.6 (0.23)	2.5 (0.14)	2.3 (0.13)	22.7 (0.53)	7.3 (0.24)	5.7 (0.24)	9.7 (0.32)
Race or ethnicity								
White	14.0 (0.42)	7.5 (0.26)	3.3 (0.17)	3.2 (0.16)	32.6 (0.64)	9.3 (0.23)	7.5 (0.24)	15.8 (0.44)
Black	14.4 (0.72)	7.2 (0.41)	3.3 (0.27)	3.9 (0.32)	22.0 (0.80)	7.6 (0.40)	5.0 (0.30)	9.4 (0.50)
Native American	19.2 (2.23)	6.5 (1.09)	5.1 (1.14)	7.7 (1.60)	43.4 (2.81)	7.5 (1.51)	8.8 (1.41)	27.2 (2.54)
Asian or Pacific Islander	10.6 (0.87)	5.9 (0.68)	2.5 (0.47)	2.2 (0.35)	15.0 (1.19)	6.1 (0.74)	3.6 (0.64)	5.3 (0.61)
Hispanic	13.6 (0.44)	7.0 (0.36)	3.0 (0.24)	3.5 (0.19)	22.9 (0.56)	7.0 (0.37)	5.1 (0.29)	10.9 (0.47)
Age, y								
18-29	26.7 (0.74)	13.1 (0.49)	6.5 (0.39)	7.1 (0.40)	37.0 (0.82)	11.6 (0.43)	8.8 (0.39)	16.6 (0.61)
30-44	16.2 (0.55)	8.8 (0.38)	3.6 (0.25)	3.8 (0.22)	34.4 (0.68)	9.8 (0.34)	7.5 (0.35)	17.0 (0.48)
45-64	10.0 (0.32)	5.3 (0.25)	2.4 (0.17)	2.4 (0.17)	28.2 (0.69)	7.8 (0.31)	6.4 (0.31)	14.0 (0.51)
≥65	2.3 (0.22)	1.8 (0.21)	0.3 (0.10)	0.2 (0.06)	13.4 (0.56)	4.5 (0.32)	3.2 (0.25)	5.7 (0.37)
Marital status								
Married or cohabiting	10.4 (0.30)	6.1 (0.21)	2.4 (0.14)	1.9 (0.12)	27.2 (0.49)	8.4 (0.25)	6.5 (0.24)	12.4 (0.34)
Widowed, separated, or divorced	11.4 (0.44)	5.6 (0.28)	2.6 (0.20)	3.2 (0.24)	27.1 (0.70)	7.0 (0.35)	5.3 (0.27)	14.9 (0.51)
Never married	25.0 (0.74)	11.8 (0.46)	6.0 (0.37)	7.3 (0.37)	35.5 (0.84)	10.6 (0.40)	8.2 (0.38)	16.8 (0.58)
Educational level								
Less than high school	11.5 (0.62)	4.8 (0.33)	2.6 (0.25)	4.1 (0.36)	22.3 (0.88)	5.4 (0.35)	4.3 (0.33)	12.6 (0.72)
High school	14.6 (0.47)	7.3 (0.31)	3.5 (0.23)	3.8 (0.25)	28.4 (0.62)	8.2 (0.38)	6.0 (0.32)	14.2 (0.48)
Some college or higher	14.1 (0.38)	7.8 (0.27)	3.3 (0.15)	3.1 (0.15)	30.8 (0.52)	9.4 (0.23)	7.4 (0.25)	14.0 (0.37)
Annual family income, \$								
0-19 999	16.2 (0.60)	7.2 (0.34)	3.8 (0.29)	5.2 (0.27)	28.9 (0.83)	7.1 (0.32)	5.7 (0.28)	16.1 (0.61)
20 000-34 999	14.0 (0.58)	7.2 (0.35)	3.1 (0.22)	3.6 (0.28)	27.9 (0.66)	7.9 (0.38)	6.3 (0.35)	13.7 (0.47)
35 000-69 999	13.2 (0.39)	6.9 (0.30)	3.3 (0.22)	3.1 (0.20)	29.0 (0.55)	8.6 (0.32)	6.7 (0.32)	13.7 (0.40)
≥70 000	12.7 (0.43)	7.7 (0.32)	2.8 (0.20)	2.1 (0.19)	30.0 (0.81)	10.1 (0.43)	7.5 (0.39)	12.4 (0.54)
Urbanicity								
Urban	14.9 (0.34)	7.7 (0.23)	3.5 (0.15)	3.6 (0.13)	29.2 (0.47)	8.7 (0.19)	6.7 (0.19)	13.8 (0.31)
Rural	10.2 (0.55)	5.6 (0.38)	2.1 (0.21)	2.4 (0.25)	28.6 (1.10)	8.2 (0.45)	6.4 (0.43)	14.1 (0.80)
Region								
Northeast	13.5 (0.55)	6.9 (0.32)	3.2 (0.35)	3.5 (0.29)	28.8 (0.99)	8.3 (0.37)	6.9 (0.26)	13.7 (0.70)
Midwest	15.0 (0.84)	8.1 (0.54)	3.5 (0.28)	3.5 (0.24)	33.6 (0.95)	9.8 (0.46)	7.5 (0.42)	16.2 (0.59)
South	12.3 (0.56)	6.3 (0.33)	3.0 (0.21)	2.9 (0.21)	25.3 (0.87)	7.8 (0.31)	5.9 (0.29)	11.6 (0.57)
West	15.7 (0.53)	8.4 (0.34)	3.4 (0.22)	3.8 (0.25)	31.3 (0.80)	8.9 (0.29)	6.9 (0.38)	15.5 (0.52)

