



Published in final edited form as:

*J Clin Psychiatry*. 2012 March ; 73(3): . doi:10.4088/JCP.10m06304.

## Gender, HIV status, and psychiatric disorders: Results from the national epidemiologic study on alcohol and related conditions

Mariana Lopes, M.D.<sup>a</sup>, Mark Olsson, M.D., M.P.H.<sup>a,b</sup>, Judith Rabkin, Ph.D., M.P.H.<sup>a,b</sup>, Deborah S. Hasin, Ph.D.<sup>a,b,c</sup>, Analucía A. Alegría, B.S.<sup>a</sup>, Keng-Han Lin, M.S.<sup>a</sup>, Bridget F. Grant, Ph.D., Ph.D.<sup>d</sup>, and Carlos Blanco, M.D., Ph.D.<sup>a,b</sup>

<sup>a</sup>New York State Psychiatric Institute, New York, NY 10032, United States.

<sup>b</sup>Department of Psychiatry, College of Physicians and Surgeons, Columbia University, New York, NY 10032, United States.

<sup>c</sup>Department of Epidemiology, Mailman School of Public Health, Columbia University, New York, NY 10032, United States.

<sup>d</sup>Department of Epidemiology, Mailman School of Public Health, Columbia University, New York, NY 10032, United States.

### Abstract

**Objective**—More than thirty years after the onset of the HIV epidemic, there is no information on the prevalence of psychiatric disorders among HIV-positive individuals in the general population. We sought to compare the prevalence of 12-month psychiatric disorders among HIV-positive and HIV-negative adults stratified by sex, and to examine the differential increase in risk of a psychiatric disorder as a function of the interaction of sex and HIV status.

**Methods**—Face-to-face interviews conducted between 2004 and 2005 with participants in a large nationally representative sample of US adults (34,653).

**Results**—When compared with their HIV-negative same sex counterparts, HIV-positive men were more likely to have any mood disorder (Odds ratio [OR]=6.10; 95% Confidence interval [CI] =2.99–12.44), major depressive disorder/dysthymia (OR=3.77; 95% CI=1.16–12.27), any anxiety disorder (OR=4.02; 95% CI=2.12–7.64), and any personality disorder (OR=2.50; 95% CI=1.34–4.67) In relation to their same sex HIV-negative counterparts, the effect of HIV status on the odds of any mood disorder (OR=7.17; 95% CI=2.52–20.41), any anxiety disorder (OR=3.45; 95% CI=1.27–9.38) and any personality disorder (OR=2.66; 95% CI=1.16–6.10) was significantly greater for men than women.

**Conclusions**—HIV status was significantly more strongly associated with psychiatric disorders in men than women. HIV-positive men had a higher prevalence than HIV-negative men of most psychiatric disorders. By contrast, HIV-positive women were not significantly more likely than HIV-negative women to have psychiatric disorders.

---

Corresponding Author: Bridget F. Grant, Ph.D., Ph.D., Laboratory of Epidemiology and Biometry, Room 3077, Division of Intramural Clinical and Biological Research, National Institute on Alcohol Abuse and Alcoholism, National Institutes of Health, M.S. 9304, 5635 Fishers Lane, Bethesda, MD 20892-9304, Phone: 301-443-7370, Fax: 301-443-1400, bgrant@willco.niaaa.nih.gov.

**Publisher's Disclaimer:** Disclaimer: The views and opinions expressed in this report are those of the authors and should not be construed to represent the views of any of the sponsoring organizations, agencies, or the U.S. government.

**Financial disclosures:** All other authors report no competing interests.

## Keywords

HIV; psychiatric disorders; gender; epidemiology

---

## INTRODUCTION

It is well established that HIV infection is associated with increased prevalence of several psychiatric disorders.<sup>1–3</sup> HIV-positive adults suffer from elevated rates of comorbid psychiatric disorders,<sup>4–6</sup> most often major depressive disorder,<sup>1, 7–9</sup> anxiety disorders,<sup>1, 5</sup> and substance use disorders.<sup>1</sup> HIV infection is also common among individuals with psychotic disorders.<sup>8, 10, 11</sup> The importance of these associations is underscored by high rates of HIV transmission,<sup>11</sup> low adherence to antiretroviral treatment,<sup>12</sup> and the poor prognosis for HIV infection among adults with HIV and psychiatric disorders.

The basic epidemiology of mental disorders among HIV-positive adults remains poorly understood. No previous study permits accurate national estimates of the prevalence of psychiatric disorders among HIV-positive adults. Further, prior work has not included HIV-negative individuals drawn from the general population to identify the specific contribution of HIV status to the risk of psychiatric disorders.<sup>1, 4</sup> Several studies have been limited by use of psychiatric screening scales rather than DSM-IV diagnoses.<sup>1, 4</sup> Finally, few studies have stratified their analyses by sex,<sup>1</sup> despite well-established sex differences in the distribution of psychiatric disorders in the general population<sup>13–16</sup> and clinical samples of HIV-positive individuals.<sup>1, 17, 18</sup>

As the result of these gaps in research on mental disorders in HIV-positive individuals, there is a paucity of accurate national information on the mental health of this population. The current study uses data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) Wave 2, a large nationally representative sample of the US non-institutionalized population, to fill these gaps in our knowledge. Specifically, we sought to: 1) examine sociodemographic correlates of HIV status among men and women; and, 2) investigate the differences in the prevalence of 12-month DSM-IV psychiatric disorders among HIV-positive and HIV-negative adults stratified by sex.

## METHODS

### Sample

Wave 1 of the NESARC was conducted in 2001–2002 and is described in detail elsewhere.<sup>19, 20</sup> The Wave 1 NESARC surveyed a representative sample of the adult population of the United States, oversampling Blacks, Hispanics, and young adults aged 18-to-24 years. The target population was the civilian population, 18 years and older, residing in households and group quarters. Face-to-face interviews were conducted with 43,093 respondents, yielding an overall response rate of 81.0%. The Wave 2 NESARC, which was conducted in 2004–2005, involved face-to-face re-interviews with participants in the Wave 1 interview. Wave 2 methods are also described in detail elsewhere.<sup>21</sup> Excluding respondents ineligible for the Wave 2 interview because they were deceased (n=1,403), deported, mentally or physically impaired (n=781), or on active duty in the armed forces throughout the follow-up period (n=950), the Wave 2 response rate was 86.7%, reflecting 34,653 completed interviews. The cumulative response rate at Wave 2 was the product of the Wave 2 and Wave 1 response rates, or 70.2%. Wave 2 NESARC data were weighted to reflect design characteristics of the NESARC and account for oversampling. Adjustment for nonresponse across sociodemographic characteristics and the presence of any lifetime Wave

2 NESARC substance use disorder or other psychiatric disorder was performed at the household and person levels.<sup>19</sup>

### **Sociodemographic correlates**

Sociodemographic characteristics were assessed by self-report. These included sex, race-ethnicity (i.e. White or non-White) sexual orientation (i.e., heterosexual or non-heterosexual), US nativity, age, education, marital status, area of residence (i.e. urban or rural), region of the country, employment status, personal and family income measured as categorical variables, and insurance type.

### **DSM-IV psychiatric disorders**

The diagnostic interview was the Alcohol Use Disorder and Associated Disabilities Interview Schedule – DSM-IV Version (AUDADIS-IV<sup>19</sup>), Wave 2 version.<sup>19</sup> This structured interview was designed for administration by experienced lay interviewers. All disorders were assessed in the last 12 months time frame preceding the interview at Wave 2 NESARC. Mood disorders included DSM-IV major depressive disorder (MDD), bipolar I and bipolar II, and dysthymia. Anxiety disorders included DSM-IV panic disorder (with and without agoraphobia), social anxiety disorder, specific phobias, generalized anxiety disorder (GAD) and posttraumatic stress disorder (PTSD). All mood and anxiety disorders satisfied the DSM-IV clinical significance criterion. Test-retest reliabilities of AUDADIS-IV measures of DSM-IV mood and anxiety disorders were fair to good, ranging from  $k=0.42$  to  $k=0.62$ .<sup>22, 23</sup>

Extensive AUDADIS-IV questions covered DSM-IV criteria for substance use disorders, including alcohol and drug-specific abuse and dependence for 10 classes of substances. Good to excellent ( $r=0.70-0.91$ ) test-retest reliability of AUDADIS-IV substance use diagnoses has been documented in clinical and general population samples.<sup>22-27</sup> Convergent, discriminant, and construct validity of AUDADIS-IV substance use disorder criteria and diagnoses were good to excellent,<sup>28-32</sup> including in the World Health Organization/National Institutes of Health International Study on Reliability and Validity,<sup>33</sup> where clinical reappraisals documented good to excellent validity of DSM-IV alcohol and drug use disorder diagnoses ( $r=0.54-0.76$ ).

Personality disorders (PDs) assessed on a lifetime basis at Wave 1, which are described in detail elsewhere,<sup>34, 35</sup> included avoidant, dependent, obsessive-compulsive, paranoid, schizoid, histrionic, and antisocial PDs. Borderline, schizotypal, and narcissistic PDs were measured at Wave 2 and test re-test reliability was good ( $k=0.67-0.71$ ).<sup>27</sup> Test-retest reliabilities of AUDADIS-IV PDs compare favorably with those obtained in patient samples using semistructured personality interviews. Convergent validity was good to excellent for all affective, anxiety, and PD diagnoses, and selected diagnoses showed good agreement ( $r=0.64-0.68$ ) with psychiatrist reappraisals.<sup>21</sup>

### **Twelve-month HIV status**

HIV status was determined by answering “Yes” or “No” to the question: “In the last 12 months, did you test positive for HIV, the virus that causes AIDS?” One hundred and forty nine participants of the NESARC answered affirmatively and were classified as HIV-positive.

### **Statistical analyses**

Weighted means, frequencies and odds ratios (ORs) of sociodemographic correlates and prevalence of psychiatric disorders were computed. Adjusted odds ratios (AORs) derived from multiple logistic regressions indicate associations between HIV status (as the outcome)

and sociodemographic correlates and presence/absence of psychiatric disorders as the predictors. Due to the cross-sectional nature of the study, AORs are interpreted throughout as measure of association, with no attribution of causality.

To examine the differential association of HIV and psychiatric disorders across sexes, we conducted logistic regressions using sex (with women as the reference group), presence of psychiatric disorders (with absence of disorder as the reference group) and their interaction term as predictors and HIV positive status as outcome. All analyses were repeated including only the 110 individuals whose HIV status had been confirmed by a physician. Because the pattern of results is the same, we present the results of the larger sample (analyses of the restricted sample are available on request). For all analyses, we consider two percentage estimates significantly different from each other if their 95% confidence intervals (95% CI) do not overlap. ORs are considered significant if their 95% CIs do not include 1. All standard errors and 95% CIs were estimated using SUDAAN to adjust for design characteristics of the survey.

## RESULTS

### Sociodemographic correlates of HIV status by sex

A total of 0.36% (95% CI=0.27–0.48) of men and 0.27% (95% CI=0.20 – 0.37) of women reported testing positive for HIV in the previous year. These figures are broadly consistent with CDC national estimates of the rate of adults and adolescents living with HIV or AIDS (0.31%).<sup>36</sup> Among HIV positive males, 63.91% had a psychiatric disorder. Of those 34.59% (i.e., 22.12% of all HIV positive men) had the onset of the current episode in the last year. Similarly, 37.45% of HIV positive women had a psychiatric disorder at the time of the interview. In 27.94% of those cases, (10.46% of all HIV positive women), the onset of the current psychiatric episode started before the year preceding the interview.

Sociodemographic characteristics of HIV-positive and negative men are shown in table 1. HIV-positive men were significantly more likely than HIV-negative men to have less than a high school education, to have public or no insurance, to be unemployed or students and to be non-heterosexual. HIV-positive men were significantly less likely than HIV-negative men to be of white race/ethnicity, and to have annual personal and family incomes of at least \$20,000.

Sociodemographic characteristics of HIV-positive and negative women are presented in table 2. Results among women mirrored those among men, with the exception that HIV-positive women were as likely as HIV-negative women to be heterosexual and less likely to live in the south region of the US.

### Clinical characteristics of men by HIV status

HIV-positive men were significantly more likely than negative men to have any mood disorder, major depressive disorder/dysthymia, bipolar disorder, any anxiety disorder, any drug use disorder, panic disorder, social anxiety disorder, post-traumatic stress disorder, drug abuse, drug dependence, and any personality disorder. The differences in any mood disorder, bipolar disorder, any anxiety disorder, post-traumatic stress disorder, any drug use disorder and drug dependence remained significant following adjustment for sociodemographic correlates (table 3).

### Clinical characteristics of women by HIV status

There were no significant differences in the prevalence of psychiatric disorders were found between HIV-positive and -negative women in unadjusted or adjusted models (table 4).

### Clinical characteristics and HIV status/sex interactions

Table 5 shows the ORs of the differential increase in risk of psychiatric disorders as a function of the interaction of sex with HIV status (using female sex and HIV-negative as reference groups). The effects of HIV status on the odds of any mood disorder, any anxiety disorder and any personality disorder were each significantly greater for men than women when compared with their same sex HIV-negative counterparts. Each of these ORs retained significance following adjustment for sociodemographic characteristics.

## DISCUSSION

Consistent with previous clinical research,<sup>1, 17, 37</sup> we report that psychiatric disorders are highly prevalent in adults with HIV. Somewhat surprisingly, the increased risk of psychiatric disorders was largely confined to HIV-positive men. Women with HIV were not significantly more likely than HIV-negative women to have psychiatric disorders. HIV status was more strongly associated with psychiatric disorders in men than women. The burden of HIV-associated psychiatric disorders appears to fall disproportionately on men.

The biological and psychological factors that contribute to the association of HIV and psychiatric disorders among men remain poorly defined. HIV can produce neuropsychiatric alterations associated with a variety of psychiatric symptoms.<sup>11, 38</sup> At the same time, stress associated with seroconversion may trigger new onset or recurrence of psychiatric disorders. Alternatively, men with pre-existing psychiatric disorders may be more likely to engage in substance use<sup>1, 39</sup> and high-risk sexual behavior<sup>39, 40</sup> that increase the probability of HIV transmission. In one sample of mentally ill adults,<sup>41</sup> 25% had multiple sexual partners and condoms were not used in 75% occasions of sexual intercourse. As a result, men with psychiatric disorders may be at high risk for becoming infected with HIV. Consistent with this explanation, higher rates of personality disorders were observed among HIV-positive than -negative men, suggesting that some of the psychopathology among HIV-positive men predates their infection. HIV stigma may also be great in men than in women.

These findings highlight the need for effective interventions to address the convergence of HIV and psychiatric disorders. Services are needed to provide mental health treatment to HIV-positive individuals with psychiatric disorders and to provide HIV prevention services to mentally ill populations, regardless of serostatus. Studies have shown that mental health treatment, whether psychotherapeutic,<sup>42</sup> psychopharmacological,<sup>43</sup> or a combination, can help reduce depressive symptoms among HIV positive patients. Furthermore, a decrease in psychiatric symptoms is associated with slower disease progression,<sup>44</sup> improved treatment adherence,<sup>12, 45</sup> and a reduction in HIV risk behavior.<sup>46, 47</sup> Yet, under diagnosis of depression among HIV-positive patients remains common.<sup>48</sup> Routine psychiatric assessments of patients receiving HIV treatment might help to identify psychiatric disorders in HIV-positive individuals which might otherwise pass undetected in community practice.

Although there is extensive evidence for the efficacy of HIV-prevention programs in the general population,<sup>49-54</sup> and among drug users,<sup>55-62</sup> much less is known about the efficacy of interventions to reduce HIV risk behavior among individuals with other psychiatric disorders.<sup>63-68</sup> The interventions<sup>69-71</sup> currently being disseminated focus only on drug use rather than on the full range of common psychiatric disorders. Recent studies<sup>72, 73</sup> also demonstrate a paucity of HIV-prevention programs in community mental health centers, where large numbers of high risk populations receive care. Research is needed to develop optimal strategies for HIV prevention among individuals with the common psychiatric disorders.<sup>74</sup>

In accord with previous clinical studies,<sup>1, 6, 17</sup> high rates of psychiatric disorders were reported among HIV-positive women. However, mental disorders were not independently and significantly associated with HIV status among women. Similar results for anxiety and depressive disorders have been reported from a clinical sample.<sup>75</sup> Among women, pre-existing psychopathology may not be a strong risk factor for HIV infection. Women are less likely than men to negotiate safe sex and insist on condom use<sup>76</sup> and are more likely than men to become infected with HIV from their spouse or partner<sup>77-80</sup> or by trading sex for money and drugs.<sup>81</sup> It is also possible that for women resiliency or protective factors, such as supportive networks and the quality of their interpersonal attachments, attenuate seroconversion stress related onset or recurrence of psychiatric disorders. As compared with men, women facing adversities related to HIV infection may have a greater capacity to adjust to the environment, tolerate negative affect, seek social support, and cope with adversities of HIV.<sup>18</sup> An understanding of how women successfully cope with HIV may offer insights into the mental health care of HIV-positive men following seroconversion.

This study has several limitations. First, information on HIV status was based on self-report and was not independently verified by a physician or laboratory testing. Independent verification is not feasible for a large, nationally representative epidemiological study. However, our self-report HIV rates are consistent with national CDC estimates, suggesting that potential bias in the estimates is likely to be limited. Second, the number of HIV-positive subjects in this sample is relatively small. This is a function of the prevalence of HIV in the general population. To our knowledge, there are no larger epidemiological studies with information on psychiatric diagnoses and HIV status. Nevertheless, even after stratifying by gender, we were able to detect several statistically significant differences between HIV-positive and negative individuals. Third, although the NESARC includes information on age of onset of psychiatric disorders, it does not include information regarding the onset of HIV-positive status, preventing temporal sequencing of psychiatric disorder and HIV onset. Fourth, some HIV-positive individuals diagnosed prior to the 12 months preceding the interview may have misunderstood the question and erroneously responded that they were HIV-negative. However, because our estimates of HIV prevalence closely match those of the CDC, we doubt that such misclassification was widespread and therefore we believe it is unlikely to have significantly altered the findings of this study. Fifth, the survey did not include some groups at high risk for HIV infection and psychiatric disorder including persons in prisons, hospitals, and those without stable housing.

Despite these limitations, the NESARC constitutes the largest nationally representative survey to include information of HIV status and a wide range of psychiatric disorders. Psychiatric disorders are highly prevalent among HIV-positive adults, especially HIV-positive men. Effective evidence-based pharmacological and psychosocial treatments exist for several of the common psychiatric disorders reported by HIV-positive men and women, although information about their efficacy in these populations remains limited. Early mental health treatment could reduce the persistence of these disorders and has the potential to decrease HIV transmission. Increased clinical and public health attention is clearly needed to improve the detection and treatment of psychiatric disorders among HIV-positive adults.

## Acknowledgments

**Financial support:** The National Epidemiologic Survey on Alcohol and Related Conditions was sponsored by the National Institute on Alcohol Abuse and Alcoholism and funded, in part, by the Intramural Program, NIAAA, National Institutes of Health. This study is supported by NIH grants DA019606, DA020783, DA023200, DA023973 and MH076051 (Dr. Blanco), P60 MD000206 (Dr. Olfson), R01AA08159 and K05AA00161 (Dr. Hasin), the American Foundation for Suicide Prevention (Dr. Blanco) and the New York State Psychiatric Institute (Drs. Blanco, Olfson, Rabkin and Hasin).

Dr. Blanco has received research support from GlaxoSmithKline, Eli Lilly & Co., and Pfizer. Dr. Olfson has received research support from Bristol-Myers Squibb and Eli Lilly & Co.

## References

1. Bing EG, Burnam MA, Longshore D, et al. Psychiatric disorders and drug use among human immunodeficiency virus-infected adults in the United States. *Arch Gen Psychiatry*. 2001; 58(8): 721–728. [PubMed: 11483137]
2. Kessler RC, Chiu WT, Demler O, et al. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry*. 2005; 62:617–627. [PubMed: 15939839]
3. Beyer JL, Taylor L, Gersing KR, et al. Prevalence of HIV infection in a general psychiatric outpatient population. *Psychosomatics*. 2007; 48(1):31–37. [PubMed: 17209147]
4. Galvan FH, Burnam MA, Bing EG. Co-occurring psychiatric symptoms and drug dependence or heavy drinking among HIV-positive people. *J Psychoactive Drugs*. 2003; 35(Suppl 1):153–160. [PubMed: 12825758]
5. Pence BW, Miller WC, Whetten K, et al. Prevalence of DSM-IV-defined mood, anxiety, and substance use disorders in an HIV clinic in the Southeastern United States. *J Acquir Immune Defic Syndr*. 2006; 42(3):298–306. [PubMed: 16639343]
6. Orlando M, Burnam MA, Beckman R, et al. Re-estimating the prevalence of psychiatric disorders in a nationally representative sample of persons receiving care for HIV: results from the HIV Cost and Services Utilization Study. *Int J Methods Psychiatr Res*. 2002; 11(2):75–82. [PubMed: 12459797]
7. Rabkin JG. HIV and depression: 2008 review and update. *Curr HIV/AIDS Rep*. 2008; 5(4):163–171. [PubMed: 18838056]
8. Baillargeon J, Ducate S, Pulvino J, et al. The association of psychiatric disorders and HIV infection in the correctional setting. *Ann Epidemiol*. 2003; 13(9):606–612. [PubMed: 14732299]
9. Perkins DO, Stern RA, Golden RN, et al. Mood disorders in HIV infection: prevalence and risk factors in a nonpccenter of the AIDS epidemic. *Am J Psychiatry*. 1994; 151(2):233–236. [PubMed: 8296895]
10. Halstead S, Riccio M, Harlow P, et al. Psychosis associated with HIV infection. *Br J Psychiatry*. 1988; 153:618–623. [PubMed: 3076497]
11. Harris MJ, Jeste DV, Gleghorn A, et al. New-onset psychosis in HIV-infected patients. *J Clin Psychiatry*. 1991; 52(9):369–376. [PubMed: 1894589]
12. Cook JA, Cohen MH, Burke J, et al. Effects of depressive symptoms and mental health quality of life on use of highly active antiretroviral therapy among HIV-seropositive women. *J Acquir Immune Defic Syndr*. 2002; 30(4):401–409. [PubMed: 12138346]
13. Hanna EZ, Grant BF. Gender differences in DSM-IV alcohol use disorders and major depression as distributed in the general population: clinical implications. *Compr Psychiatry*. 1997; 38(4):202–212. [PubMed: 9202877]
14. Vesga-Lopez O, Schneier FR, Wang S, et al. Gender differences in generalized anxiety disorder: Results from the national epidemiologic survey on alcohol and related conditions (NESARC). *J Clin Psychiatry*. 2008; 69(10):1606–1616. [PubMed: 19192444]
15. Grant BF, Stinson FS, Dawson DA, et al. Co-occurrence of 12-month alcohol and drug use disorders and personality disorders in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry*. 2004; 61:361–368. [PubMed: 15066894]
16. Kessler RC, Berglund P, Demler O, et al. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry*. 2005; 62(6):593–602. [PubMed: 15939837]
17. McDaniel JS, Fowlie E, Summerville MB, et al. An assessment of rates of psychiatric morbidity and functioning in HIV disease. *Gen Hosp Psychiatry*. 1995; 17(5):346–352. [PubMed: 8522149]

18. Lipsitz JD, Williams JB, Rabkin JG, et al. Psychopathology in male and female intravenous drug users with and without HIV infection. *Am J Psychiatry*. 1994; 151(11):1662–1668. [PubMed: 7943458]
19. Grant BF, Dawson DA, Hasin DS. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV Version. National Institute on Alcohol Abuse and Alcoholism. 2007
20. Grant BF, Stinson FS, Dawson DA, et al. Prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry*. 2004; 61:807–816. [PubMed: 15289279]
21. Grant BF, Goldstein RB, Chou SP, et al. Sociodemographic and psychopathologic predictors of first incidence of DSM-IV substance use, mood and anxiety disorders: results from the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions. *Mol Psychiatry*. 2008 [published online ahead of print April, 22, 2008] <http://www.nature.com/mp/journal/vaop/ncurrent/abs/mp200841a.html>.
22. Grant BF, Dawson DA, Stinson FS, et al. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV): reliability of alcohol consumption, tobacco use, family history of depression and psychiatric diagnostic modules in a general population sample. *Drug Alcohol Depend*. 2003; 71:7–16. [PubMed: 12821201]
23. Canino G, Bravo M, Ramirez R, et al. The Spanish Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS): reliability and concordance with clinical diagnoses in a Hispanic population. *J Stud Alcohol*. 1999; 60:790–799. [PubMed: 10606491]
24. Grant B, Harford T, Dawson D, et al. The Alcohol Use Disorder and Associated Disabilities Schedule: reliability of alcohol and drug modules in a general population sample. *Drug Alcohol Depend*. 1995; 39:37–44. [PubMed: 7587973]
25. Chatterji S, Saunders JB, Vrašti R, et al. Reliability of the alcohol and drug modules of the Alcohol Use Disorder and Associated Disabilities Interview Schedule--Alcohol/Drug-Revised (AUDADIS-ADR): An international comparison. *Drug Alcohol Depend*. 1997; 47:171–185. [PubMed: 9306043]
26. Hasin D, Carpenter KM, McCloud S, et al. The alcohol use disorder and associated disabilities interview schedule (AUDADIS): reliability of alcohol and drug modules in a clinical sample. *Drug Alcohol Depend*. 1997; 44:133–141. [PubMed: 9088785]
27. Ruan WJ, Goldstein RB, Chou SP, et al. The alcohol use disorder and associated disabilities interview schedule-IV (AUDADIS-IV): reliability of new psychiatric diagnostic modules and risk factors in a general population sample. *Drug Alcohol Depend*. 2008; 92:27–36. [PubMed: 17706375]
28. Hasin D, Paykin A. Alcohol dependence and abuse diagnoses: concurrent validity in a nationally representative sample. *Alcohol Clin Exp Res*. 1999; 23:144–150. [PubMed: 10029216]
29. Hasin DS, Grant B, Endicott J. The natural history of alcohol abuse: implications for definitions of alcohol use disorders. *Am J Psychiatry*. 1990; 147(11):1537–1541. [PubMed: 2221170]
30. Hasin DS, Rossem RV, Endicott J. Differentiating DSM-IV alcohol dependence and abuse by course: community heavy drinkers. *J Subst Abuse*. 1997; 9:127–135. [PubMed: 9494944]
31. Hasin DS, Schuckit MA, Martin CS, et al. The validity of DSM-IV alcohol dependence: What do we know and what do we need to know? *Alcohol Clin Exp Res*. 2003; 27(2):244–252. [PubMed: 12605073]
32. Hasin DS, Muthén B, Wisnicki KS, Grant BF. Validity of the bi-axial dependence concept: a test in the US general population. *Addiction*. 1994; 89(5):573–579. [PubMed: 8044123]
33. Cottler LB, Grant BF, Blaine J, et al. Concordance of DSM-IV alcohol and drug use disorder criteria and diagnoses as measured by AUDADIS-ADR, CIDI and SCAN. *Drug Alcohol Depend*. 1997; 47:195–205. [PubMed: 9306045]
34. Grant BF, Hasin DS, Stinson FS, et al. Prevalence, correlates, and disability of personality disorders in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry*. 2004; 65:948–958. [PubMed: 15291684]
35. Grant BF, Stinson FS, Dawson DA, et al. Co-occurrence of DSM-IV personality disorders in the United States: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Compr Psychiatry*. 2005; 46:1–5. [PubMed: 15714187]



36. Center for Disease Control and Prevention. HIV/AIDS surveillance report, Cases of HIV infection and AIDS in the United States and Dependent Areas, 2005. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention; 2007.
37. Galvan FH, Bing EG, Fleishman JA, et al. The prevalence of alcohol consumption and heavy drinking among people with HIV in the United States: results from the HIV Cost and Services Utilization Study. *J Stud Alcohol*. 2002; 63(2):179–186. [PubMed: 12033694]
38. Lyketsos CG, Hanson AL, Fishman M, et al. Manic syndrome early and late in the course of HIV. *Am J Psychiatry*. 1993; 150(2):326–327. [PubMed: 8422087]
39. Carey MP, Carey KB, Weinhardt LS, et al. Behavioral risk for HIV infection among adults with a severe and persistent mental illness: patterns and psychological antecedents. *Community Ment Health J*. 1997; 33(2):133–142. [PubMed: 9145255]
40. Sacks MH, Perry S, Graver R, et al. Self-reported HIV-related risk behaviors in acute psychiatric inpatients: a pilot study. *Hosp Community Psychiatry*. 1990; 41(11):1253–1255. [PubMed: 2249808]
41. Kelly JA, Murphy DA, Sikkema KJ, et al. Predictors of high and low levels of HIV risk behavior among adults with chronic mental illness. *Psychiatr Serv*. 1995; 46(8):813–818. [PubMed: 7583483]
42. Crepaz N, Passin WF, Herbst JH, et al. Meta-analysis of cognitive-behavioral interventions on HIV-positive persons' mental health and immune functioning. *Health Psychol*. 2008; 27(1):4–14. [PubMed: 18230008]
43. Himelhoch S, Medoff DR. Efficacy of antidepressant medication among HIV-positive individuals with depression: a systematic review and meta-analysis. *AIDS Patient Care STDS*. 2005; 19(12): 813–822. [PubMed: 16375613]
44. Cook JA, Grey D, Burke J, et al. Depressive symptoms and AIDS-related mortality among a multisite cohort of HIV-positive women. *Am J Public Health*. 2004; 94(7):1133–1140. [PubMed: 15226133]
45. Starace F, Ammassari A, Trotta MP, et al. Depression is a risk factor for suboptimal adherence to highly active antiretroviral therapy. *J Acquir Immune Defic Syndr*. 2002; 31(Suppl 3):S136–S139. [PubMed: 12562037]
46. Gibson DR, Flynn NM, McCarthy JJ. Effectiveness of methadone treatment in reducing HIV risk behavior and HIV seroconversion among injecting drug users. *AIDS*. 1999; 13(14):1807–1818. [PubMed: 10513638]
47. Hawkins WE, Latkin C, Green DL. Depression therapy with injection drug users: results of a pilot study. *Am J Drug Alcohol Abuse*. 2005; 31(2):243–251. [PubMed: 15912714]
48. Asch SM, Kilbourne AM, Gifford AL, et al. Underdiagnosis of depression in HIV: who are we missing? *J Gen Intern Med*. 2003; 18(6):450–460. [PubMed: 12823652]
49. Hutchinson AB, Branson BM, Kim A, et al. A meta-analysis of the effectiveness of alternative HIV counseling and testing methods to increase knowledge of HIV status. *AIDS*. 2006; 20(12): 1597–1604. [PubMed: 16868440]
50. Darbes L, Crepaz N, Lyles C, et al. The efficacy of behavioral interventions in reducing HIV risk behaviors and incident sexually transmitted diseases in heterosexual African Americans. *AIDS*. 2008; 22(10):1177–1194. [PubMed: 18525264]
51. Simoni JM, Pearson CR, Pantalone DW, et al. Efficacy of interventions in improving highly active antiretroviral therapy adherence and HIV-1 RNA viral load. A meta-analytic review of randomized controlled trials. *J Acquir Immune Defic Syndr*. 2006; 43(Suppl 1):S23–S35. [PubMed: 17133201]
52. Johnson BT, Scott-Sheldon LA, Smoak ND, et al. Behavioral interventions for African Americans to reduce sexual risk of HIV: a meta-analysis of randomized controlled trials. *J Acquir Immune Defic Syndr*. 2009; 51(4):492–501. [PubMed: 19436218]
53. Herbst JH, Sherba RT, Crepaz N, et al. A meta-analytic review of HIV behavioral interventions for reducing sexual risk behavior of men who have sex with men. *J Acquir Immune Defic Syndr*. 2005; 39(2):228–241. [PubMed: 15905741]

54. Logan TK, Cole J, Leukefeld C. Women, sex, and HIV: social and contextual factors, meta-analysis of published interventions, and implications for practice and research. *Psychol Bull.* 2002; 128(6):851–885. [PubMed: 12405135]
55. Ball AL, Rana S, Dehne KL. HIV prevention among injecting drug users: responses in developing and transitional countries. *Public Health Rep.* 1998; 113(Suppl 1):170–181. [PubMed: 9722822]
56. Metzger DS, Navaline H. Human immunodeficiency virus prevention and the potential of drug abuse treatment. *Clin Infect Dis.* 2003; 37(Suppl 5):S451–S456. [PubMed: 14648463]
57. Monterroso ER, Hamburger ME, Vlahov D, et al. Prevention of HIV infection in street-recruited injection drug users. The Collaborative Injection Drug User Study (CIDUS). *J Acquir Immune Defic Syndr.* 2000; 25(1):63–70. [PubMed: 11064506]
58. Sorensen JL, Copeland AL. Drug abuse treatment as an HIV prevention strategy: a review. *Drug Alcohol Depend.* 2000; 59(1):17–31. [PubMed: 10706972]
59. Copenhaver MM, Johnson BT, Lee IC, et al. Behavioral HIV risk reduction among people who inject drugs: meta-analytic evidence of efficacy. *J Subst Abuse Treat.* 2006; 31(2):163–171. [PubMed: 16919744]
60. Metzger DS, Navaline H, Woody GE. Drug abuse treatment as AIDS prevention. *Public Health Rep.* 1998; 113(Suppl 1):97–106. [PubMed: 9722815]
61. Des Jarlais D, Semaan S. Interventions to reduce the sexual risk behaviour of injecting drug users. *Int J Drug Policy.* 2005; 16:58–66.
62. Farrell M, Gowing L, Marsden J, et al. Effectiveness of drug dependence treatment in HIV prevention. *Int J Drug Policy.* 2005; 16:67–75.
63. Otto-Salaj LL, Kelly JA, Stevenson LY, et al. Outcomes of a randomized small-group HIV prevention intervention trial for people with serious mental illness. *Community Ment Health J.* 2001; 37(2):123–144. [PubMed: 11318241]
64. Kelly JA. HIV risk reduction interventions for persons with severe mental illness. *Clin Psychol Rev.* 1997; 17(3):293–309. [PubMed: 9160178]
65. Kalichman SC, Sikkema KJ, Kelly JA, et al. Use of a brief behavioral skills intervention to prevent HIV infection among chronic mentally ill adults. *Psychiatr Serv.* 1995; 46(3):275–280. [PubMed: 7796217]
66. Susser E, Valencia E, Berkman A, et al. Human immunodeficiency virus sexual risk reduction in homeless men with mental illness. *Arch Gen Psychiatry.* 1998; 55(3):266–272. [PubMed: 9510221]
67. Weinhardt LS, Carey MP, Carey KB, et al. Increasing assertiveness skills to reduce HIV risk among women living with a severe and persistent mental illness. *J Consult Clin Psychol.* 1998; 66(4):680–684. [PubMed: 9735586]
68. Carey MP, Carey KB, Maisto SA, et al. Reducing HIV-risk behavior among adults receiving outpatient psychiatric treatment: results from a randomized controlled trial. *J Consult Clin Psychol.* 2004; 72(2):252–268. [PubMed: 15065959]
69. Margolin A, Avants SK, et al. A randomized clinical trial of a manual-guided risk reduction intervention for HIV-positive injection drug users. *Health Psychol.* 2003; 22(2):223–228. [PubMed: 12683743]
70. Robles RR, Reyes JC, Colon HM, et al. Effects of combined counseling and case management to reduce HIV risk behaviors among Hispanic drug injectors in Puerto Rico: a randomized controlled study. *J Subst Abuse Treat.* 2004; 27(2):145–152. [PubMed: 15450647]
71. Hershberger SL, Wood MM, Fisher DG. A cognitive-behavioral intervention to reduce HIV risk behaviors in crack and injection drug users. *AIDS Behav.* 2003; 7(3):229–243. [PubMed: 14586186]
72. Solomon PL, Tennille JA, Lipsitt D, et al. Rapid assessment of existing HIV prevention programming in a community mental health center. *J Prev Interv Community.* 2007; 33(1–2):137–151. [PubMed: 17298936]
73. Wright ER, Wright DE, Lawson AH. HIV prevention services for adults with serious mental illness in public mental health care programs. *J Prev Interv Community.* 2007; 33(1–2):63–77. [PubMed: 17298931]

74. Dieffenbach CW, Fauci AS. Universal voluntary testing and treatment for prevention of HIV transmission. *JAMA*. 2009; 301(22):2380–2382. [PubMed: 19509386]
75. Morrison MF, Petitto JM, Ten Have T, et al. Depressive and anxiety disorders in women with HIV infection. *Am J Psychiatry*. 2002; 159(5):789–796. [PubMed: 11986133]
76. Turmen T. Gender and HIV/AIDS. *Int J Gynaecol Obstet*. 2003; 82(3):411–418. [PubMed: 14499987]
77. EuroHIV. Mid-year report 2007. Saint-Maurice: Institut de la Veille Sanitaire; 2007. HIV/AIDS surveillance in Europe.
78. Fisher JC, Cook PA, Sam NE, et al. Patterns of alcohol use, problem drinking, and HIV infection among high-risk African women. *Sex Transm Dis*. 2008; 35(6):537–544. [PubMed: 18418292]
79. Hobfoll SE, Jackson AP, Lavin J, et al. Safer sex knowledge, behavior, and attitudes of inner-city women. *Health Psychol*. 1993; 12(6):481–488. [PubMed: 8293732]
80. Davey-Rothwell MA, Latkin CA. Gender differences in social network influence among injection drug users: perceived norms and needle sharing. *J Urban Health*. 2007; 84(5):691–703. [PubMed: 17682947]
81. Tucker JS, Kanouse DE, Miu A, et al. HIV risk behaviors and their correlates among HIV-positive adults with serious mental illness. *AIDS Behav*. 2003; 7(1):29–40. [PubMed: 14534388]
82. Meade CS, Sikkema KJ. Psychiatric and psychosocial correlates of sexual risk behavior among adults with severe mental illness. *Community Ment Health J*. 2007; 43(2):153–169. [PubMed: 17143728]
83. Verhulst J, Schneidman B. Schizophrenia and sexual functioning. *Hosp Community Psychiatry*. 1981; 32(4):259–262. [PubMed: 7227986]
84. Kalichman SC, Kelly JA, Johnson JR, et al. Factors associated with risk for HIV infection among chronic mentally ill adults. *Am J Psychiatry*. 1994; 151(2):221–227. [PubMed: 8296893]
85. Shield H, Fairbrother G, Obmann H. Sexual health knowledge and risk behaviour in young people with first episode psychosis. *Int J Ment Health Nurs*. 2005; 14(2):149–154. [PubMed: 15896263]
86. McKinnon K, Cournos F, Sugden R, et al. The relative contributions of psychiatric symptoms and AIDS knowledge to HIV risk behaviors among people with severe mental illness. *J Clin Psychiatry*. 1996; 57(11):506–513. [PubMed: 8968298]
87. Kelly JA, Murphy DA, Bahr GR, et al. AIDS/HIV risk behavior among the chronic mentally ill. *Am J Psychiatry*. 1992; 149(7):886–889. [PubMed: 1609866]
88. Miller LJ, Finnerty M. Sexuality, pregnancy, and childrearing among women with schizophrenia-spectrum disorders. *Psychiatr Serv*. 1996; 47(5):502–506. [PubMed: 8740491]
89. Meade CS. Sexual risk behavior among persons dually diagnosed with severe mental illness and substance use disorder. *J Subst Abuse Treat*. 2006; 30(2):147–157. [PubMed: 16490678]

Table 1

Sociodemographic characteristics of men by past 12-month HIV status

Sociodemographic characteristics	HIV-positive status N=70		HIV-negative status <sup>a</sup> N=14398		OR	(95%CI)
	%	(S.E.)	%	(S.E.)		
<b>Sex</b>						
Male <sup>b</sup>	100.00		100.00		1.00	(1.00- 1.00)
Female	0.00		0.00			
<b>Race/Ethnicity</b>						
White <sup>c</sup>	55.45	(7.33)	71.36	(1.59)	1.00	(1.00- 1.00)
Non-White	44.55	(7.33)	28.64	(1.59)	2.00	(1.09- 3.68)
<b>Nativity</b>						
US-born <sup>d</sup>	78.49	(7.79)	85.77	(1.38)	1.00	(1.00- 1.00)
Foreign-born	21.51	(7.79)	14.23	(1.38)	1.65	(0.66- 4.17)
<b>Age</b>						
18-29 <sup>e</sup>	12.62	(5.93)	17.13	(0.44)	1.00	(1.00- 1.00)
30-44	39.36	(7.45)	30.31	(0.51)	1.76	(0.58- 5.39)
45-64	43.28	(7.61)	35.45	(0.50)	1.66	(0.53- 5.16)
65 and over	4.74	(2.62)	17.11	(0.42)	0.38	(0.08- 1.73)
<b>Education</b>						
Less than high school	32.47	(8.00)	14.06	(0.50)	3.29	(1.49- 7.30)
High School	23.54	(6.30)	23.20	(0.60)	1.45	(0.69- 3.03)
College or higher <sup>f</sup>	43.99	(7.86)	62.74	(0.75)	1.00	(1.00- 1.00)
<b>Individual Income</b>						
0-19K <sup>g</sup>	64.95	(7.01)	27.73	(0.66)	1.00	(1.00- 1.00)
>20K	35.05	(7.01)	72.27	(0.66)	0.21	(0.11- 0.38)
<b>Family Income</b>						
0-19K <sup>h</sup>	51.45	(7.04)	15.58	(0.48)	1.00	(1.00- 1.00)
>20K	48.55	(7.04)	84.42	(0.48)	0.17	(0.10- 0.30)
<b>Employment Status</b>						

Sociodemographic characteristics	HIV-positive status N=70		HIV-negative status <sup>/</sup> N=14398		OR (95%CI)
	%	(S.E.)	%	(S.E.)	
Employed <sup>/</sup>	46.09	(7.84)	73.00	(0.49)	1.00 (1.00- 1.00)
Unemployed or students	53.91	(7.84)	27.00	(0.49)	3.16 (1.69– 5.91)
<b>Marital Status</b>					
Married or Cohabiting <sup>/</sup>	45.25	(7.42)	67.52	(0.56)	1.00 (1.00- 1.00)
Widowed, separated or divorced	17.11	(4.44)	12.74	(0.31)	2.00 (1.00– 4.02)
Never Married	37.64	(7.35)	19.74	(0.56)	2.84 (1.42– 5.70)
<b>Urbanicity</b>					
Urban <sup>/</sup>	84.71	(6.50)	83.95	(0.64)	1.00 (1.00- 1.00)
Rural	15.29	(6.50)	16.05	(0.64)	0.94 (0.34– 2.58)
<b>Region</b>					
Northeast	17.48	(5.62)	17.67	(1.20)	1.16 (0.43– 3.16)
Midwest	21.53	(6.21)	18.42	(1.12)	1.38 (0.52– 3.63)
South	39.49	(7.74)	38.58	(1.56)	1.21 (0.50– 2.91)
West <sup>/</sup>	21.50	(7.21)	25.32	(0.97)	1.00 (1.00- 1.00)
<b>Insurance</b>					
Private <sup>/</sup>	45.83	(7.21)	77.83	(0.60)	1.00 (1.00- 1.00)
Public	33.48	(6.90)	9.19	(0.34)	6.19 (3.22– 11.89)
No insurance	20.69	(6.47)	12.98	(0.45)	2.71 (1.18– 6.20)
<b>Sexual Orientation</b>					
Heterosexual <sup>/</sup>	62.90	(7.33)	98.23	(0.14)	1.00 (1.00- 1.00)
Non-Heterosexual	37.10	(7.33)	1.77	(0.14)	32.74 (17.29– 61.98)

<sup>/</sup> Reference group

Table 2

Sociodemographic characteristics of women by past 12-month HIV status

Sociodemographic characteristics	HIV-positive status N=79		HIV-negative status/ N=19880		OR	95%CI
	%	(S.E.)	%	(S.E.)		
<b>Sex</b>						
Male <sup>/</sup>	0.00		0.00		1.00	(1.00--1.00)
Female	100.00		100.00			
<b>Race/Ethnicity</b>						
White <sup>/</sup>	29.65	(6.83)	70.80	(1.53)	1.00	(1.00--1.00)
Non-White	70.35	(6.83)	29.20	(1.53)	5.75	(2.99--11.05)
<b>Nativity</b>						
US-born <sup>/</sup>	76.71	(7.84)	86.67	(1.36)	1.00	(1.00--1.00)
Foreign-born	23.29	(7.84)	13.33	(1.36)	1.97	(0.85--4.59)
<b>Age</b>						
18--29 <sup>/</sup>	12.81	(5.02)	15.74	(0.37)	1.00	(1.00--1.00)
30--44	55.99	(8.16)	29.07	(0.42)	2.37	(0.89--6.27)
45--64	20.09	(5.08)	33.92	(0.37)	0.73	(0.28--1.88)
65 and over	11.11	(4.26)	21.28	(0.40)	0.64	(0.20--2.06)
<b>Education</b>						
Less than high school	28.57	(6.43)	13.82	(0.51)	3.14	(1.55--6.37)
High School	30.73	(5.95)	24.29	(0.46)	1.92	(1.02--3.65)
College or higher <sup>/</sup>	40.70	(7.16)	61.89	(0.60)	1.00	(1.00--1.00)
<b>Individual Income</b>						
0--19K <sup>/</sup>	73.98	(7.46)	55.27	(0.66)	1.00	(1.00--1.00)
>20K	26.02	(7.46)	44.73	(0.66)	0.43	(0.20--0.93)
<b>Family Income</b>						
0--19K <sup>/</sup>	55.48	(7.31)	22.95	(0.56)	1.00	(1.00--1.00)
>20K	44.52	(7.31)	77.05	(0.56)	0.24	(0.13--0.43)
<b>Employment Status</b>						

Sociodemographic characteristics	HIV-positive status N=79		HIV-negative status <sup>/</sup> N=19880		OR	95%CI
	%	(S.E.)	%	(S.E.)		
Employed <sup>/</sup>	36.43	(7.37)	58.03	(0.52)	1.00	(1.00--1.00)
Unemployed or students	63.57	(7.37)	41.97	(0.52)	2.41	(1.28--4.53)
<b>Marital Status</b>						
Married or Cohabiting <sup>/</sup>	33.95	(8.69)	60.58	(0.59)	1.00	(1.00--1.00)
Widowed, separated or divorced	29.13	(6.46)	24.38	(0.40)	2.13	(0.93--4.91)
Never Married	36.92	(7.48)	15.04	(0.48)	4.38	(1.89--10.17)
<b>Urbanicity</b>						
Urban <sup>/</sup>	89.73	(4.52)	83.46	(0.57)	1.00	(1.00--1.00)
Rural	10.27	(4.52)	16.54	(0.57)	0.58	(0.22--1.51)
<b>Region</b>						
Northeast	17.52	(5.43)	17.90	(1.20)	0.59	(0.27--1.31)
Midwest	14.19	(4.84)	18.59	(1.13)	0.46	(0.19--1.10)
South	26.32	(7.16)	38.21	(1.63)	0.42	(0.18--0.95)
West <sup>/</sup>	41.97	(8.03)	25.30	(0.97)	1.00	(1.00--1.00)
<b>Insurance</b>						
Private <sup>/</sup>	38.95	(7.70)	77.54	(0.64)	1.00	(1.00--1.00)
Public	45.97	(7.30)	12.24	(0.43)	7.48	(3.84--14.58)
No insurance	15.08	(4.06)	10.23	(0.41)	2.93	(1.38--6.25)
<b>Sexual Orientation</b>						
Heterosexual <sup>/</sup>	96.17	(3.15)	98.04	(0.12)	1.00	(1.00--1.00)
Non-Heterosexual	3.83	(3.15)	1.96	(0.12)	2.00	(0.36--11.09)

<sup>/</sup> Reference group

**Table 3**  
12-month prevalence of DSM-IV psychiatric disorders of men by past 12 month HIV status

Psychiatric disorders	HIV-positive status N=70	HIV-negative status/ N=14,398	OR	95% CI	AOR <sup>2</sup>	95% CI
	% (S.E.)	% (S.E.)				
<b>Any mood disorder</b>	29.86 (7.40)	6.53 (0.29)	6.10	(2.99–12.44)	3.32	(1.32–8.35)
Major depressive disorder or Dysthymia	12.47 (6.41)	3.64 (0.20)	3.77	(1.16–12.27)	1.02	(0.36–2.91)
Bipolar I or II	17.40 (5.37)	2.89 (0.17)	7.07	(3.27–15.27)	3.38	(1.55–7.35)
<b>Any anxiety disorder</b>	33.43 (7.11)	11.10 (0.32)	4.02	(2.12–7.64)	2.71	(1.39–5.30)
Panic disorder	6.27 (3.60)	1.70 (0.14)	3.86	(1.13–13.22)	2.37	(0.73–7.66)
Social anxiety disorder	6.65 (3.28)	2.07 (0.14)	3.36	(1.16–9.75)	2.04	(0.62–6.76)
Specific phobia	8.13 (3.75)	4.84 (0.21)	1.74	(0.63–4.77)	1.32	(0.56–3.13)
Posttraumatic stress disorder	24.89 (7.02)	4.02 (0.19)	7.91	(3.69–16.94)	7.07	(2.86–17.47)
Generalized anxiety disorder	5.28 (2.84)	2.38 (0.15)	2.29	(0.75–6.98)	1.13	(0.36–3.53)
<b>Any substance use disorder</b>	38.53 (7.33)	26.56 (0.61)	1.73	(0.93–3.22)	1.27	(0.64–2.51)
Any alcohol use disorder	18.91 (5.45)	14.42 (0.41)	1.38	(0.68–2.83)	1.22	(0.51–2.89)
Alcohol abuse	5.98 (2.97)	8.15 (0.31)	0.72	(0.25–2.07)	1.18	(0.40–3.48)
Alcohol dependence	12.92 (4.71)	6.28 (0.26)	2.21	(0.95–5.18)	1.20	(0.42–3.46)
Any drug use disorder	17.82 (5.22)	3.29 (0.19)	6.38	(3.06–13.32)	2.77	(1.09–7.03)
Drug abuse	10.40 (4.09)	2.45 (0.17)	4.63	(1.90–11.29)	1.91	(0.65–5.62)
Drug dependence	11.77 (4.79)	0.99 (0.11)	13.29	(5.07–34.88)	5.26	(1.55–17.84)
<b>Nicotine dependence</b>	30.09 (6.73)	15.58 (0.49)	2.33	(1.23–4.44)	1.58	(0.81–3.06)
<b>Any personality disorder</b>	43.17 (7.59)	23.28 (0.54)	2.50	(1.34–4.67)	1.62	(0.79–3.30)
Schizotypal	16.23 (5.44)	4.20 (0.23)	4.42	(1.99–9.82)	4.17	(0.84–20.80)
Schizoid	13.86 (6.68)	3.08 (0.19)	5.06	(1.65–15.54)	0.44	(0.04–5.30)
Paranoid	14.60 (6.70)	3.65 (0.21)	4.51	(1.53–13.26)	0.78	(0.28–2.16)
Borderline	19.06 (5.46)	5.55 (0.23)	4.01	(1.96–8.20)	2.78	(0.91–8.50)
Narcissistic	15.18 (4.85)	7.69 (0.30)	2.15	(1.00–4.61)	3.37	(0.79–14.36)
Histrionic	1.63 (1.31)	1.85 (0.15)	0.88	(0.17–4.59)	1.88	(0.86–4.11)
Antisocial	3.90 (2.88)	5.95 (0.28)	0.64	(0.14–2.99)	1.20	(0.57–2.52)
Obsessive-compulsive	7.35 (3.26)	8.14 (0.29)	0.90	(0.34–2.34)	1.70	(0.84–3.46)



Psychiatric disorders	HIV-positive status N=70	HIV-negative status <sup>1</sup> N=14,398	OR (95% CI)	AOR <sup>2</sup> (95% CI)
	% (S.E.)	% (S.E.)		
Avoidant	12.45 (6.72)	1.86 (0.15)	7.49 (2.18–25.75)	0.27 (0.05–1.63)
Dependant	0.65 (0.65)	0.31 (0.08)	2.11 (0.26–17.23)	0.39 (0.07–2.15)

<sup>1</sup>Reference group

<sup>2</sup>Adjusted for race, education, individual income, family income, employment status, marital status, urbanity, region, sexual orientation, and STD.

**Table 4**  
12-month prevalence of DSM-IV psychiatric disorders of women by past 12 month HIV status

Psychiatric disorders	HIV-positive status N=79		HIV-negative status <sup>a</sup> N=19,880		AOR <sup>2</sup>	(95% CI)
	%	SE	%	SE		
<b>Any mood disorder</b>	10.78	(3.71)	12.45	(0.30)	0.85	(0.39–1.84)
Major depressive disorder or Dysthymia	5.87	(2.85)	8.08	(0.23)	0.71	(0.25–1.99)
Bipolar I or II	4.92	(2.24)	4.36	(0.20)	1.13	(0.43–2.96)
<b>Any anxiety disorder</b>	23.74	(6.23)	21.05	(0.43)	1.17	(0.59–2.32)
Panic disorder	1.36	(0.80)	3.37	(0.17)	0.40	(0.12–1.29)
Social anxiety disorder	4.81	(2.61)	2.94	(0.16)	1.66	(0.53–5.27)
Specific phobia	10.85	(4.08)	9.99	(0.31)	1.10	(0.47–2.55)
Posttraumatic stress disorder	15.07	(4.93)	8.77	(0.27)	1.85	(0.85–4.00)
Generalized anxiety disorder	3.58	(1.87)	5.08	(0.22)	0.70	(0.23–2.07)
<b>Any Substance use disorder</b>	19.66	(5.81)	16.30	(0.48)	1.26	(0.60–2.61)
Any alcohol use disorder	6.30	(3.30)	5.30	(0.22)	1.20	(0.39–3.66)
Alcohol abuse	0.83	(0.83)	2.65	(0.16)	0.31	(0.04–2.31)
Alcohol dependence	5.47	(3.21)	2.65	(0.15)	2.12	(0.61–7.37)
Any drug use disorder	1.52	(1.61)	1.55	(0.13)	0.98	(0.11–8.46)
Drug abuse	0.00		1.01	(0.09)		
Drug dependence	1.52	(1.61)	0.62	(0.09)	2.46	(0.28–21.46)
<b>Nicotine dependence</b>	15.28	(4.84)	12.39	(0.41)	1.28	(0.60–2.70)
<b>Any personality disorder</b>	19.00	(4.55)	19.96	(0.41)	0.94	(0.52–1.70)
Schizotypal	7.70	(3.71)	3.66	(0.18)	2.19	(0.77–6.26)
Schizoid	5.66	(3.13)	3.03	(0.15)	1.92	(0.59–6.24)
Paranoid	5.60	(3.08)	4.92	(0.21)	1.15	(0.36–3.69)
Borderline	9.76	(3.93)	6.18	(0.25)	1.64	(0.67–4.00)
Narcissistic	7.25	(2.98)	4.81	(0.22)	1.55	(0.63–3.79)
Histrionic	4.26	(2.95)	1.75	(0.11)	2.50	(0.58–10.77)
Antisocial	0.70	(0.71)	1.93	(0.12)	0.36	(0.05–2.71)
Obsessive-compulsive	11.17	(4.33)	8.03	(0.27)	1.44	(0.60–3.43)
Avoidant	4.00	(2.90)	2.71	(0.16)	1.50	(0.33–6.76)

Psychiatric disorders	HIV-positive status N=79	HIV-negative status <sup>1</sup> N=19,880	% SE	OR	(95% CI)	AOR <sup>2</sup>	(95% CI)
Dependant	0.70(0.71)	0.53 (0.06)		1.33	(0.17– 10.30)	0.24	(0.03 – 1.80)

<sup>1</sup> Reference group

<sup>2</sup> Adjusted for race, education, individual income, family income, employment status, marital status, urbanity, region, sexual orientation, and STD

**Table 5**

DSM-IV disorders as function of the interaction of gender and HIV status

Psychiatric disorders	Interaction of gender and HIV status <sup>1</sup>			
	OR	(95% CI)	AOR <sup>2</sup>	(95% CI)
<b>Any mood disorder</b>	7.17	(2.52–20.41)	5.34	(1.74–16.40)
<b>Any anxiety disorder</b>	3.45	(1.27–9.38)	3.15	(1.15–8.63)
<b>Any substance use disorder</b>	1.38	(0.50–3.81)	0.99	(0.36–2.74)
<b>Any personality disorder</b>	2.66	(1.16–6.10)	2.16	(0.88–5.28)

<sup>1</sup>Female sex and HIV-negative status were considered as reference group

<sup>2</sup>Adjusted for race, education, individual income, family income, employment status, marital status, urbanity, region, sexual orientation, and STD