Three-Year Incidence and Predictors of First-Onset of *DSM-IV* Mood, Anxiety, and Substance Use Disorders in Older Adults: Results From Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions

Kee-Lee Chou, PhD; Corey S. Mackenzie, PhD; Kun Liang, MPhil; and Jitender Sareen, MD

Objective: The aim of this study was to determine the incidence rates of *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition (*DSM-IV*) mood disorders, anxiety disorders, and substance use disorders in older adults and to identify sociodemographic, psychopathological, health-related, and stress-related predictors of onset of these disorders.

Method: A nationally representative sample of 8,012 community-dwelling adults aged 60 and above was interviewed twice over a period of 3 years, in 2000–2001 and 2004–2005. First incidence of mood, anxiety, and substance use disorders was assessed over a period of 3 years using the Alcohol Use Disorder and Associated Disabilities Interview Schedule—*DSM-IV* Version.

Results: The 3-year incidence rates of *DSM-IV* mood, anxiety, and substance use disorders were highest for nicotine dependence (3.38%) and major depressive disorder ([MDD] 3.28%) and lowest for drug use disorder (0.29%) and bipolar II disorder (0.34%). Incidence rates were significantly greater among older women for MDD (99% CI, 1.22–3.13) and generalized anxiety disorder (GAD; 99% CI, 1.20–4.26) and greater among older men for nicotine dependence and alcohol abuse and dependence. Posttraumatic stress disorder predicted incidence of MDD, bipolar I disorder, panic disorder, specific phobia, and GAD, while Cluster B personality disorders predicted incident MDD, bipolar I and II disorders, panic disorder, social phobia, GAD, nicotine dependence, and alcohol dependence. Poor self-rated health increased the risk for the onset of MDD, whereas obesity decreased the incidence of nicotine dependence.

Conclusions: Information about disorders that are highly incident in late life and risk factors for the onset of psychiatric disorders among older adults are important for effective early intervention and prevention initiatives.

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Corresponding author: *Kee-Lee Chou, PhD, Department of Social Work and Social Administration, The University of Hong Kong, Pokfulam Rd, Hong Kong, China (klchou@hku.hk).*

Psychiatric disorders in old age place a severe burden on patients, their family members and communities, and the health care system. In order to target prevention and intervention initiatives aimed at reducing this burden, it is important to understand the prevalence of various disorders that affect older adults. Although psychiatric epidemiology surveys such as the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) Wave 1,[1] the World Mental Health (WMH) survey,[2,3] and the National Comorbidity Survey Replication (NCS-R),[4] provide estimates of the lifetime and past-year prevalences of a wide range of psychiatric disorders in late life, longitudinal studies are urgently needed to examine incidence rates and to identify risk factors for late-life psychiatric disorders.[5,6] Point prevalence data are less suitable for that purpose, because they are unable to distinguish new disorders from those that are chronic, especially among older adults. Surveys at a single point in time are therefore unable to pinpoint the conditions under which disorders arise in old age. Part of the reason for the dearth of incidence studies of older adults is that it is commonly believed that most disorders begin in or before early adulthood and that the new onset of noncognitive psychiatric disorders in old age is rare. Another reason for the lack of incidence studies in late life is that they require prospective longitudinal data with a large enough sample size to provide sufficient stability of incidence estimates, and such data have been lacking. Consequently, very few data are available regarding the incidence of various psychiatric disorders in older adults, and the data that do exist have largely focused on depression,[7–10] with a few exceptions.[11–13] Specifically, one is a recent study from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) that reported the incidence rates of *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition (*DSM-IV*) substance, mood, and anxiety disorders across the adult life span, including adults aged 55 and older. However, in this recent study,[14] the sociodemographic and psychopathological predictors of onset of these *DSM-IV* disorders were not identified in this specific subsample.

With respect to the incidence of specific disorders in old age, several studies have examined the incidence of major depressive disorder (MDD), with results ranging from

For Clinical Use

- New onset of Axis I disorders in older adults is not a rare occurrence.
- The identification of sociodemographic, psychopathological, health-related, and stress-related risk factors in this study is essential for prevention of psychiatric disorder in old age.

0.70% to 2.27%.[8–10,13,14] Studies examining the incidence rates of both *DSM-IV* anxiety and substance use disorders among older adults are rare.[15–21] To our knowledge, only Wave 2 NESARC provided such estimates among individuals aged 55 years and older. One-year incidence rates among Wave 2 NESARC participants aged 55 and older were 1.2% for MDD, 0.2% for bipolar I disorder, 0.1% for bipolar II disorder, 0.4% for panic disorder, 0.1% for social phobia, 0.2% for specific phobia, 0.7% for generalized anxiety disorder (GAD), 0.2% for alcohol abuse, 0.5% for alcohol dependence, and 0.1% for drug dependence.[14] Although prior longitudinal surveys contributed important data on the incidence of psychiatric disorders in older adults,[8–10,13,14] existing incidence research has been limited in several respects. First, previous studies have provided little information beyond sex and age as sociodemographic risk factors for first-incident psychiatric disorders in old age,[13,15] especially for bipolar I and II disorders.[22,23] Second, these studies provided limited information on the role of comorbidity in the etiology of mental disorders. The risk instigated by current disorders for the onset of new disorders has been among the most debated issues in psychiatry.[13,14] Finally, health indicators such as medical conditions, obesity, pain, self-rated health, and recent stressful life events have not yet been examined as predictors of incidence of a wide range of psychiatric disorders in older adults, although these health indicators and stressful life events have been found to be associated with the onset of specific mood, anxiety, or substance use disorder in old age.[24–29]

This study addressed these limitations by examining the incidence rates of mental disorders in later life based on the 3-year prospective follow-up of the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).[30–32] We focus on 8,012 respondents aged 60 and older who were assessed in both the baseline and 3-year follow-up studies. The goals of this study were to (1) estimate the 3-year first-incidence of 11 *DSM-IV* mood, anxiety, and substance use disorders in a nationally representative sample of older adults, (2) provide information on an expanded range of sociodemographic risk factors and other psychiatric disorders associated with the onset of these disorders, and (3) provide estimates of the risks posed by health indicators (the number of medical conditions, obesity, pain, and self-rated health) and the number of recent stressful life events for subsequent onset of the disorders. Information on risk factors for first onset of specific psychiatric disorders can inform strategies for preventing the onset of mental disorders in old age or for early intervention initiatives once they develop.

METHOD

Sample

Wave 1 of the NESARC was conducted in 2001–2002, and the design of the study has been described previously.[31,32] The second wave of the NESARC was conducted in 2004–2005.[30] The following points are relevant to the current study: (1) The Wave 1 NESARC surveyed a representative sample of civilians aged 18 and older residing in households in the United States, oversampling black people, Hispanic individuals, and young adults aged 18–24 years; (2) face-to-face interviews were conducted with 43,093 respondents, yielding an overall response rate of 81.0%; (3) all persons who participated in the Wave 1 NESARC were approached for the 3-year follow-up; and (4) the follow-up excluded respondents ineligible for the Wave 2 interview because they were deceased (n = 1,403), deported, mentally or physically impaired (n = 781), or on active duty in the armed forces throughout the follow-up period (n = 950). The Wave 2 response rate was 86.7%, reflecting 34,653 completed face-to-face interviews.

The mean interval between Wave 1 and Wave 2 interviews was 36.6 (SD = 2.62) months. Wave 2 NESARC data were weighted to reflect design characteristics of the NESARC, accounting for oversampling, adjustments for nonresponse, and the presence of any lifetime Wave 1 NESARC substance use disorder or other psychiatric disorder performed at the household and person levels.[30] Weighted data were then adjusted to be representative of the civilian population of the United States on socioeconomic variables based on the 2000 decennial census.

Wave 2 respondents and the target population (comprising Wave 2 respondents and eligible nonrespondents) were compared in terms of a number of baseline (Wave 1) sociodemographic and diagnostic measures to test whether the nonresponse adjustment was successful.[14] The resulting comparison indicated that there were no significant differences between the Wave 2 respondents and the target population on age, race/ethnicity, sex, socioeconomic status, or the presence of any lifetime substance, mood, anxiety, or personality disorder (PD; each examined separately). However, attrition analysis of older respondents on whom we focused in this study was not available.

Psychiatric Disorders

The *DSM-IV* diagnoses of psychiatric disorders were assessed with the Alcohol Use Disorder and Associated Disabilities Interview Schedule—*DSM-IV* Version (AUDADIS-IV29), which was developed for use by trained

lay interviewers.[33] Axis I disorders were examined identically in the Wave 1 and Wave 2 versions of the AUDADIS-IV except for the time frames. In Wave 1, these time frames were (1) the year prior to the assessment and (2) the past, including all but the year preceding the interview. In Wave 2, the time frames were (1) the year preceding the Wave 2 interview and (2) the intervening period of about 2 years between the Wave 1 interview and the year prior to the Wave 2 interview. No diagnostic hierarchy rules were applied in either wave, except that hierarchical diagnoses were used for MDD and bipolar disorders.

In Waves 1 and 2, *DSM-IV* primary mood disorders included MDD and bipolar I and bipolar II disorders. Anxiety disorders included panic disorder (with and without agoraphobia), social and specific phobias, and GAD. The AUDADIS-IV methods for diagnosing these disorders are described in detail elsewhere.[20,34–39] Consistent with *DSM-IV*, primary AUDADIS-IV diagnoses excluded disorders that were substance-induced or due to medical conditions. In addition, a diagnosis of MDD ruled out bereavement. Past-year and prior-to-past year diagnoses of posttraumatic stress disorder (PTSD) were assessed only at Wave 2. Because PTSD was not assessed in both waves of the NESARC, incidence estimates were not conducted in our analyses. However, diagnosis of this disorder prior to the Wave 1 interview was included as a predictor for onset of other psychiatric disorders. Personality disorders assessed on a lifetime basis at Wave 1 included avoidant, dependent, obsessive-compulsive, paranoid, schizoid, histrionic and antisocial PDs.[1,40,41] Borderline, schizotypal, and narcissistic PDs were measured at Wave 2. Lifetime measures of each PD prior to the Wave 1 assessment were included as predictors for other psychiatric disorders.

Test-retest reliabilities for AUDADIS-IV mood, anxiety, and PD diagnoses in the general population and clinical settings ranged from fair to good ($\kappa = 0.40–0.77$).[42–44] Test-retest reliabilities of AUDADIS-IV PDs were better than with those obtained in patient samples using semistructured personality interviews.[45] Convergent validity was good to excellent for all affective, anxiety, and PD diagnoses,[1,34–41] and these diagnoses indicated good agreement ($\kappa = 0.64–0.68$) with psychiatrist reappraisals.[42]

The AUDADIS-IV assessed *DSM-IV* criteria for nicotine dependence and alcohol and drug-specific abuse and dependence for 10 classes of substances (amphetamine, opioid, sedative, tranquilizer, cocaine, inhalant/solvent, hallucinogen, cannabis, heroin, and other drug). In both Wave 1 and 2, a 12-month *DSM-IV* abuse diagnosis necessitated 1 or more of 4 abuse criteria, whereas a *DSM-IV* dependence diagnosis demanded 3 or more of 7 dependence criteria to be met in the year preceding the Wave 2 interview. For the intervening period, criteria for abuse or dependence must have been fulfilled within 1 year. We combined drug-specific abuse, and dependence disorders were combined to yield diagnoses of any drug-use disorder due to the low incidence rates in old age. Although *DSM-IV* diagnoses of abuse are preempted hierarchically by diagnoses of dependence, prospective studies have shown that individuals with histories of dependence can develop abuse without dependence,[46,47] and vice versa. Therefore, we did not invoke the hierarchical relationship between alcohol and drug abuse and dependence when estimating the incidence for these disorders.

The test–retest reliability of AUDADIS-IV substance use disorder diagnoses was found to be good to excellent ($\kappa = 0.70–0.91$) in clinical and general population samples.[42–44,48–50] The good-to-excellent convergent, discriminant, and construct validity of AUDADIS-IV substance use disorder criteria and diagnoses has been documented,[46,51–54] including in the World Health Organization/National Institutes of Health International Study on Reliability and Validity,[55–60] in which clinical reappraisals demonstrated good validity of *DSM-IV* alcohol and drug use disorder diagnoses ($\kappa = 0.54–0.76$).[42,55]

Health Indicators and Stressors

A list of 8 recent stressful life events included (1) the death of family members or close friends; (2) serious illness of or injury to family members or close friends; (3) moving to a new house or having new household members; (4) becoming separated, divorced, or breaking off a steady relationship; (5) having a problem with a neighbor, friend, or relative; (6) experiencing a major financial crisis; (7) getting into trouble with the police, being arrested, or sent to jail (participants or their family members); and (8) becoming victims of a crime (participants or their family members). Participants were asked whether they had experienced any of these events in the past year at Wave 1 assessment, and the number of recent stressful life events was calculated by the summation of these 8 items.

Self-reported pain and self-rated health status were assessed with 1 item each, selected from the 12-item Short Form Health Survey (SF-12), version 2.[31] The SF-12 is a reliable and valid measure of current impairment in physical functioning that is widely used in population surveys.[31] Bodily pain was assessed by asking respondents "During the past 4 weeks, how much did pain interfere with your normal work including both work outside the home and housework?" Respondents rated this item on 5-point scale ranging from 1 (not at all) to 5 (extremely), and we dichotomized this variable (0 = not at all or mild pain; 1 = moderate, quite a bit, or extremely). Self-rated health status was examined by asking respondents: "In general, would you say your health is excellent, very good, good, fair, or poor?" and we created a binary variable (0 = excellent, very good, good, or fair; 1 = poor). We calculated body mass index through self-reported weight and height to determine whether participants were obese (≥ 30 kg/m^2). Participants were asked whether they had experienced any of 8 medical conditions from a list in the past year. The diagnoses made by a physician or another health professional included arteriosclerosis, hypertension, cirrhosis or other liver diseases, angina, heart diseases (tachycardia, myocardial infarction, or other heart diseases), stomach ulcer or gastritis, arthritis, and psychotic illness (including schizophrenia) or episode. We calculated

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the number of medical conditions by summing these 8 items. Demographic variables assessed in the surveys included sex, age, marital status, race/ethnicity, education, and family income.

Incidence

First incidence is defined as the number of persons who develop a specific disorder for the first time (ie, new cases) in their life during a specified time frame (in our case, 3 years), divided by the total number of persons who have never experienced that disorder by the start of that time frame (ie, persons at risk).[5] Therefore, we calculated incidence rates in the following way[61,62]: the numerator was the number of new cases (I) during 3 years between the Wave 1 and the Wave 2 interviews, while the denominator for each disorder comprised the total number of persons with no prior history of that disorder at the Wave 1 interview (T = persons at risk). This incidence rate was expressed as a percentage: $(I/T) \times 100$.

Statistical Analysis

Weighted 3-year incidence rates expressed as percentages of the groups at risk are presented. Multiple logistic regression analyses examined the relative risk of first incidence of each psychiatric disorder predicted by sociodemographic characteristics and other psychiatric disorders at baseline. Baseline diagnoses were defined as Axis I and II disorders occurring prior to the Wave 1 interview (ie, Wave 1 lifetime disorders). All sociodemographic characteristics and other psychiatric disorders were entered simultaneously into a single model for the incidence of each disorder during the 3-year follow-up period at Wave 2. Because the population at risk for each particular disorder excludes all respondents with prior lifetime histories of that disorder, the number of respondents included in each regression model was different but was invariably smaller than 8,012 (see Tables 2, 4, and 5). Another set of multiple logistic regression analyses examined the role of health indicators and the number of recent stressful life events in the prediction of first-incidence of psychiatric disorders. These analyses entered all health indicators and the number of stressful life events simultaneously into one model for each disorder after controlling for sociodemographic factors and psychiatric disorders at baseline assessment. Due to missing values for these health indicators and stressful life events variables, only 7,453 respondents were included in these analyses. Again, because the population at risk for each particular disorder excludes all respondents with prior lifetime histories of that disorder, the number of respondents included in each regression model was different but was invariably smaller than 7,453 (see Tables 3 and 6). Data were analyzed using SUDAAN 9.0,[63] a software program that uses Taylor series linearization to adjust for the design effects of the complex sampling methodology of the NESARC. To adjust for multiple tests, the significance level for all tests was set at $P < .01$ to reduce Type I error and increase the likelihood that the effects will be replicated in future studies. All standard errors and 99% confidence intervals were adjusted for the design effects of the Wave 2 NESARC sample.

Table 1. 3-Year Incidence of *DSM-IV* Psychiatric Disorders Among Older Adults Aged 60 and Older

Disorder	Unweighted Respondents at Risk, No.	Unweighted 3-Year Incident Cases, No.	Weighted 3-Year Incidence Rate of First Onset (SE)
Mood disorder			
Major depressive disorder	7,135	246	3.28 (0.25)
Bipolar I disorder	7,913	46	0.54 (0.09)
Bipolar II disorder	7,950	34	0.34 (0.06)
Anxiety disorder			
Panic disorder	7,752	58	0.76 (0.13)
Specific phobia	7,430	112	1.35 (0.17)
Social phobia	7,743	52	0.58 (0.10)
Generalized anxiety disorder	7,763	125	1.63 (0.18)
Substance use disorder			
Nicotine dependence	7,178	251	3.38 (0.25)
Alcohol abuse disorder	6,624	63	1.02 (0.14)
Alcohol dependence disorder	7,661	35	0.40 (0.08)
Drug abuse/ dependence disorder	7,933	20	0.29 (0.10)

RESULTS

Incidence

Table 1 indicates that the 3-year incidence rates were highest for nicotine dependence (3.38%) and MDD (3.28%); these disorders occurred considerably more often than the other 9 disorders we examined. In contrast, new cases of drug use disorder (0.29%), bipolar disorder (0.54% for bipolar I and 0.34% for bipolar II), alcohol dependence (0.40%), social phobia (0.58%), and panic disorder (0.76%) were relatively rare.

Mood Disorders

After controlling for sociodemographic characteristics and psychiatric comorbidity, we found few significant associations of incident *DSM-IV* mood disorders with sociodemographic characteristics and psychiatric disorders. Table 2 depicts that the incidence rates of MDD for women were higher than those for men, and for older people with baseline PTSD or with borderline PD were greater than for those without. Older adults who had experienced PTSD or borderline PD also had an increased likelihood of developing bipolar I disorder. The risk of incident bipolar II disorder was greater for those with baseline narcissistic PD.

After adjusting for sociodemographic characteristics, psychiatric comorbidity, and other risk factors, all associations of sociodemographic characteristics and psychiatric comorbidity with onset of mood disorders found in the earlier model remained significant except the associations between PTSD and bipolar I and between narcissistic PD and bipolar II (not shown in Table 3). With respect to the influence of other health-related risk factors, as can be seen in Table 3, we found that baseline poor self-rated health was a significant predictor of incident MDD.

