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Temporal associations between physical illnesses and mental disorders—Results from the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC)

S. Patricia Chou*, Boji Huang, Risë Goldstein, and Bridget F. Grant

National Institute on Alcohol Abuse and Alcoholism, U.S. National Institutes of Health, Bethesda, MD, USA

Abstract

Clinical and epidemiologic evidence has documented the significant associations between medical illnesses and psychiatric disorders. However, extensive research has focused on the comorbidity of medical conditions and depression, and most were cross sectional, focused on clinical samples, and grounded in DSM-III or DSM-III-R diagnostic criteria.

The current prospective investigation examined associations among medical conditions at baseline and incident psychiatric disorders over a 3-year follow-up, using data from Waves 1 and 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).

Overall, the 3-year incidence rates of DSM-IV substance use, mood and anxiety disorders ranged from 0.65% (bipolar II) to 5.2% (alcohol abuse). Multiple regression analysis was conducted to examine the prospective physical–mental associations, while controlling for sociodemographic characteristics, psychological stress and health-related risk factors, and comorbid physical and psychiatric disorders.

The present study represents, to our knowledge the largest population-based prospective study examining the physical–mental associations. Our results showed distinctly different patterns of comorbidity of medical illnesses with substance use, mood, and anxiety disorders. Stomach ulcer/gastritis, hypertension and arthritis emerged to be significant predictors of incident psychiatric disorders.

1. Introduction

An emerging body of evidence has demonstrated the disease burden of mental disorders, owing to their complex links with mortality [1], suicide [2], physical illnesses [3], scarcity of mental health resources, and the inequality and inefficiency of service delivery and utilization [4]. According to the World Health Organization [5] that mental disorders cause greater disability in developed countries than any other group of diseases including cancer and heart disease. In the United States approximately one in four adults experience a mental disorder in a given year, and nearly half of the population will develop at least one lifetime mental disorder [6–8], with mood and anxiety disorders being most prevalent [9].

Onset of a disabling medical condition is, understandably, a major stressor for mood disorders among vulnerable individuals. Clinical and epidemiologic evidence has

* Corresponding author. LEB/NIAAA/NIH, Bethesda, MD 20892, USA. Tel.: +1 301 443 5013; fax: +1 301 443 1400. pchou@mail.nih.gov (S.P. Chou)..

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documented significant associations between adverse health conditions and psychiatric disorders [10–17]. A clinical consequence of physical–mental comorbidity is its prevalence in primary care settings. However, mental disorders are often not recognized in primary care, outpatient clinic or general hospital settings. Thus, comorbid mental disorders remain untreated, leading to prolonged patient suffering and increased risk of iatrogenic injury, and over time, greater disability and further development of pathologies and associated sequelae.

The substantial overlap between a broad range of mental disorders and chronic medical conditions is increasingly recognized. To date, however, most research in this domain has focused on the comorbidity between medical illnesses and depression [18–20], reflecting depression's relatively high lifetime prevalence both overall and in primary care [21,22], as well as its association with a greater decrement in health-related quality of life (HRQoL) compared to chronic diseases including angina, arthritis, asthma and diabetes [23]. Among the limited studies that considered additional mood and anxiety disorders, most were cross sectional [16,24], reflecting the considerably greater resource intensity and complexity of longitudinal investigations. Moreover, these studies drew predominantly on clinical samples, and used Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM

III) or Diagnostic and Statistical Manual, Third Edition, Revised (DSM-III-R) criteria to diagnose psychiatric disorders. While investigations have explored the causal pathways from mental disorders to certain chronic diseases (e.g., posttraumatic stress disorder (PTSD) symptoms and coronary heart disease (CHD)) [25,26], very few studies have considered baseline medical illnesses as predictors of incident psychiatric disorders.

Furthermore, anxiety disorders are as common as depression in the United States, and like depression can result in significant functional impairment; however, much less is known about the nature and the impact of physical illnesses on anxiety than on mood disorders [27].

Accordingly, to fill this important gap in epidemiologic evidence, the present study was designed to (a) estimate the 3-year incidence rates of DSM-IV substance use (SUD), mood and anxiety disorders; and (b) determine the prospective associations between common chronic medical conditions and incident psychiatric disorders after controlling for sociodemographic characteristics, psychological stress, health risk factors and physical and psychiatric comorbidity. Data from Waves 1 and 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) provided a unique opportunity to address the aforementioned research questions.

2. Materials and methods

2.1. Sample

All potential NESARC respondents received written information about the nature of the survey, the statistical uses of the survey data, the voluntary aspect of their participation, and the Federal laws that rigorously provide for the strict confidentiality of identifiable survey information. Respondents consenting to participate after receiving this information were interviewed. The entire research protocol, including informed consent procedures, received full ethical review and approval from the institutional review board (IRB) of the US Office of Management and Budget and the U.S. Census Bureau.

The 2004–2005 Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) is a longitudinal follow-up of the Wave 1 NESARC conducted in 2001–2002 by the National Institute on Alcohol Abuse and Alcoholism and described in detail elsewhere [28]. The Wave 1 NESARC ($n=43,093$) surveyed a representative sample of the US general population and targeted the civilian, noninstitutionalized population, 18 years and older and

resided in households and group quarters. Blacks, Hispanics, and individuals 18 to 24 years old were over-sampled, yielding an overall response rate of 81.0% [29,30].

In Wave 2 [31], all Wave 1 participants were re-interviewed during the follow-up period, excluding individuals ineligible due to death, emigration, active military duty throughout the follow-up period, or physical and mental incapacity. The Wave 2 response rate was 86.7%, reflecting 34,653 completed interviews. The cumulative response rate at Wave 2 was 70.2%, and the mean interval of the follow-up period was 36.6 months. As in Wave 1, NESARC data were weighted to reflect survey design characteristics and account for oversampling. Adjustment was also performed for nonresponse across sociodemographic characteristics and Wave 1 diagnostic variables to ensure that the sample approximated the original sample minus attrition. Weighted Wave 2 data were then adjusted to represent the civilian uninstitutionalized US general population, taking into account of the distributions of sociodemographic variables including region, age, race/ethnicity, and sex, based on the 2000 Decennial Census [31].

2.2. DSM-IV psychiatric disorders

The Alcohol Use Disorder and Associated Disabilities Interview Schedule - DSM-IV Version (AUDADIS-IV) was used to derive the diagnoses of substance use disorders (SUD) and mood and anxiety disorders. The AUDADIS-IV comprised a series of questions operationalizing the DSM criteria for alcohol and drug-specific abuse and dependence criteria for 10 classes of drugs. Drug-specific abuse and dependence were aggregated to yield any drug abuse and any drug dependence. In Waves 1 and 2, mood disorders included DSM-IV major depressive disorder (MDD), dysthymia, bipolar I and bipolar II disorders. Anxiety disorders included DSM-IV primary panic disorder (with and without agoraphobia), social and specific phobias and generalized anxiety disorder (GAD). Consistent with DSM-IV, “primary” AUDADIS-IV mood and anxiety diagnoses excluded disorders that were substance induced or due to general medical conditions. Also, diagnoses of MDD ruled out bereavement. Details and psychometric properties of the AUDADIS-IV diagnoses of substance use, mood and anxiety disorders are described elsewhere [32–34].