^a Based on weighted data.

Disability

Disability was determined using the 12-Item Short Form Health Survey, version 2 (SF-12v2). The SF-12v2 is a reliable and valid measure of current impairment widely used in population surveys.⁴¹ The SF-12v2 included Mental Health, Social Functioning, and Role Emotional subscales and the Mental Component Summary. Each SF-12v2 norm-based disability score has a mean of 50, SD of 10, and range of 0 to 100. Lower scores indicated greater disability.

Statistical Analysis

We computed weighted means, frequencies, and cross-tabulations for 12-month and lifetime DSM-5 AUD across

AUD severity levels. Adjusted odds ratios derived from multiple logistic regression indicated associations between AUD and each sociodemographic characteristic (including self-identified race or ethnicity) while controlling for all others. Logistic regressions of psychiatric comorbidity on AUD was controlled for sociodemographic characteristics and other substance use and psychiatric disorders. Eating disorders were too rare to assess comorbid associations with AUD but were used as covariates in comorbidity analyses of AUD with other disorders. Relationships of 12-month AUD to SF-12v2 disability scales were determined using multiple linear regression, controlling for sociodemographic characteristics and other psychiatric disorders.

Table 3. AORs of 12-Month and Lifetime DSM-5 AUD by Sociodemographic Characteristics^a

