

# Psychiatric Disorders and Drug Use Among Human Immunodeficiency Virus–Infected Adults in the United States

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**Background:** There have been no previous nationally representative estimates of the prevalence of mental disorders and drug use among adults receiving care for human immunodeficiency virus (HIV) disease in the United States. It is also not known which clinical and sociodemographic factors are associated with these disorders.

**Subjects and Methods:** We enrolled a nationally representative probability sample of 2864 adults receiving care for HIV in the United States in 1996. Participants were administered a brief structured psychiatric instrument that screened for psychiatric disorders (major depression, dysthymia, generalized anxiety disorders, and panic attacks) and drug use during the previous 12 months. Sociodemographic and clinical factors associated with screening positive for any psychiatric disorder and drug dependence were examined in multivariate logistic regression analyses.

**Results:** Nearly half of the sample screened positive for a psychiatric disorder, nearly 40% reported using an il-

licit drug other than marijuana, and more than 12% screened positive for drug dependence during the previous 12 months. Factors independently associated with screening positive for a psychiatric disorder included number of HIV-related symptoms, illicit drug use, drug dependence, heavy alcohol use, and being unemployed or disabled. Factors independently associated with screening positive for drug dependence included having many HIV-related symptoms, being younger, being heterosexual, having frequent heavy alcohol use, and screening positive for a psychiatric disorder.

**Conclusions:** Many people infected with HIV may also have psychiatric and/or drug dependence disorders. Clinicians may need to actively identify those at risk and work with policymakers to ensure the availability of appropriate care for these treatable disorders.

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**P**SYCHIATRIC AND substance abuse disorders among people with human immunodeficiency virus (HIV) infections may impair quality of life,<sup>1,2</sup> adversely affect the need for and use of health services,<sup>3</sup> impact health outcomes,<sup>4,5</sup> and compromise adherence with complicated medication regimens.<sup>6</sup> Psychiatric and substance abuse disorders may also be associated with unsafe sexual and needle-sharing behaviors that increase the likelihood of HIV transmission.<sup>7-10</sup> In addition, psychiatric and drug-use disorders produce substantial social burden<sup>11,12</sup> and can increase health care costs.<sup>13-16</sup> Population-based estimates of the prevalence of these disorders among people with HIV and factors associated with them are important for the development of policies and programs that will enhance access to appropriate care, increase individual well-being, and reduce the social and economic costs of care.

Previous research suggests that rates of psychiatric and drug disorders vary depending on the population studied and the comparison groups used. Depression in HIV-infected clinic populations has been found to range from 22% to 32%,<sup>17-21</sup> which

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is 2 to 3 times higher than the prevalence of depression in general community populations.<sup>22-24</sup> The rates of disorders among gay men in some studies are high,<sup>20,25</sup> although high rates of psychiatric disorders have also been found among general population studies of gay men.<sup>26</sup> Studies that have also included seronegative comparisons from the same population as those who are HIV positive have not found large differences in the prevalence of psychiatric disorders among the seronegative and seropositive subpopulations.<sup>21,25,27-30</sup>

The prevalence of drug use and drug dependence among people with HIV dis-

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## SUBJECTS AND METHODS

### STUDY DESIGN AND SAMPLE

The HCSUS cohort is a nationally representative probability sample of HIV-infected adults receiving medical care in the continental United States. The reference population was adults (aged  $\geq 18$  years) who had HIV infection and made at least 1 medical visit for regular or ongoing HIV-related care, excluding emergency, military, and prison settings, between January 5 and February 29, 1996. (In 1 metropolitan statistical area, recruitment began 2 months later due to delays receiving institutional review board approval.) For full details of the study design, see Bozzette et al.<sup>37</sup> and Frankel et al.<sup>38</sup>

HCSUS used a multistage sampling design in which geographical areas, medical providers, and patients were sampled. In the first stage, 28 metropolitan statistical areas and 24 clusters of rural counties were sampled with probabilities based on the number of reported AIDS cases during 1995. In the second stage, we sampled 58 urban and 28 rural "known providers" from lists of all providers in each area known by local informants to be providing HIV care. In addition, we also randomly selected 87 urban and 23 rural "other providers" from the physician master file of the American Medical Association who had reported caring for HIV patients in a screening survey in the selected geographic areas. In the third stage, we randomly selected 4042 patients from anonymous lists of all eligible patients who visited participating providers during the recruitment period. To the extent possible, duplicate entries of persons appearing on more than 1 list were removed. We set the third-stage sampling rates such that the overall probability of selection was as uniform as possible within subgroups. The sampling rate was doubled for women and for members of staff model health maintenance organizations.

