Relationship Between Household Income and Mental Disorders

Findings From a Population-Based Longitudinal Study

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Context: There has been increasing concern about the impact of the global economic recession on mental health. To date, findings on the relationship between income and mental illness have been mixed. Some studies have found that lower income is associated with mental illness, while other studies have not found this relationship.

Objective: To examine the relationship between income, mental disorders, and suicide attempts.

Design: Prospective, longitudinal, nationally representative survey.

Setting: United States general population.

Participants: A total of 34 653 noninstitutionalized adults (aged ≥20 years) interviewed at 2 time points 3 years apart.

Main Outcomes: Lifetime *DSM-IV* Axis I and Axis II mental disorders and lifetime suicide attempts, as well as incident mental disorders and change in income during the follow-up period.

Results: After adjusting for potential confounders, the presence of most of the lifetime Axis I and Axis II mental disorders was associated with lower levels of income. Participants with household income of less than $20 000 per year were at increased risk of incident mood disorders during the 3-year follow-up period in comparison with those with income of $70 000 or more per year. A decrease in household income during the 2 time points was also associated with an increased risk of incident mood, anxiety, or substance use disorders (adjusted odds ratio, 1.30; 99% confidence interval, 1.06-1.60) in comparison with respondents with no change in income. Baseline presence of mental disorders did not increase the risk of change in personal or household income in the follow-up period.

Conclusions: Low levels of household income are associated with several lifetime mental disorders and suicide attempts, and a reduction in household income is associated with increased risk for incident mental disorders. Policymakers need to consider optimal methods of intervention for mental disorders and suicidal behavior among low-income individuals.

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THE RECENT GLOBAL ECOnomic recession has promoted increasing concern about the impact of decreasing income as a risk factor for mental disorders and suicidal behavior. The media have reported increased rates of crisis calls to telephone support centers.[1-3] Despite this recent increase in media attention, there has long been an interest in understanding the link between mental illness, suicide, life satisfaction, and income.[4-13] Once the basic needs are met (ie, food and shelter), higher levels of income have not been shown to be strongly associated with happiness or decreased risk of mental health problems.[8,14]

Two main mechanisms have been posited in understanding the link between mental illness and income: social causation and social selection.[10] Social causation posits that adversity, stress, and reduced capacity to cope related to low income increase the risk of development of mental illness.[15-20] The social selection hypothesis suggests that individuals with mental illness have a predisposition to declining socioeconomic status due to possible genetic factors, hospitalizations related to mental illness, and/or loss of work. These theories have been debated and there is some empirical support for each.[21-24] Classic work by Dohrenwend et al[10] found that social causation theory was more important for depression, substance use, and antisocial personality disorder (PD) than for schizophrenia, which was better explained by social selection.

Clinical and population-based studies have demonstrated that severe mental ill-

ness (eg, psychotic disorder) has been associated with higher likelihood of poverty and homelessness.[25-29] However, findings on the relationship between other mental disorders, such as depression, anxiety, and substance abuse, and income have been mixed.[30,31] Lorant et al[30] conducted a meta-analysis of more than 50 cross-national epidemiologic studies on the relationship between socioeconomic status and depression. Although the studies in the meta-analysis had substantial heterogeneity in the measurement of socioeconomic status and depression, the investigators found that individuals with low income were at increased odds (1.81) of depression compared with those in the higher income categories. Similarly, large cross-sectional epidemiologic studies using structured diagnostic interviews have found that lower socioeconomic status is associated with increased likelihood of mood, anxiety, and substance use disorders.[9] In contrast, a recent study[31] did not find an association between household income and any mood disorder or any anxiety disorder in the US Collaborative Psychiatric Epidemiologic Survey (>20 000 people). In that large US study, any substance use disorder and suicide attempts were strongly associated with decreasing income status.

Most studies on income and mental health have been limited by the use of cross-sectional data that do not allow for examination of temporal relationships between income and mental disorders. A 7-year longitudinal study[32] of adults in Great Britain found that reductions in income and increases in self-reported financial strain were associated with increased risk for depressive symptoms compared with no change in income or financial strain. However, reductions in financial strain and increases in income were not associated with a decreased risk for depressive symptoms. In contrast, another longitudinal study compared winners of medium-sized lotteries ($200 000) with 2 comparison groups (those with no winnings or small winnings).[7] The study found that winners of medium-sized lotteries had significantly better psychological health, as measured by the General Health Questionnaire,[33] than the control groups. Although these studies possess the strengths of longitudinal design and large samples, they were limited by the use of self-report screening instruments that are not meant for diagnosis of mental disorders. To the best of our knowledge, the only study that used a quasi-experimental design and structured diagnostic interviews was recently published by Costello et al.[34] They examined a large sample of American Indian youth evaluated into adulthood and demonstrated that family income supplements of $9000 per year were associated with a decreased risk of mental disorders.

Several limitations exist in this area of inquiry. Most published studies have used small samples that limit capacity for generalization. Also, since most studies have been cross-sectional, they are limited by retrospective recall biases and difficulty with understanding the temporal nature of the relationship between variables. Hence, there are few data to support whether changes in income are potential risk factors for development of incident mental disorders. Furthermore, most of the studies have not used a comprehensive assessment of mental disorders; indeed, much of the focus has been placed on mood and anxiety disorders, without much emphasis on long-term problems such as PDs. Moreover, most studies have used self-report screening measures of depression and distress that are not specifically designed for making *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*)–based diagnoses.

To overcome these limitations, we used the largest longitudinal, population-based mental health survey: the US National Epidemiologic Survey of Alcohol and Related Conditions (NESARC).[35-37] The NESARC data have several strengths that allow for detailed examination of the relationship between household income and mental illness. First, unlike previous studies in this area that have typically focused on depression and some of the Axis I mental disorders, the NESARC assesses both Axis I and Axis II mental disorders, as well as suicide attempts. Second, the NESARC includes interview-based assessment of several Axis I mental disorders at 2 time points (3 years apart) rather than self-report screening instruments that have been used in most of the previous longitudinal work in this area. Finally, with a sample size of more than 34 000 people, this survey has sufficient statistical power to examine the change in household income over time from baseline and the risk of incident mental disorders. The objectives of this study were defined as follows:

1. To examine the cross-sectional association between income and all lifetime Axis I and Axis II mental disorders, and suicide attempts.
2. To examine whether baseline income was associated with incident mental disorders.
3. To examine whether a change in household income during the 3-year period was associated with incident mental disorders.
4. To examine whether baseline mental disorders were predictors of change in income during the follow-up period.

METHODS

POPULATION

The NESARC is an ongoing, nationally representative survey of the US population funded by the National Institute on Alcohol Abuse and Alcoholism. Wave 1 of the NESARC[37,38] was conducted between 2001 and 2002 and included 43 093 respondents 18 years or older from the United States. Institutionalized individuals were excluded. Participants received detailed written information describing the NESARC and the legislation protecting their rights to full confidentiality of the information they disclosed. After participants gave their informed consent, lay interviewers trained by the US Census Bureau conducted face-to-face interviews in the homes of respondents. The overall response rate was 81.0%. Wave 2 of the NESARC was performed between 2004 and 2005 and involved an attempt to reinterview the wave 1 sample.[39] The response rate was 86.7% after excluding individuals who were unable to participate in wave 2 owing to death, impairment, deportation, or being away from the country because of military duty.[36] Thus, a total sample of 34 653 individuals participated in wave 2 of the survey. The cumulative response rate was 70.2%. A thorough description of the design and field procedures of the NESARC has been published.[37,40] For the sake of brevity and because multiple previous reports have been published, information on the general demographics,[41,42] preva-

lence of mental disorders,[43-45] and incidence of mental disorders[39,40,46] in the NESARC are not included in this report.

MEASURES

Household Income

Household income was divided into quartiles based on the distribution of the sample: less than $19 999, $20 000 to $39 999, $40 000 to $69 999, and $70 000 or more per year. This method of dividing household income into quartiles has been used in several epidemiologic studies[31,47] as well as cross-national comparison studies.[20] It ensures adequate power in each of the 4 categories to examine outcomes and overcomes the problem of nonnormal distribution of income in most epidemiologic samples. To examine the relationship between change in household income and mental disorder, we created a trichotomous household income variable: (1) reduction in income during the 3-year period, (2) no change in income during the 3-year period, and (3) increase in income during the 3-year period.

Mental Disorders

Axis I and Axis II *DSM-IV* mental disorders[48] were diagnosed using the Alcohol Use Disorder and Associated Disabilities Interview Schedule-*DSM-IV* Version,[36,37] a fully structured diagnostic interview appropriate for use by trained lay interviewers and clinicians. The following Axis I mental disorders were assessed: major depression, dysthymia, bipolar disorder, posttraumatic stress disorder, social phobia, panic disorder with/without agoraphobia, specific phobia, agoraphobia without panic disorder, generalized anxiety disorder, alcohol use disorders, illicit substance use disorders, and nicotine dependence. All these disorders, with the exception of posttraumatic stress disorder, were assessed at both waves of the survey; posttraumatic stress disorder was assessed only at wave 2. For Axis II mental disorders, all 10 PDs were assessed (schizoid, paranoid, schizotypal, borderline, narcissistic, antisocial, dependent, histrionic, obsessive-compulsive, and avoidant) once during the 2 waves of the survey. At wave 2, borderline,[49] narcissistic,[50] and schizotypal[46] PDs were assessed; the remaining PDs were assessed at wave 1.[51] To minimize burden of time on participants, the NESARC team had not assessed several mental disorders (eg, posttraumatic stress disorder, borderline PD, and schizotypal PD) at wave 1. Because of the poor concordance between lay interviewer–based structured assessment of schizophrenia or psychotic illness, the NESARC survey used the following question to assess this condition: "Did a doctor or other health professional ever diagnose you with schizophrenia or psychotic illness or episode?" This method has been used in multiple epidemiologic surveys.[52,53] Psychotic disorder was included only in the cross-sectional analyses.

Lifetime Suicide Attempts

To assess for lifetime suicide attempts, all wave 2 respondents were asked, "In your entire life, did you ever attempt suicide?" No information was available with respect to details of the suicide attempt. Suicide attempts were not assessed at wave 1 for all respondents. Thus, we were unable to examine the relationship between baseline income and incident suicide attempts.

Sociodemographic Factors

The sociodemographic factors included in the logistic models were age, sex, marital status, and race/ethnicity. We tested for age and sex interactions for group-level disorders. If there was no significant age by income interaction, we entered age as a continuous variable. Marital status was categorized into 3 groups: never married, married/common-law, and widowed/divorced/separated. Number of people in the household was included as a separate variable. Race/ethnicity was categorized into 5 groups: white, Asian, Hispanic, black, and American Indian/Alaska Native.[54] Change in marital status from baseline to wave 2 was adjusted for in the models using a dichotomous variable (yes or no).

Overall Analytic Strategy

Weights were created for the NESARC sample for it to be representative of the US population according to several sociodemographic characteristics (age, sex, and race/ethnicity) of the population in the 2000 Decennial Census.[37] These weights were applied to all statistical analyses in the current study. Taylor series linearization was used to correct for the complex sampling design of the NESARC using SUDAAN statistical software.[55,56] Because of multiple comparisons and reducing the risk for type I error, we set the α for significance at $P < .01$. In all analyses, we used multiple logistic regressions with adjustment for marital status, race/ethnicity, and number of people in the household. We tested for interactions between age and income, as well as between sex and income, for group-level mental disorders. If the interaction term for age and/or sex was significant ($P < .01$), we stratified the analysis based on that variable. If the interaction term was not significant, we adjusted for the variable in the analyses.

Analysis for Objective 1

We used wave 2 of the survey to examine the cross-sectional association between all lifetime mental disorders/suicide attempts and income. Wave 2 of the survey was used for this analysis because information on all mental disorders/suicide attempts was available for participants at that point. To maximize power, we tested for age and sex interactions only at the group level for mental disorders and not for individual disorders. There were few significant interactions for sex and income in relation to mental disorders and suicide attempts. Thus, we adjusted for sex in the analyses. However, we found a significant interaction for age (continuous) and income across all outcomes. We conducted sensitivity analyses and determined that it was optimal to stratify age into 2 categories: 20 to 54 years and 55 years or older.

Analysis for Objective 2

We used wave 1 household income quartiles and examined the risk for incident new-onset mental disorders during the 3-year follow-up period. To reduce the number of comparisons and increase the power for incident analyses, we grouped mental disorders into the following categories: (1) any incident mood disorder (major depression, dysthymia, and bipolar disorder), (2) any incident anxiety disorder (social phobia, generalized anxiety disorder, panic disorder, agoraphobia, and specific phobia), (3) any incident substance use disorder (alcohol abuse or dependence, drug abuse or dependence, and nicotine dependence), and (4) incident mood/anxiety or substance use disorder. The 3-year incidence rate for each of these outcomes was as follows: incident mood disorder, 6.8% (99% confidence interval, 6.2-7.3); incident anxiety disorder, 9.7% (9.1-10.4); incident substance use disorder, 10.8% (10.0-11.7); and incident mood, anxiety, or substance use disorder, 19.9% (18.8-21.1).

Similar to previous methods using the NESARC,[39] we created a separate at-risk group of people for each disorder category. For example, when examining the outcome of any in-

Table 1. Cross-sectional Association Between Household Income and Each of the Mood, Anxiety, Substance Use, and Personality Disorders

	Household Income, $							
	No. (%)[a]				AOR (99% CI)[b]			
Lifetime Mental Disorder	≤19 999	20 000- 39 999	40 000- 69 999	≥70 000	≤19 999	20 000- 39 999	40 000- 69 999	≥70 000
Major depression	2145 (27.1)	2045 (21.9)	1955 (21.1)	1795 (19.4)	1.44 (1.24-1.68)	1.13 (1.00-1.27)	1.06 (0.94-1.19)	1.00 [Reference]
Dysthymia	690 (8.1)	496 (5.3)	413 (4.5)	340 (3.6)	2.01 (1.53-2.64)	1.38 (1.07-1.77)	1.19 (0.94-1.50)	1.00 [Reference]
Bipolar disorder	797 (10.1)	721 (8.3)	540 (6.0)	436 (4.7)	2.56 (2.05-3.20)	1.94 (1.59-2.36)	1.26 (1.02-1.57)	1.00 [Reference]
Panic disorder[c]	774 (9.8)	652 (7.2)	622 (7.1)	579 (6.3)	1.77 (1.41-2.21)	1.22 (0.99-1.51)	1.13 (0.93-1.38)	1.00 [Reference]
GAD	814 (10.3)	702 (7.9)	668 (7.3)	546 (6.2)	1.67 (1.34-2.08)	1.29 (1.05-1.58)	1.17 (0.95-1.44)	1.00 [Reference]
PTSD	776 (9.3)	680 (7.1)	534 (5.5)	473 (4.9)	1.80 (1.41-2.29)	1.39 (1.12-1.74)	1.08 (0.86-1.36)	1.00 [Reference]
Agoraphobia	27 (0.4)	19 (0.2)	29 (0.5)	20 (0.2)	1.43 (0.49-4.14)	0.86 (0.33-2.27)	1.95 (0.75-5.05)	1.00 [Reference]
Specific phobia	1442 (17.3)	1404 (15.4)	1347 (14.6)	1294 (14.1)	1.33 (1.13-1.56)	1.13 (0.99-1.30)	1.03 (0.91-1.18)	1.00 [Reference]
Social phobia	685 (8.7)	617 (7.2)	643 (7.4)	503 (5.5)	1.70 (1.36-2.13)	1.39 (1.14-1.70)	1.37 (1.13-1.68)	1.00 [Reference]
Alcohol use disorder	2018 (28.0)	2649 (31.5)	3136 (36.2)	3500 (39.6)	0.76 (0.66-0.88)	0.81 (0.71-0.91)	0.88 (0.79-0.98)	1.00 [Reference]
Drug use disorder	797 (11.7)	981 (11.8)	1064 (12.1)	1070 (12.3)	1.17 (0.96-1.43)	1.07 (0.90-1.27)	0.97 (0.83-1.15)	1.00 [Reference]
Nicotine dependence	1904 (25.4)	2101 (25.2)	1917 (24.0)	1635 (19.3)	1.88 (1.62-2.18)	1.70 (1.47-1.96)	1.39 (1.20-1.61)	1.00 [Reference]
Schizoid PD	370 (4.8)	305 (3.3)	277 (2.9)	192 (2.0)	2.46 (1.79-3.37)	1.66 (1.22-2.27)	1.40 (1.04-1.90)	1.00 [Reference]
Paranoid PD	600 (7.3)	471 (4.6)	386 (4.3)	232 (2.3)	3.12 (2.31-4.21)	1.93 (1.46-2.57)	1.76 (1.33-2.35)	1.00 [Reference]
Schizotypal PD	562 (6.4)	406 (4.3)	344 (3.8)	222 (2.3)	2.70 (2.00-3.66)	1.81 (1.33-2.46)	1.57 (1.20-2.06)	1.00 [Reference]
Borderline PD	771 (9.6)	648 (7.0)	483 (5.2)	329 (3.3)	3.08 (2.37-4.02)	2.17 (1.72-2.74)	1.52 (1.17-1.97)	1.00 [Reference]
Histrionic PD	163 (2.3)	208 (2.2)	168 (1.7)	112 (1.2)	1.85 (1.18-2.89)	1.76 (1.19-2.59)	1.30 (0.89-1.91)	1.00 [Reference]
Antisocial PD	325 (4.7)	315 (4.2)	314 (3.8)	272 (3.1)	2.06 (1.49-2.85)	1.58 (1.16-2.16)	1.24 (0.93-1.66)	1.00 [Reference]
Narcissistic PD	665 (7.2)	658 (7.0)	579 (5.6)	547 (5.4)	1.16 (0.92-1.46)	1.16 (0.94-1.44)	0.93 (0.77-1.14)	1.00 [Reference]
Avoidant PD	307 (3.9)	214 (2.5)	176 (2.1)	124 (1.5)	2.79 (1.93-4.03)	1.73 (1.21-2.49)	1.38 (0.95-2.02)	1.00 [Reference]
Dependent PD	70 (0.9)	39 (0.5)	25 (0.3)	13 (0.1)	8.19 (3.16-21.25)	4.17 (1.68-10.32)	1.94 (0.72-5.20)	1.00 [Reference]
Obsessive-compulsive PD	609 (8.2)	698 (8.1)	720 (7.8)	726 (8.1)	1.12 (0.88-1.43)	1.06 (0.85-1.32)	0.97 (0.82-1.16)	1.00 [Reference]
Psychosis[d]	174 (1.9)	56 (0.7)	36 (0.4)	33 (0.3)	4.28 (2.11-8.67)	1.71 (0.81-3.59)	0.99 (0.47-2.07)	1.00 [Reference]

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; GAD, generalized anxiety disorder; PD, personality disorder; PTSD, posttraumatic stress disorder.
[a] Unweighted number, weighted percentage.
[b] Adjusted odds ratio with 99% CI (adjusted for age, sex, race/ethnicity, marital status, and number of persons in the household).
[c] Panic disorder with or without agoraphobia.
[d] Schizophrenia or psychotic illness.

cident mood disorder, participants with a baseline lifetime history of any mood disorder were excluded from analysis. We also adjusted for other Axis I mental disorders at baseline. So, in this example, we adjusted for baseline lifetime history of any anxiety or substance use disorder. We tested for age by income interactions and for sex by income interactions in relation to mental disorders. None of these interaction terms were significant. Thus, we adjusted for age, sex, race/ethnicity, marital status, and number of people in the household.

Analysis for Objective 3

We created a change in the household income variable based on the difference between wave 1 and wave 2 household income. This change variable was grouped into 3 categories: decrease in income, no change in income, and increase in income. Among the whole sample, 32.9% had a decrease in income, 18.0% had no change in income, and 49.1% had an increase in income. The same incident mental disorders that were used in objective 2 were used as dependent variables. We tested for age by income interactions and for sex by income interactions in relation to mental disorders. None of these interaction terms was significant. Thus, we adjusted for age, sex, race/ethnicity, marital status, and number of people in the household, as well as other Axis I baseline lifetime mental disorders.

Analysis for Objective 4

We examined whether baseline lifetime and past-year mental disorders were associated with a reduction in personal income during the 3-year period. Similar to objectives 2 and 3, age and sex interaction terms were not significant in this set of analyses.

RESULTS

CROSS-SECTIONAL ANALYSES

Table 1 shows the results of analysis of objective 1. Mental disorders, with the exceptions of agoraphobia, narcissistic PD, obsessive-compulsive PD, drug use disorder, and alcohol use disorder, were associated with increased likelihood of lower levels of income. In comparison with participants who had income of $70 000 or more per year, participants in the 2 lowest income categories (ie, <$40 000 per year) had increased odds of most of the mental disorders. Axis II PDs had odds ratios that were often greater than 2.0. A few mental disorders were associated with every level of decrease in income (ie, bipolar disorder, social phobia, nicotine dependence, paranoid PD, schizoid PD, schizotypal PD, and borderline PD). Interestingly, lower levels of income were associated with a significantly lower likelihood of alcohol use disorder.

Table 2 shows the relationship between income and lifetime suicide and mental disorders at the group level. We found that there was a significant interaction between age with income in relation to all mental disorders and suicide attempts. Thus, we stratified the sample into 2 groups: (ie, 20-54 years and 55 years or older). Since we did not find significant interactions for sex and income, we included sex as a covariate in the logistic models. Table 2 shows that the associations between lower levels of income and higher likelihood of mental disor-

Table 2. Cross-sectional Association Between Household Income, Lifetime Mental Disorder Groups, and Suicide Attempts

| | Household Income, $ | | | | | | | |
| | No. (%)[a] | | | | AOR (99% CI)[b] | | | |
Lifetime Outcome	≤19 999	20 000-39 999	40 000-69 999	≥70 000	≤19 999	20 000-39 999	40 000-69 999	≥70 000
Any mood disorder[c]								
Age, y								
20-54	1444 (37.1)	1627 (29.6)	1639 (25.0)	1597 (22.7)	1.80 (1.50-2.16)	1.36 (1.18-1.57)	1.08 (0.95-1.24)	1.00 [Reference]
≥55	951 (22.7)	651 (17.0)	483 (18.2)	360 (16.1)	1.11 (0.85-1.44)	0.90 (0.72-1.14)	1.08 (0.86-1.37)	1.00 [Reference]
Any anxiety disorder[d]								
Age, y								
20-54	1478 (37.1)	1750 (31.7)	1909 (29.7)	1906 (27.3)	1.54 (1.29-1.83)	1.25 (1.09-1.43)	1.11 (0.98-1.27)	1.00 [Reference]
≥55	1119 (26.4)	819 (22.1)	633 (23.9)	483 (22.1)	1.07 (0.83-1.38)	0.92 (0.74-1.13)	1.07 (0.86-1.35)	1.00 [Reference]
Any substance use disorder[e]								
Age, y								
20-54	1930 (53.6)	2554 (50.9)	3036 (50.7)	3378 (50.4)	1.34 (1.14-1.57)	1.17 (1.01-1.34)	1.06 (0.93-1.20)	1.00 [Reference]
≥55	1117 (27.1)	1134 (32.0)	963 (38.1)	4811 (38.9)	0.72 (0.59-0.89)	0.81 (0.66-0.99)	1.00 (0.82-1.22)	1.00 [Reference]
Any mood, anxiety, or substance use disorder								
Age, y								
20-54	2705 (70.7)	3577 (67.3)	4136 (66.3)	4484 (65.5)	1.36 (1.16-1.59)	1.18 (1.03-1.35)	1.05 (0.93-1.20)	1.00 [Reference]
≥55	2070 (49.5)	1790 (50.5)	1376 (53.5)	1146 (54.0)	0.87 (0.71-1.05)	0.88 (0.73-1.05)	0.98 (0.82-1.18)	1.00 [Reference]
Any personality disorder[f]								
Age, y								
20-54	1349 (33.7)	1572 (28.9)	1532 (24.0)	1411 (20.0)	1.77 (1.46-2.16)	1.51 (1.30-1.76)	1.21 (1.05-1.38)	1.00 [Reference]
≥55	707 (16.7)	520 (13.6)	388 (14.4)	304 (13.5)	1.23 (0.92-1.65)	0.99 (0.76-1.29)	1.06 (0.79-1.41)	1.00 [Reference]
Any suicide attempt								
Age, y								
20-54	358 (8.7)	252 (4.8)	217 (3.6)	168 (2.3)	3.66 (2.56-5.24)	2.03 (1.44-2.87)	1.52 (1.09-2.13)	1.00 [Reference]
≥55	113 (2.5)	71 (1.7)	57 (2.1)	29 (1.4)	1.31 (0.66-2.57)	1.06 (0.53-2.13)	1.45 (0.70-2.97)	1.00 [Reference]

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval.
[a] Unweighted number, weighted percentage.
[b] Adjusted odds ratio with 99% CI (adjusted for sex, race/ethnicity, marital status, and number of persons in the household).
[c] Major depression, dysthymia, or bipolar disorder.
[d] Social phobia, agoraphobia without panic disorder, panic disorder with or without agoraphobia, specific phobia, posttraumatic stress disorder, or generalized anxiety disorder.
[e] Alcohol use disorder, drug use disorder, or nicotine dependence.
[f] Schizoid, paranoid, schizotypal, borderline, antisocial, histrionic, antisocial, avoidant, obsessive-compulsive, or dependent.

ders were significant across all mental disorder categories for participants between 20 and 54 years old. There were no significant associations between income level and mental disorders among people 55 years or older, with the exception of the any substance use disorder category, in which lower levels of substance use were found among participants in the lower 2 income levels compared with those in the highest income level.

LONGITUDINAL ANALYSES

Table 3 shows the relationship between baseline income categories and incident Axis I mental disorders (mood, anxiety, or substance use). In comparison with participants who had income of $70 000 or more per year, participants with household income less than $20 000 were at increased odds of mood disorders. Baseline household income was not associated with increased risk of incident anxiety or substance use disorders.

Table 4 shows the results of objective 3, which examined the association between change in household income during the 2 time points and risk for incident mental disorders. Participants with a decrease in income during the study period, compared with those with no change in income, were at significantly increased risk of incident mood disorders; substance use disorders; and any mood, anxiety, or substance use disorders. Interest-

ingly, an increase in income during the follow-up period was not associated with an increase or decrease in odds of incident mental disorders.

The results from the analysis for objective 4 found no significant relationships between baseline mental disorders and a change in income status during the 3-year follow-up period. For the sake of brevity, we have not reported these results in table format, but they are available upon request from the corresponding author.

COMMENT

To the best of our knowledge, the present study examined the relationship between income and mental disorders and suicide attempts using the largest population-based longitudinal sample to date. There are several key strengths of this study. First, the NESARC includes a standardized interview-based assessment of mental disorders, helping to overcome limitations of the many previous studies that used self-report distress instruments to proxy diagnostic status. Second, the NESARC is the most contemporaneous longitudinal data set and allows for examination of both cross-sectional and longitudinal relationships between income and mental disorders. The main findings from this study have important public health implications. Participants in the lowest in-

Table 3. Incident Mental Disorders in Relation to Baseline Household Income

Incident Mental Disorder	Household Income, $							
	No. (%)[a]				AOR (99% CI)[b]			
	≤19 999	20 000-39 999	40 000-69 999	≥70 000	≤19 999	20 000-39 999	40 000-69 999	≥70 000
Any incident mood disorder[c]	609 (8.5)	576 (7.5)	449 (5.9)	328 (5.7)	1.42 (1.08-1.88)	1.26 (0.99-1.60)	0.99 (0.79-1.24)	1.00 [Reference]
Any incident anxiety disorder[d]	823 (10.6)	828 (10.2)	700 (9.0)	554 (9.4)	1.06 (0.87-1.29)	1.06 (0.88-1.27)	0.91 (0.74-1.11)	1.00 [Reference]
Any incident substance use disorder[e]	624 (11.0)	625 (10.6)	556 (11.2)	411 (10.3)	1.18 (0.94-1.48)	1.08 (0.88-1.32)	1.10 (0.90-1.35)	1.00 [Reference]
Any incident mood, anxiety, and substance use disorder	907 (20.9)	964 (20.0)	825 (20.0)	609 (18.9)	1.16 (0.94-1.43)	1.07 (0.89-1.30)	1.05 (0.88-1.27)	1.00 [Reference]

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval.
[a] Unweighted number, weighted percentage.
[b] Adjusted odds ratio with 99% CI (adjusted for age, sex, race/ethnicity, change in marital status, number of family members in the household, and other baseline mental disorder).
[c] Major depression, dysthymia, or bipolar disorder.
[d] Social phobia, agoraphobia, panic disorder, specific phobia, or generalized anxiety disorder.
[e] Alcohol use disorder, drug use disorder, or nicotine dependence.

Table 4. Incident Mental Disorders in Relation to Change in Household Income Status Between Baseline and 3-Year Follow-up Period

Incident Mental Disorder	Change in Household Income During 2 Waves of Survey					
	No. (%)[a]			AOR (99% CI)[b]		
	Reduction in Income	No Change in Income	Increase in Income	Reduction in Income	No Change in Income	Increase in Income
Any incident mood disorder[c]	724 (8.5)	287 (5.2)	951 (6.2)	1.55 (1.17-2.05)	1.00 [Reference]	1.08 (0.84-1.40)
Any incident anxiety disorder[d]	948 (10.3)	478 (8.8)	1479 (9.7)	1.14 (0.94-1.38)	1.00 [Reference]	1.03 (0.87-1.21)
Any incident substance use disorder[e]	788 (12.1)	315 (8.1)	1113 (10.9)	1.40 (1.09-1.80)	1.00 [Reference]	1.11 (0.89-1.38)
Any incident mood, anxiety, or substance use disorder	1171 (21.5)	503 (16.4)	1694 (20.0)	1.30 (1.06-1.60)	1.00 [Reference]	1.11 (0.92-1.33)

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval.
[a] Unweighted number, weighted percentage.
[b] Adjusted for age, sex, race/ethnicity, change in marital status, number of family members in the household, and other baseline mental disorder.
[c] Major depression, dysthymia, or bipolar disorder.
[d] Social phobia, agoraphobia, panic disorder, specific phobia, or generalized anxiety disorder.
[e] Alcohol use disorder, drug use disorder, or nicotine dependence.

come category were at increased odds of most of the mental disorders compared with those in the highest income category. Individuals with low income were at increased risk for incident mood disorders even after adjusting for other baseline Axis I mental disorders. A reduction in household income was associated with any incident mood, anxiety, and substance use disorders.

Although the present study supports the social causation theory of the association between income and mental disorders, a causal link between income and mental disorders cannot be drawn. This lack of capacity to infer causality is a limitation of most studies in this area of inquiry. To date, only 1 study meets criteria for causation. A longitudinal study[7] of winners of medium-sized lotteries in Britain showed a decrease in subjective distress in comparison with the control group. However, that study was limited by the lack of detailed assessment of mental disorders.

Several mechanisms might increase the risk of individuals with lower income to develop mental health problems. These mechanisms may include overcrowding, hunger, violence, social networks, and a decreased capacity to acquire health care for physical health problems.[29,57]

The present study underscores the need for targeted public health interventions for early detection and treatment of mental health problems among people with household income less than $20 000.

With the recent worldwide economic recession, we were particularly interested in examining the relationship between change in household income and risk for mental health problems. We had hypothesized that, compared with no change in income during the 3-year period, a decrease in income would be associated with increased risk of incident mental health problems and an increase in income would be associated with a lower likelihood of incident mental health problems. The findings from our study provide partial support for the social causation hypothesis in that a decrease in income was associated with increased risk for mood disorders and substance use disorders. A reduction of income was not associated with incident anxiety disorders. Because of the assessment of suicide attempts only at the second wave of the survey, we were unable to examine whether a reduction in income was associated with incident suicide attempts.

We did not find any evidence to suggest that an increase in household income was protective in reducing

the risk for incident mental health problems. It is plausible that a reduction in income might have a short-term effect on increasing mood disorders and substance use disorders, whereas an increase in income may have a long-term effect on reducing the risk for mental health problems that was not captured during the time of the study. Alternatively, as Kahneman et al[8] point out, an increase in income may not be associated with improved life satisfaction and happiness.

Although much of the focus in the literature has been on the relationship between income and Axis I mental disorders, the present study shows strong associations between many of the PD (Axis II) diagnoses and income. Since PDs are usually lifelong patterns of behavior and were assessed only once in this survey, we were only able to examine the relationship between PDs and income cross-sectionally; thus, we can draw limited conclusions and cannot make any causal inferences. It is possible that individuals in lower income categories are more likely to have particular PDs. Alternatively, it is possible that individuals with particular PDs are more likely to have difficulties with employment and relationships, leading to comparatively lower income potential and therefore decreased incomes. We were particularly surprised by the lack of association between narcissistic PD and obsessive-compulsive PD and income. We speculate that these 2 types of PDs may be more adaptive in work settings than other PDs (borderline, schizoid, and paranoid) that were strongly negatively associated with income. For example, features of obsessive-compulsive PD include compulsive attention to detail and perfectionism—personality features that may have some utility in a work environment—whereas odd, eccentric behavior (cluster A PD) and impulsivity and anger management problems (core features of borderline PD) may be much more likely to interfere with work functioning.

In comparison with participants who reported income of $70 000 or more per year, those in the lower income categories were significantly less likely to have an alcohol use disorder. Since our a priori hypothesis was that alcohol use disorders, similar to other mental disorders, would be associated with lower income, this could be a chance finding. To date, we found no literature stating that low-income individuals are at a lower risk of alcohol use disorders in comparison with higher-income individuals. We carefully reviewed our analysis and ruled out any moderators. We are reluctant to speculate about this unexpected finding; nonetheless, it is possible that diminished income reduces an individual's capacity to purchase alcohol.

Furthermore, we did not find that baseline mental disorders were associated with an increased risk of reduction in income in the 3-year follow-up period. It is possible that lower levels of income have a stronger effect on mental health problems than the impact of mental disorders on household income. Alternatively, the 3-year follow-up period might be too short for the impact of mental disorders to be observed. It is also possible that the effect of mental disorders on income might occur at an earlier age (eg, adolescence) rather than adulthood.

In the cross-sectional analyses, we found that age was a moderator in the relationship between income and mental disorders as well as in the relationship between income and suicide attempts. Lower levels of income were associated with increased odds of mental disorders among participants who were 20 to 54 years old, but this association was not significant among older adults, with the exception of the any substance use disorder category, in which lower levels of income were associated with higher likelihood of substance use disorder diagnoses. Similar to the current findings, a recent cross-sectional study[58] in the Canadian general population found that low income was strongly associated with mental illness among adults. However, the prevalence of mental illness among low-income older adults was not much higher than in those with higher income. We speculate that there might be several reasons for this age discovery. In comparison with younger adults, older adults have a lower likelihood of mental illness[59] and greater likelihood of psychological well-being and satisfaction.[60] Thus, household income may not have as strong an influence on mental illness among older adults than it does in younger adults. It is also possible that older adults in the community might have a greater economic base and assets than younger adults. Thus, older adults may not rely on income as much as younger adults. The NESARC did not have any information about the participants' economic base. Finally, older adults are unlikely to have dependents; thus, they might not need as much income as younger adults. Future studies should consider exploring these age differences between income and mental illness.

The present findings should be considered in the context of the study's limitations. Although we found strong relationships between household income and mental disorders, causal inferences cannot be drawn. Also, although all mental disorder diagnoses were made by a reliable structured interview conducted by trained lay interviewers, the diagnoses may not match those made by an experienced clinician. Furthermore, we did not have information about the lethality or number of suicide attempts. The survey was conducted between 2001 and 2005 when the world economy was not in a recession. Thus, it is possible that the relationship between income and mental illness might not be the same during the economic recession. For example, a decrease in household income during a period of economic growth may be more stressful for an individual in comparison with a period when there is an economic recession. During the latter circumstances, the individual may take solace in the fact that the change in income is not within his or her control. It is possible that a person may not be as distressed about his or her own shortcomings and have social support from other members in the community who are also facing a decrease in household income. To the best of our knowledge, there have been no large, representative mental health surveys conducted during the economic recession; thus, the present study uses the most recently collected mental health survey data to examine the association between income and mental disorders. For the longitudinal analyses, to maximize power and minimize the number of comparisons, we examined only incident mental disorders at the larger category level of mental disorders rather than each diagnosis. Further studies using larger samples, longer periods of follow-up, and multiple follow-up assessments will facilitate the capac-

ity to examine the relationship between baseline income and change in income in relation to individual mental disorders. The assessment of schizophrenia and psychosis was limited because it was based on a question that asked participants whether they had been diagnosed with schizophrenia or psychosis by a health care professional. Although this method has limitations, it is commonly used in psychiatric epidemiologic studies[52] because lay interviewer–based assessment of psychotic illness has shown poor reliability and validity.[25] Furthermore, we were unable to adjust for physical health conditions that may be potential confounders in this relationship. Moreover, there was no information available in the survey as to the reason for the decrease in income (eg, retirement or job loss) or in the assets of the members of the household. Finally, data used were provided by US participants and may not be generalizable to other countries with different cultures and health care systems.

In conclusion, within the context of a worldwide economic recession and ongoing debates within the US federal government on health care reform, the present study has substantial policy implications. Most important, the findings suggest that income below $20 000 per year is associated with substantial psychopathologic characteristics and that there is a need for targeted interventions to treat and prevent mental illness in this low-income sector of the population. The findings also suggest that adults with reduction in income are at increased risk of mood and substance use disorders.

REFERENCES

1. Britt RR. Recession to fuel more family murder, suicide. Live Science Web site. February 2, 2009. http://www.livescience.com/5288-recession-fuel-family-murder-suicide.html. Accessed Fall 2009.
2. Desmon S, Calvert S. As economic crisis goes on, financial fears can push some over the edge. *Baltimore Sun.* April 23, 2009. http://www.baltimoresun.com/news/maryland/bal-te.md.strain23apr23,0,3795561.story. Accessed Fall 2009.
3. US suicide rate rises as recession continues. Press TV Web site. November 24, 2009. http://www.presstv.ir/detail.aspx?id=112050&sectionid=3510212. Accessed Fall 2009.
4. Demyttenaere K, Bruffaerts R, Posada-Villa J, Gasquet I, Kovess V, Lepine JP, Angermeyer MC, Bernert S, de Girolamo G, Morosini P, Polidori G, Kikkawa T, Kawakami N, Ono Y, Takeshima T, Uda H, Karam EG, Fayyad JA, Karam AN, Mneimneh ZN, Medina-Mora ME, Borges G, Lara C, de Graaf R, Ormel J, Gureje O, Shen Y, Huang Y, Zhang M, Alonso J, Haro JM, Vilagut G, Bromet EJ, Gluzman S, Webb C, Kessler RC, Merikangas KR, Anthony JC, Von Korff MR, Wang PS, Brugha TS, Aguilar-Gaxiola S, Lee S, Heeringa S, Pennell BE, Zaslavsky AM, Ustun TB, Chatterji S; WHO World Mental Health Survey Consortium. Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA.* 2004;291(21):2581-2590.
5. Katz SJ, Kessler RC, Frank RG, Leaf P, Lin E. Mental health care use, morbidity, and socioeconomic status in the United States and Ontario. *Inquiry.* 1997; 34(1):38-49.
6. Kessler RC, Chiu WT, Demler O, Merikangas KR, Walters EE. Prevalence, severity, and comorbidity of 12-month *DSM-IV* disorders in the National Comorbidity Survey Replication [published correction appears in *Arch Gen Psychiatry.* 2005;62(7):709]. *Arch Gen Psychiatry.* 2005;62(6):617-627.
7. Gardner J, Oswald AJ. Money and mental wellbeing: a longitudinal study of medium-sized lottery wins. *J Health Econ.* 2007;26(1):49-60.
8. Kahneman D, Krueger AB, Schkade D, Schwarz N, Stone AA. Would you be happier if you were richer? a focusing illusion. *Science.* 2006;312(5782):1908-1910.
9. Fryers T, Melzer D, Jenkins R. Social inequalities and the common mental disorders: a systematic review of the evidence. *Soc Psychiatry Psychiatr Epidemiol.* 2003;38(5):229-237.
10. Dohrenwend BP, Levav I, Shrout PE, Schwartz S, Naveh G, Link BG, Skodol AE, Stueve A. Socioeconomic status and psychiatric disorders: the causation-selection issue. *Science.* 1992;255(5047):946-952.
11. Clark AE, Oswald AJ. A simple statistical method for measuring how life events affect happiness. *Int J Epidemiol.* 2002;31(6):1139-1146.
12. Winkelmann R. Co-payments for prescription drugs and the demand for doctor visits—evidence from a natural experiment. *Health Econ.* 2004;13(11):1081-1089.
13. Powdthavee N. What happens to people before and after disability? focusing effects, lead effects, and adaptation in different areas of life. *Soc Sci Med.* 2009; 69(12):1834-1844.
14. Dunn EW, Aknin LB, Norton MI. Spending money on others promotes happiness. *Science.* 2008;319(5870):1687-1688.
15. Kessler RC, Berglund PA, Foster CL, Saunders WB, Stang PE, Walters EE. Social consequences of psychiatric disorders, II: teenage parenthood. *Am J Psychiatry.* 1997;154(10):1405-1411.
16. MacMillan HL, Fleming JE, Trocmé N, Boyle MH, Wong M, Racine YA, Beardslee WR, Offord DR. Prevalence of child physical and sexual abuse in the community: results from the Ontario Health Supplement. *JAMA.* 1997;278(2):131-135.
17. Sareen J, Jagdeo A, Cox BJ, ten Have M, Clara I, de Graaf R, Belik S, Stein MB. Perceived barriers toward mental health service utilization: a comparison of epidemiologic surveys in the United States, Ontario and the Netherlands. *Psychiatr Serv.* 2007;58:357-364.
18. Phongsavan P, Chey T, Bauman A, Brooks R, Silove D. Social capital, socioeconomic status and psychological distress among Australian adults. *Soc Sci Med.* 2006;63(10):2546-2561.
19. Kessler RC, Frank RG, Edlund M, Katz SJ, Lin E, Leaf P. Differences in the use of psychiatric outpatient services between the United States and Ontario. *N Engl J Med.* 1997;336(8):551-557.
20. Alegría M, Bijl RV, Lin E, Walters EE, Kessler RC. Income differences in persons seeking outpatient treatment for mental disorders: a comparison of the United States with Ontario and the Netherlands. *Arch Gen Psychiatry.* 2000;57(4): 383-391.
21. Stein MB, Kean YM. Disability and quality of life in social phobia: epidemiologic findings. *Am J Psychiatry.* 2000;157(10):1606-1613.
22. Wang PS, Beck AL, Berglund P, McKenas DK, Pronk NP, Simon GE, Kessler RC. Effects of major depression on moment-in-time work performance. *Am J Psychiatry.* 2004;161(10):1885-1891.
23. Agerbo E, Nordentoft M, Mortensen PB. Familial, psychiatric, and socioeconomic risk factors for suicide in young people: nested case-control study. *BMJ.* 2002;325(7355):74.
24. Johnson W, Krueger RF. How money buys happiness: genetic and environmental processes linking finances and life satisfaction. *J Pers Soc Psychol.* 2006; 90(4):680-691.

25. Kendler KS, Gallagher TJ, Abelson JM, Kessler RC. Lifetime prevalence, demographic risk factors, and diagnostic validity of nonaffective psychosis as assessed in a US community sample: the National Comorbidity Survey. *Arch Gen Psychiatry.* 1996;53(11):1022-1031.

26. Kessler RC, Heeringa S, Lakoma MD, Petukhova M, Rupp AE, Schoenbaum M, Wang PS, Zaslavsky AM. Individual and societal effects of mental disorders on earnings in the United States: results from the National Comorbidity Survey replication. *Am J Psychiatry.* 2008;165(6):703-711.

27. Mojtabai R. Perceived reasons for loss of housing and continued homelessness among homeless persons with mental illness. *Psychiatr Serv.* 2005;56(2):172-178.

28. Greenberg GA, Rosenheck RA. Correlates of past homelessness in the National Epidemiological Survey on Alcohol and Related Conditions. *Adm Policy Ment Health.* 2010;37(4):357-366.

29. Insel TR. Assessing the economic costs of serious mental illness. *Am J Psychiatry.* 2008;165(6):663-665.

30. Lorant V, Deliège D, Eaton W, Robert A, Philippot P, Ansseau M. Socioeconomic inequalities in depression: a meta-analysis. *Am J Epidemiol.* 2003;157(2):98-112.

31. McMillan KA, Enns MW, Asmundson GJG, Sareen J. The association between income, mental disorders, and suicidal behavior: findings from the Collaborative Psychiatric Epidemiologic Survey. *J Clin Psychiatry.* 2010;71(9):1168-1175.

32. Lorant V, Croux C, Weich S, Deliège D, Mackenbach J, Ansseau M. Depression and socio-economic risk factors: 7-year longitudinal population study. *Br J Psychiatry.* 2007;190:293-298.

33. Goldberg DP, Gater R, Sartorius N, Ustun TB, Piccinelli M, Gureje O, Rutter C. The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychol Med.* 1997;27(1):191-197.

34. Costello EJ, Erkanli A, Copeland W, Angold A. Association of family income supplements in adolescence with development of psychiatric and substance use disorders in adulthood among an American Indian population. *JAMA.* 2010;303(19):1954-1960.

35. Compton WM, Grant BF, Colliver JD, Glantz MD, Stinson FS. Prevalence of marijuana use disorders in the United States: 1991-1992 and 2001-2002. *JAMA.* 2004;291(17):2114-2121.

36. Ruan WJ, Goldstein RB, Chou SP, Smith SM, Saha TD, Pickering RP, Dawson DA, Huang B, Stinson FS, Grant BF. 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.

37. Grant BF, Dawson DA, Stinson FS, Chou PS, Kay W, Pickering R. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV): reliability of alcohol consumption, tobacco use, family history of depression and psychiatric diagnostic modules in a general population sample. *Drug Alcohol Depend.* 2003;71(1):7-16.

38. Grant B, Kaplan KD. *Source and Accuracy Statement for the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions.* Rockville, MD: NESARC; 2005.

39. Grant BF, Goldstein RB, Chou SP, Huang B, Stinson FS, Dawson DA, Saha TD, Smith SM, Pulay AJ, Pickering RP, Ruan WJ, Compton WM. 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.

40. Dawson DA, Li TK, Chou SP, Grant BF. Transitions in and out of alcohol use disorders: their associations with conditional changes in quality of life over a 3-year follow-up interval. *Alcohol Alcohol.* 2009;44(1):84-92.

41. Grant BF, Dawson DA, Stinson FS, Chou SP, Dufour MC, Pickering RP. The 12-month prevalence and trends in *DSM-IV* alcohol abuse and dependence: United States, 1991-1992 and 2001-2002. *Drug Alcohol Depend.* 2004;74(3):223-234.

42. Grant BF, Hasin DS, Stinson FS, Dawson DA, Chou SP, Ruan WJ, Huang B. Co-occurrence of 12-month mood and anxiety disorders in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Psychiatr Res.* 2005;39:1-9.

43. Vesga-López O, Blanco C, Keyes K, Olfson M, Grant BF, Hasin DS. Psychiatric disorders in pregnant and postpartum women in the United States. *Arch Gen Psychiatry.* 2008;65(7):805-815.

44. Hasin DS, Keyes KM, Alderson D, Wang S, Aharonovich E, Grant BF. Cannabis withdrawal in the United States: results from NESARC. *J Clin Psychiatry.* 2008;69(9):1354-1363.

45. Bolton JM, Belik SL, Enns MW, Cox BJ, Sareen J. Exploring the correlates of suicide attempts among individuals with major depressive disorder: findings from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry.* 2008;69(7):1139-1149.

46. Pulay AJ, Stinson FS, Dawson DA, Goldstein RB, Chou SP, Huang B, Saha TD, Smith SM, Pickering RP, Ruan WJ, Hasin DS, Grant BF. Prevalence, correlates, disability, and comorbidity of *DSM-IV* schizotypal personality disorder: results from the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions. *Prim Care Companion J Clin Psychiatry.* 2009;11(2):53-67.

47. Agerbo E. High income, employment, postgraduate education, and marriage: a suicidal cocktail among psychiatric patients. *Arch Gen Psychiatry.* 2007;64(12):1377-1384.

48. *Diagnostic and Statistical Manual of Mental Disorders.* 4th ed. Washington, DC: American Psychiatric Association; 1994.

49. Grant BF, Chou SP, Goldstein RB, Huang B, Stinson FS, Saha TD, Smith SM, Dawson DA, Pulay AJ, Pickering RP, Ruan WJ. Prevalence, correlates, disability, and comorbidity of *DSM-IV* borderline personality disorder: results from the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry.* 2008;69(4):533-545.

50. Stinson FS, Dawson DA, Goldstein RB, Chou SP, Huang B, Smith SM, Ruan WJ, Pulay AJ, Saha TD, Pickering RP, Grant BF. Prevalence, correlates, disability, and comorbidity of *DSM-IV* narcissistic personality disorder: results from the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry.* 2008;69(7):1033-1045.

51. Cox BJ, Sareen J, Enns MW, Clara I, Grant BF. The fundamental structure of Axis II personality disorders assessed in the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry.* 2007;68(12):1913-1920.

52. McMillan KA, Enns MW, Cox BJ, Sareen J. Comorbidity of Axis I and II mental disorders with schizophrenia and psychotic disorders: findings from the National Epidemiologic Survey on Alcohol and Related Conditions. *Can J Psychiatry.* 2009;54(7):477-486.

53. Supina AL, Patten SB. Self-reported diagnoses of schizophrenia and psychotic disorders may be valuable for monitoring and surveillance. *Can J Psychiatry.* 2006;51(4):256-259.

54. Huang B, Grant BF, Dawson DA, Stinson FS, Chou SP, Saha TD, Goldstein RB, Smith SM, Ruan WJ, Pickering RP. Race-ethnicity and the prevalence and co-occurrence of *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition,* alcohol and drug use disorders and Axis I and II disorders: United States, 2001 to 2002. *Compr Psychiatry.* 2006;47(4):252-257.

55. *Software for the Statistical Analysis of Correlated Data (SUDAAN)* [computer program]. Version 8.0. Research Triangle Park, NC: Research Triangle Institute; 2000.

56. Shah BV, Barnswell BG, Bieler GS. *SUDAAN User's Manual: Software for Analysis of Correlated Data.* Research Triangle Park, NC: Research Triangle Institute; 1995.

57. Clarke DE, Colantonio A, Rhodes AE, Escobar M. Pathways to suicidality across ethnic groups in Canadian adults: the possible role of social stress. *Psychol Med.* 2008;38(3):419-431.

58. Caron J, Liu A. A descriptive study of the prevalence of psychological distress and mental disorders in the Canadian population: comparison between low-income and non–low-income populations. *Chronic Dis Can.* 2010;30(3):84-94.

59. Streiner DL, Cairney J, Veldhuizen S. The epidemiology of psychological problems in the elderly. *Can J Psychiatry.* 2006;51(3):185-191.

60. Stone AA, Schwartz JE, Broderick JE, Deaton A. A snapshot of the age distribution of psychological well-being in the United States. *Proc Natl Acad Sci U S A.* 2010;107(22):9985-9990.