Table 2. Association of 3-Year Incidence of *DSM-IV* Mood Disorders by Sociodemographic Characteristics and Specific Psychiatric Disorders at Baseline, Controlling for Sociodemographic Characteristics and Other Baseline Psychiatric Disorders[a]

	Major Depressive Disorder (n = 7,135)		Bipolar I Disorder (n = 7,913)		Bipolar II Disorder (n = 7,950)	
Variable	% (SE)	OR (99% CI)	% (SE)	OR (99% CI)	% (SE)	OR (99% CI)
Sex						
Male	2.35 (0.32)	1.00 (1.00–1.00)	0.50 (0.15)	1.00 (1.00–1.00)	0.25 (0.09)	1.00 (1.00–1.00)
Female	4.04 (0.35)	**1.95 (1.22–3.13)**	0.57 (0.11)	1.42 (0.51–3.91)	0.41 (0.10)	1.98 (0.41–9.50)
Age, y						
60–69	3.11 (0.33)	1.00 (1.00–1.00)	0.80 (0.16)	1.00 (1.00–1.00)	0.38 (0.10)	1.00 (1.00–1.00)
70–79	3.45 (0.43)	1.21 (0.73–2.02)	0.27 (0.10)	0.45 (0.11–1.81)	0.36 (0.11)	1.00 (0.28–3.66)
≥ 80	3.38 (0.60)	1.39 (0.75–2.55)	0.33 (0.18)	0.78 (0.14–4.25)	0.19 (0.11)	…[b]
Marital status						
Married/cohabiting	3.10 (0.31)	1.00 (1.00–1.00)	0.63 (0.13)	1.00 (1.00–1.00)	0.35 (0.09)	1.00 (1.00–1.00)
Widowed	3.35 (0.45)	0.71 (0.44–1.14)	0.32 (0.11)	0.33 (0.08–1.40)	0.30 (0.10)	0.54 (0.13–2.31)
Divorced/separated	4.58 (0.75)	1.13 (0.64–1.97)	0.60 (0.23)	0.32 (0.07–1.44)	0.16 (0.12)	…[b]
Never married	3.11 (0.96)	0.92 (0.38–2.26)	0.14 (0.10)	…[b]	0.85 (0.49)	…[b]
Race/ethnicity						
White	3.17 (0.27)	1.00 (1.00–1.00)	0.48 (0.09)	1.00 (1.00–1.00)	0.28 (0.07)	1.00 (1.00–1.00)
Black	2.88 (0.57)	0.77 (0.40–1.47)	1.13 (0.46)	1.94 (0.49–7.59)	1.08 (0.29)	3.09 (0.94–10.18)
Hispanic	4.65 (1.03)	1.19 (0.58–2.41)	0.95 (0.40)	1.91 (0.37–10.02)	0.25 (0.20)	…[b]
Other	4.13 (1.34)	1.24 (0.45–3.45)	0 (0)	…[c]	0.28 (0.28)	…[b]
Education						
Less than high school	6.16 (1.37)	1.00 (1.00–1.00)	0.79 (0.45)	1.00 (1.00–1.00)	0.21 (0.12)	1.00 (1.00–1.00)[c]
High school	3.29 (0.37)	0.51 (0.22–1.15)	0.55 (0.12)	0.59 (0.06–6.24)	0.43 (0.10)	2.46 (0.30–19.95)
Some college or beyond	2.91 (0.34)	0.50 (0.21–1.17)	0.49 (0.15)	0.69 (0.04–10.70)	0.24 (0.09)	1.74 (0.20–15.44)
Family income, $						
0–19,999	3.95 (0.41)	1.00 (1.00–1.00)	0.63 (0.15)	1.00 (1.00–1.00)	0.40 (0.11)	1.00 (1.00–1.00)
20,000–34,999	3.43 (0.54)	0.94 (0.55–1.61)	0.57 (0.20)	0.78 (0.24–2.56)	0.49 (0.17)	1.14 (0.31–4.12)
35,000–69,999	3.20 (0.52)	0.96 (0.52–1.79)	0.44 (0.17)	0.61 (0.13–2.86)	0.15 (0.10)	…[b]
≥ 70,000	1.54 (0.45)	0.48 (0.20–1.18)	0.45 (0.25)	…[b]	0.32 (0.20)	…[b]
Mood disorder						
Major depressive disorder	…	…	0.90 (0.33)	0.86 (0.20–3.82)	0.95 (0.37)	3.46 (0.84–14.24)
Bipolar I disorder	8.80 (5.02)	…[b]	…	…	0 (0)	…[c]
Bipolar II disorder	1.72 (1.25)	…[b]	0 (0)	…[c]	…	…
Anxiety disorder						
Panic disorder	9.38 (2.63)	2.24 (0.84–5.95)	2.00 (1.11)	2.04 (0.20–20.47)	0 (0)	…[c]
Specific phobia	4.90 (1.19)	1.21 (0.57–2.57)	1.66 (0.63)	2.97 (0.77–11.41)	0.51 (0.31)	…[b]
Social phobia	3.14 (1.40)	0.54 (0.12–2.42)	0.73 (0.44)	…[b]	0 (0)	…[c]
Generalized anxiety disorder	4.55 (2.38)	…[b]	1.12 (0.77)	…[b]	0.72 (0.69)	…[b]
Posttraumatic stress disorder	10.87 (2.33)	**2.94 (1.41–6.11)**	2.69 (1.04)	**3.35 (1.03–10.84)**	0.90 (0.47)	…[b]
Nicotine dependence	5.26 (0.93)	1.68 (0.91–3.10)	1.29 (0.46)	2.48 (0.59–10.40)	0.41 (0.22)	0.96 (0.17–5.39)
Alcohol use disorder						
Alcohol abuse	3.45 (0.53)	1.26 (0.71–2.26)	0.63 (0.24)	0.67 (0.13–3.37)	0.34 (0.16)	1.03 (0.14–7.75)
Alcohol dependence	3.74 (1.15)	0.83 (0.32–2.20)	1.64 (0.83)	2.55 (0.41–15.93)	0.61 (0.37)	…[b]
Any drug use disorder	6.68 (3.72)	…[b]	1.23 (1.19)	…[b]	0.43 (0.44)	…[b]
Personality disorder						
Antisocial	3.61 (2.63)	…[b]	0 (0)	…[c]	0 (0)	…[c]
Avoidant	7.74 (3.91)	…[b]	5.75 (3.10)	…[b]	0 (0)	…[c]
Dependent	17.54 (15.54)	…[b]	5.79 (5.70)	…[b]	0 (0)	…[c]
Obsessive-compulsive	5.99 (1.56)	1.52 (0.68–3.41)	0.86 (0.50)	…[b]	0.36 (0.25)	…[b]
Paranoid	7.53 (2.77)	0.81 (0.14–4.69)	2.52 (1.49)	…[b]	0 (0)	…[c]
Schizoid	6.11 (2.82)	1.39 (0.29–6.70)	1.23 (0.83)	…[b]	1.16 (1.16)	…[b]
Histrionic	10.98 (5.96)	…[b]	7.07 (4.83)	…[b]	0 (0)	…[c]
Borderline	18.13 (3.60)	**4.77 (2.07–10.99)**	8.45 (2.36)	**11.27 (2.70–47.04)**	1.25 (0.81)	…[b]
Schizotypal	10.02 (3.25)	0.97 (0.24–3.91)	6.63 (2.35)	2.78 (0.53–14.54)	0.71 (0.42)	…[b]
Narcissistic	9.86 (2.25)	1.77 (0.79–3.97)	4.10 (1.36)	1.88 (0.50–7.12)	2.11 (0.90)	**7.29 (1.19–44.66)**

[a]Values in bold are statistically significant.
[b]Not reported due to fewer than 5 positive responses.
[c]Zero cell.
Abbreviations: *DSM-IV* = *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition; OR = odds ratio.
Symbol: … = not applicable.

Anxiety Disorders

Table 4 shows that respondents in the oldest age group (80 and older) in comparison with those in the youngest age group (60 to 69 years) and respondents in the highest income group (US $70,000 and above) in comparison with the lowest income group (below US $20,000) were more at risk for incident panic disorder. Older women were also more likely to experience a new onset of GAD than older men. Compared with white respondents, Hispanics were at increased risk of incident social phobia. Similar to the findings related to mood disorder, the presence of baseline PTSD increased the chance of an incident panic disorder, specific phobia, or GAD. Besides PTSD, the risk of incident panic disorder was also increased among respondents with schizotypal PD. The risk of incident social phobia was increased among respondents with baseline panic disorder and borderline PD

Table 3. Association of 3-Year Incidence of *DSM-IV* Mood Disorders by Specific Health Indicators and the Number of Recent Stressful Life Events at Baseline, Controlling for Sociodemographic Characteristics, Other Baseline Psychiatric Disorders, and Other Risk Factors[a]

	Major Depressive Disorder (n = 6,640)		Bipolar I Disorder (n = 7,365)		Bipolar II Disorder (n = 7,394)	
	% (SE)	OR (99% CI)	% (SE)	OR (99% CI)	% (SE)	OR (99% CI)
Health indicators						
Obesity	3.25 (0.49)	0.86 (0.50–1.48)	0.50 (0.19)	0.55 (0.14–2.20)	0.36 (0.15)	0.55 (0.15–2.00)
Pain	5.17 (0.54)	1.55 (0.93–2.58)	0.88 (0.22)	1.84 (0.52–6.52)	0.38 (0.13)	0.63 (0.18–2.20)
Poor self-rated health	8.65 (1.61)	**2.27 (1.17–4.39)**	1.27 (0.52)	1.66 (0.40–6.85)	1.13 (0.48)	3.16 (0.67–14.94)
Medical conditions, no.						
None	2.36 (0.41)	1.00 (1.00–1.00)	0.33 (0.14)	1.00 (1.00–1.00)	0.23 (0.09)	1.00 (1.00–1.00)
1	3.07 (0.41)	1.02 (0.55–1.90)	0.42 (0.15)	0.94 (0.22–4.05)	0.25 (0.10)	0.95 (0.18–5.03)
2+	3.89 (0.45)	0.86 (0.46–1.60)	0.73 (0.19)	1.42 (0.24–8.44)	0.51 (0.14)	1.64 (0.41–6.55)
Schizophrenia or psychotic illness or episode	12.01 (7.59)	…[b]	0 (0)	…[c]	0 (0)	…[c]
Stressful life events, no.						
None	2.14 (0.32)	1.00 (1.00–1.00)	0.31 (0.12)	1.00 (1.00–1.00)	0.18 (0.08)	1.00 (1.00–1.00)
1	3.76 (0.49)	1.60 (0.94–2.73)	0.58 (0.16)	1.68 (0.40–6.97)	0.26 (0.10)	1.21 (0.26–5.76)
2+	3.85 (0.48)	1.49 (0.87–2.56)	0.67 (0.20)	1.36 (0.27–6.77)	0.62 (0.17)	2.89 (0.62–13.42)

[a]Values in bold are statistically significant.
[b]Not reported due to fewer than 5 positive responses.
[c]Zero cell.
Abbreviations: *DSM-IV* = *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition; OR = odds ratio.

but decreased among those with alcohol abuse. Finally, increased risk of incident GAD was associated with baseline narcissistic PD.