2.3. Chronic medical conditions

The following medical conditions, which required diagnosis by health professionals in the past 12 months, were considered at baseline: (1) circulatory disease included arteriosclerosis, CHD (i.e., angina pectoris and myocardial infarction), hypertension, and other heart disease (i.e., tachycardia and any other form of heart disease); (2) digestive disease included stomach disease (i.e., stomach ulcer and gastritis) and liver disease (i.e., liver cirrhosis and any other form of liver disease); and (3) musculoskeletal disease (i.e., arthritis).

2.4. Sociodemographic characteristics

The following sociodemographic variables measured at the baseline (2001–2002) were included as model covariates: gender: male vs. female; age: 18–29, 30–44, 45–64, and 65+ (referent); race/ethnicity: White (referent), Black, Native American, Asian, and Hispanic; marital status: married/cohabiting (referent), widowed/divorced/separated, and never married; educational attainment: <high school, high school, and some college (referent); income: \$0–\$19,999, \$20,000–\$34,999, \$35,000–\$69,999, and \$70,000 or more (referent); urbanicity: urban vs. rural; and census region: Northeast, Midwest, South, and West (referent).

2.5. Psychological stress and other health-related risky behaviors

In Wave 1 NESARC, a series of 12 questions queried the respondent's experiences with an array of stressful events during the last 12 months. These included questions related to health (e.g., serious illness of self or someone close); social problems (e.g., conflicts with neighbor or someone close); job problems (e.g., being fired or laid off); and legal problems (e.g., troubles with the police of self or a family member). We summed the number of positively endorsed events and dichotomized the total score into low stress level (0–1 events) and moderate-to-high stress level (2+ events).

We also considered other health-related baseline risk factors. They were drinking status: abstainer, former or current drinker; smoking status: nonsmoker, former or current smoker; and body mass index (BMI) status: underweight (BMI < 18.5 kg/m²), healthy (BMI of 18.5 to 24.9 kg/m²), overweight (BMI of 25.0 to 29.9 kg/m²) or obese (BMI ≥ 30 kg/m²).

2.6. Statistical analysis

The 3-year incidence rate, expressed as a percentage, was calculated as: $100 \cdot ((\# \text{ of incident cases}) \div (\# \text{ of individuals without lifetime disorder at the start of the 3-year follow-up}))$. For each psychiatric disorder, the effective sample size was determined by the total number of individuals at risk for the index disorder at the beginning of the follow-up period, thus different for different disorders (as shown in Tables 1, 2 and 3 of the Appendix).

Multiple logistic regression analyses were conducted to estimate associations of baseline medical conditions with incident psychiatric disorders, adjusted for the effects of sociodemographic characteristics, stress and other health risk factors, and comorbid physical and psychiatric disorders. Initially, sociodemographic characteristics were entered into the logistic model first; we then additionally adjusted for the effect of stress and health risk factors. To address the issues of comorbidity, relative risks were estimated by entering all other comorbid physical, psychiatric and personality disorders present at the baseline in the final stage of the regression analyses.

The odds ratios (ORs) derived from multiple logistic regression analyses closely approximate relative risks when the incidence of a disorder is <10% [35], as was the case for all incidence rates herein. Therefore, the adjusted ORs derived from multiple logistic regression models will be referred as adjusted relative risks hereafter.

3. Results

3.1. Three-year incidence

Tables 1–3 of the Appendix present the 3-year incidence rates and the associated standard errors of DSM-IV SUD, mood and anxiety disorders by selected sociodemographic characteristics at baseline. Overall, alcohol abuse had by far the largest incidence rate (5.23%), followed by MDD, GAD and alcohol dependence at 4.76%, 3.30% and 3.28% respectively. In contrast, any drug dependence (DD), dysthymia and bipolar II exhibited the lowest rates (0.85%, 0.66% and 0.65%, respectively). These incidence rates (according to important sociodemographic characteristics) are extensive and they are presented in the Appendix.

3.2. Sociodemographic predictors

3.2.1. Substance use disorders (SUDs)—Males were more likely than females to develop incident SUDs, with alcohol abuse exhibiting the largest relative risk (2.85, 95% CI=2.47–3.28) (Table 1, Appendix). Most strikingly, young adults (18-to-29-year-olds) were exceedingly vulnerable to incident SUDs, with relative risks ranging from 13.28 to 37.99;

however, the corresponding 95% confidence intervals were wide, indicating imprecise relative risks, especially for drug abuse and dependence.

With respect to race/ethnicity, Asians and Hispanics exhibited reduced risk of alcohol abuse, whereas Blacks and Hispanics were at greater risks of incident alcohol dependence.

Never-married individuals were more likely to develop all incident SUDs, and those who were separated, divorced, or widowed were also more likely to develop drug dependence over the follow-up interval. Lower incomes also posed greater risks of incident alcohol dependence and drug use disorders, whereas educational attainment, urbanicity and census region did not predict incident SUDs except for greater risk of alcohol abuse and lower risk of drug dependence among residents of the Midwest, a decreased risk of alcohol dependence among residents of the Northeast, and a decreased risk of alcohol abuse among individuals who did not complete high school.

3.2.2. Mood disorders—As shown in Table 2 of the Appendix, sex exerted effects on incident mood disorders opposite to those in SUDs, with higher rates observed in females except for bipolar I disorder. Respondents younger than 65 years had greater risks of incident MDD, bipolar I and bipolar II disorders. Native American respondents were at elevated risks of MDD and bipolar I, whereas Blacks were at increased risk for incident bipolar I and bipolar II disorders and Hispanics were at elevated risk to develop dysthymia. Respondents with less than high school education were more likely than those with postsecondary studies to develop dysthymia and bipolar I, whereas high school graduates were more likely to develop MDD and bipolar II disorder. Individuals who were widowed/divorced or separated were at increased risk of MDD and dysthymia; the never married were at increased risk of MDD and bipolar I and II disorders; and individuals with low incomes were at increased risk of all mood disorders except MDD.

3.2.3. Anxiety disorders—As with mood disorders, there were excess risks among female respondents and those less than 65 years old in all examined incident anxiety disorders. Native Americans were at increased risk of incident social phobia. Never-married respondents and those with less than high school education were at elevated risk for incident panic disorder, whereas both previously (separated, divorced, or widowed) and never-married respondents were at elevated risks for incident social and specific phobias. Lower incomes predicted incident social phobia and GAD (Table 3, Appendix).