Characteristic	AUD, AOR (95% CI) ^b							
	12-mo				Lifetime			
	Any	Mild	Moderate	Severe	Any	Mild	Moderate	Severe
Sex								
Male	1.9 (1.72-2.01)	1.8 (1.58-1.95)	1.8 (1.55-2.10)	2.2 (1.90-2.50)	2.0 (1.87-2.11)	1.6 (1.50-1.81)	1.7 (1.50-1.88)	2.4 (2.25-2.65)
Female	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Race or ethnicity								
White	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Black	0.8 (0.67-0.90)	0.8 (0.70-0.94)	0.7 (0.58-0.90)	0.8 (0.62-0.97)	0.5 (0.47-0.58)	0.7 (0.60-0.76)	0.5 (0.45-0.63)	0.4 (0.37-0.50)
Native American	1.3 (0.99-1.76)	0.9 (0.61-1.28)	1.5 (0.92-2.44)	2.1 (1.32-3.23)	1.5 (1.19-1.84)	1.0 (0.62-1.48)	1.4 (0.94-1.98)	1.8 (1.40-2.31)
Asian or Pacific Islander	0.5 (0.42-0.64)	0.5 (0.41-0.71)	0.5 (0.34-0.80)	0.5 (0.33-0.66)	0.3 (0.23-0.35)	0.4 (0.31-0.54)	0.3 (0.20-0.43)	0.2 (0.16-0.27)
Hispanic	0.7 (0.58-0.72)	0.7 (0.59-0.79)	0.6 (0.50-0.75)	0.6 (0.53-0.74)	0.5 (0.45-0.54)	0.6 (0.50-0.65)	0.5 (0.44-0.58)	0.4 (0.38-0.51)
Age, y								
18-29	13.9 (11.57-16.67)	9.2 (7.11-11.98)	23.2 (13.07-41.09)	44.0 (22.98-84.09)	4.5 (4.01-4.98)	3.9 (3.25-4.76)	4.2 (3.41-5.11)	5.0 (4.25-5.98)
30-44	8.7 (7.11-10.57)	5.8 (4.48-7.52)	13.4 (7.51-23.94)	28.6 (15.31-53.42)	4.1 (3.63-4.55)	3.1 (2.64-3.66)	3.4 (2.79-4.15)	5.3 (4.54-6.15)
45-64	4.8 (3.94-5.84)	3.1 (2.41-4.01)	7.8 (4.36-14.13)	16.0 (8.87-28.98)	2.7 (2.48-3.03)	2.1 (1.76-2.50)	2.4 (2.00-2.98)	3.5 (3.01-3.98)
≥65	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Marital status								
Married or cohabiting	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Widowed, separated, or divorced	1.6 (1.46-1.81)	1.4 (1.24-1.62)	1.6 (1.28-2.02)	2.3 (1.88-2.80)	1.3 (1.25-1.44)	1.2 (1.05-1.37)	1.1 (0.98-1.28)	1.5 (1.41-1.69)
Never married	1.6 (1.45-1.75)	1.4 (1.23-1.55)	1.6 (1.28-1.94)	2.2 (1.82-2.71)	1.1 (1.05-1.23)	1.1 (1.00-1.28)	1.1 (0.99-1.31)	1.1 (1.01-1.28)
Educational level								
Less than high school	0.9 (0.77-1.02)	0.7 (0.61-0.84)	0.9 (0.68-1.12)	1.3 (1.02-1.61)	0.8 (0.69-0.85)	0.7 (0.57-0.76)	0.7 (0.54-0.80)	0.9 (0.77-1.03)
High school	1.0 (0.95-1.15)	1.0 (0.87-1.12)	1.1 (0.92-1.31)	1.1 (0.95-1.35)	0.9 (0.86-0.97)	0.9 (0.81-1.03)	0.8 (0.73-0.95)	1.0 (0.87-1.04)
Some college or higher	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Annual family income, \$								
0-19 999	1.1 (0.97-1.23)	0.9 (0.76-1.01)	1.1 (0.90-1.43)	1.8 (1.38-2.24)	1.1 (1.00-1.25)	0.8 (0.66-0.91)	0.9 (0.78-1.09)	1.5 (1.33-1.79)
20 000-34 999	1.0 (0.91-1.15)	0.9 (0.80-1.05)	1.0 (0.80-1.30)	1.4 (1.10-1.84)	1.1 (0.96-1.18)	0.9 (0.73-1.02)	1.0 (0.84-1.18)	1.3 (1.13-1.48)
35 000-69 999	1.0 (0.87-1.07)	0.8 (0.74-0.98)	1.1 (0.85-1.32)	1.3 (1.02-1.54)	1.0 (0.92-1.15)	0.9 (0.75-1.01)	1.0 (0.82-1.14)	1.2 (1.02-1.32)
≥70 000	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Urbanicity								
Urban	1.4 (1.20-1.55)	1.3 (1.08-1.50)	1.6 (1.25-2.01)	1.4 (1.11-1.72)	1.1 (0.96-1.19)	1.1 (0.94-1.20)	1.1 (0.92-1.30)	1.1 (0.91-1.22)
Rural	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Region								
Northeast	0.8 (0.72-0.95)	0.8 (0.66-0.89)	0.9 (0.68-1.17)	0.9 (0.70-1.13)	0.8 (0.72-0.93)	0.8 (0.72-0.94)	0.9 (0.75-1.03)	0.8 (0.68-0.93)
Midwest	0.9 (0.77-1.06)	0.9 (0.75-1.09)	1.0 (0.77-1.21)	0.8 (0.68-1.05)	0.9 (0.84-1.07)	1.0 (0.87-1.16)	1.0 (0.81-1.17)	0.9 (0.79-1.04)
South	0.7 (0.65-0.84)	0.7 (0.62-0.83)	0.9 (0.70-1.04)	0.7 (0.56-0.86)	0.7 (0.61-0.78)	0.8 (0.68-0.87)	0.8 (0.63-0.90)	0.6 (0.53-0.72)
West	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]

Abbreviations: AOR, adjusted odds ratio; AUD, alcohol use disorder.