After sociodemographic characteristics and other psychiatric disorders were controlled for, neither health indicators nor the number of stressful life events were significantly associated with the incidence of anxiety disorders. Therefore, the findings are not shown but are available upon request.

Substance Use Disorder

Table 5 indicates that the demographic variables sex, age, and marital status were prominent predictors of incident nicotine dependence. New onset of this disorder was more likely among (1) men than women, (2) the youngest age group (60–69 years) than the older age categories, and (3) individuals who were widowed, divorced, or separated than those who were married. Men were also at increased risk of incident alcohol abuse and dependence. Baseline narcissistic PD increased risk of both nicotine and alcohol dependence.

Health problems and recent stressful life events had no impact on incident substance disorders with 1 exception. Table 6 shows that obesity at baseline reduced the risk of incident nicotine dependence.

DISCUSSION

To our knowledge, this is the first study to examine the incidence rates of a wide range of *DSM-IV* psychiatric disorders in older adults using a large representative sample and a prospective design. The conclusion we draw from this study is that, first, the most common incident disorders are nicotine dependence and MDD, followed by GAD, specific phobia, and alcohol abuse disorder. One must be cautious when comparing our 3-year incidence rates with previous studies that typically provided incidence rates over a 1-year period, which will necessarily result in lower incidence rates. After the difference in the length of period observed for the onset is taken into consideration, the 3-year incidence of MDD in our sample is 3.28%, which is similar to the median of annual rates found in previous studies (0.70%–2.27%).[8–10,14] Not surprisingly, our 3-year incidence rates of all other *DSM-IV* disorders are comparable to the annual rate reported in individuals aged 55 and older.[14]

A second key finding from this study is its evidence of the association between sex and the incidence of mood, anxiety, and substance use disorders in old age. Specifically, older women had a higher relative risk for MDD and GAD, while the risk of nicotine dependence and alcohol abuse or dependence was greater for older men. The sex differences in the incidence of MDD and GAD are consistent with previous research with older adults.[64–67] To our knowledge, no incidence study of substance use disorder in an aged population has been undertaken. The risk of incident alcohol abuse and dependence was higher in men, which is consistent with a longitudinal study demonstrating that men consumed higher levels of alcohol than women.[68,69] Moreover, that older men were more likely to experience a new onset of nicotine dependence than older women is in line with previous findings that smoking rates are higher among older men than older women.[28,70,71]

Moreover, the incidence of nicotine dependence is not only affected by sex but also by marital status and age. Specifically, both being younger and not being currently married predicted the incidence of nicotine dependence in old age. These findings are consistent with prior research demonstrating that unmarried, divorced, and separated older adults are more likely to be smokers than married ones and that the prevalence of smoking declines with increasing age.[28] Compared with older white respondents in this study, older Hispanic individuals were more likely to report a new incident of social phobia. This finding is, however, inconsistent with prior research, which found that older white individuals are more likely to report social phobia than nonwhites.[72]

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Table 4. Association of 3-Year Incidence of *DSM-IV* Anxiety Disorders by Sociodemographic Characteristics and Specific Psychiatric Disorders at Baseline, Controlling for Sociodemographic Characteristics and Other Baseline Psychiatric Disorders[a]

	Panic Disorder (n = 7,752)		Specific Phobia (n = 7,430)		Social Phobia (n = 7,743)		Generalized Anxiety Disorder (n = 7,763)	
Variable	% (SE)	OR (99% CI)	% (SE)	OR (99% CI)	% (SE)	OR (95% CI)	% (SE)	OR (99% CI)
Sex								
Male	0.59 (0.17)	1.00 (1.00–1.00)	1.21 (0.24)	1.00 (1.00–1.00)	0.37 (0.11)	1.00 (1.00–1.00)	1.06 (0.19)	1.00 (1.00–1.00)
Female	0.90 (0.18)	1.42 (0.44–4.55)	1.46 (0.23)	0.86 (0.40–1.86)	0.74 (0.15)	1.29 (0.36–4.55)	2.30 (0.29)	**2.26 (1.20–4.26)**
Age, y								
60–69	0.55 (0.14)	1.00 (1.00–1.00)	1.67 (0.26)	1.00 (1.00–1.00)	0.78 (0.17)	1.00 (1.00–1.00)	1.87 (0.28)	1.00 (1.00–1.00)
70–79	0.91 (0.23)	2.16 (0.73–6.36)	1.10 (0.23)	0.63 (0.31–1.26)	0.42 (0.12)	0.68 (0.26–1.80)	1.65 (0.31)	0.96 (0.44–2.09)
≥ 80	1.11 (0.34)	**3.51 (1.03–11.91)**	0.94 (0.30)	0.46 (0.15–1.38)	0.36 (0.19)	0.65 (0.12–3.62)	1.63 (0.43)	1.14 (0.44–2.95)
Marital status								
Married/ cohabiting	0.70 (0.15)	1.00 (1.00–1.00)	1.13 (0.19)	1.00 (1.00–1.00)	0.47 (0.13)	1.00 (1.00–1.00)	1.69 (0.24)	1.00 (1.00–1.00)
Widowed	1.02 (0.29)	0.74 (0.26–2.11)	1.84 (0.44)	1.62 (0.64–4.11)	0.79 (0.20)	1.38 (0.40–4.76)	1.89 (0.42)	0.69 (0.27–1.77)
Divorced/ separated	0.82 (0.36)	0.71 (0.20–2.52)	1.59 (0.40)	1.05 (0.44–2.47)	0.77 (0.26)	1.20 (0.28–5.13)	1.96 (0.50)	0.66 (0.28–1.54)
Never married	0.08 (0.08)	…[b]	1.36 (0.53)	1.22 (0.38–3.95)	0.74 (0.42)	…[b]	1.55 (0.70)	0.78 (0.22–2.80)
Race/ethnicity								
White	0.64 (0.12)	1.00 (1.00–1.00)	1.11 (0.17)	1.00 (1.00–1.00)	0.41 (0.08)	1.00 (1.00–1.00)	1.58 (0.18)	1.00 (1.00–1.00)
Black	1.10 (0.62)	0.75 (0.16–3.41)	1.96 (0.39)	1.28 (0.60–2.76)	1.05 (0.39)	1.94 (0.44–8.56)	2.01 (0.44)	1.12 (0.51–2.46)
Hispanic	1.89 (0.66)	3.05 (0.85–10.95)	1.44 (0.51)	0.94 (0.29–3.04)	1.93 (0.89)	**5.13 (1.61–16.37)**	1.98 (0.57)	1.16 (0.45–3.00)
Others	0.90 (0.59)	…[b]	4.10 (1.68)	3.44 (0.99–12.03)	1.02 (0.72)	…[b]	3.92 (1.57)	2.38 (0.65–8.69)
Education								
Less than high school	1.10 (0.49)	1.00 (1.00–1.00)	1.98 (0.77)	1.00 (1.00–1.00)	1.02 (0.79)	1.00 (1.00–1.00)[b]	1.77 (0.66)	1.00 (1.00–1.00)
High school	0.78 (0.19)	1.19 (0.25–5.75)	1.48 (0.25)	0.94 (0.23–3.95)	0.71 (0.15)	1.26 (0.14–11.10)	1.97 (0.30)	1.21 (0.33–4.41)
Some college or beyond	0.70 (0.18)	1.09 (0.22–5.40)	1.10 (0.22)	0.73 (0.19–2.86)	0.37 (0.11)	0.80 (0.08–8.35)	1.48 (0.24)	1.05 (0.29–3.80)
Family income, $								
0–19,999	0.89 (0.16)	1.00 (1.00–1.00)	1.74 (0.24)	1.00 (1.00–1.00)	0.67 (0.18)	1.00 (1.00–1.00)	2.21 (0.32)	1.00 (1.00–1.00)
20,000–34,999	0.76 (0.24)	1.18 (0.37–3.74)	1.09 (0.25)	0.67 (0.30–1.54)	0.74 (0.23)	1.86 (0.46–7.60)	1.74 (0.33)	0.82 (0.40–1.66)
35,000–69,999	0.22 (0.11)	…[b]	1.11 (0.35)	0.78 (0.30–2.02)	0.42 (0.17)	1.12 (0.24–5.23)	1.83 (0.39)	0.95 (0.41–2.16)
≥ 70, 000	1.55 (0.58)	**3.26 (1.10–9.67)**	1.33 (0.52)	0.93 (0.24–3.61)	0.42 (0.24)	…[b]	0.50 (0.34)	…[b]
Mood disorder								
Major depressive disorder	1.26 (0.43)	1.04 (0.21–5.16)	2.84 (1.00)	2.02 (0.64–6.32)	1.13 (0.50)	0.99 (0.21–4.64)	4.86 (1.20)	2.31 (0.91–5.89)
Bipolar I disorder	1.88 (1.87)	…[b]	5.30 (3.69)	…[b]	4.47 (3.77)	…[b]	6.86 (3.21)	1.44 (0.19–10.87)
Bipolar II disorder	2.03 (1.57)	…[b]	2.98 (2.12)	…[b]	0.61 (0.59)	…[b]	1.58 (1.58)	…[b]
Anxiety disorder								
Panic disorder	…	…	2.21 (1.11)	1.29 (0.22–7.47)	4.93 (1.83)	**9.64 (2.74–33.87)**	4.24 (1.60)	1.51 (0.45–5.07)
Specific phobia	0.39 (0.29)	…[b]	…	…	1.54 (0.77)	1.52 (0.38–6.18)	3.48 (1.10)	1.47 (0.56–3.84)
Social phobia	0 (0)	…[c]	0 (0)	…[c]	…	…	4.55 (1.82)	1.32 (0.28–6.28)
Generalized anxiety disorder	3.02 (1.25)	2.69 (0.41–17.81)	0.94 (0.94)	…[b]	1.22 (0.82)	…[b]	…	…
Posttraumatic stress disorder	5.33 (1.63)	**7.72 (1.83–32.52)**	4.95 (1.66)	**3.12 (1.07–9.15)**	3.82 (1.61)	3.92 (0.83–18.49)	7.47 (1.76)	**3.42 (1.43–8.16)**
Nicotine dependence	0.94 (0.54)	1.07 (0.32–3.58)	2.35 (0.64)	1.69 (0.73–3.94)	1.33 (0.50)	2.76 (0.84–9.07)	2.59 (0.59)	1.20 (0.53–2.71)
Alcohol use disorder								
Alcohol abuse	0.62 (0.22)	1.22 (0.33–4.43)	1.04 (0.30)	0.67 (0.25–1.77)	0.20 (0.09)	**0.15 (0.03–0.64)**	1.87 (0.41)	1.40 (0.69–2.86)
Alcohol dependence	0.46 (0.31)	…[b]	1.27 (0.50)	0.88 (0.23–3.37)	1.13 (0.60)	3.00 (0.36–25.00)	1.55 (0.75)	0.45 (0.07–2.67)
Any drug use disorder	0 (0)	…[c]	0.81 (0.56)	…[b]	0.50 (0.51)	…[b]	0 (0)	…[c]
Personality disorder								
Antisocial	0 (0)	…[c]	0 (0)	…[c]	0.60 (0.60)	…[b]	4.09 (2.54)	…[b]
Avoidant	3.57 (2.46)	…[b]	2.54 (1.80)	…[b]	0.78 (0.80)	…[b]	4.01 (2.69)	…[b]
Dependent	9.05 (8.85)	…[b]	5.55 (5.53)	…[b]	0 (0)	…[b]	0 (0)	…[c]
Obsessive-compulsive	2.28 (0.85)	2.24 (0.65–7.70)	1.11 (0.64)	…[b]	1.08 (0.84)	…[b]	4.00 (1.08)	1.62 (0.73–3.63)
Paranoid	1.79 (1.20)	…[b]	3.29 (1.58)	…[b]	5.58 (2.79)	7.05 (0.94–52.68)	2.61 (1.52)	…[b]
Schizoid	0 (0)	…[c]	2.21 (2.14)	…[b]	0.31 (0.30)	…[b]	0 (0)	…[c]
Histrionic	1.58 (1.58)	…[b]	1.86 (1.87)	…[b]	0.82 (0.82)	…[b]	2.85 (2.11)	…[b]
Borderline	4.84 (1.90)	1.00 (0.11–9.14)	5.24 (1.91)	1.69 (0.45–6.33)	7.01 (2.22)	**6.89 (2.65–17.93)**	10.77 (2.79)	2.85 (0.95–8.56)
Schizotypal	12.23 (4.58)	**22.31 (5.48–90.81)**	5.18 (1.56)	1.87 (0.50–6.92)	4.82 (2.10)	1.63 (0.27–9.85)	8.79 (2.06)	1.80 (0.50–6.52)
Narcissistic	5.64 (1.93)	3.20 (0.96–10.68)	3.77 (0.75)	1.82 (0.70–4.71)	3.30 (1.09)	2.01 (0.71–5.71)	7.42 (1.91)	**3.03 (1.14–8.04)**