3.3. Chronic medical conditions as predictors

Tables 1–3 show the associations of baseline physical disorders with the incidence of SUD, mood and anxiety disorders. None of the chronic medical conditions at baseline predicted incident AUDs. At stage 1 when only the socio-demographic characteristics were controlled, stomach ulcer/gastritis predicted the largest number (7) of psychiatric disorders at 3-year follow-up (drug abuse, MDD, bipolar I and II, panic, social phobia, and GAD), followed by CHD (drug dependence, MDD, dysthymia, bipolar I, panic, and social phobia) and arthritis (drug dependence, MDD, bipolar I, panic, social phobia, and GAD). In contrast, arteriosclerosis and liver disease each predicted only two psychiatric disorders (MDD and dysthymia for arteriosclerosis and MDD and GAD for liver disease).

At stage 2, we further adjusted for the effects of stress-and health-related risky behaviors. The strengths of the prospective associations varied from 1.40 to 3.14. Further, CHD and stomach ulcer/gastritis were the leading predictors of SUD, mood and anxiety disorders, each predicting six incident psychiatric disorders.

At the final stage we adjusted for all physical and psychiatric comorbidity. Stomach ulcer/gastritis retained its strong prospective associations with four psychiatric disorders, namely, incident MDD, panic, social phobia and GAD, followed by hypertension and arthritis (each predicted 3 psychiatric disorders). In contrast, arteriosclerosis, other heart conditions and any liver disease no longer predicted any incident psychiatric disorders.

4. Discussion

Incidence studies of psychiatric disorders are rare. A report published by the same authors [36] documented the 1-year incidence rates of major DSM-IV substance use, mood and anxiety disorders. In the current study we reported the 3-year incidence rates of DSM-IV psychiatric disorders. Alcohol abuse had by far the largest incidence rate (5.23%), followed by MDD at 4.76%. Dysthymia and bipolar II exhibited the lowest rates at 0.66% and 0.65%, respectively as shown in Tables 1, 2 and 3 of the Appendix.

The current investigation adopted a prospective study design to examine the associations among physical disorders at baseline and incident psychiatric disorders at a 3-year follow-up, based on a large nationally representative sample of the US general population. Our results showed that none of the chronic medical conditions predicted any AUDs and only few predicted DUDs (even at stage 1 when only the effects of sociodemographic characteristics were adjusted for). Notably, this comorbid pattern was distinctly different than those between chronic diseases and mood and anxiety disorders. One may attribute the disparate comorbid patterns between SUD and mood and anxiety disorders to psychiatric disorders that manifest primary with “disordered” behaviors versus those that manifest primary with involuntary symptoms. SUDs are usually construed as impulse control disorders, whereas “disease,” reflecting brain dysfunctioning is usually used in conceptualizing the emergence of mood or anxiety syndromes [37,38].

Results of the current study suggested that stomach ulcer/gastritis, hypertension and arthritis are significant predictors of several incident psychiatric disorders. Further investigation revealed that approximately one in five US adults had a diagnosis of hypertension or arthritis at the baseline (prevalence rates were 18.6% and 17.2%, respectively), whereas the rate of stomach ulcer/gastritis was lower (which was about a third of the prevalences of hypertension and arthritis at 5.7%). These rates represented a substantial number of individuals of the US general population were inflicted with these medical conditions.

There exists significant comorbidity between mood and anxiety disorders. Theoretical models, (e.g., the tripartite model) have been developed to describe the overlap of anxiety and depressive disorders [39,40], and several studies have suggested that the pathophysiologic characteristics of anxiety disorders are similar to those of depression, and are associated with similar chronic medical conditions [41,42]. Using meta-analytic methods to summarize results across 17 participating countries of the World Mental Health Surveys Initiative [16] the pooled cross-national results consistently suggested that depressive and anxiety disorders were independently and comparably associated with an array of chronic medical conditions.

The results of the present study, after adjusting for comorbid physical and psychiatric disorders in addition to sociodemographic, stress and health factors, showed only three positive associations between baseline physical disorders and incident mood disorders: stomach disorders predicting MDD, hypertension predicting dysthymia and arthritis predicting bipolar I disorder.

There were twice as many positive associations with incident anxiety disorders, with panic disorder independently associated with CHD, stomach disease and arthritis; social phobia

independently associated with hypertension and stomach disease; and GAD independently associated with stomach disease and arthritis. The magnitudes of the significant associations were similar for mood and anxiety disorders.

In the quest to quantify physical–mental comorbidity, very few studies have examined the association between gastric ulcer and psychiatric disorders. Further, the pathogenesis of gastric ulceration and related complications, to some extent remains unclear. Our results showed that gastric ulcer/gastritis emerged to be a significant predictor of MDD and all anxiety disorders but specific phobia. Usually emotional distress was followed by dyspeptic symptoms. A study of air traffic controllers whose rates of dyspeptic symptoms were greater compared to the control group of less stressful occupations provided such indirect evidence [43]. Corroborating evidence came from studies of postgastrectomy patients whose suicide rates were fairly high [44,45]. Further research into the nature and mechanism of the gastric ulcer-mental comorbidity is warranted.

It has been suggested that stressful events (i.e., negative or socially undesirable events) are strongly associated with poor physical and mental health. Moreover, the greater exposure to stress during a given period of time (say, during a year), the greater the likelihood that an individual will subsequently suffer an injury, an illness, a disability or even death [46–48].

Results of this study were consistent with previous studies that further adjusting for the effects of psychological stress and other health risk factors in the regression analyses rendered fewer statistically significant physical–mental associations. Moreover, among those physical–mental associations which retained their statistical significance the strength of the associations was considerably weakened.

Additional analyses were conducted to estimate the adjusted ORs (controlling for important sociodemographic characteristics) of stressful events and various incident psychiatric disorders. The resultant ORs were generally statistically significant and varied between 1.3 and 2.0 (data not shown).

These results all pointed toward the fact that psychological distress is an important etiological factor shared by both physical and psychiatric disorders. In addition, results of this study underscored the clinical and public health implications of psychological distress.

The mechanisms underlying the link between physical illnesses and psychiatric disorders may be partially due to psychological and physiological effects of chronic illnesses on mood. For example, certain medical conditions are accompanied by severe pain (e.g., myocardial infarction, stomach ulcer, or arthritis) and fatality risk (or fear of death) may result in traumatic experiences. These mood disturbances, in turn might exacerbate existing physical disorders via the processes including (a) amplify subjective reactions to somatic symptoms; (b) lack of motivation for self-care of chronic illnesses; and (c) reduce the capacities to cope with physical illnesses such as limited energy or perception of shame or stigma [11,49].

To our knowledge, the current investigation represents the largest ($n=34,653$) population-based prospective study examining physical–mental comorbidity in the United States, while controlling for sociodemographic characteristics, psychological stress, other health risk factors, and comorbid physical and psychiatric disorders. The large sample size coupled with a prospective design of the Waves 1 and 2 of the NESARC data afforded us to conduct in-depth and disease-specific analyses to further illuminate the physical–mental comorbidity. This preliminary report, therefore, represents the first of a series of prospective investigations of the temporal associations between physical illnesses and mental disorders.

Nonetheless, limitations of this study are noted. First, duration of each physical illness during which the respondent has sustained such a diagnosis was not available in the NESARC data to be controlled for in the regression analyses. Additionally, the medical conditions considered were restricted to those which were queried at baseline. Consequently, certain physical illnesses were not available in the Wave 1 NESARC data, such as chronic obstructive pulmonary disease (COPD), which has been linked to anxiety disorders, especially panic disorder. All physical and psychiatric disorders considered were also based on self-report and did not incorporate clinical interviews. Hence, misclassification of diseases was possible. In addition, consistent with the DSM-IV convention and the clinical tradition, all psychiatric disorders examined were categorical. As the DSM-5 revision process is currently underway, a dimensional approach to psychiatric disorder has been proposed, which holds great merit to measure and understand substance use, mood and anxiety disorders. Thus, the nature and magnitude of the physical–psychiatric comorbidity can be further illuminated.

Our findings highlight the importance that front-line clinicians are aware of mental health issues, especially among frequent users of primary care. Approximately 43% to 60% of treatment for mental illnesses occurs in primary care settings, compared with 17% to 20% in specialty mental health settings [7,50]. A recent report made a compelling case for greater integration of care through improved collaboration between primary care physicians and mental health specialists [51]. Strategies may include timely consultation with psychiatrists to mitigate the detrimental effects of physical illnesses on mental health. Further research remains to be done, with the aim of developing and implementing evidence-based treatment protocols to improve prognosis and quality of life among all patients presenting at the medical facilities with chronic medical conditions.

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Appendix

Table 1

Three-year incidence (%) and odds ratios (ORs) of DSM-IV substance use disorder (SUD) by sociodemographic characteristics.

	Sociodemographic characteristics	Substance use disorder					
		Alcohol abuse (<i>n</i> = 25,279)			Alcohol dependence (<i>n</i> = 30,696)		
		% (SE)	OR (95% CI)	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)
Total		5.23 (0.22)	—	3.28 (0.14)	—	1.69 (0.12)	—
Sex	Male	8.39 (0.40)	2.85 (2.47–3.28)	4.62 (0.23)	2.18 (1.85–2.56)	2.24 (0.19)	1.85 (1.47–2.34)
	Female	3.12 (0.19)	1.00 (1.00–1.00)	2.18 (0.14)	1.00 (1.00–1.00)	1.22 (0.11)	1.00 (1.00–1.00)
Age (years)	18–29	11.21 (0.67)	13.28 (9.36–18.86)	8.06 (0.49)	24.02 (14.84–38.90)	4.64 (0.40)	37.99 (17.23–83.78)
	30–44	5.43 (0.37)	6.05 (4.18–8.76)	3.07 (0.22)	8.67 (5.22–14.40)	1.53 (0.16)	12.11 (5.41–27.11)
	45–64	3.31 (0.27)	3.60 (2.44–5.33)	2.03 (0.18)	5.67 (3.39–9.48)	0.79 (0.12)	6.20 (2.74–14.06)
	65+	0.94 (0.16)	1.00 (1.00–1.00)	0.36 (0.09)	1.00 (1.00–1.00)	0.13 (0.05)	1.00 (1.00–1.00)
Race/ethnicity	White	5.68 (0.26)	1.00 (1.00–1.00)	2.92 (0.16)	1.00 (1.00–1.00)	1.62 (0.13)	1.00 (1.00–1.00)
	Black	4.74 (0.47)	0.83 (0.66–1.03)	4.40 (0.40)	1.53 (1.25–1.87)	2.13 (0.37)	1.32 (0.91–1.92)
	Native American	4.46 (1.12)	0.78 (0.45–1.32)	4.20 (1.32)	1.46 (0.75–2.83)	0.97 (0.44)	0.59 (0.23–1.50)
	Asian	2.34 (0.79)	0.40 (0.20–0.79)	2.48 (0.66)	0.85 (0.48–1.49)	2.03 (0.67)	1.26 (0.62–2.55)
Education	Hispanic	4.62 (0.42)	0.80 (0.66–0.98)	4.47 (0.42)	1.55 (1.24–1.95)	1.70 (0.26)	1.05 (0.73–1.51)
	< High school	3.92 (0.38)	0.71 (0.57–0.89)	3.60 (0.36)	1.17 (0.92–1.49)	1.74 (0.26)	1.02 (0.73–1.43)
	High school	5.55 (0.39)	1.02 (0.87–1.20)	3.49 (0.25)	1.14 (0.96–1.35)	1.66 (0.19)	0.98 (0.78–1.23)
Marital status	Some college	5.43 (0.26)	1.00 (1.00–1.00)	3.09 (0.17)	1.00 (1.00–1.00)	1.70 (0.13)	1.00 (1.00–1.00)
	Married, living with someone as if married	3.79 (0.22)	1.00 (1.00–1.00)	2.20 (0.14)	1.00 (1.00–1.00)	0.98 (0.10)	1.00 (1.00–1.00)
	Widowed/separated/divorced	3.11 (0.26)	0.82 (0.67–1.00)	1.99 (0.22)	0.90 (0.69–1.17)	1.13 (0.19)	1.15 (0.81–1.63)
Income	Never married	11.29 (0.71)	3.24 (2.74–3.81)	7.94 (0.47)	3.83 (3.24–4.52)	4.48 (0.37)	4.73 (3.70–6.06)
	\$0–\$19,999	4.68 (0.37)	0.83 (0.68–1.02)	4.11 (0.29)	1.57 (1.22–2.02)	2.20 (0.23)	1.78 (1.21–2.61)
	\$20,000–\$34,999	4.79 (0.37)	0.85 (0.69–1.05)	3.56 (0.31)	1.35 (1.05–1.75)	1.50 (0.20)	1.20 (0.82–1.77)
	\$35,000–\$69,999	5.65 (0.35)	1.01 (0.85–1.21)	3.04 (0.22)	1.15 (0.90–1.46)	1.80 (0.18)	1.44 (1.00–2.08)
Urbanicity	\$70,000 or more	5.58 (0.40)	1.00 (1.00–1.00)	2.66 (0.25)	1.00 (1.00–1.00)	1.25 (0.19)	1.00 (1.00–1.00)
	Urban	5.25 (0.26)	1.02 (0.84–1.25)	3.43 (0.15)	1.29 (1.00–1.67)	1.78 (0.13)	1.33 (0.92–1.93)
	Rural	5.13 (0.42)	1.00 (1.00–1.00)	2.68 (0.32)	1.00 (1.00–1.00)	1.34 (0.23)	1.00 (1.00–1.00)
Region	Northeast	4.59 (0.59)	0.91 (0.66–1.24)	2.80 (0.24)	0.76 (0.59–0.97)	1.58 (0.17)	0.81 (0.60–1.11)

Sociodemographic characteristics	Substance use disorder					
	Alcohol abuse (<i>n</i> = 25,279)		Alcohol dependence (<i>n</i> = 30,696)		Drug abuse (<i>n</i> = 31,277)	
	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)
Midwest	6.32 (0.40)	1.27 (1.03–1.57)	3.09 (0.29)	0.84 (0.65–1.09)	1.43 (0.30)	0.74 (0.45–1.20)
South	5.05 (0.33)	1.00 (0.81–1.24)	3.44 (0.24)	0.94 (0.74–1.18)	1.77 (0.21)	0.92 (0.66–1.28)
West	5.04 (0.38)	1.00 (1.00–1.00)	3.67 (0.32)	1.00 (1.00–1.00)	1.93 (0.22)	1.00 (1.00–1.00)

Table 2
Three-year incidence (%) and odds ratios (ORs) of DSM-IV mood disorder by sociodemographic characteristics.

Sociodemographic characteristics		Mood disorder					
		Major depression (<i>n</i> = 29,868)			Dysthymia (<i>n</i> = 33,487)		
		% (SE)	OR (95% CI)	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)
Total		4.76 (0.15)	—	0.66 (0.06)	—	1.97 (0.10)	—
Sex	Male	3.16 (0.19)	0.48 (0.41–0.55)	0.46 (0.06)	0.53 (0.39–0.74)	1.80 (0.15)	0.85 (0.70–1.02)
	Female	6.38 (0.23)	1.00 (1.00–1.00)	0.85 (0.08)	1.00 (1.00–1.00)	2.12 (0.12)	1.00 (1.00–1.00)
Age (years)	18–29	5.49 (0.37)	1.58 (1.25–1.99)	0.85 (0.15)	1.39 (0.84–2.30)	3.20 (0.28)	8.08 (5.12–12.74)
	30–44	5.01 (0.26)	1.43 (1.19–1.73)	0.62 (0.09)	1.02 (0.61–1.70)	2.29 (0.19)	5.72 (3.58–9.13)
	45–64	4.66 (0.27)	1.33 (1.08–1.64)	0.59 (0.08)	0.96 (0.58–1.58)	1.64 (0.18)	4.07 (2.51–6.59)
	65+	3.55 (0.29)	1.00 (1.00–1.00)	0.61 (0.13)	1.00 (1.00–1.00)	0.41 (0.09)	1.00 (1.00–1.00)
Race/ethnicity	White	4.73 (0.19)	1.00 (1.00–1.00)	0.59 (0.06)	1.00 (1.00–1.00)	1.76 (0.12)	1.00 (1.00–1.00)
	Black	4.10 (0.34)	0.86 (0.72–1.04)	0.63 (0.12)	1.07 (0.71–1.62)	3.27 (0.32)	1.89 (1.49–2.41)
	Native American	7.34 (1.27)	1.60 (1.09–2.35)	0.41 (0.29)	0.69 (0.16–2.93)	3.38 (0.94)	1.95 (1.09–3.49)
	Asian	3.95 (0.70)	0.83 (0.57–1.21)	0.63 (0.28)	1.07 (0.46–2.48)	0.77 (0.32)	0.43 (0.19–1.00)
	Hispanic	5.48 (0.39)	1.17 (0.98–1.39)	1.17 (0.22)	2.00 (1.29–3.10)	2.22 (0.25)	1.27 (0.97–1.66)
	< High school	4.92 (0.40)	1.11 (0.90–1.36)	0.94 (0.17)	1.61 (1.03–2.51)	2.86 (0.30)	1.70 (1.29–2.23)
Education	High school	5.26 (0.27)	1.19 (1.04–1.36)	0.67 (0.11)	1.14 (0.73–1.77)	2.04 (0.17)	1.20 (0.97–1.49)
	Some college	4.46 (0.19)	1.00 (1.00–1.00)	0.59 (0.08)	1.00 (1.00–1.00)	1.70 (0.13)	1.00 (1.00–1.00)
Marital status	Married, living with someone as if married	4.41 (0.19)	1.00 (1.00–1.00)	0.55 (0.06)	1.00 (1.00–1.00)	1.68 (0.12)	1.00 (1.00–1.00)
	Widowed/separated/divorced	5.32 (0.32)	1.22 (1.04–1.42)	0.92 (0.15)	1.68 (1.15–2.46)	2.03 (0.20)	1.21 (0.95–1.55)
Income	Never married	5.42 (0.34)	1.24 (1.07–1.45)	0.79 (0.13)	1.44 (1.00–2.07)	2.82 (0.24)	1.70 (1.38–2.08)
	\$0–\$19,999	5.55 (0.31)	1.31 (1.05–1.64)	0.88 (0.13)	1.95 (1.15–3.32)	2.79 (0.22)	2.14 (1.57–2.92)
Urbanicity	\$20,000–\$34,999	4.78 (0.33)	1.12 (0.90–1.40)	0.77 (0.12)	1.70 (1.05–2.78)	2.22 (0.21)	1.70 (1.21–2.39)
	\$35,000–\$69,999	4.58 (0.27)	1.07 (0.87–1.33)	0.60 (0.09)	1.32 (0.84–2.08)	1.78 (0.19)	1.35 (0.98–1.87)
Region	\$70,000 or more	4.29 (0.36)	1.00 (1.00–1.00)	0.45 (0.09)	1.00 (1.00–1.00)	1.32 (0.17)	1.00 (1.00–1.00)
	Urban	4.87 (0.17)	1.13 (0.94–1.35)	0.69 (0.07)	1.29 (0.85–1.95)	2.03 (0.12)	1.16 (0.90–1.50)
Midwest	Rural	4.34 (0.33)	1.00 (1.00–1.00)	0.54 (0.10)	1.00 (1.00–1.00)	1.75 (0.19)	1.00 (1.00–1.00)
	Northeast	4.20 (0.41)	0.81 (0.64–1.02)	0.59 (0.11)	0.78 (0.46–1.31)	1.73 (0.20)	1.00 (0.71–1.42)
South	Midwest	4.97 (0.33)	0.96 (0.80–1.16)	0.82 (0.14)	1.09 (0.66–1.80)	2.04 (0.24)	1.19 (0.84–1.68)
	South						

Sociodemographic characteristics	Mood disorder							
	Major depression (n = 29,868)				Dysthymia (n = 33,487)			
	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)
South	4.70 (0.24)	0.91 (0.77–1.07)	0.54 (0.07)	0.71 (0.45–1.12)	2.21 (0.17)	1.29 (0.96–1.73)	0.73 (0.09)	1.22 (0.82–1.83)
West	5.16 (0.30)	1.00 (1.00–1.00)	0.75 (0.13)	1.00 (1.00–1.00)	1.72 (0.21)	1.00 (1.00–1.00)	0.60 (0.10)	1.00 (1.00–1.00)

Table 3
Three-year incidence (%) and odds ratios (ORs) of DSM-IV anxiety disorder by sociodemographic characteristics.

Sociodemographic characteristics			Anxiety Disorder					
	Panic (<i>n</i> =34,863)		Social phobia (<i>n</i> = 32,932)		Specific phobia (<i>n</i> = 31,246)		GAD (<i>n</i> =33,160)	
	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)	% (SE)	OR (95% CI)
Total	1.88 (0.10)	—	1.58 (0.08)	—	2.48 (0.12)	—	3.33 (0.13)	—
Sex								
Male	1.21 (0.12)	0.47 (0.38–0.59)	1.32 (0.10)	0.72 (0.59–0.88)	1.86 (0.13)	0.59 (0.49–0.71)	2.07 (0.15)	0.45 (0.38–0.53)
Female	2.52 (0.15)	1.00 (1.00–1.00)	1.83 (0.12)	1.00 (1.00–1.00)	3.10 (0.20)	1.00 (1.00–1.00)	4.52 (0.21)	1.00 (1.00–1.00)
Age (years)								
18–29	2.80 (0.26)	3.49 (2.18–5.58)	2.28 (0.24)	4.27 (2.80–6.53)	3.15 (0.28)	2.76 (1.91–3.98)	3.68 (0.32)	2.24 (1.62–3.09)
30–44	2.03 (0.17)	2.51 (1.60–3.93)	1.81 (0.16)	3.37 (2.21–5.16)	2.79 (0.20)	2.44 (1.74–3.41)	3.98 (0.23)	2.43 (1.83–3.22)
45–64	1.66 (0.18)	2.04 (1.27–3.29)	1.43 (0.15)	2.65 (1.72–4.07)	2.42 (0.18)	2.11 (1.49–2.98)	3.31 (0.23)	2.00 (1.48–2.71)
65+	0.82 (0.16)	1.00 (1.00–1.00)	0.54 (0.10)	1.00 (1.00–1.00)	1.16 (0.19)	1.00 (1.00–1.00)	1.68 (0.21)	1.00 (1.00–1.00)
Race/ethnicity								
White	1.87 (0.11)	1.00 (1.00–1.00)	1.60 (0.10)	1.00 (1.00–1.00)	2.43 (0.14)	1.00 (1.00–1.00)	3.45 (0.15)	1.00 (1.00–1.00)
Black	1.86 (0.27)	1.00 (0.73–1.36)	1.67 (0.19)	1.04 (0.80–1.36)	2.63 (0.23)	1.09 (0.89–1.32)	3.11 (0.25)	0.90 (0.75–1.07)
Native American	2.06 (0.66)	1.10 (0.58–2.10)	3.05 (0.78)	1.93 (1.14–3.27)	2.96 (0.86)	1.23 (0.67–2.25)	4.16 (0.95)	1.22 (0.75–1.98)
Asian	1.87 (0.64)	1.00 (0.50–2.02)	0.99 (0.35)	0.61 (0.29–1.30)	2.05 (0.62)	0.84 (0.44–1.60)	2.99 (0.72)	0.86 (0.52–1.43)
Hispanic	1.94 (0.23)	1.03 (0.79–1.35)	1.35 (0.21)	0.84 (0.60–1.18)	2.72 (0.27)	1.12 (0.91–1.38)	2.79 (0.36)	0.80 (0.60–1.07)
Education								
< High school	2.56 (0.32)	1.54 (1.15–2.06)	1.58 (0.23)	1.02 (0.76–1.37)	2.69 (0.31)	1.13 (0.86–1.48)	3.68 (0.36)	1.11 (0.89–1.38)
High school	1.93 (0.16)	1.15 (0.93–1.43)	1.64 (0.16)	1.06 (0.84–1.34)	2.56 (0.24)	1.07 (0.85–1.34)	3.13 (0.21)	0.94 (0.80–1.10)
Some college	1.68 (0.13)	1.00 (1.00–1.00)	1.55 (0.10)	1.00 (1.00–1.00)	2.39 (0.16)	1.00 (1.00–1.00)	3.34 (0.16)	1.00 (1.00–1.00)
Marital status								
Married, living with someone as if married	1.73 (0.12)	1.00 (1.00–1.00)	1.26 (0.10)	1.00 (1.00–1.00)	2.10 (0.13)	1.00 (1.00–1.00)	3.16 (0.16)	1.00 (1.00–1.00)
Widowed/separated/divorced	1.93 (0.19)	1.12 (0.87–1.45)	1.88 (0.19)	1.50 (1.17–1.93)	2.85 (0.27)	1.37 (1.10–1.71)	3.61 (0.28)	1.15 (0.95–1.38)
Never married	2.32 (0.26)	1.36 (1.04–1.76)	2.36 (0.22)	1.90 (1.47–2.44)	3.36 (0.32)	1.62 (1.30–2.02)	3.61 (0.29)	1.15 (0.96–1.38)
Income								
\$0–\$19,999	2.16 (0.18)	1.27 (0.97–1.67)	2.02 (0.20)	1.76 (1.27–2.43)	2.55 (0.21)	1.02 (0.80–1.30)	3.80 (0.27)	1.30 (1.02–1.66)
\$20,000–\$34,999	2.23 (0.26)	1.31 (0.95–1.80)	1.94 (0.19)	1.68 (1.23–2.31)	2.62 (0.23)	1.05 (0.81–1.37)	3.79 (0.31)	1.30 (1.01–1.68)
\$35,000–\$69,999	1.62 (0.17)	0.94 (0.71–1.24)	1.40 (0.14)	1.21 (0.88–1.65)	2.34 (0.21)	0.93 (0.72–1.21)	3.03 (0.21)	1.03 (0.81–1.30)
\$70,000 or more	1.71 (0.18)	1.00 (1.00–1.00)	1.16 (0.14)	1.00 (1.00–1.00)	2.50 (0.24)	1.00 (1.00–1.00)	2.94 (0.26)	1.00 (1.00–1.00)
Urbanicity								
Urban	1.92 (0.12)	1.12 (0.82–1.51)	1.59 (0.09)	1.02 (0.77–1.34)	2.55 (0.14)	1.15 (0.92–1.44)	3.39 (0.16)	1.10 (0.91–1.32)
Rural	1.73 (0.23)	1.00 (1.00–1.00)	1.57 (0.19)	1.00 (1.00–1.00)	2.22 (0.21)	1.00 (1.00–1.00)	3.10 (0.23)	1.00 (1.00–1.00)
Region								
Northeast	1.46 (0.15)	0.77 (0.55–1.07)	1.16 (0.17)	0.67 (0.47–0.97)	2.31 (0.27)	0.92 (0.68–1.26)	2.69 (0.25)	0.82 (0.63–1.05)
Midwest	2.05 (0.25)	1.08 (0.75–1.55)	1.67 (0.19)	0.98 (0.72–1.33)	2.48 (0.32)	0.99 (0.71–1.38)	3.40 (0.28)	1.04 (0.81–1.32)

Sociodemographic characteristics	Anxiety Disorder									
	Panic (<i>n</i> =34,863)			Social phobia (<i>n</i> = 32,932)			Specific phobia (<i>n</i> =31,246)			GAD (<i>n</i> =33,160)
	% (SE)	OR (95% CI)		% (SE)	OR (95% CI)		% (SE)	OR (95% CI)	% (SE)	OR (95% CI)
South	2.00 (0.16)	1.06 (0.78–1.43)		1.68 (0.13)	0.98 (0.76–1.28)		2.57 (0.19)	1.03 (0.80–1.33)	3.66 (0.21)	1.12 (0.91 –1.38)
West	1.90 (0.24)	1.00 (1.00–1.00)		1.71 (0.18)	1.00 (1.00–1.00)		2.50 (0.25)	1.00 (1.00–1.00)	3.28 (0.27)	1.00 (1.00–1.00)

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Table 1

The associations between physical disorders at baseline and 3-year incidence of DSM-IV substance use disorders.

	Substance use disorder			
	Alcohol abuse	Alcohol dependence	Drug abuse	Drug dependence
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Controlling for sociodemographic characteristics ^a only				
Circulatory				
Arteriosclerosis	1.07 (0.48–2.39)	0.85 (0.28–2.62)	1.42 (0.36–5.65)	1.71 (0.38–7.75)
Coronary heart disease	0.60 (0.34–1.05)	1.54 (0.90–2.65)	1.50 (0.53–4.23)	2.55 (1.38 – 4.73)
Hypertension	0.88 (0.64–1.20)	0.97 (0.73–1.30)	1.71 (1.10–2.65)	1.26 (0.71–2.23)
Other heart disease	0.71 (0.45–1.12)	1.10 (0.71–1.72)	1.15 (0.65–2.05)	2.39 (1.27 – 4.50)
Digestive				
Stomach	1.10 (0.76–1.59)	1.28 (0.85–1.95)	1.68 (1.05–2.70)	1.76 (0.84–3.66)
Liver	0.53 (0.11–2.58)	1.80 (0.81–4.01)	2.69 (0.87–8.32)	2.02 (0.64–6.35)
Musculoskeletal				
Arthritis	0.91 (0.67–1.24)	0.83 (0.59–1.15)	1.34 (0.84–2.12)	2.01 (1.15 – 3.53)
Controlling for sociodemographic characteristics, stress and health risk factors				
Circulatory				
Arteriosclerosis	1.24 (0.55–2.79)	0.59 (0.19–1.87)	0.64 (0.09–4.44)	1.67 (0.36–7.82)
Coronary heart disease	0.69 (0.40–1.21)	1.43 (0.83–2.47)	1.46 (0.50–4.23)	2.46 (1.31 – 4.62)
Hypertension	1.00 (0.73–1.39)	1.09 (0.80–1.47)	1.74 (1.10–2.74)	1.40 (0.81–2.43)
Other heart disease	0.79 (0.50–1.23)	1.05 (0.69–1.60)	1.14 (0.63–2.08)	2.33 (1.22 – 4.43)
Digestive				
Stomach	1.13 (0.78–1.64)	1.32 (0.86–2.01)	1.55 (0.95–2.51)	1.62 (0.76–3.43)
Liver	0.57 (0.11–2.91)	1.99 (0.91–4.38)	2.82 (0.99–8.05)	1.93 (0.62–6.03)
Musculoskeletal				
Arthritis	0.93 (0.69–1.27)	0.83 (0.60–1.15)	1.26 (0.78–2.02)	1.93 (1.09 – 3.40)
Controlling for sociodemographic characteristics, stress, health risk factors, and comorbid physical and psychiatric disorders				
Circulatory				
Arteriosclerosis	1.54 (0.65–3.65)	0.53 (0.16–1.72)	0.49 (0.06–4.09)	0.83 (0.16–4.34)
Coronary heart disease	0.69 (0.37–1.30)	1.43 (0.79–2.57)	1.24 (0.35–4.41)	1.50 (0.82–2.74)
Hypertension	1.03 (0.74–1.42)	1.06 (0.78–1.44)	1.65 (1.02–2.67)	1.09 (0.57–2.08)
Other heart disease	0.81 (0.49–1.33)	0.93 (0.58–1.48)	0.86 (0.38–1.92)	1.56 (0.77–3.15)
Digestive				
Stomach	1.14 (0.79–1.65)	1.29 (0.85–1.97)	1.39 (0.84–2.29)	1.26 (0.55–2.90)
Liver	0.56 (0.11–2.88)	1.77 (0.80–3.95)	2.27 (0.78–6.61)	1.25 (0.41–3.80)
Musculoskeletal				
Arthritis	0.92 (0.68–1.26)	0.76 (0.54–1.06)	1.09 (0.66–1.82)	1.61 (0.85–3.06)

Numbers in bold print indicate statistical significance, $\alpha < 0.05$.

^aSociodemographic characteristics considered were gender, age, race/ethnicity, marital status, education, income, urbanicity and census region.

Table 2

The associations between physical disorders at baseline and 3-year incidence of DSM-IV mood disorders.