^a Significant AORs ($P < .05$) are set in boldface.^b Odds ratios for associations of each sociodemographic variable with any, mild, moderate, and severe AUD are adjusted for all other sociodemographic characteristics.

Table 4. AORs of 12-Month and Lifetime DSM-5 AUD and Other Psychiatric Disorders^a

Other Psychiatric Disorder	AUD, AOR (95% CI)							
	12-mo				Lifetime			
	Any	Mild	Moderate	Severe	Any	Mild	Moderate	Severe
Any drug use disorder	3.3 (2.88-3.76)	2.2 (1.79-2.77)	3.2 (2.56-4.00)	5.3 (4.52-6.27)	4.1 (3.72-4.57)	2.1 (1.72-2.66)	2.8 (2.35-3.32)	6.4 (5.76-7.22)
Nicotine use disorder	2.5 (2.24-2.69)	2.0 (1.75-2.25)	2.7 (2.26-3.32)	3.6 (3.07-4.24) ^c	3.2 (2.95-3.42)	2.2 (2.00-2.46)	3.0 (2.69-3.42)	4.3 (3.89-4.81)
Any mood disorder	1.3 (1.18-1.47)	1.1 (0.93-1.26)	1.4 (1.15-1.62)	1.8 (1.49-2.18)	1.5 (1.37-1.63)	1.2 (1.08-1.42)	1.4 (1.17-1.56)	1.8 (1.64-2.02)
Major depressive disorder	1.2 (1.08-1.36)	1.1 (0.91-1.29)	1.2 (0.97-1.56)	1.4 (1.19-1.76)	1.3 (1.15-1.39)	1.2 (1.00-1.34)	1.3 (1.13-1.50)	1.3 (1.18-1.50)
Bipolar I disorder	1.4 (1.08-1.78)	1.2 (0.84-1.81)	1.6 (1.06-2.55)	1.4 (1.03-1.90)	2.0 (1.59-2.44)	1.4 (1.01-1.83)	1.6 (1.13-2.30)	2.4 (1.84-3.11)
Bipolar II disorder	1.3 (0.70-2.39)	1.4 (0.67-2.74)	1.0 (0.34-3.04)	1.4 (0.54-3.63)	1.2 (0.63-2.20)	0.8 (0.35-1.91)	1.0 (0.46-2.35)	1.4 (0.66-3.01)
Persistent depression	0.9 (0.72-1.15)	0.8 (0.58-1.11)	0.9 (0.63-1.32)	1.0 (0.75-1.47)	1.3 (1.09-1.46)	1.3 (1.01-1.58)	1.1 (0.88-1.45)	1.3 (1.10-1.58)
Any anxiety disorder	1.1 (0.97-1.27)	1.2 (1.00-1.37)	1.0 (0.77-1.24)	1.1 (0.91-1.37)	1.3 (1.18-1.43)	1.2 (1.04-1.35)	1.3 (1.11-1.52)	1.4 (1.22-1.57)
Panic disorder	1.1 (0.89-1.42)	1.1 (0.83-1.46)	1.1 (0.71-1.58)	1.2 (0.83-1.72)	1.3 (1.12-1.44)	1.0 (0.81-1.25)	1.3 (1.04-1.63)	1.4 (1.18-1.66)
Agoraphobia	1.1 (0.81-1.44)	1.3 (0.86-1.84)	0.9 (0.60-1.47)	1.0 (0.65-1.46)	1.0 (0.80-1.27)	0.9 (0.62-1.24)	1.0 (0.67-1.64)	1.0 (0.82-1.34)
Social anxiety disorder	0.8 (0.63-0.98)	0.6 (0.47-0.88)	1.1 (0.69-1.65)	0.8 (0.56-1.17)	1.0 (0.86-1.20)	0.9 (0.65-1.13)	1.2 (0.85-1.60)	1.0 (0.85-1.26)
Specific phobia	1.2 (1.03-1.43)	1.4 (1.13-1.67)	1.1 (0.83-1.48)	1.0 (0.79-1.33)	1.2 (1.11-1.41)	1.3 (1.13-1.60)	1.2 (1.01-1.54)	1.2 (1.02-1.38)
Generalized anxiety disorder	1.0 (0.86-1.22)	1.2 (0.96-1.46)	0.7 (0.53-1.01)	1.0 (0.77-1.38)	1.2 (1.05-1.39)	1.2 (1.02-1.45)	1.2 (0.91-1.52)	1.2 (1.01-1.46)
Posttraumatic stress disorder	1.0 (0.86-1.22)	0.9 (0.74-1.15)	0.9 (0.69-1.29)	1.2 (0.93-1.57)	1.3 (1.10-1.48)	1.1 (0.88-1.35)	1.2 (0.94-1.52)	1.4 (1.19-1.68)
Personality disorder								
Antisocial	1.6 (1.28-1.94)	1.4 (1.06-1.76)	1.7 (1.23-2.25)	1.8 (1.40-2.36)	1.9 (1.67-2.26)	1.3 (0.98-1.60)	1.7 (1.26-2.20)	2.4 (2.06-2.83)
Borderline	1.9 (1.66-2.23)	1.7 (1.42-2.06)	1.8 (1.43-2.25)	2.5 (2.02-3.17)	2.0 (1.74-2.19)	1.5 (1.22-1.80)	1.5 (1.27-1.83)	2.5 (2.17-2.87)
Schizotypal	1.1 (0.95-1.28)	1.1 (0.85-1.30)	1.0 (0.80-1.33)	1.2 (1.00-1.49)	1.1 (0.93-1.24)	0.9 (0.73-1.16)	1.0 (0.82-1.32)	1.2 (0.98-1.36)

Abbreviations: AOR, adjusted odds ratio; AUD, alcohol use disorder.

^a The AORs are controlled for sociodemographic characteristics and other psychiatric disorders. Significant AORs ($P < .05$) appear in boldface.

Results

Prevalence, Onset, and Sociodemographic Correlates

Prevalences (SE) of 12-month and lifetime DSM-5 AUD were 13.9% (0.31%) and 29.1% (0.48%), respectively (Table 2). Twelve-month prevalences of mild, moderate, and severe AUD were 7.3% (0.19%), 3.2% (0.13%), and 3.4% (0.12%), respectively; prevalences of lifetime AUD, 8.6% (0.18%), 6.6% (0.18%), and 13.9% (0.31%), respectively. Mean age at AUD onset was 26.2 years, which decreased with increasing severity to 30.1 years for mild AUD, 25.9 years for moderate AUD, and 23.9 years for severe AUD. Rates of 12-month and lifetime DSM-IV AUDs in the NESARC-III were 12.7% and 43.6%, respectively, which are considerably higher than those of the 2001-2002 NESARC (8.5% and 30.3%, respectively).⁶

Table 2 and Table 3 show prevalences and adjusted odds ratios of DSM-5 AUD by sociodemographic characteristics. Odds of 12-month and lifetime AUD were greater among men and lower among black, Asian or Pacific Islander, and His-

panic than white respondents, regardless of severity. Native American respondents had greater rates of severe AUD than white respondents. Odds of 12-month and lifetime AUD were greater among respondents younger than 65 years, regardless of severity level. With few exceptions, rates of AUD were greater among previously and never married respondents than those currently married or cohabitating. Most groups of respondents in the lowest 3 income levels had greater rates of 12-month and lifetime severe AUD than those with the highest incomes.

Compared with respondents who attained postsecondary educational levels, respondents with educational levels less than high school had greater odds of severe and lower odds of mild 12-month AUD. Conversely, respondents with educational levels of high school or less had lower odds of any, mild, and moderate lifetime AUD than those with postsecondary education. Regardless of severity, the odds of 12-month but not lifetime AUD were greater among respondents living in urban areas. With few exceptions, the odds of AUD were lower in the Northeast and South than in the West.

Table 5. Mean Norm-Based Disability Scores by 12-Month Alcohol Use Disorder (AUD)

AUD	Norm-Based Scores, Mean (SE) ^a			
	Mental Health	Social Functioning	Role Emotional	Mental Component Summary
None	52.3 (0.09)	50.9 (0.10)	48.7 (0.12)	51.4 (0.09)
Any	48.6 (0.20) ^b	49.1 (0.17) ^c	46.9 (0.20) ^b	47.6 (0.18) ^b
Mild	50.4 (0.25) ^b	50.9 (0.22)	48.5 (0.24) ^d	49.6 (0.23) ^b
Moderate	48.3 (0.39) ^b	48.6 (0.43) ^d	46.8 (0.36) ^b	47.2 (0.37) ^b
Severe	45.1 (0.38) ^b	45.7 (0.41) ^c	43.4 (0.38) ^b	43.8 (0.38) ^b
No. of AUD criteria				
0	52.4 (0.09)	50.9 (0.10)	48.6 (0.13)	51.5 (0.09)
1	51.0 (0.24) ^b	51.0 (0.22)	49.1 (0.23)	50.3 (0.22) ^c
2	50.5 (0.32) ^b	50.9 (0.27)	48.6 (0.30)	49.7 (0.28) ^b
3	50.2 (0.39) ^c	51.0 (0.36)	48.3 (0.34)	49.3 (0.36) ^c
4	48.4 (0.53) ^b	49.0 (0.64)	47.6 (0.47)	47.6 (0.53) ^b
5	48.2 (0.54) ^c	48.1 (0.49) ^d	45.6 (0.56) ^b	46.5 (0.50) ^b
6	47.3 (0.66) ^b	48.3 (0.63)	45.3 (0.64) ^c	46.1 (0.60) ^b
7	45.9 (1.10) ^d	46.6 (1.11)	43.3 (1.01) ^c	44.7 (1.12) ^d
8	45.3 (0.82) ^b	46.1 (0.82)	43.6 (0.81) ^d	44.4 (0.85) ^c
9	44.2 (1.17) ^d	44.2 (1.22)	44.3 (1.06)	42.9 (1.10) ^c
10	42.1 (1.12) ^b	42.0 (1.33) ^c	40.4 (1.02) ^b	40.1 (1.21) ^b
11	39.2 (1.23) ^b	40.2 (1.42) ^c	37.6 (1.38) ^b	36.7 (1.42) ^b

^a Scores were determined using 12-Item Short Form Health Survey, version 2.

^b Significantly different ($P < .001$) from the scores for individuals with no AUD and 0 AUD criteria, after adjusting for sociodemographic characteristics and 12-month psychiatric comorbidity.

^c Significantly different ($P < .01$) from the scores for individuals with no AUD and 0 AUD criteria, after adjusting for sociodemographic characteristics and 12-month psychiatric comorbidity.

^d Significantly different ($P < .05$) from the scores for individuals with no AUD and 0 AUD criteria, after adjusting for sociodemographic characteristics and 12-month psychiatric comorbidity.

Comorbidity

When we controlled for sociodemographic characteristics and other disorders, AUD was associated with other substance use disorders, major depressive and bipolar I disorders, and antisocial and borderline PDs across time frames and severity levels (Table 4; see eTables 1 and 2 in the Supplement, in which we controlled for sociodemographic characteristics only). Alcohol use disorder was also positively associated with 12-month specific phobia, but negatively associated with past-year social anxiety disorder. Lifetime AUD was associated with persistent depression (except moderate severity), panic disorder (except mild severity), specific phobia, and generalized anxiety disorder (except moderate severity). Any and severe lifetime AUD were associated with posttraumatic stress disorder.

Disability

When we adjusted for sociodemographic characteristics and psychiatric comorbidity, respondents with 12-month AUD had significantly lower Mental Health, Social Functioning, Role Emotional, and Mental Component Summary scores than those without AUD. With few exceptions, disability was greater among respondents with 1 or more positive AUD criteria compared with those with none, and disability generally increased with greater severity (Table 5).

Seeking Treatment or Help for AUD

Among respondents with 12-month and lifetime DSM-5 AUD, 7.7% and 19.8%, respectively, sought treatment or help for AUD. Corresponding rates for any 12-month and lifetime DSM-IV AUD were 8.1% and 15.6%, slightly higher than those in the 2001-2002 NESARC (7.2% and 14.0%, respectively). In the NESARC-III, the mean age at first treatment of DSM-5 AUD was 29.4 years, representing a 3-year lag between the mean ages at onset (26.2 years) and treatment.

Among those with 12-month AUD, 4.5% received help from 12-step groups; 3.6%, from health care practitioners; and 2.0% and 1.8%, from outpatient facilities and rehabilitation programs, respectively. Treatment from other sources was less frequent (eTables 3 and 4 in the Supplement). Respondents with lifetime AUD showed similar treatment modality rankings, although a higher percentage sought treatment through rehabilitation programs (9.0%) than from health care practitioners (8.7%). Treatment rankings across severity levels were similar to those for overall AUD. In general, treatment seeking increased from mild to moderate to severe AUD among respondents with 12-month (2.7% to 4.9% to 21.3%, respectively) and lifetime (4.4% to 8.7% to 34.7%, respectively) AUD.

Discussion

In 2012 through 2013, US prevalences of DSM-5 12-month and lifetime AUD among adults 18 years and older were 13.9% and 29.1%, respectively, representing approximately 32 648 000 and 68 485 000 individuals, respectively, in the United States. Corresponding DSM-IV rates, 12.7% and 43.6%, respectively, increased substantially since 2001 through 2002 (8.5% and 30.3%, respectively).⁶ Increases in DSM-IV AUD during the past decade may partly reflect increases in heavy alcohol consumption during that period: past-year drinking of at least 5, at least 8, and at least 10 drinks/d increased from 31.0%, 15.6%, and 11.5%, respectively, in the 2001-2002 NESARC to 39.6%, 20.8%, and 15.5%, respectively, in the 2012-2013 NESARC-III (R.B.G., unpublished data, February 2015). In contrast, rates of 12-month AUD remained stable from 2002 and 2013 (about 7.5%) in the National Survey on Drug Use and Health.¹⁵ More research on reasons for increasing prevalence of AUD during the

past decade and discrepancies in the rates between national surveys is warranted.

Consistent with previous research, rates of AUD were greater among men than women.^{1,2,5,14} Age was inversely related to 12-month AUD, a finding also observed in earlier epidemiologic studies.^{1-5,14} Whether this result is owing to cohort effects, differential mortality, or recall bias merits further investigation. The 12-month rate of 7.1% for severe AUD among 18- to 29-year-old respondents is especially striking. The rate is consistent with the earlier age at onset of severe relative to mild or moderate AUD (23.9 vs 25.9 or 30.1 years, respectively) and increasing rates of heavy drinking in this age group. For example, among men, past-year drinking of at least 5, at least 8, and at least 10 drinks/d increased from 60.7%, 41.0%, and 33.9%, respectively, in the NESARC to 68.2%, 46.3%, and 38.0%, respectively, in the NESARC-III. In women, the increase was from 33.5%, 14.7%, and 8.7%, respectively, in the NESARC to 47.7%, 22.1%, and 14.2%, respectively, in the NESARC-III (R.B.G, unpublished data, February 2015). Thus, emerging adulthood is becoming an increasingly vulnerable period for AUD onset. Given the potential effect of young-adult AUD on long-term employment prospects in a changing economy and the risk for young-adult alcohol-related mortality, the increases suggest an urgent need to develop and implement more effective prevention and intervention efforts.

Study findings indicate a lower risk for AUD among black, Asian or Pacific Islander, and Hispanic than white respondents. Although genetic factors affecting alcohol metabolism likely influence lower rates among Asian respondents,^{42,43} understanding risk factors among white respondents and protective factors among black and Hispanic respondents will be important to elucidate the etiology of AUD and design better prevention and intervention programs. In contrast, Native American respondents had high rates of 12-month and lifetime severe AUD. These results are consistent with regional studies of Native Americans showing high rates of alcohol-related morbidity and mortality⁴⁴⁻⁴⁶ and underscore the need for more extensive prevention and intervention efforts in this group.

We generally found significant associations between 12-month and lifetime AUD and other substance use disorders, major depressive disorder, bipolar I disorder, specific phobia, and antisocial and borderline PDs when we controlled for sociodemographic characteristics and other disorders. Significant associations between persistent depressive disorder, post-traumatic stress disorder, panic disorder, and generalized anxiety disorder with lifetime AUD were also observed. That these associations were weaker than those when we only controlled for sociodemographic variables suggests common causal factors underlying the pairwise comorbid associations. Moreover, that these associations remained significant after additional control for comorbid disorders indicates the possibility of unique underlying factors contributing to the disorder-specific associations.⁴⁷⁻⁴⁹ These findings, consistent with genetic studies, highlight the need for further investigation of the unique and common factors underlying AUD comorbidity. Within this framework, special emphasis should be given to sociodemographic risk factors identified herein (education and income) that may interact with genetic vulnerability to influence phenotypic expression of AUD.

Despite increased AUD prevalence during the past decade, this study showed that AUD largely goes untreated. Rather than lack of insurance, fears of stigmatization and beliefs that treatment is ineffective explain the lack of AUD treatment in the United States.⁵⁰⁻⁵⁴ Nonetheless, a large body of literature supports the effectiveness of treatment of AUD. Prior NESARC findings⁵⁵ show that participation in 12-step groups increases the likelihood of recovery, consistent with randomized clinical trials testing the efficacy of 12-step facilitation administered by health care practitioners.⁵⁶ Reviews and meta-analyses of randomized trials involving thousands of patients have demonstrated the efficacy of brief screening and intervention in primary care settings among individuals whose alcohol problems are not yet severe.⁵⁷⁻⁶⁰ For more severe problems, effective medications include oral and extended-release naltrexone hydrochloride, acamprosate calcium, and disulfiram⁶¹⁻⁶⁵; evidence-based behavioral treatments include 12-step facilitation,⁵⁶ motivational interviewing,⁶⁶⁻⁶⁸ and cognitive-behavioral therapy.⁶⁸⁻⁷⁰ Effective treatment might be more widely accessed if public and professional education programs targeted mistaken attitudes about treatment efficacy and provided information about where to obtain treatment.

All measures of current disability were strongly related to 12-month AUD, increasing with AUD severity. These findings highlight the seriousness of AUD, particularly among never-treated individuals. Prior research has shown significantly less disability among those treated for an AUD than those never treated.^{71,72} When untreated, AUD-related functional impairment also has been associated with diminished life chances, increased stressful life conditions, and increased risk for and severity of other psychiatric disorders, even after AUD remission.⁷³ These findings suggest that AUD treatment should aim to remediate impaired functioning in addition to targeting alcohol consumption.

Strengths of the NESARC-III include its large sample size, reliable and valid measures of AUD and other psychopathology, and rigorous study methods. The NESARC-III is also unique in providing current, comprehensive information on DSM-5 AUD and its correlates and comorbidity in the United States. Potential study limitations include differences in some aspects of survey methods between the 2001-2002 NESARC and the 2012-2013 NESARC-III and less than ideal reliability for a few diagnoses other than AUD. Lifetime comorbid associations with AUD may be subject to recall bias and bias in variation of associations by ages at onset of comorbid disorders. However, these concerns are not relevant to 12-month comorbidity associations that demonstrated similar direction and magnitude as comorbid lifetime associations. Similarly to other large US surveys, we did not assess all psychiatric disorders. Because some population segments were not covered (ie, homeless individuals, prisoners, and most treated individuals), estimates presented herein may underestimate the true prevalence of AUD. The NESARC-III was also cross-sectional. Longitudinal surveys are needed to further investigate the relationships found herein and their stability in the general population.

Conclusions

The DSM-5 diagnosis of AUD is a highly prevalent, highly comorbid, disabling disorder often untreated in the United

States. Numerous risk factors for AUD were identified that can lead to further hypothesis-driven investigation. Most importantly, this study highlighted the urgency of educating the public and policy makers about AUD and its treatments,

destigmatizing the disorder, and encouraging among those who cannot reduce their alcohol consumption on their own, despite substantial harm to themselves and others, to seek treatment.

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