[a]Values in bold are statistically significant.
[b]Not reported due to fewer than 5 positive responses.
[c]Zero cell.
Abbreviations: *DSM-IV* = *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition; OR = odds ratio.
Symbol: … = not applicable.

Table 5. Association of 3-Year Incidence of *DSM-IV* Substance Use Disorders by Sociodemographic Characteristics and Specific Psychiatric Disorders at Baseline, Controlling for Sociodemographic Characteristics and Other Baseline Psychiatric Disorders[a]

	Nicotine Dependence (n = 7,178)		Alcohol Abuse (n = 6,624)		Alcohol Dependence (n = 7,661)		Any Drug Use Disorder (n = 7,933)	
Variable	% (SE)	OR (99% CI)	% (SE)	OR (99% CI)	% (SE)	OR (99% CI)	% (SE)	OR (99% CI)
Sex								
Male	4.31 (0.44)	1.00 (1.00–1.00)	2.29 (0.35)	1.00 (1.00–1.00)	0.73 (0.15)	1.00 (1.00–1.00)	0.44 (0.21)	1.00 (1.00–1.00)
Female	2.70 (0.27)	**0.62 (0.39–0.99)**	0.31 (0.10)	**0.16 (0.06–0.44)**	0.16 (0.06)	**0.26 (0.08–0.88)**	0.17 (0.06)	0.37 (0.08–1.78)
Age, y								
60–69	5.00 (0.44)	1.00 (1.00–1.00)	1.28 (0.20)	1.00 (1.00–1.00)	0.49 (0.12)	1.00 (1.00–1.00)	0.44 (0.19)	1.00 (1.00–1.00)
70–79	2.52 (0.38)	**0.46 (0.27–0.77)**	0.90 (0.23)	0.84 (0.34–2.07)	0.39 (0.12)	0.99 (0.30–3.27)	0.15 (0.07)	0.42 (0.07–2.69)
≥ 80	0.73 (0.21)	**0.12 (0.05–0.27)**	0.54 (0.36)	0.62 (0.09–4.20)	0.16 (0.11)	…[b]	0.12 (0.07)	…[b]
Marital status								
Married/ cohabiting	2.95 (0.32)	1.00 (1.00–1.00)	1.20 (0.21)	1.00 (1.00–1.00)	0.37 (0.10)	1.00 (1.00–1.00)	0.32 (0.15)	1.00 (1.00–1.00)
Widowed	3.26 (0.49)	**1.95 (1.06–3.60)**	0.30 (0.11)	0.61 (0.16–2.34)	0.30 (0.10)	1.53 (0.35–6.59)	0.24 (0.12)	1.94 (0.36–10.39)
Divorced/ separated	6.16 (0.92)	**1.77 (1.01–3.09)**	1.97 (0.55)	2.29 (0.84–6.25)	0.59 (0.24)	1.09 (0.22–5.32)	0.28 (0.17)	…[b]
Never married	5.25 (1.29)	1.85 (0.85–4.04)	0.87 (0.65)	…[b]	1.14 (0.56)	…[b]	0 (0)	…[c]
Race/ethnicity								
White	3.20 (0.29)	1.00 (1.00–1.00)	1.11 (0.16)	1.00 (1.00–1.00)	0.37 (0.08)	1.00 (1.00–1.00)	0.19 (0.06)	1.00 (1.00–1.00)
Black	4.62 (0.84)	1.06 (0.58–1.93)	0.64 (0.27)	0.55 (0.16–1.90)	0.60 (0.26)	1.24 (0.22–7.08)	0.12 (0.07)	…[b]
Hispanic	4.44 (1.12)	1.05 (0.42–2.62)	0.91 (0.49)	0.63 (0.08–5.29)	0.86 (0.36)	2.73 (0.65–11.55)	0.32 (0.17)	…[b]
Others	2.81 (1.29)	0.87 (0.22–3.48)	0.23 (0.24)	…[b]	0 (0)	…[c]	2.19 (1.76)	…[b]
Education								
Less than high school	3.86 (0.96)	1.00 (1.00–1.00)	0.79 (0.51)	1.00 (1.00–1.00)[c]	0.07 (0.07)	1.00 (1.00–1.00)[b]	0.45 (0.44)	1.00 (1.00–1.00)[b]
High school	3.85 (0.35)	1.04 (0.45–2.44)	0.68 (0.15)	0.63 (0.08–5.12)	0.53 (0.13)	13.37 (0.66–269.04)	0.23 (0.08)	1.98 (0.21–18.80)
Some college or beyond	2.73 (0.34)	0.72 (0.29–1.79)	1.47 (0.28)	0.89 (0.10–7.62)	0.28 (0.09)	6.62 (0.31–142.72)	0.33 (0.20)	1.04 (0.06–18.83)
Family income, $								
0–19,999	3.84 (0.41)	1.00 (1.00–1.00)	0.51 (0.15)	1.00 (1.00–1.00)	0.44 (0.11)	1.00 (1.00–1.00)	0.08 (0.04)	1.00 (1.00–1.00)
20,000–34,999	2.92 (0.49)	0.69 (0.40–1.19)	0.89 (0.26)	1.30 (0.39–4.35)	0.34 (0.14)	0.62 (0.15–2.62)	0.24 (0.13)	2.49 (0.35–17.50)
35,000–69,999	3.92 (0.54)	0.94 (0.57–1.58)	1.65 (0.38)	1.96 (0.57–6.67)	0.55 (0.17)	1.36 (0.41–4.44)	0.25 (0.11)	3.02 (0.31–29.60)
≥ 70,000	1.96 (0.58)	0.46 (0.18–1.22)	1.38 (0.45)	1.16 (0.28–4.84)	0.13 (0.13)	…[b]	0.96 (0.63)	…[b]
Mood disorder								
Major depressive disorder	4.83 (1.07)	1.16 (0.56–2.39)	0.85 (0.27)	0.78 (0.16–3.94)	0.43 (0.18)	0.89 (0.23–3.53)	0.31 (0.21)	…[b]
Bipolar I disorder	3.14 (2.25)	…[b]	0 (0)	…[c]	0 (0)	…[c]	0 (0)	…[c]
Bipolar II disorder	8.12 (5.47)	…[b]	0 (0)	…[c]	0 (0)	…[c]	0 (0)	…[c]
Anxiety disorder								
Panic disorder	5.55 (1.78)	1.36 (0.46–4.01)	0.36 (0.35)	…[b]	0.94 (0.69)	…[b]	1.30 (0.90)	…[b]
Specific phobia	4.24 (1.24)	1.21 (0.53–2.75)	1.07 (0.54)	1.43 (0.30–6.79)	0.48 (0.36)	…[b]	0.28 (0.28)	…[b]
Social phobia	2.79 (1.19)	0.66 (0.16–2.64)	0.32 (0.32)	…[b]	0.78 (0.45)	…[b]	0 (0)	…[c]
Generalized anxiety disorder	4.56 (1.75)	1.26 (0.41–3.86)	2.38 (1.41)	…[b]	0.36 (0.36)	…[b]	0 (0)	…[c]
Posttraumatic stress disorder	2.64 (1.03)	0.48 (0.14–1.63)	0.30 (0.30)	…[b]	0.96 (0.71)	…[b]	0.79 (0.58)	…[b]
Nicotine dependence	…	…	2.65 (0.85)	2.30 (0.83–6.37)	0.91 (0.38)	2.10 (0.41–10.69)	0 (0)	…[c]
Alcohol use disorder								
Alcohol abuse	6.31 (0.93)	1.61 (0.87–3.00)	…	…	1.21 (0.32)	2.78 (0.85–9.03)	0.25 (0.15)	…[b]
Alcohol dependence	8.44 (2.27)	1.33 (0.49–3.61)	6.14 (3.36)	…[b]	…	…	0.06 (0.06)	…[b]
Any drug use disorder	5.67 (4.37)	…[b]	0 (0)	…[c]	0 (0)	…[c]	…	…
Personality disorder								
Antisocial	6.35 (4.00)	…[b]	9.86 (7.08)	…[b]	0 (0)	…[c]	0 (0)	…[c]
Avoidant	5.10 (3.36)	…[b]	0 (0)	…[c]	1.17 (1.14)	…[b]	0 (0)	…[c]
Dependent	0 (0)	…[c]	0 (0)	…[c]	0 (0)	…[c]	0 (0)	…[c]
Obsessive-compulsive	3.30 (1.00)	0.72 (0.26–2.03)	1.84 (0.79)	1.41 (0.44–4.50)	0 (0)	…[c]	0.04 (0.04)	…[b]
Paranoid	4.62 (1.90)	0.71 (0.12–4.33)	0 (0)	…[c]	0.81 (0.61)	…[b]	0 (0)	…[c]
Schizoid	3.71 (2.01)	…[b]	1.73 (1.72)	…[b]	0 (0)	…[c]	0 (0)	…[c]
Histrionic	9.44 (7.05)	…[b]	0 (0)	…[c]	4.93 (4.12)	…[b]	0 (0)	…[c]
Borderline	13.23 (3.31)	1.97 (0.71–5.51)	1.04 (0.76)	…[b]	2.38 (1.16)	2.36 (0.41–13.65)	0.18 (0.18)	…[b]
Schizotypal	12.03 (3.39)	1.33 (0.35–5.10)	0.66 (0.51)	…[b]	1.66 (1.23)	…[b]	0 (0)	…[c]
Narcissistic	13.96 (2.56)	**3.60 (1.57–8.23)**	3.70 (1.53)	4.33 (0.94–20.01)	3.12 (1.34)	**9.18 (1.31–64.21)**	1.03 (0.66)	…[b]

[a]Values in bold are statistically significant.
[b]Not reported due to fewer than 5 positive responses.
[c]Zero cell.
Abbreviations: *DSM-IV* = *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition; OR = odds ratio.
Symbol: … = not applicable.

Table 6. Association of 3-Year Incidence of *DSM-IV* Substance Use Disorders by Specific Health Indicators, and the Number of Recent Stressful Life Events at Baseline, Controlling for Sociodemographic Characteristics and Other Baseline Psychiatric Disorders[a]

	Nicotine Dependence (n = 6,667)		Alcohol Abuse (n = 6,142)		Alcohol Dependence (n = 7,121)		Drug Abuse (n = 7,381)	
Variable	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)
Health Indicators								
Obesity	2.64 (0.46)	**0.56 (0.32–0.99)**	1.29 (0.35)	1.52 (0.61–3.82)	0.27 (0.14)	0.68 (0.13–3.51)	0.33 (0.14)	0.75 (0.16–3.43)
Pain	3.22 (0.45)	1.07 (0.64–1.78)	0.72 (0.21)	1.06 (0.38–2.99)	0.29 (0.10)	0.86 (0.29–2.58)	0.39 (0.15)	1.27 (0.24–6.69)
Poor self-rated health	5.28 (1.20)	1.54 (0.70–3.38)	0.66 (0.42)	…[b]	0.32 (0.23)	…[b]	0.36 (0.36)	…[b]
Number of medical conditions								
None	4.07 (0.51)	1.00 (1.00–1.00)	1.40 (0.30)	1.00 (1.00–1.00)	0.60 (0.17)	1.00 (1.00–1.00)	0.13 (0.07)	1.00 (1.00–1.00)
1	2.93 (0.40)	0.81 (0.50–1.33)	0.89 (0.22)	0.75 (0.28–2.02)	0.36 (0.12)	0.62 (0.17–2.36)	0.09 (0.07)	…[b]
2+	2.85 (0.36)	0.83 (0.48–1.43)	0.76 (0.22)	0.79 (0.23–2.71)	0.25 (0.11)	0.45 (0.09–2.22)	0.69 (0.29)	11.12 (0.96–128.61)
Schizophrenia or psychotic illness or episode	6.47 (6.25)	…[b]	0 (0)	…[c]	4.45 (3.55)	…[b]	0 (0)	…[c]
Number of stressful life events								
None	3.46 (0.41)	1.00 (1.00–1.00)	0.84 (0.21)	1.00 (1.00–1.00)	0.53 (0.14)	1.00 (1.00–1.00)	0.17 (0.08)	1.00 (1.00–1.00)
1	3.10 (0.44)	0.90 (0.52–1.59)	0.82 (0.24)	1.12 (0.38–3.30)	0.24 (0.11)	0.35 (0.09–1.31)	0.31 (0.13)	1.44 (0.19–11.01)
2+	3.16 (0.41)	0.93 (0.54–1.61)	1.43 (0.32)	1.96 (0.73–5.21)	0.38 (0.14)	0.85 (0.23–3.16)	0.49 (0.31)	2.22 (0.38–13.05)

[a]Values in bold are statistically significant.
[b]Not reported due to fewer than 5 positive responses.
[c]Zero cell.
Abbreviations: *DSM-IV* = *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition; OR = odds ratio.

One explanation for this discrepancy may be that previous cross-sectional studies included both new and chronic disorders. As was the case in the general population,[14] our results suggest that sex is an important demographic risk factor for *DSM-IV* psychiatric disorders in later life, whereas the effects of age, marital status, race/ethnicity, and socioeconomic factors appear to be disorder specific.

A third important finding from this study is that PTSD and Cluster B PDs increased older adults' risk for other psychiatric disorders. Specifically, PTSD predicted the onset of MDD and bipolar I disorder. The association of PTSD with mood disorders is consistent with findings of previous studies showing a relationship between experiencing traumatic life events and developing MDD and bipolar disorders.[73–77] According to the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision,[78] PDs are patterns of personality traits and behaviors that deviate markedly from the culturally anticipated and accepted range. These traits and behaviors are not only pervasive but also must have been present since adolescence or early adulthood. Moreover, they are often comorbid with Axis I disorders.[32,34–39,79] Although it is not surprising that PDs predicted incident mood and anxiety disorders, we also found that PDs predicted substance use disorders. Borderline PD predicted incident MDD, bipolar I disorder, and social phobia, while narcissistic PD predicted the onset of GAD, nicotine dependence, and alcohol abuse. Schizotypal PD was a significant predictor of incidence panic disorder. The association between PD and bipolar disorders is consistent with findings of high rates of personality disorders comorbid with bipolar disorder in a sample of geriatric patients.[80] The associations of depression with borderline and narcissistic PD are observed in depressed older adults.[81]

Surprisingly, the risk of incident social phobia decreased with the history of alcohol abuse in older adults. This finding is inconsistent with previous findings suggesting that alcohol use disorder is positively associated with social phobia in older adults.[74] It is not clear why alcohol abuse prevented the onset of social phobia. It may be that the depressant effects of alcohol dampen anxiety, although future studies are needed for replication and clarification of this finding. Previous studies have consistently found coexistence between depression and anxiety disorders in old age.[82–84] Although PTSD predicted the onset of MDD, no reciprocal relationships between MDD and anxiety disorders were observed in this study. This discrepancy suggests that the relationship between MDD and anxiety disorders may not be consistent across developmental periods. Their comorbidities may be developed earlier in life and thus not captured in the current older adult sample. Specifically, a reciprocal temporal relationship between MDD and GAD was found in the general population using the entire NESARC Wave II sample.[14] A similar argument could be applied to the discrepancies between our findings and results of previous studies concerning the coexistence of anxiety disorders with substance use disorder, bipolar disorders with GAD, and panic disorder with alcohol use disorder.[85] It is important to note that one reason substance use disorders were not significant predictors of mood and anxiety disorders is that NESARC excluded mood disorders caused by substances.

A final noteworthy finding from this study is that very few health-related factors and no stress factors predicted the onset of psychiatric disorders in old age. One reason for this curious finding may be that illness- and bereavement-induced mood disorders were ruled out during NESARC diagnoses. This explanation does not, however, explain why we did not find a relationship between the number of stressful life events and the onset of MDD, which is inconsistent with previous studies.[86,87] One reason for this finding may be

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that older individuals benefit from more life experiences and, perhaps as a result, have better emotion regulation abilities than younger adults.[88] The unexpected negative association between obesity and nicotine dependence may be due to medical advice to quit smoking given to obese patients.

Although this is a large study of older adults with a follow-up assessment that enhances the accuracy of incidence rate estimates, it also has several limitations. First, this study reports rather small numbers of respondents who reported the onset of some psychiatric disorders, such as drug abuse, drug dependence, and bipolar disorders. Although this issue reduces the stability of some of our incidence estimates, it would be difficult to remedy this situation given the very large sample size in the NESARC and its prospective design. Our results are therefore useful in highlighting the low incidence of some psychiatric disorders in later life and the difficulties in their estimation. A second limitation is the sampling design of the NESARC, which only included community-dwelling older adults. Thus, older adults who were institutionalized in hospitals, nursing homes, or other residential treatment centers during the period of data collection were not included in the sample, so that the findings of the current study are most relevant to the community-dwelling older population. Third, the attrition analysis of our respondents aged 60 and older was not available. Therefore, our results may be affected by the systematic differences between those who dropped out and those who were reinterviewed in the 3-year follow-up assessment. Fourth, the lifetime diagnoses of psychiatric disorders were assessed at baseline measurement to identify eligible respondents who were at risk of incident disorders during the 3-year follow-up period. However, the lifetime diagnoses were retrospectively self-reported and thus susceptible to recall bias. Finally, we acknowledge that the application of *DSM-IV* criteria developed for younger adults may not be appropriate for older individuals, which could reduce the reliability of diagnosis for older adults.[89] There is an urgent need to develop age-appropriate diagnostic criteria for major psychiatric disorders so as to provide more accurate prevalence and incidence estimates among older adults.

In conclusion, there have been few studies estimating the incidence of noncognitive psychiatric disorders in late life.[90] Because the new onset of psychiatric disorders is believed to be rare in old age, clinically significant and potentially treatable psychiatric disorders may be overlooked. This study provides the strongest evidence of current estimates of incidence rates of psychiatric disorders in elderly individuals. These findings also suggest that the new onset of certain disorders is not a rare occurrence, with more than 3% of older adults experiencing a new diagnosis of major depression or nicotine dependence over a 3-year period, and more than 1% of older adults experiencing incident GAD, specific phobia, or alcohol abuse. Furthermore, our results shed light on the sociodemographic, psychopathological, health-related, and stress-related risk factors for major *DSM-IV* substance use and mood and anxiety disorders in old age. Not only do our findings underscore the need for heightened vigilance in identifying and treating common incident disorders among older adults, they also provide a framework for future analyses focusing prospectively on other risk factors for the incidence, remission, and recurrence of specific disorders among older adults. The identification of sociodemographic, psychopathological, health-related, and stress-related risk factors in this study is essential not only for the successful early identification of disorders but also for developing and improving methods targeted at preventing the onset of psychiatric disorder in old age.

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Author affiliations: Department of Social Work and Social Administration, The University of Hong Kong, Hong Kong, China (Dr Chou and Mr Liang); Department of Psychology, University of Manitoba, Canada (Dr Mackenzie); Departments of Psychiatry, Psychology, and Community Health Sciences, University of Manitoba, Canada (Dr Sareen).
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REFERENCES

1. Grant BF, Hasin DS, Stinson FS, et al. 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.
2. Kessler RC, Ustün TB. The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res*. 2004;13(2):93–121.
3. Demyttenaere K, Bruffaerts R, Posada-Villa J, et al; WHO World Mental Health Survey Consortium. Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA*. 2004;291(21):2581–2590.
4. Kessler RC, Berglund P, Demler O, et al. 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.
5. Rothman K, Greenland S. *Modern Epidemiology*. Philadelphia, PA: Lippincott Williams and Wilkins; 1998.
6. Hybels CF, Blazer DG, Hays JC. Demography and epidemiology of psychiatric disorders in late life. In: Blazer DG, Steffens DC, eds. *Textbook of Geriatric Psychiatry*. Arlington, VA: American Psychiatric Publishing; 2009.
7. Forsell Y, Winblad B. Incidence of major depression in a very elderly population. *Int J Geriatr Psychiatry*. 1999;14(5):368–372.
8. Luijendijk HJ, van den Berg JF, Dekker MJHJ, et al. Incidence and recurrence of late-life depression. *Arch Gen Psychiatry*. 2008;65(12): 1394–1401.
9. Norton MC, Skoog I, Toone L, et al; Cache County Investigators. Three-year incidence of first-onset depressive syndrome in a population sample of older adults: the Cache County study. *Am J Geriatr Psychiatry*. 2006;14(3):237–245.
10. PÁlsson SP, Ostling S, Skoog I. The incidence of first-onset depression in a population followed from the age of 70 to 85. *Psychol Med*. 2001; 31(7):1159–1168.

11. Regier DA, Myers JK, Kramer M, et al. The NIMH Epidemiologic Catchment Area program: historical context, major objectives, and study population characteristics. *Arch Gen Psychiatry*. 1984;41(10):934–941.
12. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, Third Edition. Washington, DC: American Psychiatric Association; 1980.
13. Eaton WW, Kramer M, Anthony JC, et al. The incidence of specific DIS/DSM-III mental disorders: data from the NIMH Epidemiologic Catchment Area Program. *Acta Psychiatr Scand*. 1989;79(2):163–178.
14. Grant BF, Goldstein RB, Chou SP, et al. Sociodemographic and psychopathologic predictors of first incidence of DSM-IV substance use, mood and anxiety disorders: results from the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions. *Mol Psychiatry*. 2009;14(11): 1051–1066.
15. Bijl RV, De Graaf R, Ravelli A, et al; Netherlands Mental Health Survey and Incidence Study. Gender and age-specific first incidence of DSM-III-R psychiatric disorders in the general population: results from the Netherlands Mental Health Survey and Incidence Study (NEMESIS). *Soc Psychiatry Psychiatr Epidemiol*. 2002;37(8):372–379.
16. Crum RM, Chan Y-F, Chen L-S, et al. Incidence rates for alcohol dependence among adults: prospective data from the Baltimore Epidemiologic Catchment Area Follow-Up Survey, 1981–1996. *J Stud Alcohol*. 2005; 66(6):795–805.
17. de Graaf R, Bijl RV, Smit F, et al. Risk factors for 12-month comorbidity of mood, anxiety, and substance use disorders: findings from the Netherlands Mental Health Survey and Incidence Study. *Am J Psychiatry*. 2002;159(4):620–629.
18. Keyl PM, Eaton WW. Risk factors for the onset of panic disorder and other panic attacks in a prospective, population-based study. *Am J Epidemiol*. 1990;131(2):301–311.
19. Newman SC, Bland RC. Incidence of mental disorders in Edmonton: estimates of rates and methodological issues. *J Psychiatr Res*. 1998;32(5): 273–282.
20. Neufeld KJ, Swartz KL, Bienvenu OJ, et al. Incidence of DIS/DSM-IV social phobia in adults. *Acta Psychiatr Scand*. 1999;100(3):186–192.
21. Wells JC, Tien AY, Garrison R, et al. Risk factors for the incidence of social phobia as determined by the Diagnostic Interview Schedule in a population-based study. *Acta Psychiatr Scand*. 1994;90(2):84–90.
22. Beyer JL, Kuchibhatla M, Cassidy F, et al. Stressful life events in older bipolar patients. *Int J Geriatr Psychiatry*. 2008;23(12):1271–1275.
23. Depp CA, Lindamer LA, Folsom DP, et al. Differences in clinical features and mental health service use in bipolar disorder across the lifespan. *Am J Geriatr Psychiatry*. 2005;13(4):290–298.
24. Blazer DG 2nd, Hybels CF. Origins of depression in later life. *Psychol Med*. 2005;35(9):1241–1252.
25. Brennan PL, Schutte KK, Moos RH. Pain and use of alcohol to manage pain: prevalence and 3-year outcomes among older problem and nonproblem drinkers. *Addiction*. 2005;100(6):777–786.
26. Depp CA, Jeste DV. Bipolar disorder in older adults: a critical review. *Bipolar Disord*. 2004;6(5):343–367.
27. Djernes JK. Prevalence and predictors of depression in populations of elderly: a review. *Acta Psychiatr Scand*. 2006;113(5):372–387.
28. Marinho V, Blay SL, Andreoli SB, et al. A prevalence study of current tobacco smoking in later life community and its association with sociodemographic factors, physical health and mental health status. *Soc Psychiatry Psychiatr Epidemiol*. 2008;43(6):490–497.
29. Vink D, Aartsen MJ, Schoevers RA. Risk factors for anxiety and depression in the elderly: a review. *J Affect Disord*. 2008;106(1–2):29–44.
30. Grant BF, Kaplan KK, Stinson FS. *Source and Accuracy Statement for the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions*. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2005.
31. Grant BF, Kaplan K, Shepard J, et al. *Source and Accuracy Statement for Wave 1 of the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions*. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2003.
32. Grant BF, Stinson FS, Dawson DA, et al. Prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry*. 2004;61(8):807–816.
33. Grant BF, Dawson DA, Hasin DS. *The Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions Alcohol Use Disorder and Associated Disabilities Interview Schedule DSM-IV Version*. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2004.
34. Hasin DS, Goodwin RD, Stinson FS, et al. Epidemiology of major depressive disorder: results from the National Epidemiologic Survey on Alcoholism and Related Conditions. *Arch Gen Psychiatry*. 2005;62(10):1097–1106.
35. Grant BF, Hasin DS, Blanco C, et al. 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.
36. Grant BF, Hasin DS, Stinson FS, et al. 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.
37. Grant BF, Hasin DS, Stinson FS, et al. Prevalence, correlates, co-morbidity, and comparative disability of DSM-IV generalized anxiety disorder in the USA: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychol Med*. 2005;35(12):1747–1759.
38. Grant BF, Stinson FS, Hasin DS, et al. 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.
39. Stinson FS, Dawson DA, Patricia Chou S, et al. The epidemiology of DSM-IV specific phobia in the USA: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychol Med*. 2007;37(7):1047–1059.
40. Compton WM, Conway KP, Stinson FS, et al. 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.
41. Grant BF, Hasin DS, Stinson FS, et al. 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.
42. Canino GJ, Bravo M, Ramírez R, et al. 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.
43. Grant BF, Dawson DA, Stinson FS, et al. 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.
44. Ruan WJ, Goldstein RB, Chou SP, et al. The alcohol use disorder and associated disabilities interview schedule-IV (AUDADIS-IV): reliability of new psychiatric diagnostic modules and risk factors in a general population sample. *Drug Alcohol Depend*. 2008;92(1–3):27–36.
45. Zimmerman M. Diagnosing personality disorders: a review of issues and research methods. *Arch Gen Psychiatry*. 1994;51(3):225–245.
46. Hasin DS, Grant BF, Endicott J. The natural history of alcohol abuse: implications for definitions of alcohol use disorders. *Am J Psychiatry*. 1990;147(11):1537–1541.
47. Schuckit MA, Smith TL, Danko GP, et al. Five-year clinical course associated with DSM-IV alcohol abuse or dependence in a large group of men and women. *Am J Psychiatry*. 2001;158(7):1084–1090.
48. Chatterji S, Saunders JB, Vrasti R, et al. 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.
49. Grant BF, Harford TC, Dawson DA, et al. 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.
50. Hasin D, Carpenter KM, McCloud S, et al. 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.
51. 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.
52. Hasin DS, Muthuen B, Wisnicki KS, et al. Validity of the bi-axial dependence concept: a test in the US general population. *Addiction*. 1994;89(5):573–579.
53. Hasin DS, Van Rossem R, McCloud S, et al. Differentiating DSM-IV alcohol dependence and abuse by course: community heavy drinkers. *J Subst Abuse*. 1997;9:127–135.
54. Hasin DS, Schuckit MA, Martin CS, et al. 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.

55. Cottler LB, Grant BF, Blaine J, et al. 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.
56. Hasin DS, Grant BF, Cottler LB, et al. Nosological comparisons of alcohol and drug diagnoses: a multisite, multi-instrument international study. *Drug Alcohol Depend*. 1997;47(3):217–226.
57. Nelson CB, Rehm J, Ustün TB, et al. Factor structures for DSM-IV substance disorder criteria endorsed by alcohol, cannabis, cocaine and opiate users: results from the WHO reliability and validity study. *Addiction*. 1999;94(6):843–855.
58. Pull CB, Saunders JB, Mavreas V, et al. 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.
59. Ustün B, Compton W, Mager D, et al. 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):161–169.
60. Vrasti R, Grant BF, Chatterji S, et al. 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.
61. Kleinbaum DG, Kupper LL, Morgenstern H. *Epidemiologic Research: Principles and Quantitative Methods*. Belmont, CA: Lifetime; 1982.
62. Miettinen O. *Theoretical Epidemiology*. New York, NY: Wiley; 1985.
63. SUDAAN. *Software for Survey Data Analysis (SUDAAN) Version 9.0*. Research Triangle Park, NC: Research Triangle Institute; 2004.
64. Beekman AT, Deeg DJ, Geerlings SW, et al. Emergence and persistence of late life depression: a 3-year follow-up of the Longitudinal Aging Study Amsterdam. *J Affect Disord*. 2001;65(2):131–138.
65. Roberts RE, Kaplan GA, Shema SJ, et al. Prevalence and correlates of depression in an aging cohort: the Alameda County Study. *J Gerontol B Psychol Sci Soc Sci*. 1997;52(5):S252–S258.
66. Schoevers RA, Beekman AT, Deeg DJ, et al. Risk factors for depression in later life; results of a prospective community based study (AMSTEL). *J Affect Disord*. 2000;59(2):127–137.
67. Schoevers RA, Beekman AT, Deeg DJ, et al. Comorbidity and risk-patterns of depression, generalised anxiety disorder and mixed anxiety-depression in later life: results from the AMSTEL study. *Int J Geriatr Psychiatry*. 2003;18(11):994–1001.
68. Blazer DG, Wu LT. The epidemiology of substance use and disorders among middle aged and elderly community adults: national survey on drug use and health. *Am J Geriatr Psychiatry*. 2009;17(3):237–245.
69. Moore AA, Gould R, Reuben DB, et al. Longitudinal patterns and predictors of alcohol consumption in the United States. *Am J Public Health*. 2005;95(3):458–465.
70. Maxwell CJ, Hirdes JP. The prevalence of smoking and implications for quality of life among the community-based elderly. *Am J Prev Med*. 1993;9(6):338–345.
71. Williams CD, Lewis-Jack O, Johnson K, et al. Environmental influences, employment status, and religious activity predict current cigarette smoking in the elderly. *Addict Behav*. 2001;26(2):297–301.
72. Chou KL. Social anxiety disorder in older adults: evidence from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Affect Disord*. 2009;119(1–3):76–83.
73. Averill PM, Beck JG. Posttraumatic stress disorder in older adults: a conceptual review. *J Anxiety Disord*. 2000;14(2):133–156.
74. Davidson JRT, Kudler HS, Saunders WB, et al. Symptom and comorbidity patterns in World War II and Vietnam veterans with posttraumatic stress disorder. *Compr Psychiatry*. 1990;31(2):162–170.
75. Herrmann N, Eryavec G. Delayed onset post-traumatic stress disorder in World War II veterans. *Can J Psychiatry*. 1994;39(7):439–441.
76. Sajatovic M, Blow FC, Ignacio RV. Psychiatric comorbidity in older adults with bipolar disorder. *Int J Geriatr Psychiatry*. 2006;21(6):582–587.
77. Hyer L, Summers MN, Boyd S, et al. Assessment of older combat veterans with the clinician-administered PTSD scale. *J Trauma Stress*. 1996;9(3):587–593.
78. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision. Washington, DC: American Psychiatric Association; 2000.
79. Kessler RC, McGonagle KA, Zhao S, et al. 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.
80. Molinari V, Marmion J. Relationship between affective disorders and Axis II diagnoses in geropsychiatric patients. *J Geriatr Psychiatry Neurol*. 1995;8(1):61–64.
81. Devanand DP, Turret N, Moody BJ, et al. Personality disorders in elderly patients with dysthymic disorder. *Am J Geriatr Psychiatry*. 2000;8(3):188–195.
82. Beekman AT, de Beurs E, van Balkom AJ, et al. Anxiety and depression in later life: co-occurrence and communality of risk factors. *Am J Psychiatry*. 2000;157(1):89–95.
83. Kvaal K, McDougall FA, Brayne C, et al; MRC CFAS. Co-occurrence of anxiety and depressive disorders in a community sample of older people: results from the MRC CFAS (Medical Research Council Cognitive Function and Ageing Study). *Int J Geriatr Psychiatry*. 2008;23(3):229–237.
84. Lenze EJ, Mulsant BH, Shear MK, et al. Comorbid anxiety disorders in depressed elderly patients. *Am J Psychiatry*. 2000;157(5):722–728.
85. Goldstein BI, Herrmann N, Shulman KI. Comorbidity in bipolar disorder among the elderly: results from an epidemiological community sample. *Am J Psychiatry*. 2006;163(2):319–321.
86. Brilman EI, Ormel J. Life events, difficulties and onset of depressive episodes in later life. *Psychol Med*. 2001;31(5):859–869.
87. Livingston G, Watkin V, Milne B, et al. Who becomes depressed? the Islington community study of older people. *J Affect Disord*. 2000;58(2):125–133.
88. Blanchard-Fields F, Coats AH. The experience of anger and sadness in everyday problems impacts age differences in emotion regulation. *Dev Psychol*. 2008;44(6):1547–1556.
89. Jeste DV, Blazer DG, First M. Aging-related diagnostic variations: need for diagnostic criteria appropriate for elderly psychiatric patients. *Biol Psychiatry*. 2005;58(4):265–271.
90. Hybels CF, Blazer DG. Epidemiology of late-life mental disorders. *Clin Geriatr Med*. 2003;19(4):663–696, v.

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