	Mood disorder			
	Major depression	Dysthymia	Bipolar 1	Bipolar 2
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Controlling for sociodemographic characteristics ^a only				
Circulatory				
Arteriosclerosis	1.59 (1.03–2.46)	3.97 (1.86–8.48)	2.07 (0.70–6.10)	0.37 (0.07–1.79)
Coronary heart disease	1.48 (1.10–1.99)	2.12 (1.19–3.76)	2.14 (1.38–3.31)	1.13 (0.55–2.33)
Hypertension	1.12 (0.92–1.37)	2.16 (1.40–3.34)	1.21 (0.89–1.64)	1.57 (1.02–2.43)
Other heart disease	1.31 (1.03–1.67)	1.93 (1.14–3.24)	1.99 (1.38–2.89)	1.58 (0.88–2.84)
Digestive				
Stomach	1.62 (1.22–2.15)	1.57 (0.96–2.56)	1.65 (1.16–2.35)	1.98 (1.21–3.24)
Liver	2.25 (1.12–4.51)	1.26 (0.27–5.89)	1.69 (0.69–4.17)	1.87 (0.49–7.17)
Musculoskeletal				
Arthritis	1.27 (1.05–1.53)	1.22 (0.81–1.83)	2.01 (1.52–2.67)	1.65 (0.83–3.27)
Controlling for sociodemographic characteristics, stress and health risk factors				
Circulatory				
Arteriosclerosis	1.47 (0.93–2.32)	3.14 (1.34–7.33)	1.89 (0.64–5.56)	0.34 (0.07–1.68)
Coronary heart disease	1.40 (1.03–1.89)	1.95 (1.10–3.43)	1.93 (1.24–3.01)	0.99 (0.48–2.04)
Hypertension	1.04 (0.85–1.28)	2.23 (1.40–3.55)	1.13 (0.82–1.56)	1.36 (0.83–2.24)
Other heart disease	1.22 (0.95–1.56)	1.62 (0.94–2.79)	1.79 (1.24–2.60)	1.40 (0.78–2.54)
Digestive				
Stomach	1.55 (1.16–2.07)	1.43 (0.89–2.32)	1.47 (1.03–2.11)	1.73 (1.05–2.84)
Liver	2.11 (1.05–4.25)	1.07 (0.23–4.87)	1.41 (0.58–3.43)	1.57 (0.40–6.09)
Musculoskeletal				
Arthritis	1.18 (0.97–1.43)	1.09 (0.71–1.66)	1.79 (1.35–2.36)	1.42 (0.73–2.76)
Controlling for sociodemographic characteristics, stress, health risk factors, and comorbid physical and psychiatric disorders				
Circulatory				
Arteriosclerosis	1.26 (0.79–2.02)	2.25 (0.97–5.23)	1.22 (0.40–3.77)	0.28 (0.06–1.40)
Coronary heart disease	1.21 (0.84–1.75)	1.27 (0.72–2.25)	1.38 (0.83–2.29)	0.73 (0.34–1.59)
Hypertension	0.97 (0.79–1.21)	2.03 (1.24–3.32)	0.92 (0.66–1.29)	1.23 (0.73–2.09)
Other heart disease	1.02 (0.76–1.37)	0.97 (0.55–1.70)	1.35 (0.86–2.10)	1.26 (0.68–2.34)
Digestive				
Stomach	1.48 (1.10–1.98)	1.22 (0.76–1.96)	1.22 (0.83–1.79)	1.49 (0.93–2.38)
Liver	1.90 (0.94–3.83)	0.74 (0.17–3.34)	1.08 (0.43–2.68)	1.16 (0.30–4.49)
Musculoskeletal				
Arthritis	1.11 (0.90–1.36)	0.88 (0.57–1.34)	1.59 (1.17–2.15)	1.24 (0.61–2.52)

Numbers in bold print indicate statistical significance, $\alpha < 0.05$.^a Sociodemographic characteristics considered were gender, age, race/ethnicity, marital status, education, income, urbanicity and census region.

Table 3

The associations between physical disorders at baseline and 3-year incidence of DSM-IV anxiety disorders.

	Anxiety disorder			
	Panic	Social phobia	Specific phobia	GAD
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Controlling for sociodemographic characteristics ^a only				
Circulatory				
Arteriosclerosis	1.59 (0.74–3.41)	1.54 (0.61–3.89)	1.09 (0.49–2.42)	1.14 (0.52–2.51)
Coronary heart disease	2.34 (1.48–3.71)	2.23 (1.21–4.14)	0.57 (0.33–0.98)	1.17 (0.80–1.71)
Hypertension	1.23 (0.88–1.72)	1.68 (1.24–2.26)	0.92 (0.69–1.23)	1.24 (1.01–1.54)
Other heart disease	1.28 (0.83–1.97)	1.39 (0.93–2.08)	0.68 (0.43–1.08)	1.29 (0.93–1.79)
Digestive				
Stomach	1.81 (1.24–2.64)	2.20 (1.53–3.18)	0.77 (0.52–1.13)	1.90 (1.45–2.48)
Liver	1.75 (0.75–4.11)	1.30 (0.36–4.63)	0.78 (0.27–2.29)	2.10 (1.04–4.26)
Musculoskeletal				
Arthritis	1.62 (1.20–2.20)	1.42 (1.04–1.93)	0.89 (0.68–1.16)	1.61 (1.30–1.99)
Controlling for sociodemographic characteristics, stress and health risk factors				
Circulatory				
Arteriosclerosis	1.49 (0.68–3.23)	0.95 (0.29–3.13)	0.85 (0.36–1.99)	0.87 (0.35–2.16)
Coronary heart disease	2.11 (1.33–3.35)	2.08 (1.13–3.85)	0.58 (0.34–0.99)	1.08 (0.74–1.59)
Hypertension	1.12 (0.80–1.57)	1.54 (1.12–2.12)	0.88 (0.65–1.19)	1.14 (0.91–1.43)
Other heart disease	1.16 (0.75–1.80)	1.30 (0.87–1.96)	0.69 (0.44–1.10)	1.18 (0.85–1.65)
Digestive				
Stomach	1.63 (1.11–2.40)	2.06 (1.42–2.99)	0.78 (0.53–1.16)	1.76 (1.35–2.31)
Liver	1.49 (0.64–3.49)	1.07 (0.30–3.81)	0.73 (0.25–2.16)	1.88 (0.91–3.86)
Musculoskeletal				
Arthritis	1.46 (1.07–1.98)	1.30 (0.96–1.77)	0.88 (0.66–1.16)	1.50 (1.21–1.85)
Controlling for sociodemographic characteristics, stress, health risk factors, and comorbid physical and psychiatric disorders				
Circulatory				
Arteriosclerosis	1.10 (0.49–2.52)	0.63 (0.18–2.18)	1.14 (0.51–2.52)	0.77 (0.30–1.98)
Coronary heart disease	2.04 (1.23–3.37)	1.81 (0.83–3.93)	0.66 (0.40–1.10)	0.87 (0.59–1.31)
Hypertension	0.99 (0.71–1.39)	1.39 (1.00–1.91)	0.93 (0.68–1.26)	1.05 (0.84–1.31)
Other heart disease	0.77 (0.47–1.27)	0.84 (0.45–1.59)	0.81 (0.51–1.29)	1.03 (0.73–1.45)
Digestive				
Stomach	1.51 (1.02–2.23)	1.82 (1.24–2.66)	0.82 (0.55–1.21)	1.55 (1.19–2.03)
Liver	1.36 (0.58–3.20)	0.78 (0.22–2.81)	0.77 (0.26–2.27)	1.50 (0.73–3.07)
Musculoskeletal				
Arthritis	1.37 (1.01–1.86)	1.08 (0.79–1.47)	0.92 (0.70–1.21)	1.35 (1.09–1.67)

Numbers in bold print indicate statistical significance, $\alpha < 0.05$.^a Sociodemographic characteristics considered were gender, age, race/ethnicity, marital status, education, income, urbanicity and census region.