We enrolled 57 of 58 urban known providers (the refusing institution was replaced with a similar institution in the same city), 22 of 28 rural known providers, 61 of 87 urban other providers, and 19 of 23 rural other providers. Nonresponse in these latter 3 groups was handled by weighting. Among selected patients, 2864 (71%) completed the full interview at baseline. This baseline sample provides a 68% coverage rate of the population that would have been directly represented if there were no refusals at any stage. Analytic weights were adjusted for the study sample design and for nonresponse (using data from short form, proxy

forms, or basic nonresponse information that was collected on those who failed to complete the full interviews).

### BASELINE SURVEY AND MEASURES

All interviews were conducted by trained interviewers using computer-assisted personal interviewing instruments over a 15-month period, beginning in January 1996. Ninety-one percent of the full interviews were conducted in person at a private location convenient to the participant and the remainder were conducted over the telephone.

The interview assessed basic demographic and clinical information, psychiatric disorders, and drug use as well as other topics. Demographic characteristics included sex, age, race/ethnicity, and education. We used information on household composition at the time of the interview to categorize respondents as living with a spouse, with an unmarried partner, with others (either related or unrelated), or alone; a small number of persons<sup>39</sup> who reported being homeless were combined with those living alone. Sexual behavior was assessed by asking respondents to indicate the gender(s) of their sexual partners in the past 6 months (ie, all of the opposite sex, all of the same sex, those of the same and opposite sex, or no partners). On the basis of this information, we classified respondents as "heterosexual," "gay," "bisexual," or "currently abstinent."

Respondents reported their employment status at the time of the interview. We classified respondents as either "working full-time" or "working part-time," "unemployed," "disabled," or "not working" (eg, on sick leave, retired). Disability refers to self-reported employment status or ineligibility for income support programs. Respondents also reported total family income in 1995; persons who were reluctant to report their specific income were asked to indicate which of several income ranges was appropriate. Respondents provided information on current insurance coverage and were categorized as having no medical insurance; having Medicaid, Medicare, or Veterans Affairs benefits; or being privately insured. Individuals with both Medicaid and Medicare were classified as having Medicare.

We used self-reported clinical data to determine HIV disease progression. Participants identified which of 13 HIV-related clinical symptoms they had experienced in the previous 6 months (new or persistent headaches; fevers, sweats, or chills; pain in the mouth, lips, or gums; white patches in the mouth; painful rashes or sores on the skin; nausea or loss of appetite; trouble with the eyes; a sinus infection,

ease is suspected to be high, at least in part due to the association between injection drug use and HIV transmission. In the United States, injection drug use has shown an increasing trend as a transmission route for infection and currently stands as the cause of approximately one third of the nation's acquired immunodeficiency syndrome (AIDS) cases.<sup>31,32</sup> In some HIV-positive cohorts, illicit drug use is common. In the Multicenter AIDS Cohort Study, for example, the proportion of gay and bisexual men reporting use of an illegal drug in the prior 6 months ranged from 92% to 55%, depending on the period, between 1985 and 1989.<sup>33</sup> Nevertheless, such high rates of illicit drug use among gay men declined during

the 1990s, paralleling a decline in national rates during this period.<sup>34</sup>

National estimates of the prevalence of psychiatric and drug disorders among people with HIV disease are not currently available. Prior studies have generally relied on convenience samples, which may not be representative of the broader population and often are limited to specific subpopulations, such as gay men.<sup>35,36</sup> This study, based on data from the HIV Cost and Services Utilization Study (HCSUS), presents the first national estimates of the 12-month prevalence of psychiatric disorders, illicit drug use, and drug dependence among people with HIV infection. This study also examines the

pain or discharge; numbness or tingling in the hands or feet; persistent cough or difficulty breathing; diarrhea or watery stools; weight loss; and among women, an abnormal vaginal discharge). Since women could report 1 more HIV-related symptom than men, we calculated the percentage of total possible symptoms that the patient reported.

The HIV disease stage was determined by asking participants if they currently had any of the symptoms noted above, had ever been diagnosed as having any of 22 AIDS-indicator conditions, and their lowest CD4<sup>+</sup> lymphocyte count. Individuals classified as “asymptomatic” reported no HIV-related symptoms, an AIDS-defining illness, or a CD4<sup>+</sup> lymphocyte count less than 200/μL. Symptomatic individuals reported 1 or more HIV-related symptoms, but not an AIDS-defining illness or CD4<sup>+</sup> count less than 200/μL. Individuals with AIDS reported an AIDS-defining illness and/or a CD4<sup>+</sup> count less than 200/μL.

All participants were screened for symptoms of major depression, dysthymia, generalized anxiety disorders (GAD), panic attacks, and illicit drug use and dependence within the past year. We selected these disorders because they are relatively common in the general population and can often be treated with existing therapeutic techniques. We screened for major depression, dysthymia, GAD, and panic attacks using the University of Michigan Composite International Diagnostic Interview (UM-CIDI) brief screener.<sup>40</sup> The UM-CIDI is based on *DSM-III-R* criteria for the disorders within the general population. For major depression, GAD, and panic attacks, the reported sensitivity of the instrument in the general population is 0.90, 0.99, and 0.67, respectively; corresponding reported specificities are 0.94, 1.00, and 1.00. The sensitivity and specificity of the dysthymia screener have not been reported.

The screeners for drug use and drug dependence are based on the UM-CIDI brief screener for drug dependence, with modifications for this study. Participants were asked if they had used marijuana, sedatives, amphetamines, analgesics, cocaine, inhalants, lysergic acid diethylamide or hallucinogens, or heroin during the previous 12 months. Participants who reported using any of these drugs were asked whether (1) they had to use larger amounts to get the same effect and whether (2) they had experienced any emotional or psychological problems from using drugs. Those who gave affirmative responses to either question were classified as drug dependent. Participants were categorized into 4 mutually exclusive categories: “no drug use,” “marijuana use only without dependence,” “other

illicit drug use without dependence,” and “drug dependence.”

Participants were asked questions on quantity and frequency of alcohol consumption in the past 4 weeks. Based on their responses, they were classified into 4 categories: “none, non-heavy drinking” (drank alcohol in the past 4 weeks, but never  $\geq 5$  drinks in a day), “heavy drinking” (drank  $\geq 5$  drinks on 1-3 days in the past 4 weeks), and “frequent heavy drinking” (drank  $\geq 5$  drinks on  $\geq 4$  days in the past 4 weeks).

## ANALYSES

For each respondent, an analytic weight was constructed consisting of the product of 3 individual weights.<sup>41</sup> The first component is a sampling weight, which is the inverse of a respondent’s sampling probability and which adjusts for the differential selection probabilities across subgroups of the population. The second component is a nonresponse weight, which adjusts for differential cooperation rates using the supplemental data (abbreviated and proxy interviews and non-response data), collected for nonresponding patients and providers. The third component is a multiplicity weight, which adjusts for the fact that some patients were seen by more than 1 eligible provider and thus had more than 1 opportunity to enter the sample. The analytic weight is equivalent to an estimate of the number of persons represented by that respondent. All analyses in this article incorporate these analytic weights and also adjust for the complex multistage sampling design. To adjust SEs and statistical tests for the differential weighting and the complex sampling design, we used linearization methods<sup>42</sup> available in the SUDAAN (Research Triangle Institute, Research Triangle Park, NC) and Stata (Stata Corp, College Station, Tex) software packages.

We used 2 summary-dependent variables: any psychiatric disorder that indicates whether the respondent scored positive on at least 1 of the 4 psychiatric disorder screeners (vs all negative scores), and drug dependence that indicates dependence on illicit drugs (vs no use and drug use without dependence). Multiple logistic regression analyses of (1) any psychiatric disorder and (2) drug dependence were conducted to determine associations with clinical and sociodemographic variables. We report multiple logistic regressions that include the full array of independent variables; ancillary analyses (not shown) examined potential collinearity by removing subsets of variables (eg, insurance, employment, and income) to assess the sensitivity of the results to model specification.

association of clinical and sociodemographic factors with the prevalence of these disorders.

## RESULTS

### POPULATION DESCRIPTION

The majority of the 2864 participants were men and between the ages of 35 and 49 years (**Table 1**). Approximately half of the sample was nonwhite and more than 40% were heterosexual. Almost two thirds were not employed and more than 40% reported annual incomes of less than \$10000. Most of the sample had an advanced

stage of HIV disease: more than half had a CD4<sup>+</sup> lymphocyte count less than 200/μL and more than 9 of 10 were symptomatic or had AIDS.

### PSYCHIATRIC DISORDERS

Nearly half of the population screened positive for 1 or more of the 4 psychiatric disorders during the 12 months preceding the interview (**Table 2**). More people screened positive for mood disorders (major depression and dysthymia) than for anxiety disorders (GAD and panic attacks). More than one third of the population screened positive for major depression and more than one quar-

**Table 1. Sample Characteristics\***

|                              | Unweighted Sample | Weighted Sample, % |
|------------------------------|-------------------|--------------------|
| <b>Total</b>                 | <b>2864</b>       | <b>100</b>         |
| Sex                          |                   |                    |
| Male                         | 2017              | 77.4               |
| Female                       | 847               | 22.6               |
| Age, y                       |                   |                    |
| 18-34                        | 987               | 34.2               |
| 35-49                        | 1591              | 54.4               |
| ≥50                          | 286               | 11.4               |
| Race/ethnicity               |                   |                    |
| White                        | 1399              | 49.2               |
| African American             | 959               | 32.8               |
| Hispanic                     | 415               | 14.8               |
| Other                        | 91                | 3.2                |
| Education                    |                   |                    |
| <High school                 | 723               | 24.9               |
| High school                  | 805               | 27.4               |
| Some college                 | 810               | 28.4               |
| College degree               | 526               | 19.3               |
| Living arrangement           |                   |                    |
| Spouse                       | 303               | 10.7               |
| Unmarried partner            | 705               | 25.6               |
| Others                       | 965               | 32.9               |
| Alone or homeless            | 891               | 30.8               |
| Sexual behavior              |                   |                    |
| Heterosexual                 | 1222              | 40.4               |
| Gay                          | 1287              | 47.4               |
| Bisexual                     | 150               | 5.4                |
| Abstinent                    | 205               | 6.8                |
| Employment                   |                   |                    |
| Full- or part-time           | 1015              | 37.3               |
| Unemployed                   | 216               | 7.1                |
| Disabled                     | 1375              | 47.4               |
| Not working                  | 258               | 8.2                |
| Current annual income, \$    |                   |                    |
| 0-5000                       | 609               | 19.7               |
| 5001-10 000                  | 740               | 25.8               |
| 10 001-25 000                | 736               | 26.0               |
| ≥25 001                      | 779               | 28.5               |
| Current insurance            |                   |                    |
| None                         | 597               | 19.8               |
| Medicaid                     | 858               | 29.2               |
| Medicare or Veterans Affairs | 544               | 19.2               |
| Private                      | 865               | 31.9               |
| Region                       |                   |                    |
| Northeast                    | 707               | 24.7               |
| Midwest                      | 332               | 11.1               |
| South                        | 916               | 35.8               |
| West                         | 909               | 28.4               |
| MSA, millions of people      |                   |                    |
| Rural                        | 58                | 1.4                |
| 0-1.5                        | 768               | 33.4               |
| 1.6-2.5                      | 523               | 14.5               |
| 2.6-4.5                      | 562               | 15.6               |
| >4.5                         | 953               | 35.2               |
| CDC AIDS                     |                   |                    |
| Asymptomatic                 | 181               | 7.6                |
| Symptomatic                  | 997               | 33.6               |
| AIDS                         | 1686              | 58.8               |
| % of symptoms                |                   |                    |
| 0                            | 228               | 9.1                |
| 1-25                         | 865               | 31.8               |
| 26-50                        | 958               | 32.3               |
| 51-75                        | 613               | 19.8               |
| 76-100                       | 200               | 7.0                |

**Table 1. Sample Characteristics\* (cont)**

|                           | Unweighted Sample | Weighted Sample, % |
|---------------------------|-------------------|--------------------|
| Psychiatric disorders     |                   |                    |
| None                      | 1450              | 52.1               |
| Any                       | 1414              | 47.9               |
| Drug use                  |                   |                    |
| None                      | 1407              | 49.9               |
| Marijuana                 | 342               | 12.1               |
| Other drugs/no dependence | 744               | 25.6               |
| Drug dependence           | 368               | 12.5               |
| Drinking (alcohol)        |                   |                    |
| None                      | 1369              | 46.6               |
| Nonheavy                  | 961               | 34.9               |
| Heavy                     | 358               | 12.3               |
| Frequent heavy            | 168               | 6.2                |

\*MSA indicates metropolitan statistical area; CDC, