

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

Deborah S. Hasin, PhD; Frederick S. Stinson, PhD; Elizabeth Ogburn, MS; Bridget F. Grant, PhD, PhD

Context: Epidemiologic information is important to inform etiological research and service delivery planning. However, current information on the epidemiology of alcohol use disorders in the United States is lacking.

Objectives: To present nationally representative findings on the prevalence, correlates, psychiatric comorbidity, and treatment of *DSM-IV* alcohol abuse and dependence.

Design, Setting, and Participants: Face-to-face interviews with a representative US adult sample (N=43 093).

Main Outcome Measures: Lifetime and 12-month *DSM-IV* alcohol abuse and dependence.

Results: Prevalence of lifetime and 12-month alcohol abuse was 17.8% and 4.7%; prevalence of lifetime and 12-month alcohol dependence was 12.5% and 3.8%. Alcohol dependence was significantly more prevalent among men, whites, Native Americans, younger and unmarried adults, and those with lower incomes. Current alcohol abuse was more prevalent among men, whites, and younger and unmarried individuals while lifetime rates were highest among middle-aged Americans. Signifi-

cant disability was particularly associated with alcohol dependence. Only 24.1% of those with alcohol dependence were ever treated, slightly less than the treatment rate found 10 years earlier. Strong associations between other substance use disorders and alcohol use disorders (odds ratios, 2.0-18.7) were lower but remained strong and significant (odds ratios, 1.8-7.5) when controlling for other comorbidity. Significant associations between mood, anxiety, and personality disorders and alcohol dependence (odds ratios, 2.1-4.8) were reduced in number and magnitude (odds ratios, 1.5-2.0) when controlling for other comorbidity.

Conclusions: Alcohol abuse and dependence remain highly prevalent and disabling. Comorbidity of alcohol dependence with other substance disorders appears due in part to unique factors underlying etiology for each pair of disorders studied while comorbidity of alcohol dependence with mood, anxiety, and personality disorders appears more attributable to factors shared among these other disorders. Persistent low treatment rates given the availability of effective treatments indicate the need for vigorous education efforts for the public and professionals.

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Author Affiliations: Mailman School of Public Health (Dr Hasin and Ms Ogburn) and College of Physicians and Surgeons (Dr Hasin), Columbia University, New York, New York; New York State Psychiatric Institute, New York (Dr Hasin and Ms Ogburn); and Laboratory of Epidemiology and Biometry, Division of Intramural Clinical and Biological Research, National Institute on Alcohol Abuse and Alcoholism, National Institutes of Health, Department of Health and Human Services, Bethesda, Maryland (Drs Stinson and Grant).

ALCOHOL USE DISORDERS (alcohol abuse and dependence) are maladaptive patterns of alcohol consumption manifested by symptoms leading to clinically significant impairment or distress.¹ Alcohol abuse and dependence are associated with car crashes,² domestic violence,³ fetal alcohol syndrome,⁴ neuropsychological impairment,⁵ poor medication adherence,⁶⁻⁸ economic costs and lost productivity,⁹ and psychiatric comorbidity.^{10,11} The descriptive epidemiology of alcohol use disorders provides important evidence on treatment and prevention needs and informs hypotheses on biological and psychosocial causes of alcohol use disor-

ders. Thus, epidemiologic information must be accurate and up-to-date.

Large-scale US and international surveys conducted in the early 1980s¹²⁻¹⁴ using *DSM-III* criteria¹⁵ showed current prevalence of alcohol abuse and dependence of 1.9% to 2.1% and 2.8%, lifetime prevalence of 4.4% to 14.0% and 8.8% to 23.0%, and lifetime prevalence of any alcohol use disorder (abuse or dependence) of 12.6% to 27.5%. Using *DSM-III-R*¹⁶ criteria, surveys showed current prevalence of alcohol abuse and dependence of 1.0% to 4.7% and 3.0% to 7.2%, lifetime prevalence of 3.5% to 23.7% and 4.1% to 14.1%, and lifetime prevalence of any alcohol use disorder of 8.5% to 32.8%.¹⁷⁻²¹ In surveys using *DSM-IV* cri-

teria,²²⁻²⁵ prevalence of current alcohol abuse and dependence was 1.9% to 4.3% and 3.6% to 4.4%, lifetime prevalence was 4.5% to 13.2% and 3.8% to 13.3%, and lifetime prevalence of any alcohol use disorder was 8.3% to 18.2%. The range of rates over time, location, and diagnostic criteria^{26,27} leave unclear the relative influence of true variation and methodological differences, although certain risk factors (eg, male sex, younger age) remain consistent throughout. These studies contributed valuable information on alcohol use disorders toward the end of the 20th century, but less is known about the epidemiology of alcohol disorders since then. The National Household Survey on Drug Abuse²⁵ began assessing alcohol disorders in 2000 but does not address lifetime diagnoses, disability, psychiatric comorbidity, or separate information on alcohol abuse and dependence despite differences between abuse and dependence in symptoms, prevalence, and correlates.^{1,24}

Given the seriousness of alcohol use disorders, current data on the prevalence, correlates, disability, comorbidity, and treatment of alcohol use disorders are needed using a reliable, valid, and uniform data source. Currently, several aspects of the epidemiology of alcohol use disorders are unknown. First, potential health disparities in disadvantaged groups and in birth cohorts now aging (eg, “baby boom” and “generation X” cohorts) require determining the prevalence of alcohol abuse and dependence in these age and race/ethnic groups. Second, accurate information on the distinct comorbidity of alcohol abuse and dependence with other specific mental disorders is important.^{28,29} These aspects require larger samples than were previously available. Further, the comorbidity of alcohol abuse or dependence with other disorders controlling for the comorbidity of these disorders with each other has not been addressed, which is important information in understanding the unique relationship of alcohol abuse and dependence to other psychiatric disorders. Third, recent US^{30,31} and international³² surveys deviated from *DSM-IV* criteria by skipping alcohol dependence criteria if respondents did not endorse alcohol abuse criteria.³³⁻³⁵ This caused about one third of 12-month cases and about 15% of lifetime cases of alcohol dependence (disproportionately women and minorities) to be missed.³⁴ Fourth, determining whether treatment needs that were unmet in the early 1990s are now better served is important.

The present study was designed to provide this knowledge, using data from the 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), sponsored by the National Institute on Alcohol Abuse and Alcoholism.^{10,36} The richness, representativeness, and size of the NESARC enabled us to address *DSM-IV* alcohol abuse and dependence in minorities not previously studied on a national basis, as well as the comorbidity of *DSM-IV* alcohol abuse and dependence with specific, often rare, psychiatric conditions, disability, and treatment rates among those with alcohol use disorders. Importantly, all symptoms of alcohol abuse and dependence were asked of all drinkers, resulting in complete coverage of both *DSM-IV* alcohol abuse and dependence.

Table 1. Characteristics of NESARC Respondents

| Characteristic | % (SE) ^a | Total No. ^b |
|----------------------------|---------------------|------------------------|
| Sex | | |
| Male | 47.92 (0.31) | 18 518 |
| Female | 52.08 (0.31) | 24 575 |
| Race/ethnicity | | |
| White | 70.89 (1.59) | 24 507 |
| Black | 11.07 (0.64) | 8245 |
| Native American | 2.12 (0.16) | 701 |
| Asian | 4.36 (0.53) | 1332 |
| Hispanic | 11.56 (1.23) | 8308 |
| Age, y | | |
| 18-29 | 21.80 (0.37) | 8666 |
| 30-44 | 30.89 (0.32) | 13 382 |
| 45-64 | 31.06 (0.30) | 12 840 |
| ≥65 | 16.25 (0.33) | 8205 |
| Marital status | | |
| Married/cohabiting | 61.62 (0.47) | 22 081 |
| Widowed/separated/divorced | 17.46 (0.23) | 11 117 |
| Never married | 20.92 (0.47) | 9895 |
| Education | | |
| Less than high school | 15.65 (0.49) | 7849 |
| High school | 29.33 (0.55) | 12 547 |
| Some college or higher | 55.02 (0.62) | 22 697 |
| Personal income, \$ | | |
| 0-19 999 | 47.25 (0.58) | 21 075 |
| 20 000-34 999 | 22.65 (0.36) | 9999 |
| 35 000-69 999 | 21.96 (0.38) | 9031 |
| ≥70 000 | 8.14 (0.38) | 2988 |
| Urbanicity | | |
| Urban | 80.28 (1.61) | 35 297 |
| Rural | 19.72 (1.61) | 7796 |
| Region | | |
| Northeast | 19.67 (3.41) | 8209 |
| Midwest | 23.15 (3.18) | 8991 |
| South | 35.21 (3.25) | 16 156 |
| West | 21.97 (3.51) | 9737 |

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

^aBased on weighted data.

^bBased on unweighted data.

METHODS

SAMPLE

The 2001-2002 NESARC is based on a US representative sample as described elsewhere.^{10,36} The target population included those residing in households and group quarters who were aged 18 years and older. Face-to-face interviews were conducted with 43 093 respondents. The survey response rate was 81%. Blacks, Hispanics, and young adults (ages 18-24 years) were oversampled with data adjusted for oversampling and nonresponse. The weighted data were then adjusted to represent the US civilian population based on the 2000 census. (**Table 1** shows the weighted distribution of the NESARC sample.) Field methods included extensive home study and structured in-person training, supervision, and quality control, including random call-backs to respondents to verify data, described in detail elsewhere.^{10,36-38}

DSM-IV DIAGNOSTIC INTERVIEW

The diagnostic interview was the National Institute on Alcohol Abuse and Alcoholism Alcohol Use Disorder and Associ-

ated Disabilities Interview Schedule–*DSM-IV* Version (AUDADIS-IV).³⁹ This structured interview, designed for lay interviewers, was developed to advance measurement of substance use and mental disorders in large-scale surveys.^{10,36} Computer diagnostic programs implemented the *DSM-IV* criteria for the disorders using AUDADIS-IV data.

ALCOHOL USE DISORDERS

Extensive AUDADIS-IV questions covered *DSM-IV* criteria for alcohol abuse and dependence. Consistent with *DSM-IV*, lifetime diagnoses of alcohol abuse required 1 or more of the 4 abuse criteria in the 12-month period preceding the interview or previously. AUDADIS-IV alcohol dependence diagnoses required 3 or more of the 7 *DSM-IV* dependence criteria in the last 12 months or during any previous 12-month period. For prior diagnoses of alcohol dependence, 3 or more criteria must have occurred within a 1-year period following the *DSM-IV* clustering criterion. AUDADIS-IV diagnoses of alcohol use disorders incorporate important improvements over other survey instruments, including the Diagnostic Interview Schedule (DIS),⁴⁰ the University of Michigan Composite International Diagnostic Interview (UM-CIDI),⁴¹ and the World Mental Health-CIDI (WMH-CIDI).⁴² First, to diagnose *DSM-IV* alcohol dependence, the AUDADIS-IV requires 3 or more criteria within a year in contrast to the DIS and UM-CIDI, which diagnose dependence criteria without requiring syndromal clustering of symptoms. Second, as noted, the WMH-CIDI skipped dependence questions among those with no abuse symptoms. By missing current dependence cases, especially among women and minorities,³³⁻³⁵ the WMH-CIDI underestimates dependence prevalence (NESARC, 3.8% vs National Comorbidity Survey-Replication [NCS-R], 1.3%) and limits the study of comorbidity between alcohol dependence and other psychiatric disorders. In contrast, the NESARC provides complete coverage of *DSM-IV* alcohol dependence.

The reliability of the AUDADIS-IV alcohol diagnoses is documented in clinical and general population samples⁴³⁻⁴⁶ with test-retest reliability ranging from good to excellent ($\kappa=0.70-0.84$). Convergent, discriminant, and construct validity of AUDADIS-IV alcohol use disorder criteria and diagnoses were good to excellent,⁴⁷⁻⁵¹ including in the World Health Organization/National Institutes of Health International Study on Reliability and Validity,⁵²⁻⁵⁷ where clinical reappraisals documented good validity of *DSM-IV* alcohol use disorder diagnoses ($\kappa=0.60-0.76$).^{52,58} No reliability data exist for the WMH-CIDI⁴² used in the NCS-R.^{30,31} Validity coefficients were similar for alcohol disorders in the WMH-CIDI ($\kappa=0.56, 0.70$)³⁰ but lower for the DIS (≤ 0.50).⁵⁹

MOOD, ANXIETY, AND PERSONALITY DISORDERS

Mood disorders included *DSM-IV* primary major depressive disorder, bipolar I, bipolar II, and dysthymia. Anxiety disorders included *DSM-IV* primary panic disorder with and without agoraphobia, social and specific phobias, and generalized anxiety disorder. AUDADIS-IV methods to diagnose these disorders are described in detail in the ARCHIVES^{10,11} and elsewhere.^{37,38,60-64} In *DSM-IV*, “primary” excludes substance-induced disorders or those due to medical conditions; AUDADIS-IV improvements over other measures in making the primary/substance-induced distinction for mood and anxiety disorders are presented elsewhere,^{10,11,62-64} including the fact that specific AUDADIS-IV questions about the chronological relationship between intoxication or withdrawal and the full psychiatric syndrome implement *DSM-IV* criteria differentiating primary from

substance-induced disorders. Major depressive disorder diagnoses also ruled out bereavement. Personality disorders (PDs), assessed on a lifetime basis, included *DSM-IV* avoidant, dependent, obsessive-compulsive, paranoid, schizoid, and antisocial personality disorders. *DSM-IV* PD diagnoses require long-term patterns of social/occupational impairment and exclusion of substance-induced cases; AUDADIS-IV PD diagnoses were made accordingly.⁶⁰⁻⁶²

Test-retest reliability for AUDADIS-IV mood, anxiety, and personality diagnoses in general population and clinical settings was fair to good ($\kappa=0.40-0.62$).⁴⁴⁻⁴⁶ Test-retest reliabilities of AUDADIS-IV personality disorders (not measured in prior surveys) compare favorably with those in patient samples using semistructured personality interviews.⁶⁵ Convergent validity was good to excellent for all affective and anxiety diagnoses, and selected diagnoses showed good agreement ($\kappa=0.64-0.68$) with psychiatrist reappraisals,^{11,46,58} similar to that of the NCS-R WMH-CIDI ($\kappa=0.54$)³⁰ and better than the DIS ($\kappa=0.20$).^{66,67} Test-retest reliability data do not exist for the DIS in general population samples or for the NCS-R WMH-CIDI.

DISABILITY AND IMPAIRMENT

Disability among respondents was determined with the Short Form 12, version 2 (SF-12v2).⁶⁸ In contrast to other measures of functioning that incorporate information on premature mortality (disability-adjusted life years), the SF-12v2 is a reliable and valid measure of current impairment in psychosocial functioning widely used in population surveys.⁶⁸ The SF-12v2 scales included mental health, social functioning (limitations due to emotional problems), role emotional functioning (role impairment due to emotional problems), and mental component summary (MCS). Each SF-12v2 norm-based disability score is a continuous variable with mean of 50 in the general population, a standard deviation of ± 10 , and a range of 0 to 100. Lower scores indicate more disability.

STATISTICAL ANALYSES

Weighted means, frequencies, and cross-tabulations were computed. Adjusted odds ratios (ORs) derived from multiple logistic regressions indicated associations between alcohol abuse or dependence and sociodemographic variables. Associations of alcohol use disorders with psychiatric comorbidity were calculated 2 ways. The first included control for sociodemographic characteristics comparable with other reports on comorbidity. The second way further controlled for all other substance use and psychiatric disorders. This analysis addresses the fact that tests of association controlling only sociodemographic characteristics do not yield information on the unique relationship of other disorders (that themselves have considerable comorbidity) to alcohol abuse and dependence. Analyses that control for other comorbidity test the hypothesis that an alcohol diagnosis is associated with the pure (noncomorbid) form of the other disorder.⁶⁹

The relationship of 12-month alcohol abuse and dependence to disability as measured by the SF-12v2 disability scores was determined using multiple linear regression analyses controlling for sociodemographic characteristics and all other substance use, mood, anxiety, and personality disorders assessed in the NESARC. Hazard rates, reflecting lifetime alcohol abuse and dependence risk at specific ages among the population at risk at those ages, were calculated using standard life table methods.⁷⁰ Hazard rate curves were statistically smoothed by using rolling averages of 5-year age groups, a standard methodology. Standard errors and 99% confidence intervals were estimated using SUDAAN,⁷¹ which adjusts for characteristics of complex sample surveys such as the NESARC.

Table 2. Prevalences of 12-Month and Lifetime *DSM-IV* Alcohol Use Disorders by Sociodemographic Characteristics

| Characteristic | 12-Month, % (SE) | | | Lifetime, % (SE) | | |
|----------------------------|---------------------------------|--------------------------|-------------------------------|-----------------------------------|--------------------------|-------------------------------|
| | Alcohol Use Disorder (n = 3327) | Alcohol Abuse (n = 1843) | Alcohol Dependence (n = 1484) | Alcohol Use Disorder (n = 11 843) | Alcohol Abuse (n = 7062) | Alcohol Dependence (n = 4781) |
| Total | 8.5 (0.24) | 4.7 (0.18) | 3.8 (0.14) | 30.3 (0.77) | 17.8 (0.52) | 12.5 (0.35) |
| Sex | | | | | | |
| Male | 12.4 (0.36) | 6.9 (0.28) | 5.4 (0.21) | 42.0 (1.00) | 24.6 (0.70) | 17.4 (0.50) |
| Female | 4.9 (0.22) | 2.6 (0.16) | 2.3 (0.13) | 19.5 (0.64) | 11.5 (0.44) | 8.0 (0.31) |
| Race/ethnicity | | | | | | |
| White | 8.9 (0.27) | 5.1 (0.21) | 3.8 (0.16) | 34.1 (0.65) | 20.3 (0.46) | 13.8 (0.35) |
| Black | 6.9 (0.40) | 3.3 (0.30) | 3.6 (0.29) | 20.6 (0.85) | 12.2 (0.58) | 8.4 (0.43) |
| Native American | 12.1 (1.60) | 5.8 (1.02) | 6.4 (1.17) | 43.0 (2.62) | 22.9 (1.97) | 20.1 (1.99) |
| Asian | 4.5 (0.62) | 2.1 (0.46) | 2.4 (0.38) | 11.6 (1.18) | 5.6 (0.76) | 6.0 (0.75) |
| Hispanic | 7.9 (0.58) | 4.0 (0.30) | 4.0 (0.44) | 21.0 (1.19) | 11.5 (0.70) | 9.5 (0.73) |
| Age, y | | | | | | |
| 18-29 | 16.2 (0.59) | 7.0 (0.39) | 9.2 (0.41) | 30.1 (0.94) | 12.8 (0.58) | 17.3 (0.64) |
| 30-44 | 9.7 (0.40) | 6.0 (0.31) | 3.8 (0.23) | 36.7 (1.01) | 21.4 (0.68) | 15.4 (0.53) |
| 45-64 | 5.4 (0.29) | 3.5 (0.25) | 1.9 (0.15) | 31.4 (0.92) | 20.4 (0.69) | 11.0 (0.45) |
| ≥65 | 1.5 (0.16) | 1.2 (0.15) | 0.2 (0.06) | 16.1 (0.60) | 12.7 (0.55) | 3.4 (0.27) |
| Marital status | | | | | | |
| Married/cohabiting | 6.1 (0.22) | 4.0 (0.19) | 2.1 (0.12) | 30.4 (0.77) | 19.5 (0.54) | 10.9 (0.35) |
| Widowed/separated/divorced | 8.1 (0.45) | 4.4 (0.28) | 3.7 (0.30) | 28.8 (0.93) | 16.5 (0.62) | 12.3 (0.59) |
| Never married | 15.9 (0.63) | 6.9 (0.43) | 9.0 (0.44) | 31.2 (1.04) | 14.0 (0.65) | 17.2 (0.67) |
| Education | | | | | | |
| Less than high school | 7.0 (0.45) | 3.1 (0.28) | 4.0 (0.33) | 23.7 (1.00) | 13.5 (0.72) | 10.2 (0.60) |
| High school | 8.3 (0.37) | 4.5 (0.26) | 3.7 (0.24) | 28.2 (0.87) | 16.3 (0.58) | 11.9 (0.48) |
| Some college or higher | 9.0 (0.30) | 5.2 (0.24) | 3.8 (0.16) | 33.2 (0.82) | 19.8 (0.59) | 13.4 (0.41) |
| Personal income, \$ | | | | | | |
| 0-19 999 | 7.6 (0.29) | 3.2 (0.18) | 4.5 (0.21) | 23.9 (0.74) | 12.6 (0.47) | 11.3 (0.40) |
| 20 000-34 999 | 9.5 (0.41) | 5.5 (0.31) | 4.0 (0.27) | 32.3 (0.93) | 18.6 (0.67) | 13.8 (0.53) |
| 35 000-69 999 | 9.0 (0.41) | 6.2 (0.36) | 2.9 (0.20) | 37.8 (1.12) | 23.7 (0.87) | 14.1 (0.54) |
| ≥70 000 | 8.8 (0.61) | 6.6 (0.61) | 2.2 (0.33) | 41.4 (1.40) | 30.0 (1.27) | 11.4 (0.69) |
| Urbanicity | | | | | | |
| Urban | 8.4 (0.28) | 4.6 (0.21) | 3.8 (0.15) | 29.6 (0.90) | 17.4 (0.60) | 12.2 (0.41) |
| Rural | 8.8 (0.44) | 4.8 (0.32) | 4.0 (0.31) | 33.3 (0.93) | 19.4 (0.69) | 13.8 (0.55) |
| Region | | | | | | |
| Northeast | 7.8 (0.59) | 4.3 (0.50) | 3.5 (0.29) | 27.1 (2.25) | 16.6 (1.68) | 10.6 (0.71) |
| Midwest | 10.6 (0.66) | 5.9 (0.43) | 4.6 (0.37) | 35.3 (1.63) | 20.7 (0.92) | 15.0 (0.87) |
| South | 7.3 (0.33) | 4.2 (0.24) | 3.1 (0.21) | 27.0 (0.82) | 16.7 (0.54) | 10.3 (0.48) |
| West | 8.8 (0.48) | 4.5 (0.34) | 4.3 (0.27) | 32.6 (1.87) | 17.6 (1.13) | 15.1 (0.95) |

RESULTS

PREVALENCE AND SOCIODEMOGRAPHIC CORRELATES OF *DSM-IV* ALCOHOL ABUSE AND DEPENDENCE

The 12-month prevalences of *DSM-IV* alcohol abuse and dependence (**Table 2**) were 4.7% and 3.8%; the 12-month prevalence of any alcohol use disorder was 8.5%. The lifetime prevalences of *DSM-IV* alcohol abuse and dependence were 17.8% and 12.5%, respectively; the total lifetime prevalence of any alcohol use disorder was 30.3%. **Table 3** shows the risks of 12-month and lifetime abuse and dependence in population subgroups via adjusted ORs and 99% confidence intervals.

For 12-month disorders, odds of alcohol abuse were greater among men; among whites compared with blacks, Asians, and Hispanics; and among respondents who were younger and unmarried. The odds of 12-month dependence were lower in the South than in the West and among Asians, blacks, and Hispanics than whites. The odds were

also higher among men, younger and unmarried adults, and those in the lowest income group.

For lifetime abuse and dependence, the odds were higher among men and lower among blacks, Asians, and Hispanics compared with whites. The odds of lifetime alcohol abuse were greater among respondents aged 30 to 64 years and lower among never-married adults, those with a high school education, and lower income. The odds of lifetime dependence were greater in the youngest age groups, unmarried respondents, Native Americans, and those with lower incomes; odds were lower in the Northeast and South than in the West.

ASSOCIATIONS BETWEEN *DSM-IV* ALCOHOL USE DISORDERS AND OTHER PSYCHIATRIC DISORDERS, CONTROLLING FOR SOCIODEMOGRAPHIC CHARACTERISTICS

Comorbidity between *DSM-IV* alcohol abuse and dependence and other psychiatric disorders adjusted for so-

Table 3. Adjusted Odds Ratios of 12-Month and Lifetime DSM-IV Alcohol Use Disorders by Sociodemographic Characteristics

| Characteristic | Adjusted Odds Ratios (99% Confidence Intervals) | | | | | |
|----------------------------|---|------------------------------|---------------------------------|------------------------------|------------------------------|------------------------------|
| | 12-Month | | | Lifetime | | |
| | Alcohol Use Disorder | Alcohol Abuse | Alcohol Dependence | Alcohol Use Disorder | Alcohol Abuse | Alcohol Dependence |
| Sex | | | | | | |
| Male | 2.7 (2.38-3.05) ^a | 2.5 (2.11-2.97) ^a | 2.5 (2.10-3.00) ^a | 3.1 (2.81-3.35) ^a | 2.3 (2.12-2.58) ^a | 2.6 (2.31-2.91) ^a |
| Female | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] |
| Race/ethnicity | | | | | | |
| White | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] |
| Black | 0.6 (0.53-0.76) ^a | 0.6 (0.47-0.79) ^a | 0.7 (0.54-0.95) ^a | 0.5 (0.45-0.57) ^a | 0.6 (0.54-0.70) ^a | 0.5 (0.45-0.61) ^a |
| Native American | 1.4 (0.93-2.10) | 1.2 (0.72-2.03) | 1.6 (0.91-2.65) | 1.4 (0.08-1.92) | 1.2 (0.88-1.65) | 1.4 (1.03-2.00) ^a |
| Asian | 0.4 (0.26-0.60) ^a | 0.4 (0.21-0.68) ^a | 0.5 (0.30-0.75) ^a | 0.2 (0.15-0.27) ^a | 0.2 (0.15-0.32) ^a | 0.3 (0.22-0.44) ^a |
| Hispanic | 0.7 (0.53-0.87) ^a | 0.7 (0.58-0.95) ^a | 0.7 (0.48-0.91) ^a | 0.4 (0.37-0.54) ^a | 0.5 (0.46-0.66) ^a | 0.5 (0.40-0.61) ^a |
| Age, y | | | | | | |
| 18-29 | 13.2 (9.44-18.50) ^a | 6.3 (4.25-9.20) ^a | 41.9 (20.66-85.04) ^a | 2.8 (2.46-3.29) ^a | 1.2 (0.98-1.47) | 6.7 (5.12-8.81) ^a |
| 30-44 | 8.1 (5.82-11.19) ^a | 4.8 (3.34-6.91) ^a | 22.1 (11.23-43.48) ^a | 3.5 (3.03-3.95) ^a | 1.8 (1.58-2.09) ^a | 6.2 (4.85-7.92) ^a |
| 45-64 | 4.1 (2.91-5.74) ^a | 2.7 (1.80-3.95) ^a | 10.3 (5.19-20.40) ^a | 2.5 (2.17-2.77) ^a | 1.6 (1.40-1.82) ^a | 3.9 (3.13-4.96) ^a |
| ≥65 | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] |
| Marital status | | | | | | |
| Married/cohabiting | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] |
| Widowed/separated/divorced | 2.3 (1.94-2.75) ^a | 1.8 (1.46-2.12) ^a | 3.1 (2.30-4.07) ^a | 1.4 (1.29-1.56) ^a | 1.1 (0.97-1.18) | 1.7 (1.50-2.00) ^a |
| Never married | 1.8 (1.54-2.04) ^a | 1.4 (1.14-1.73) ^a | 2.1 (1.70-2.71) ^a | 1.0 (0.89-1.10) | 0.8 (0.69-0.93) ^a | 1.2 (1.08-1.42) ^a |
| Education | | | | | | |
| Less than high school | 0.9 (0.76-1.18) | 0.8 (0.60-1.10) | 1.1 (0.85-1.47) | 0.8 (0.74-0.96) ^a | 0.9 (0.74-1.02) | 0.9 (0.74-1.06) |
| High school | 1.0 (0.83-1.11) | 1.0 (0.81-1.18) | 0.9 (0.76-1.15) | 0.9 (0.78-0.94) ^a | 0.9 (0.79-0.98) ^a | 0.9 (0.78-1.00) |
| Some college or higher | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] |
| Personal income, \$ | | | | | | |
| 0-19 999 | 0.9 (0.71-1.14) | 0.6 (0.42-0.79) ^a | 1.8 (1.13-2.82) ^a | 0.9 (0.75-1.02) | 0.6 (0.53-0.74) ^a | 1.6 (1.29-1.97) ^a |
| 20 000-34 999 | 1.0 (0.83-1.29) | 0.9 (0.66-1.15) | 1.5 (0.98-2.39) | 1.0 (0.85-1.12) | 0.7 (0.64-0.88) ^a | 1.6 (1.28-1.93) ^a |
| 35 000-69 999 | 1.0 (0.79-1.27) | 0.9 (0.71-1.24) | 1.2 (0.76-1.92) | 1.0 (0.87-1.16) | 0.8 (0.71-0.98) ^a | 1.4 (1.15-1.71) ^a |
| ≥70 000 | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] |
| Urbanicity | | | | | | |
| Urban | 0.9 (0.77-1.14) | 0.9 (0.74-1.16) | 0.9 (0.72-1.19) | 0.9 (0.77-1.04) | 0.9 (0.80-1.06) | 0.9 (0.78-1.08) |
| Rural | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] |
| Region | | | | | | |
| Northeast | 0.9 (0.66-1.14) | 0.9 (0.63-1.35) | 0.8 (0.62-1.10) | 0.7 (0.51-0.93) ^a | 0.9 (0.63-1.16) | 0.6 (0.51-0.79) ^a |
| Midwest | 1.2 (0.89-1.50) | 1.3 (0.93-1.73) | 1.0 (0.76-1.33) | 1.0 (0.74-1.25) | 1.1 (0.87-1.33) | 0.9 (0.68-1.08) |
| South | 0.8 (0.64-1.00) | 0.9 (0.71-1.24) | 0.7 (0.52-0.89) | 0.7 (0.56-0.85) ^a | 0.9 (0.74-1.08) | 0.6 (0.49-0.74) ^a |
| West | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] | 1.0 [Reference] |

^aOdds ratio is significant.

ciodemographic characteristics is outlined in **Table 4** for 12-month and **Table 5** for lifetime disorders. Twelve-month alcohol abuse was significantly associated with other 12-month substance use disorders except drug dependence but unrelated to 12-month psychiatric disorders except antisocial PD. In contrast, 12-month alcohol dependence was strongly and significantly associated with all 12-month substance use and psychiatric disorders. Lifetime alcohol dependence comorbidity followed a similar pattern.

ASSOCIATIONS BETWEEN DSM-IV ALCOHOL USE DISORDERS AND OTHER PSYCHIATRIC DISORDERS, CONTROLLING FOR SOCIODEMOGRAPHIC CHARACTERISTICS AND OTHER COMORBIDITY

The associations of 12-month and lifetime DSM-IV alcohol abuse and dependence with other substance use and

psychiatric disorders, controlling for sociodemographic characteristics and psychiatric comorbidity, are outlined in Table 4 and Table 5. Odds ratios were reduced when other comorbidity was controlled. Twelve-month alcohol abuse remained strongly and significantly associated with substance use disorders (OR≥1.8) but not with other Axis I disorders (and was negatively associated with schizoid PD). A similar pattern was observed for lifetime abuse with an additional negative association with bipolar I disorder. Twelve-month alcohol dependence remained strongly associated with substance use disorders (ORs=3.4-7.5) and bipolar disorders but with lower ORs (1.9, 2.0) and was significantly associated with only 2 Axis II disorders: histrionic and antisocial PD. Lifetime DSM-IV alcohol abuse followed a similar pattern of associations when comorbidity was controlled. Lifetime DSM-IV alcohol dependence remained positively although less strongly associated with substance use disorders; most mood and anxiety disorders; and paranoid, histrionic, and antisocial PDs.

Table 4. Adjusted Odds Ratios of 12-Month DSM-IV Alcohol Use Disorders and Other Psychiatric Disorders Controlling for Sociodemographic Characteristics and Comorbid Psychiatric Disorders

| Comorbid Disorder | Adjusted Odds Ratios (99% Confidence Intervals) | | | | | |
|---------------------------|---|------------------------------|---------------------------------|---|------------------------------|-------------------------------|
| | Sociodemographic Characteristics ^a | | | Sociodemographic Characteristics and Other Psychiatric Disorders ^b | | |
| | Alcohol Use Disorder | Alcohol Abuse | Alcohol Dependence | Alcohol Use Disorder | Alcohol Abuse | Alcohol Dependence |
| Any drug use disorder | 9.0 (6.96-11.72) ^c | 2.8 (2.02-3.77) ^c | 9.8 (7.19-13.24) ^c | 5.5 (4.21-7.30) ^c | 2.1 (1.48-2.90) ^c | 5.0 (3.59-6.94) ^c |
| Any drug abuse | 6.4 (4.76-8.69) ^c | 3.2 (2.21-4.58) ^c | 5.8 (3.99-8.37) ^c | 4.9 (3.56-6.67) ^c | 2.5 (1.72-3.72) ^c | 4.1 (2.74-6.03) ^c |
| Any drug dependence | 15.0 (8.44-26.52) ^c | 1.6 (0.89-3.04) | 18.7 (10.74-32.51) ^c | 7.5 (4.14-13.70) ^c | 1.2 (0.61-2.19) | 7.5 (4.16-13.64) ^c |
| Nicotine dependence | 3.5 (3.01-4.05) ^c | 2.0 (1.62-2.44) ^c | 4.9 (4.01-5.93) ^c | 2.7 (2.34-3.21) ^c | 1.8 (1.48-2.90) ^c | 3.4 (2.78-4.19) ^c |
| Any mood disorder | 2.2 (1.88-2.67) ^c | 1.2 (0.98-1.59) | 3.2 (2.51-4.00) ^c | 1.4 (1.13-1.79) ^c | 1.0 (0.79-1.36) | 1.7 (1.23-2.29) ^c |
| Major depressive disorder | 1.8 (1.44-2.26) ^c | 1.3 (0.98-1.81) | 2.1 (1.57-2.95) ^c | 1.3 (1.01-1.67) ^c | 1.2 (0.89-1.68) | 1.3 (0.92-1.93) |
| Bipolar I | 2.7 (1.99-3.73) ^c | 1.1 (0.70-1.73) | 4.0 (2.71-5.96) ^c | 1.5 (0.98-2.11) | 0.8 (0.49-1.32) | 1.9 (1.13-3.01) ^c |
| Bipolar II | 2.1 (1.33-3.38) ^c | 0.9 (0.37-2.03) | 3.1 (1.92-5.09) ^c | 1.5 (0.91-2.36) | 0.7 (0.30-1.65) | 2.0 (1.22-3.41) ^c |
| Dysthymia | 1.6 (0.95-2.77) | 1.0 (0.49-2.11) | 2.2 (1.10-4.24) ^c | 0.8 (0.47-1.44) | 0.9 (0.42-1.87) | 0.9 (0.42-1.76) |
| Any anxiety disorder | 1.9 (1.58-2.25) ^c | 1.2 (0.93-1.46) | 2.7 (2.15-3.31) ^c | 1.3 (1.05-1.59) ^c | 1.1 (0.82-1.36) | 1.5 (1.16-1.99) ^c |
| Any panic disorder | 2.3 (1.68-3.16) ^c | 1.0 (0.63-1.70) | 3.5 (2.42-5.18) ^c | 1.2 (0.80-1.65) | 0.8 (0.47-1.42) | 1.4 (0.89-2.20) |
| Panic with agoraphobia | 2.7 (1.55-4.79) ^c | 1.5 (0.64-3.62) | 3.6 (1.74-7.41) ^c | 1.1 (0.60-2.22) | 1.2 (0.47-3.12) | 1.0 (0.47-2.32) |
| Panic without agoraphobia | 2.1 (1.48-3.01) ^c | 0.9 (0.46-1.60) | 3.4 (2.18-5.25) ^c | 1.1 (0.75-1.69) | 0.7 (0.35-1.33) | 1.5 (0.91-2.57) |
| Social phobia | 1.6 (1.15-2.21) ^c | 0.9 (0.59-1.47) | 2.3 (1.50-3.46) ^c | 0.9 (0.61-1.32) | 0.8 (0.49-1.34) | 1.0 (0.59-1.67) |
| Specific phobia | 1.8 (1.42-2.19) ^c | 1.2 (0.89-1.60) | 2.3 (1.79-3.00) ^c | 1.2 (0.93-1.52) | 1.1 (0.78-1.45) | 1.3 (0.94-1.71) |
| Generalized anxiety | 2.1 (1.40-2.87) ^c | 1.0 (0.56-1.71) | 3.0 (2.00-4.61) ^c | 0.9 (0.58-1.36) | 0.8 (0.41-1.44) | 1.0 (0.62-1.68) |
| Any personality disorder | 2.1 (1.85-2.44) ^c | 1.2 (1.00-1.53) | 3.2 (2.68-3.76) ^c | 1.4 (1.18-1.66) ^c | 1.0 (0.82-1.31) | 1.8 (1.45-2.20) ^c |
| Avoidant | 1.8 (1.32-2.44) ^c | 0.8 (0.44-1.33) | 2.8 (1.97-3.94) ^c | 0.9 (0.60-1.23) | 0.6 (0.33-1.10) | 1.1 (0.71-1.57) |
| Dependent | 2.7 (1.37-5.24) ^c | 0.6 (0.15-2.11) | 4.3 (2.01-9.29) ^c | 0.8 (0.34-1.82) | 0.3 (0.09-1.20) | 1.0 (0.39-2.39) |
| Obsessive-compulsive | 1.6 (1.29-1.93) ^c | 1.1 (0.84-1.52) | 2.1 (1.61-2.63) ^c | 1.0 (0.76-1.23) | 1.0 (0.75-1.38) | 1.0 (0.70-1.30) |
| Paranoid | 2.4 (1.96-3.04) ^c | 1.2 (0.82-1.85) | 3.4 (2.67-4.38) ^c | 1.3 (0.97-1.66) | 1.0 (0.61-1.49) | 1.4 (0.97-1.87) |
| Schizoid | 1.5 (1.09-2.01) ^c | 0.7 (0.46-1.11) | 2.3 (1.61-3.31) ^c | 0.7 (0.49-0.99) ^c | 0.5 (0.34-0.88) ^c | 0.9 (0.55-1.31) |
| Histrionic | 3.4 (2.50-4.67) ^c | 1.4 (0.85-2.22) | 4.8 (3.46-6.66) ^c | 1.7 (1.16-2.47) ^c | 1.0 (0.59-1.65) | 1.8 (1.22-2.73) ^c |
| Antisocial | 2.9 (2.35-3.67) ^c | 1.5 (1.06-2.02) ^c | 4.1 (3.16-5.20) ^c | 1.5 (1.18-2.01) ^c | 1.1 (0.74-1.54) | 1.7 (1.26-2.34) ^c |

^aOdds ratios adjusted for age, race/ethnicity, sex, education, income, marital status, urbanicity, and geographic region.

^bOdds ratios adjusted for age, race/ethnicity, sex, education, income, marital status, urbanicity, geographic region, and other psychiatric disorders.

^cOdds ratio is significant.

ONSET AND COURSE OF DSM-IV ALCOHOL USE DISORDERS

Mean ages at onset of alcohol abuse and dependence were 22.5 and 21.9 years, respectively. Hazard rates for onsets of both disorders (**Figure**) peaked at age 19 years, decreasing thereafter. Mean durations of longest episodes of alcohol abuse and dependence were 2.7 and 3.7 years. Of respondents with lifetime abuse or dependence, 72.0% had one episode; the mean number of episodes among respondents with multiple episodes of abuse and dependence was 5.2 and 5.1, respectively. Mean duration of dependence episodes differed significantly ($P < .01$) between those with one episode (3.4 years) vs multiple episodes (2.4 years). Mean duration of abuse episodes among respondents with a single episode (2.7 years) vs multiple episodes (2.4 years) did not differ significantly.

DISABILITY ASSOCIATED WITH DSM-IV ALCOHOL ABUSE AND DEPENDENCE

Mean (SE) SF-12v2 scores for those with current (12-month) alcohol abuse ranged from 48.8 (0.23) to 49.8 (0.26); corresponding scores for those with 12-month alcohol dependence ranged from 47.3 (0.37) to 48.2 (0.39) (**Table 6**). Adjusting for sociodemographic character-

istics and other Axis I and II disorders, alcohol abuse was associated with lower social functioning ($b = -0.59$; $P < .05$) and role emotional functioning ($b = -0.96$; $P < .003$) while alcohol dependence was highly and significantly associated with lower MCS ($b = -2.52$; $P < .001$), mental health ($b = -1.39$; $P < .001$), social functioning ($b = -2.06$; $P < .001$), and role emotional functioning ($b = -2.07$; $P < .001$). Disability increased steadily and significantly with alcohol dependence severity (adjusted for sociodemographic characteristics and other Axis I and II disorders, $b = -0.92$ [SE=0.1], $P < .001$). The lowest quartile of MCS scores among respondents with alcohol dependence was 43.6 or less. For comparative purposes, mean (SE) MCS scores for respondents with 12-month drug abuse, drug dependence, any anxiety disorder, any mood disorder, and any (lifetime) personality disorder were 48.7 (0.54), 41.9 (1.15), 41.7 (0.27), 46.5 (0.22), and 47.3 (0.17), respectively. Thus, respondents with alcohol abuse manifested less disability than those with drug, anxiety, mood, or personality disorders. On average, respondents with alcohol dependence manifested less disability than those with drug dependence and anxiety disorders, but their disability was comparable with that among respondents who had drug abuse, mood, and personality disorders.

Table 5. Adjusted Odds Ratios of Lifetime DSM-IV Alcohol Use Disorders and Other Psychiatric Disorders Controlling for Sociodemographic Characteristics and Comorbid Psychiatric Disorders

| Comorbid Disorder | Adjusted Odds Ratios (99% Confidence Intervals) | | | | | |
|---------------------------|---|------------------------------|---------------------------------|---|------------------------------|-------------------------------|
| | Sociodemographic Characteristics ^a | | | Sociodemographic Characteristics and Other Psychiatric Disorders ^b | | |
| | Alcohol Use Disorder | Alcohol Abuse | Alcohol Dependence | Alcohol Use Disorder | Alcohol Abuse | Alcohol Dependence |
| Any drug use disorder | 10.4 (9.03-11.96) ^c | 2.0 (1.75-2.28) ^c | 7.6 (6.68-8.65) ^c | 6.7 (5.79-7.77) ^c | 1.7 (1.45-1.93) ^c | 4.4 (3.81-5.03) ^c |
| Any drug abuse | 7.6 (6.54-8.93) ^c | 2.4 (2.10-2.79) ^c | 4.4 (3.83-5.14) ^c | 6.3 (5.35-7.40) ^c | 2.1 (1.77-2.40) ^c | 3.7 (3.14-4.33) ^c |
| Any drug dependence | 15.9 (11.91-21.14) ^c | 0.8 (0.63-1.10) | 14.9 (11.78-18.84) ^c | 8.9 (6.48-12.24) ^c | 0.7 (0.50-0.91) ^c | 8.0 (6.13-10.52) ^c |
| Nicotine dependence | 4.9 (4.40-5.36) ^c | 1.7 (1.55-1.94) ^c | 5.4 (4.84-6.12) ^c | 3.3 (2.96-3.62) ^c | 1.5 (1.37-1.75) ^c | 3.3 (2.94-3.75) ^c |
| Any mood disorder | 2.4 (2.20-2.71) ^c | 1.2 (1.03-1.30) ^c | 3.4 (2.99-3.87) ^c | 1.4 (1.24-1.59) ^c | 1.0 (0.57-1.79) | 1.7 (1.47-2.07) ^c |
| Major depressive disorder | 1.9 (1.66-2.08) ^c | 1.2 (1.03-1.34) ^c | 2.2 (1.93-2.59) ^c | 1.2 (1.09-1.41) ^c | 1.1 (0.94-1.24) | 1.4 (1.18-1.64) ^c |
| Bipolar I | 3.5 (2.84-4.22) ^c | 1.0 (0.77-1.32) | 4.6 (3.72-5.79) ^c | 1.5 (1.21-1.97) ^c | 0.7 (0.54-0.97) ^c | 2.1 (1.57-2.86) ^c |
| Bipolar II | 2.6 (1.92-3.62) ^c | 1.2 (0.82-1.68) | 3.0 (2.13-4.31) ^c | 1.6 (1.10-2.22) ^c | 0.9 (0.64-1.39) | 1.9 (1.30-2.78) ^c |
| Dysthymia | 2.0 (1.63-2.38) ^c | 1.0 (0.81-1.32) | 2.6 (2.11-3.30) ^c | 1.0 (0.80-1.25) | 0.9 (0.70-1.19) | 1.2 (0.90-1.51) |
| Any anxiety disorder | 2.3 (2.11-2.61) ^c | 1.2 (1.10-1.41) ^c | 3.0 (2.68-3.35) ^c | 1.5 (1.33-1.71) ^c | 1.1 (0.99-1.31) | 1.7 (1.43-1.92) ^c |
| Any panic disorder | 2.4 (2.08-2.78) ^c | 1.1 (0.92-1.37) | 3.2 (2.76-3.71) ^c | 1.1 (0.96-1.36) | 0.9 (0.75-1.15) | 1.3 (1.07-1.53) ^c |
| Panic with agoraphobia | 2.5 (1.87-3.32) ^c | 1.0 (0.64-1.45) | 3.5 (2.56-4.92) ^c | 0.8 (0.56-1.25) | 0.7 (0.48-1.15) | 1.0 (0.67-1.59) |
| Panic without agoraphobia | 2.3 (1.95-2.71) ^c | 1.2 (0.93-1.46) | 2.9 (2.49-3.45) ^c | 1.2 (1.03-1.49) ^c | 1.0 (0.79-1.26) | 1.3 (1.09-1.63) ^c |
| Social phobia | 2.3 (1.94-2.76) ^c | 1.2 (0.99-1.53) | 2.7 (2.22-3.33) ^c | 1.2 (1.03-1.50) ^c | 1.1 (0.85-1.35) | 1.2 (0.98-1.56) ^c |
| Specific phobia | 2.2 (1.90-2.47) ^c | 1.2 (1.04-1.39) ^c | 2.7 (2.32-3.13) ^c | 1.3 (1.11-1.50) ^c | 1.1 (0.90-1.23) | 1.4 (1.16-1.68) ^c |
| Generalized anxiety | 2.2 (1.80-2.63) ^c | 1.1 (0.89-1.36) | 2.8 (2.35-3.40) ^c | 1.0 (0.77-1.22) | 0.9 (0.74-1.16) | 1.0 (0.81-1.32) |
| Any personality disorder | 2.8 (2.52-3.11) ^c | 1.3 (1.14-1.50) ^c | 3.4 (3.05-3.82) ^c | 1.5 (1.37-1.74) ^c | 1.1 (0.93-1.25) | 1.6 (1.40-1.90) ^c |
| Avoidant | 2.0 (1.54-2.51) ^c | 0.8 (0.53-1.09) | 3.0 (2.33-3.93) ^c | 0.7 (0.51-0.86) ^c | 0.6 (0.39-0.83) ^c | 1.0 (0.72-1.32) |
| Dependent | 2.0 (1.22-3.40) ^c | 0.7 (0.33-1.54) | 3.1 (1.84-5.35) ^c | 0.5 (0.23-1.02) | 0.5 (0.21-1.10) | 0.7 (0.35-1.33) |
| Obsessive-compulsive | 2.1 (1.87-2.46) ^c | 1.3 (1.06-1.48) ^c | 2.5 (2.15-2.82) ^c | 1.2 (1.04-1.42) ^c | 1.1 (0.95-1.33) | 1.1 (0.94-1.35) |
| Paranoid | 2.8 (2.37-3.37) ^c | 1.1 (0.87-1.33) | 3.7 (3.07-4.56) ^c | 1.1 (0.90-1.39) | 0.8 (0.64-0.99) ^c | 1.3 (1.04-1.70) ^c |
| Schizoid | 2.3 (1.89-2.80) ^c | 1.1 (0.88-1.49) | 2.8 (2.25-3.50) ^c | 0.9 (0.71-1.19) | 0.9 (0.68-1.17) | 0.9 (0.72-1.32) |
| Histrionic | 3.9 (2.97-5.02) ^c | 1.1 (0.84-1.57) | 4.6 (3.52-6.08) ^c | 1.5 (1.09-2.12) ^c | 0.8 (0.57-1.13) | 1.6 (1.17-2.32) ^c |
| Antisocial | 6.5 (5.29-7.97) ^c | 1.5 (1.20-1.88) ^c | 5.4 (4.46-6.54) ^c | 2.2 (1.73-2.90) ^c | 1.0 (0.77-1.24) | 1.7 (1.33-2.23) ^c |

^aOdds ratios adjusted for age, race/ethnicity, sex, education, income, marital status, urbanicity, and geographic region.

^bOdds ratios adjusted for age, race/ethnicity, sex, education, income, marital status, urbanicity, geographic region, and other psychiatric disorders.

^cOdds ratio is significant.

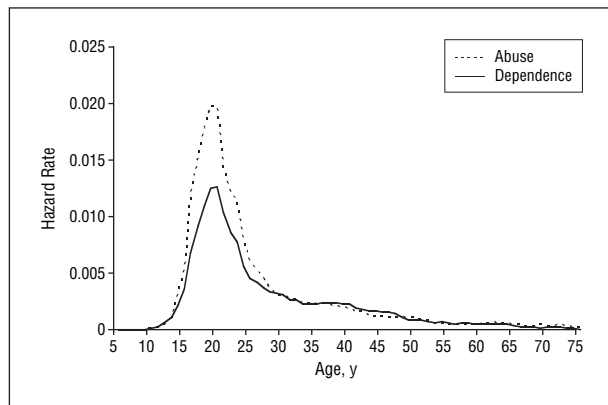


Figure. Hazard rates for age at onset of DSM-IV alcohol abuse and alcohol dependence.

TREATMENT FOR DSM-IV ALCOHOL USE DISORDERS

Of those with lifetime alcohol dependence, only 24.1% ever received treatment while of those with 12-month alcohol dependence, only 12.1% received alcohol treatment in the past year. Among those with lifetime and 12-month alcohol abuse, 7.0% and 3.1% received any alcohol treatment, respectively. These treatment rates are slightly

lower than treatment rates 10 years earlier (dependence: 23.5% lifetime and 13.8% 12-month; abuse: 9.2% lifetime and 4.4% 12-month).²⁴ In the NESARC, the mean age of respondents' first treatment for dependence was 29.8 years, an 8-year mean lag between onset and treatment. The mean age of first treatment for abuse was 32.1 years, a 10-year mean lag between onset and treatment.

Among those with 12-month alcohol dependence, 7.4% received help from 12-step (self-help) groups; 10.0% from any health professional other than 12-step groups, employee assistance programs, or clergy; and 6.7% from physicians or other health professionals; with other treatment sources less frequent (**Table 7**). Of those with 12-month alcohol abuse, 2.0% received help from 12-step groups; remaining percentages ranged from 0.0% (halfway houses) to 1.9% (any professional other than 12-step groups, employee assistance programs, or clergy). Respondents with lifetime alcohol use disorders showed similar ranking of treatment patterns regarding prevalence by setting. Excluding 12-step programs, employee assistance programs, and clergy, lifetime professional treatment rates were 4.5% among respondents with alcohol abuse and 20.1% among respondents with alcohol dependence.

Among respondents with 12-month alcohol use disorders, few characteristics significantly ($P < .05$) predicted treatment. For 12-month alcohol dependence, the lowest

Table 6. Mean Disability Scores (Short Form 12, version 2) and 12-Month Alcohol Use Disorders

| Alcohol Category | Mean (SE) | | | |
|---|--------------------------|--------------------------|----------------------------|--------------------------|
| | Mental Health | Social Functioning | Role Emotional Functioning | Mental Component Summary |
| DSM-IV alcohol abuse | 49.6 (0.32) ^a | 48.9 (0.29) ^a | 48.8 (0.23) ^b | 49.8 (0.26) |
| DSM-IV alcohol dependence diagnosis | 48.1 (0.34) ^c | 48.2 (0.39) ^c | 47.5 (0.36) ^c | 47.3 (0.37) ^c |
| DSM-IV alcohol dependence criteria, No. | | | | |
| 3 | 49.1 (0.5) | 50.8 (0.5) | 50.3 (0.4) | 49.3 (0.5) |
| 4 | 48.2 (0.8) | 49.9 (0.6) | 47.8 (0.7) | 47.4 (0.8) |
| 5 | 45.9 (1.1) | 48.6 (1.0) | 47.4 (0.9) | 46.2 (1.1) |
| 6 | 43.5 (1.2) | 45.9 (1.3) | 44.2 (1.9) | 43.3 (1.3) |
| 7 | 43.2 (1.6) | 43.2 (1.7) | 42.9 (1.4) | 42.3 (1.4) |

^a *P* < .05.^b *P* < .01.^c *P* < .001.**Table 7. Alcohol Treatment and Help-Seeking Settings Among Respondents With 12-Month and Lifetime DSM-IV Alcohol Use Disorders**

| Type of Alcohol Treatment/ Help Seeking | 12-Month, % (SE) | | | Lifetime, % (SE) | | |
|--|----------------------|---------------|--------------------|----------------------|---------------|--------------------|
| | Alcohol Use Disorder | Alcohol Abuse | Alcohol Dependence | Alcohol Use Disorder | Alcohol Abuse | Alcohol Dependence |
| 12-step program | 4.46 (0.43) | 2.03 (0.39) | 7.44 (0.79) | 10.84 (0.41) | 5.21 (0.38) | 18.87 (0.72) |
| Family/social services | 1.47 (0.25) | 0.62 (0.19) | 2.51 (0.49) | 3.18 (0.20) | 1.32 (0.17) | 5.82 (0.39) |
| Detoxification | 1.98 (0.30) | 0.47 (0.14) | 3.82 (0.62) | 4.84 (0.26) | 1.72 (0.19) | 9.30 (0.53) |
| Outpatient clinic | 1.78 (0.27) | 0.64 (0.22) | 3.18 (0.55) | 4.11 (0.23) | 1.35 (0.16) | 8.03 (0.48) |
| Rehabilitation program | 2.34 (0.32) | 0.71 (0.23) | 4.34 (0.65) | 6.58 (0.29) | 2.53 (0.24) | 12.36 (0.60) |
| Other inpatient facility | 1.35 (0.24) | 0.34 (0.14) | 2.58 (0.48) | 3.45 (0.21) | 1.11 (0.15) | 6.79 (0.44) |
| Emergency department | 1.35 (0.26) | 0.24 (0.12) | 2.71 (0.54) | 3.77 (0.21) | 1.16 (0.14) | 7.49 (0.45) |
| Halfway house | 0.29 (0.11) | 0.00 (0.00) | 0.65 (0.25) | 1.21 (0.11) | 0.49 (0.09) | 2.23 (0.26) |
| Crisis center | 0.16 (0.05) | 0.03 (0.03) | 0.32 (0.11) | 0.53 (0.07) | 0.11 (0.04) | 1.13 (0.16) |
| Employee assistance program | 0.32 (0.12) | 0.04 (0.04) | 0.65 (0.27) | 1.10 (0.11) | 0.44 (0.11) | 2.03 (0.23) |
| Clergy | 1.20 (0.22) | 0.20 (0.15) | 2.42 (0.45) | 2.18 (0.16) | 1.47 (0.09) | 4.61 (0.36) |
| Physician or other health care professional | 3.34 (0.36) | 0.56 (0.18) | 6.73 (0.77) | 5.54 (0.27) | 1.62 (0.18) | 11.13 (0.56) |
| Any professional other than AA, EAP, or clergy | 5.47 (0.44) | 1.85 (0.33) | 9.99 (0.88) | 11.00 (0.36) | 4.50 (0.32) | 20.07 (0.68) |
| Other | 0.65 (0.17) | 0.53 (0.21) | 0.80 (0.27) | 1.80 (0.14) | 0.74 (0.12) | 3.31 (0.30) |

Abbreviations: AA, Alcoholics Anonymous; EAP, employee assistance program.

income category predicted treatment (OR=2.8). For 12-month abuse, compared with married and cohabiting respondents, those widowed, separated, or divorced (OR=3.5) were more likely to receive treatment as were those with less than high school education (OR=4.0). For lifetime abuse and dependence, treatment likelihood increased among men, unmarried respondents, and those with lower education and incomes (ORs=1.5-2.3).

COMMENT

In the United States in 2001-2002, 8.5% of adults experienced alcohol use disorders in the prior 12 months (4.7% abuse, 3.8% dependence) while 30.3% experienced alcohol use disorders during their lifetimes (17.8% abuse, 12.5% dependence). The duration of alcohol disorders was often chronic with a mean of nearly 4 years for alcohol dependence. The disorders were associated with significant disability. Thus, alcohol use disorders continue to present a widespread and serious personal and public health problem in the United States.

Consistent with previous studies^{17,20,22,23,25} and recent reviews,^{72,73} men were at greater risk of alcohol use disorders than women. Younger cohorts also showed higher risk of alcohol dependence and current alcohol abuse. This could indicate a true cohort effect or, alternatively, an undercount among older cohorts due to differential mortality or poor recall of remote events. Longitudinal studies are needed to address this issue. In contrast, the highest risk for lifetime alcohol abuse was in the baby boom and generation X cohorts (aged 30-64 years). This is the first time such an age distribution in an alcohol use disorder has been identified in the United States, although it is consistent with the new age distribution found in the NESARC for major depressive disorder.¹¹ Investigation of the reasons for this changed age pattern is warranted.

Due to its size, the NESARC provides more precise information on the risk for alcohol disorders by ethnic group than any other source. The findings indicate higher risk for lifetime alcohol dependence among Native Americans, which is consistent with local studies of Native

Americans showing high rates of alcohol-related morbidity and mortality.⁷⁴⁻⁷⁷ The specific risk among Native Americans for alcohol dependence but not abuse warrants further research.

The NESARC is consistent with earlier studies showing African Americans and Asians at lower risk than whites for alcohol abuse and dependence.²³ Among Asians, genetic factors affecting alcohol metabolism likely influence the rates.⁷⁸⁻⁸⁰ Lower socioeconomic status generally increases poor health indicators⁸¹ and the mean socioeconomic level of African Americans is lower than many other US groups. Therefore, determining the protective factors decreasing African American risk for alcohol use disorders is of interest, both to better understand the overall etiology of alcohol disorders and to develop improved prevention and intervention for blacks who do develop alcohol abuse or dependence.

NESARC findings of lower risk for alcohol abuse and dependence among Hispanics contribute new information. The NESARC size, oversampling for Hispanics (20% of the sample), and cultural sensitivity of the survey⁸² provide highly accurate findings on Hispanics. Further analyses are needed to understand potential protective factors in these groups (eg, family cohesiveness, social norms).⁸²⁻⁸⁴ Such work should distinguish between Hispanic groups since these may differ. Note that lower rates among disadvantaged minority groups do not reduce the importance of providing treatment to those with alcohol use disorders when they occur.

While alcohol abuse showed comorbidity with drug abuse, nicotine dependence, and antisocial PD, associations with other disorders, even when significant, were weak ($OR \leq 1.3$). Consistent with earlier reports,¹⁷⁻²⁵ alcohol dependence showed strong, significant associations with all other substance and psychiatric disorders, controlling only for sociodemographic characteristics. This indicates that alcohol dependence remains highly comorbid with other disorders and that better understanding of the causes and treatment implications of this comorbidity would serve important public health functions. The results also underscore the importance of examining alcohol abuse and dependence separately.

To also understand the unique relationships of other disorders to alcohol dependence, we additionally determined the associations controlling for all remaining disorders measured in the study. Associations with drug and nicotine use disorders were reduced but remained strong and significant. The drop in magnitude suggests common causal factors underlying alcohol and other substance use disorders (consistent with family,⁶⁹ twin,^{85,86} and genetic association studies^{87,88}). However, remaining associations of alcohol dependence with other substance disorders after controlling for comorbidity suggest unique factors leading to the disorder-specific associations, for example, that the specific factors underlying associations between alcohol and nicotine dependence are not necessarily the same as the specific factors underlying associations between alcohol and illicit drug use disorders. This finding, also consistent with twin studies,^{85,86} suggests continued investigation of both common and specific factors leading to associations between alcohol and other substance use disorders.

With control for additional comorbidity, significant associations remained only between alcohol dependence and bipolar I, bipolar II, specific phobia, and histrionic and antisocial PDs, and these were considerably reduced. Thus, while some unique disorder-specific associations were found, much of the association of alcohol dependence with other affective, anxiety, and PDs appears due to factors common to these other disorders.

The mean length and number of alcohol dependence episodes (72% reporting 1, the remainder reporting a mean of about 5), indicate 2 important points: first, alcohol dependence is highly chronic, and second, recovery is possible (addressed in detail elsewhere^{89,90}). The recovery rates provide an important empirical counterpoint to the belief that alcohol disorders are always lifelong with efforts at recovery always unsuccessful.

All measures of current disability from the SF-12v2 scales were strongly associated with *DSM-IV* alcohol dependence, controlling for sociodemographic characteristics and comorbidity, and were similar to impairment levels for drug abuse, mood disorders, and PDs. Further, as severity of alcohol dependence increased, impairment approached the more severe levels associated with other disorders. When untreated, impaired functioning may diminish life chances and increase stressful life conditions even after alcohol dependence remits, increasing the subsequent risk for other psychiatric disorders such as major depression.⁹¹ The NESARC findings on disability underscore the seriousness of *DSM-IV* alcohol dependence, which largely occurs among those who never receive treatment. In fact, among those with lifetime alcohol dependence, less disability was found among treated compared with untreated respondents (mean [SE] MCS scores 48.1 [0.40] and 44.7 [0.78], respectively, $P < .02$). Further investigation of the determinants of disability among those with alcohol use disorders is warranted.

Compared with 1991-1992, treatment rates for alcohol use disorders in 2001-2002 reveal a disappointing lack of progress. Most excessive drinkers are insured and have regular medical contacts,⁹² so lack of health insurance does not account for this problem. The lack of progress on treatment for alcohol disorders differs sharply from improvement in treatment rates for major depression in recent years.⁹³ In identifying ways to improve treatment rates for alcohol disorders, depression may offer instructive points to consider. These include availability of multiple medications and behavioral treatments with reasonable efficacy, few adverse effects and simple regimens, and rapid screening measures for routine practice.^{94,95} Additional points include a National Institute of Mental Health campaign to destigmatize depression and educate the public and professionals about recognition and treatment⁹⁶ and vigorous pharmaceutical promotion of antidepressants to professionals and the public.⁹³

In contrast, alcohol disorders remain highly stigmatized,^{97,98} more so than mental illness.⁹⁹ Medical attention to alcohol problems has declined^{100,101} for many reasons, including clinician lack of knowledge,¹⁰² uncertainty that screening is warranted,¹⁰³ insufficient organizational support,¹⁰⁴ and low expectations of results.^{105,106} Individuals with alcohol disorders also express lack of

confidence in alcoholism treatment and stigmatization as reasons for not seeking treatment.¹⁰⁷

Evidence on the effectiveness of alcohol treatment is inconsistent with these negative beliefs. Published NESARC findings indicate that treatment and participation in 12-step groups significantly and substantially increased the likelihood of recovery from alcohol dependence⁸⁹ with other characteristics influencing recovery in more complex ways.⁹⁰ Many randomized trials demonstrate the efficacy of brief drinking reduction interventions in medical or primary care settings for those whose problems are not yet chronic and severe.¹⁰⁸⁻¹¹² For more severe alcohol disorders, reasonably effective medications include naltrexone¹¹³⁻¹¹⁵ and possibly acamprosate¹¹⁶⁻¹¹⁹ while evidence-based manualized behavioral treatments include 12-step facilitation,^{120,121} motivational interviewing,¹²² cognitive behavioral therapy,¹²³ and a combination of these.¹²⁴ A multisite randomized trial recently added evidence on the effectiveness of naltrexone and behavioral treatment, including medical management.¹²⁵ These interventions have efficacy comparable with many routine treatments for other diseases.¹²⁶ The NIAAA clinician's guide¹²⁷ provides brief, clear instructions on screening and intervention for alcohol problems, and training packages for these procedures are available.¹²⁸

Thus, numerous factors identified as important in improving treatment rates for major depression⁹³⁻⁹⁵ also exist for alcohol. What is lacking is a major effort to change public and professional attitudes toward treatment. In the absence of vigorous pharmaceutical marketing, an intensive government program and active work by other nonprofit agencies is urgently needed to educate the public and professionals about the signs and risks of alcohol dependence, to destigmatize the illness, and to promote understanding of the benefits of intervention.

Potential study limitations are noted. Similar to all prior epidemiologic studies, lifetime comorbidity associations may be subject to recall bias and pseudocomorbidity¹²⁹ (ie, estimated lifetime associations may be biased due to variation of the association by age at onset of the comorbid disorders). However, these issues are not relevant to comorbidity estimates of 12-month disorders. Most other psychiatric epidemiology studies have focused on lifetime comorbidity associations because samples were too small for stable 12-month comorbidity estimates.^{14,19} However, the large sample size of the NESARC permitted comorbidity analyses for 12-month disorders at the same level of detail as lifetime disorders. These analyses indicated that the direction and magnitude of the comorbidity associations were very similar for 12-month and lifetime disorders, suggesting that any biases in the NESARC lifetime comorbidity estimates may not be strong enough for concern. Another potential limitation includes the cross-sectional design. Accordingly, when data from a 3-year follow-up of NESARC participants become available, they will offer a rich source of information to further investigate the relationships found and their stability in the general population.

In summary, the NESARC has shown that *DSM-IV* alcohol abuse and dependence are highly prevalent, disabling disorders that go largely untreated in the United States. The study identified population subgroups at particular risk and generated many findings that can lead

to further, hypothesis-driven investigation. Further, the study showed that at this point, a call to action appears indicated to educate and update the public and policymakers about alcohol use disorders, to destigmatize the disorders, and to encourage help-seeking among those who cannot stop drinking despite considerable harm to themselves and others.

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Correspondence: Bridget F. Grant, PhD, PhD, Laboratory of Epidemiology and Biometry, Room 3077, Division of Intramural Clinical and Biological Research, National Institute on Alcohol Abuse and Alcoholism, National Institutes of Health, MS 9304, 5635 Fishers Ln, Bethesda, MD 20892-9304 (bgrant@willco.niaaa.nih.gov).

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REFERENCES

1. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition. Washington, DC: American Psychiatric Association; 1994.
2. Chou SP, Dawson DA, Stinson FS, Huang B, Pickering RP, Zhou Y, Grant BF. The prevalence of drinking and driving in the United States, 2001-2002: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Drug Alcohol Depend*. 2006;83(2):137-146.
3. Caetano R, Nelson S, Cunradi C. Intimate partner violence, dependence symptoms and social consequences of drinking among white, black and Hispanic couples in the United States. *Am J Addict*. 2001;10(suppl):60-69.
4. Lemoine P, Harousseau H, Borteyru JP, Mennet JC. Children of alcoholic parents—observed anomalies: discussion of 127 cases. *Ther Drug Monit*. 2003;25(2):132-136.
5. Bates ME, Bowden SC, Barry D. Neurocognitive impairment associated with alcohol use disorders: implications for treatment. *Exp Clin Psychopharmacol*. 2002;10(3):193-212.
6. Bazargan-Hejazi S, Bazargan M, Hardin E, Bing EG. Alcohol use and adherence to prescribed therapy among under-served Latino and African-American patients using emergency department services. *Ethn Dis*. 2005;15(2):267-275.
7. Kamali M, Kelly BD, Clarke M, Browne S, Gervin M, Kinsella A, Lane A, Larkin C, O'Callaghan E. A prospective evaluation of adherence to medication in first episode schizophrenia. *Eur Psychiatry*. 2006;21(1):29-33.
8. Tucker JS, Burnam MA, Sherbourne CD, Kung FY, Gifford AL. Substance abuse and mental health correlates of nonadherence to antiretroviral medications in a sample of patients with human immunodeficiency virus infection. *Am J Med*. 2003;114(7):573-580.
9. Harwood R, Fountain D, Livermore G. *The Economic Costs of Alcohol and Drug Abuse in the United States, 1992*. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism and National Institute on Drug Abuse; 1998.
10. Grant BF, Stinson FS, Dawson DA, Chou SP, Dufour MC, Compton W, Pickering RP, Kaplan K. 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):807-816.

11. Hasin DS, Goodwin RD, Stinson FS, Grant BF. The epidemiology of major depressive disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry*. 2005;62(10):1097-1106.
12. Canino GJ, Bird HR, Shrout PE, Rubio-Stipec M, Bravo M, Martinez R, Sesman M, Guevara LM. The prevalence of specific psychiatric disorders in Puerto Rico. *Arch Gen Psychiatry*. 1987;44(8):727-735.
13. Helzer JE, Canino G, Yeh EK, Bland R, Lee C, Hwu H-G, Newman S. Alcoholism: North America and Asia. *Arch Gen Psychiatry*. 1990;47(4):313-319.
14. Regier DA, Farmer ME, Rae DS, Locke BZ, Keith SJ, Judd LL, Goodwin FK. Comorbidity of mental disorders with alcohol and other drug abuse: results from the Epidemiologic Catchment Area (ECA) Study. *JAMA*. 1990;264(19):2511-2518.
15. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, Third Edition. Washington, DC: American Psychiatric Association; 1980.
16. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition*. Washington, DC: American Psychiatric Association; 1987.
17. Bijl RV, Ravelli A, van Zessen G. Prevalence of psychiatric disorder in the general population: results of the Netherlands Mental Health Survey and Incidence Survey (NEMESIS). *Soc Psychiatry Psychiatr Epidemiol*. 1998;33(12):587-595.
18. Kawakami N, Shimizu H, Haratani T, Iwata N, Kitamura T. Lifetime and 6-month prevalence of DSM-III-R psychiatric disorders in an urban community in Japan. *Psychiatry Res*. 2004;121(3):293-301.
19. Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S, Wittchen HU, Kendler KS. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: results from the National Comorbidity Survey. *Arch Gen Psychiatry*. 1994;51(1):8-19.
20. Kringlen E, Torgersen S, Cramer V. A Norwegian psychiatric epidemiological study. *Am J Psychiatry*. 2001;158(7):1091-1098.
21. Vicente B, Kohn R, Riosceco P, Saldivia SA, Baker C, Torres S. Population prevalence of psychiatric disorders in Chile: 6-month and 1-year rates. *Br J Psychiatry*. 2004;184:299-305.
22. Andrews G, Henderson S, Hall W. Prevalence, comorbidity, disability and service utilisation: overview of the Australian National Mental Health Survey. *Br J Psychiatry*. 2001;178:145-153.
23. Grant BF. Prevalence and correlates of alcohol use and DSM-IV alcohol dependence in the United States: results of the National Longitudinal Alcohol Epidemiologic Survey. *J Stud Alcohol*. 1997;58(5):464-473.
24. Grant BF, Dawson DA, Stinson FS, Chou SP, Dufour MC, Pickering RP. The 12-month prevalence and trends in DSM-IV alcohol abuse and dependence: United States, 1991-1992 and 2001-2002. *Drug Alcohol Depend*. 2004;74(3):223-234.
25. Substance Abuse and Mental Health Services Administration. *Results from the 2004 National Survey on Drug Use and Health: National Findings [NSDUH Series H-28, DHHS Pub. No. (SMA) 05-4062]*. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2005.
26. Grant BF. DSM-III-R and ICD-10 classifications of alcohol use disorders and associated disabilities: a structural analysis. *Int Rev Psychiatry*. 1989;1:21-39.
27. Grant BF, Towle LH. A comparison of diagnostic criteria: DSM-III-R, ICD-10 and DSM-IV. *Alcohol Health Res World*. 1992;15:284-292.
28. Mueser KT, Drake RE, Wallach MA. Dual diagnosis: a review of etiological theories. *Addict Behav*. 1998;23(6):717-734.
29. Swendsen JD, Merikangas KR. The comorbidity of depression and substance use disorders. *Clin Psychol Rev*. 2000;20(2):173-189.
30. Kessler RC, Berglund PA, Demler O, Jin R, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry*. 2005;62(6):593-602.
31. Kessler RC, Chiu WT, Demler O, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry*. 2005;62(6):617-627.
32. Alonso J, Angermeyer MC, Bernert S, Bruffaerts R, Brugha TS, Bryson H, de Girolamo G, Graaf R, Demyttenaere K, Gasquet I, Haro JM, Katz SJ, Kessler RC, Kovess V, Lepine JP, Ormel J, Polidori G, Russo LJ, Vilagut G, Almansa J, Arbabzadeh-Bouchez S, Autonell J, Bernal M, Buist-Bouwman MA, Codony M, Domingo-Salvany A, Ferrer M, Joo SS, Martinez-Alonso M, Matschinger H, Mazzi F, Morgan Z, Morosini P, Palacin C, Romera B, Taub N, Vollebergh WA; ESEMeD/MHEDEA 2000 Investigators, European Study of the Epidemiology of Mental Disorders (ESEMeD) Project. Prevalence of mental disorders in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatr Scand Suppl*. 2004;(420):21-27.
33. Grant BF, Compton WM, Crowley TJ, Hasin DS, Helzer JE, Li T-K, Rounsaville BJ, Volkow ND, Woody GE. Errors in assessing DSM-IV substance use disorders [letter]. *Arch Gen Psychiatry*. 2007;64(3):379-380.
34. Hasin DS, Grant BF. The co-occurrence of DSM-IV alcohol abuse in DSM-IV alcohol dependence: results of the National Epidemiologic Survey on Alcohol and Related Conditions on heterogeneity that differ by population subgroup. *Arch Gen Psychiatry*. 2004;61(9):891-896.
35. Hasin DS, Hatzenbuehler BA, Smith SM, Grant BF. The co-occurrence of DSM-IV drug abuse in DSM-IV drug dependence: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Drug Alcohol Depend*. 2005;80(1):117-124.
36. Grant BF, Moore TC, Shepard J, Kaplan K. Source and Accuracy Statement: Wave 1 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). National Institute on Alcohol Abuse and Alcoholism Web Site. <http://www.niaaa.nih.gov>. Accessed July 2, 2005.
37. Grant BF, Hasin DS, Blanco C, Stinson FS, Chou SP, Goldstein RB, Dawson DA, Smith S, Saha TD, Huang B. The epidemiology of social anxiety disorder in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry*. 2005;66(11):1351-1361.
38. Grant BF, Hasin DS, Stinson FS, Dawson DA, Goldstein RB, Smith SM, Huang B, Saha TD. The epidemiology of DSM-IV panic disorder and agoraphobia in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry*. 2006;67(3):363-374.
39. Grant BF, Dawson DA, Hasin DS. *The Alcohol Use Disorder and Associated Disabilities Interview Schedule—DSM-IV Version (AUDADIS-IV)*. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2001.
40. Robins LN, Helzer J, Croughan J, Ratcliff K. National Institute of Mental Health Diagnostic Interview Schedule (DIS): its history, characteristics, and validity. *Arch Gen Psychiatry*. 1981;38(4):381-389.
41. Kessler RC, Wittchen HU, Abelson F, McGonagle K, Swartz N, Kendler K, Knauer B, Zhao S. Methodological studies of the Composite International Diagnostic Interview (CIDI) in the US National Comorbidity Survey (NCS). *Int J Methods Psychol Res*. 1996;7:33-55.
42. Demyttenaere K, Bruffaerts R, Posada-Villa J, Gasquet I, Kovess V, Lepine JP, Angermeyer MC, Bernert S, de Girolamo G, Morosini P, Polidori G, Kikkawa T, Kawakami N, Ono Y, Takeshima T, Uda H, Karam EG, Fayyad JA, Karam AN, Mneimneh ZN, Medina-Mora ME, Borges G, Lara C, de Graaf R, Ormel J, Gureje O, Shen Y, Huang Y, Zhang M, Alonso J, Haro JM, Vilagut G, Bromet EJ, Gluzman S, Webb C, Kessler RC, Merikangas KR, Anthony JC, Von Korff MR, Wang PS, Brugha TS, Aguilar-Gaxiola S, Lee S, Heeringa S, Pennell BE, Zaslavsky AM, Ustun TB, Chatterji S; WHO World Mental Health Survey Consortium. Prevalence, severity, and unmet need for treatment of mental disorders in the World Mental Health Organization World Mental Health Surveys. *JAMA*. 2004;291(21):2581-2590.
43. Chatterji S, Saunders JB, Vrašti R, Grant BF, Hasin D, Mager D. Reliability of the alcohol and drug modules of the Alcohol Use Disorder and Associated Disabilities Interview Schedule—Alcohol/Drug-Revised (AUDADIS-ADR): an international comparison. *Drug Alcohol Depend*. 1997;47(3):171-185.
44. Grant BF, Dawson DA, Stinson FS, Chou PS, Kay W, Pickering R. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV): reliability of alcohol consumption, tobacco use, family history of depression and psychiatric diagnostic modules in a general population sample. *Drug Alcohol Depend*. 2003;71(1):7-16.
45. Grant BF, Harford TC, Dawson DA, Chou PS, Pickering RP. The Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS): reliability of alcohol and drug modules in a general population sample. *Drug Alcohol Depend*. 1995;39(1):37-44.
46. Hasin D, Carpenter KM, McCloud S, Smith M, Grant BF. The Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS): reliability of alcohol and drug modules in a clinical sample. *Drug Alcohol Depend*. 1997;44(2-3):133-141.
47. Hasin D, Paykin A. Alcohol dependence and abuse diagnoses: concurrent validity in a nationally representative sample. *Alcohol Clin Exp Res*. 1999;23(1):144-150.
48. Hasin DS, Grant B, Endicott J. The natural history of alcohol abuse: implications for definitions of alcohol use disorders. *Am J Psychiatry*. 1990;147(11):1537-1541.
49. Hasin DS, Muthen B, Wisnicki KS, Grant BF. Validity of the bi-axial dependence concept: a test in the US general population. *Addiction*. 1994;89(5):573-579.
50. Hasin DS, Van Rossem R, Endicott J. Differentiating DSM-IV alcohol dependence and abuse by course: community heavy drinkers. *J Subst Abuse*. 1997;9:127-135.
51. Hasin DS, Schuckit MA, Martin CS, Grant BF, Bucholz KK, Helzer JE. The validity of DSM-IV alcohol dependence: what do we know and what do we need to know? *Alcohol Clin Exp Res*. 2003;27(2):244-252.
52. Cottler LB, Grant BF, Blaine J, Mavreas V, Pull C, Hasin D, Compton WM, Rubio-Stipec M, Mager D. Concordance of DSM-IV alcohol and drug use disorder criteria and diagnoses as measured by AUDADIS-ADR, CIDI and SCAN. *Drug Alcohol Depend*. 1997;47(3):195-205.
53. Hasin DS, Grant BF, Cottler L, Blaine J, Towle L, Ustun B, Sartorius N. Noso-

- logical comparisons of alcohol and drug diagnoses: a multisite, multi-instrument international study. *Drug Alcohol Depend.* 1997;47(3):217-226.
54. Nelson CB, Rehm J, Ustun B, Grant BF, Chatterji S. Factor structure of DSM-IV substance disorder criteria endorsed by alcohol, cannabis, cocaine and opiate users: results from the World Health Organization Reliability and Validity Study. *Addiction.* 1999;94(6):843-855.
 55. Pull CB, Saunders JB, Mavreas V, Cottler LB, Grant BF, Hasin DS, Blaine J, Mager D, Ustun BT. Concordance between ICD-10 alcohol and drug use disorder criteria and diagnoses as measured by the AUDADIS-ADR, CIDI and SCAN: results of a cross-national study. *Drug Alcohol Depend.* 1997;47(3):207-216.
 56. Ustun B, Compton W, Mager D, Babor T, Baiyewu O, Chatterji S, Cottler L, Gogus A, Mavreas V, Peters L, Pull C, Saunders J, Smeets R, Stipek MR, Vrsti R, Hasin D, Room R, Van den Brink W, Regier D, Blaine J, Grant BF, Sartorius N. WHO Study on the reliability and validity of the alcohol and drug use disorder instruments: overview of methods and results. *Drug Alcohol Depend.* 1997;47(3):161-170.
 57. Vrsti R, Grant BF, Chatterji S, Ustun BT, Mager T, Olteanu I, Badoi M. Reliability of the Romanian version of the alcohol module of the WHO Alcohol Use Disorder and Associated Disabilities Interview Schedule—Alcohol/Drug-Revised. *Eur Addict Res.* 1998;4(4):144-149.
 58. Canino GJ, Bravo M, Ramirez R, Febo V, Fernandez R, Hasin DS. The Spanish Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS): reliability and concordance with clinical diagnoses in a Hispanic population. *J Stud Alcohol.* 1999;60(6):790-799.
 59. Anthony JC, Folstein M, Romanoski AJ, Von Korff MR, Nestadt GR, Chahal R, Merchant A, Brown CH, Shapiro S, Kramer M, et al. Comparison of the lay Diagnostic Interview Schedule and a standardized psychiatric diagnosis: experience in eastern Baltimore. *Arch Gen Psychiatry.* 1985;42(7):667-675.
 60. Grant BF, Hasin DS, Stinson FS, Dawson DA, Chou SP, Ruan WJ, Pickering RP. Prevalence, correlates, and disability of personality disorders in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry.* 2004;65(7):948-958.
 61. Grant BF, Hasin DS, Stinson FS, Dawson DA, Chou SP, Ruan WJ, Huang B. Co-occurrence of 12-month mood and anxiety disorders and personality disorders in the US: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Psychiatr Res.* 2005;39(1):1-9.
 62. Compton WM, Conway KP, Stinson FS, Colliver JD, Grant BF. Prevalence, correlates, and comorbidity of DSM-IV antisocial personality syndromes and alcohol and specific drug use disorders in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry.* 2005;66(6):677-685.
 63. Grant BF, Hasin DS, Stinson FS, Dawson DA, Ruan WJ, Goldstein RB, Smith SM, Saha TD, Huang B. Prevalence, correlates, co-morbidity, and comparative disability of DSM-IV generalized anxiety disorder in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychol Med.* 2005;35(12):1747-1759.
 64. Grant BF, Stinson FS, Hasin DS, Dawson DA, Chou SP, Ruan WJ, Huang B. Prevalence, correlates, and comorbidity of bipolar I disorder and Axis I and II disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry.* 2005;66(10):1205-1215.
 65. Zimmerman M. Diagnosing personality disorders: a review of issues and research methods. *Arch Gen Psychiatry.* 1994;51(3):225-245.
 66. Eaton WW, Neufeld K, Chen LS, Cai G. A comparison of self-report and clinical diagnostic interviews for depression: Diagnostic Interview Schedule and Schedules for Clinical Assessment in Neuropsychiatry in the Baltimore Epidemiologic Catchment Area Follow-up. *Arch Gen Psychiatry.* 2000;57(3):217-222.
 67. Nelson E, Rice J. Stability of diagnosis of obsessive-compulsive disorder in the Epidemiologic Catchment Area study. *Am J Psychiatry.* 1997;154(6):826-831.
 68. Gandek B, Ware JE, Aaronson NK, Alonso J, Apolone G, Bjorner J, Bazier J, Bullinger M, Fukuhara S, Kaasa S, Lepleige A, Sullivan M. Tests of data quality, scaling assumptions, and reliability of the SF-36 in eleven countries: results from the IQOLA Project. International Quality of Life Assessment. *J Clin Epidemiol.* 1998;51(11):1149-1158.
 69. Nurnberger JI Jr, Wiegand R, Bucholz K, O'Connor S, Meyer ET, Reich T, Rice J, Schuckit M, King L, Petti T, Bierut L, Hinrichs AL, Kuperman S, Hesselbrock V, Porjesz B. A family study of alcohol dependence: coaggregation of multiple disorders in relatives of alcohol-dependent probands. *Arch Gen Psychiatry.* 2004;61(12):1246-1256.
 70. Lee ET. *Statistical Methods for Survival Analysis.* Belmont, CA: Lifetime Learning Publications; 1980.
 71. Research Triangle Institute. *Software for Survey Data Analysis (SUDAAN), Version 9.0.* Research Triangle Park, NC: Research Triangle Institute; 2004.
 72. Frank E. *Gender and Its Effects on Psychopathology.* Arlington, VA: American Psychiatric Publishing, Inc; 2000.
 73. Nolen-Hoeksema S. Gender differences in risk factors and consequences of alcohol use and problems. *Clin Psychol Rev.* 2004;24(8):981-1010.
 74. Beals J, Novins DK, Whitesell NR, Spicer P, Mitchell CM, Manson SM. Prevalence of mental disorders and mental health services in two American Indian reservation populations: mental health disparities in a national context. *Am J Psychiatry.* 2005;162(9):1723-1732.
 75. Ehlers CL, Wilhelmsen KC. Genomic scan for alcohol craving in Mission Indians. *Psychiatr Genet.* 2005;15(1):71-75.
 76. Ehlers CL, Spence JP, Wall TL, Gilder DA, Carr LG. Association of ALDH1 promoter polymorphisms with alcohol-related phenotypes in southwest California Indians. *Alcohol Clin Exp Res.* 2004;28(10):1481-1486.
 77. Wilhelmsen KC, Ehlers C. Heritability of substance dependence in a native American population. *Psychiatr Genet.* 2005;15(2):101-107.
 78. Cook TA, Luczak SE, Shea SH, Ehlers CL, Carr LG, Wall TL. Associations of ALDH2 and ADH1B genotypes with response to alcohol in Asian Americans. *J Stud Alcohol.* 2005;66(2):196-204.
 79. Luczak SE, Elvine-Kries B, Shea SH, Carr LG, Wall TL. Genetic risk for alcoholism relates to level of response to alcohol in Asian American men and women. *J Stud Alcohol.* 2002;63(1):74-82.
 80. Wall TL, Ehlers CL. Acute effects of alcohol on P300 in Asians with different ALDH2 genotypes. *Alcohol Clin Exp Res.* 1995;19(3):617-622.
 81. Link BG, Phelan JC, McKeown and the idea that social conditions are fundamental causes of disease. *Am J Public Health.* 2002;92(5):730-732.
 82. Grant BF, Stinson FS, Hasin DS, Dawson DA, Chou SP, Anderson K. Immigration and lifetime prevalence of DSM-IV psychiatric disorders among Mexican Americans and non-Hispanic whites in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry.* 2004;61(12):1226-1233.
 83. Ortega AN, Rosenheck R, Alegria M, Desai RA. Acculturation and the lifetime risk of psychiatric and substance use disorders among Hispanics. *J Nerv Ment Dis.* 2000;188(11):728-735.
 84. Vega WA, Kolody B, Anguilar-Gaxiola S, Catalano R, Caraveo-Anduaga JJ. Lifetime prevalence of DSM-III-R psychiatric disorders among urban and rural Mexican Americans in California. *Arch Gen Psychiatry.* 1998;55(9):771-778.
 85. Hicks BM, Krueger RF, Iacono WG, McGue M, Patrick CJ. Family transmission and heritability of externalizing disorders: a twin-family study. *Arch Gen Psychiatry.* 2004;61(9):922-928.
 86. Kendler KS, Prescott CA, Myers J, Neale MC. The structure of genetic and environmental risk factors for common psychiatric and substance use disorders in men and women. *Arch Gen Psychiatry.* 2003;60(9):929-937.
 87. Luo X, Kranzler HR, Zuo L, Wang S, Blumberg HP, Gelernter J. CHRM2 gene predisposes to alcohol dependence, drug dependence, and affective disorders: results from an extended case-control structured association study. *Hum Mol Genet.* 2005;14(16):2421-2434.
 88. Luo X, Kranzler HR, Zuo L, Yang BZ, Lappalainen J, Gelernter J. ADH4 gene variation is associated with alcohol and drug dependence: results from family controlled and population-structured association studies. *Pharmacogenet Genomics.* 2005;15(11):755-768.
 89. Dawson DA, Grant BF, Stinson FS, Chou PS. Estimating the effect of help-seeking on achieving recovery from alcohol dependence. *Addiction.* 2006;101(6):824-834.
 90. Dawson DA, Grant BF, Stinson FS, Chou PS, Huang B, Ruan WJ. Recovery from DSM-IV alcohol dependence: United States, 2001-2002. *Addiction.* 2005;100(3):281-292.
 91. Hasin DS, Grant BF. Major depression in 6050 former drinkers: association with past alcohol dependence. *Arch Gen Psychiatry.* 2002;59(9):794-800.
 92. Town M, Naimi TS, Mokdad AH, Brewer RD. Health care access among U.S. adults who drink alcohol excessively: missed opportunities for prevention. *Prev Chronic Dis.* 2006;3(2):A53.
 93. Olsson M, Marcus SC, Druss B, Elinson L, Tanielian T, Pincus HA. National trends in the outpatient treatment of depression. *JAMA.* 2002;287(2):203-209.
 94. Leon AC, Olsson M, Weissman MM, Portera L, Fireman BH, Blacklow RS, Hoven C, Broadhead WE. Brief screens for mental disorders in primary care. *J Gen Intern Med.* 1996;11(7):426-430.
 95. Spitzer RL, Williams JB, Kroenke K, Linzer M, deGruy FV III, Hahn SR, Brody D, Johnson JG. Utility of a new procedure for diagnosing mental disorders in primary care: the PRIME-MD 1000 study. *JAMA.* 1994;272(22):1749-1756.
 96. Regier DA, Hirschfeld RM, Goodwin FK, Burke JD Jr, Lazar JB, Judd LL. The NIMH Depression Awareness, Recognition, and Treatment Program: structure, aims, and scientific basis. *Am J Psychiatry.* 1988;145(11):1351-1357.
 97. Crisp AH, Gelder MG, Rix S, Meltzer HI, Rowlands OJ. Stigmatisation of people with mental illnesses. *Br J Psychiatry.* 2000;177:4-7.
 98. Room R. Stigma, social inequality and alcohol and drug use. *Drug Alcohol Rev.* 2005;24(2):143-155.

99. Corrigan PW, Lurie BD, Goldman HH, Slopen N, Medasani K, Phelan S. How adolescents perceive the stigma of mental illness and alcohol abuse. *Psychiatr Serv*. 2005;56(5):544-550.
100. Friedmann PD, McCullough D, Chin MH, Saitz R. Screening and intervention for alcohol problems: a national survey of primary care physicians and psychiatrists. *J Gen Intern Med*. 2000;15(2):84-91.
101. Hasin DS, Grant BF, Dufour MG, Endicott J. Alcohol problems increase while physician attention declines: 1967 to 1984. *Arch Intern Med*. 1990;150(2):397-400.
102. Lock CA, Kaner E, Lamont S, Bond S. A qualitative study of nurses' attitudes regarding brief alcohol intervention in primary health care. *J Adv Nurs*. 2002;39(4):333-342.
103. Johansson K, Bendtsen P, Akerlind I. Early intervention for problem drinkers: readiness to participate among general practitioners and nurses in Swedish primary health care. *Alcohol Alcohol*. 2002;37(1):38-42.
104. Babor TE, Higgins-Biddle J, Dauser D, Higgins P, Burtleson JA. Alcohol screening and brief intervention in primary care settings: implementation models and predictors. *J Stud Alcohol*. 2005;66(3):361-368.
105. Kaner EF, Heather N, McAvoy BR, Lock CA, Gilvarry E. Intervention for excessive alcohol consumption in primary health care: attitudes and practices of English general practitioners. *Alcohol Alcohol*. 1999;34(4):559-566.
106. Saitz R, Svikis D, D'Onofrio G, Kraemer KL, Perl H. Challenges applying alcohol brief interventions in diverse practice settings: populations, outcomes, and costs. *Alcohol Clin Exp Res*. 2006;30(2):332-338.
107. Grant BF. Barriers to alcohol treatment: reasons for not seeking treatment in a general population sample. *J Stud Alcohol*. 1997;58(4):365-371.
108. Bertholet N, Daepfen JB, Wietlisbach V, Fleming M, Burnand B. Reduction of alcohol consumption by brief alcohol intervention in primary care: systematic review and meta-analysis. *Arch Intern Med*. 2005;165(9):986-995.
109. Fleming MF, Barry KL, Manwell LB, Johnson K, London R. Brief physician advice for problem alcohol drinkers: a randomized controlled trial in community-based primary care practices. *JAMA*. 1997;277(13):1039-1045.
110. Fleming MF, Mundt MP, French MT, Manwell LB, Stauffacher EA, Barry KL. Brief physician advice for problem drinkers: long-term efficacy and benefit-cost analysis. *Alcohol Clin Exp Res*. 2002;26(1):36-43.
111. Grossberg PM, Brown DD, Fleming MF. Brief physician advice for high-risk drinking among young adults. *Ann Fam Med*. 2004;2(5):474-480.
112. Whitlock EP, Polen MR, Green CA, Orleans T, Klein J; US Preventive Services Task Force. Behavioral counseling interventions in primary care to reduce risky/harmful alcohol use by adults: a summary of the evidence for the US Preventive Services Task Force. *Ann Intern Med*. 2004;140(7):557-568.
113. Garbutt JC, Kranzler HR, O'Malley SS, Gastfriend DR, Pettinati HM, Silverman BL, Loewy JW, Ehrich EW; Vivitrex Study Group. Efficacy and tolerability of long-acting injectable naltrexone for alcohol dependence: a randomized controlled trial. *JAMA*. 2005;293(13):1617-1625.
114. O'Malley SS, Rounsaville BJ, Farren C, Namkoong K, Wu R, Robinson J, O'Connor PG. Initial and maintenance naltrexone treatment for alcohol dependence using primary care vs. specialty care; a nested sequence of 3 randomized trials. *Arch Intern Med*. 2003;163(14):1695-1704.
115. Volpicelli JR, Alterman AI, Hayashida M, O'Brien CP. Naltrexone in the treatment of alcohol dependence. *Arch Gen Psychiatry*. 1992;49(11):876-880.
116. Anton RF, Swift RM. Current pharmacotherapies of alcoholism: a US perspective. *Am J Addict*. 2003;12(suppl 1):S53-S68.
117. Lhuin JP, Moore N, Tran G, Steru L, Langrenon S, Daoust M, Parot P, Ladure P, Libert C, Boismare F, Hillemand B. Acamprosate appears to decrease alcohol intake in weaned alcoholics. *Alcohol Alcohol*. 1990;25(6):613-622.
118. Mason BJ. Acamprosate and naltrexone treatment for alcohol dependence: an evidence-based risk-benefits assessment. *Eur Neuropsychopharmacol*. 2003;13(6):469-475.
119. Mason BJ. Treatment of alcohol-dependent outpatients with acamprosate: a clinical review. *J Clin Psychiatry*. 2001;62(suppl 20):42-48.
120. Project MATCH Treatment Group. Matching alcoholism treatments to client heterogeneity: Project MATCH three-year drinking outcomes. *Alcohol Clin Exp Res*. 1998;22(6):1300-1311.
121. Project MATCH Treatment Group. Matching alcoholism treatments to client heterogeneity: treatment main effects and matching effects on drinking during treatment. *J Stud Alcohol*. 1998;59(6):631-639.
122. Miller WR, Rollnick S. *Motivational Interviewing: Preparing People for Change*. 2nd ed. New York, NY: Guilford Press; 2002.
123. Kadden R, Carroll K, Donovan D, Cooney N, Monti P, Abrams D, Litt M, Hester R. *Cognitive-Behavioral Coping Skills Therapy Manual: A Clinical Research Guide for Treating Individuals with Alcohol Abuse and Dependence*. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism; 1994.
124. COMBINE Study Research Group. Testing combined pharmacotherapies and behavioral interventions for alcohol dependence (the COMBINE study): a pilot feasibility study. *Alcohol Clin Exp Res*. 2003;27(7):1123-1131.
125. Anton RF, O'Malley SS, Ciraulo DA, Cisler RA, Couper D, Donovan DM, Gastfriend DR, Hosking JD, Johnson BA, LoCastro JS, Longabaugh R, Mason BJ, Mattson ME, Miller WR, Pettinati HM, Randall CL, Swift R, Weiss RD, Williams LD, Zweben A; COMBINE Study Research Group. Combined pharmacotherapies and behavioral interventions for alcohol dependence: the COMBINE study: a randomized controlled trial. *JAMA*. 2006;295(17):2003-2017.
126. McLellan AT, Lewis DC, O'Brien CP, Kleber HD. Drug dependence, a chronic medical illness: implications for treatment, insurance, and outcomes evaluation. *JAMA*. 2000;284(13):1689-1695.
127. National Institute on Alcohol Abuse and Alcoholism. *Helping Patients Who Drink Too Much*. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism; 2005.
128. Babor TF, Higgins-Biddle JC, Higgins PS, Gassman RA, Gould BE. Training medical providers to conduct alcohol screening and brief interventions. *Subst Abuse*. 2004;25(1):17-26.
129. Kraemer HC, Wilson KA, Hayward C. Lifetime prevalence and pseudocomorbidity in psychiatric research. *Arch Gen Psychiatry*. 2006;63(6):604-608.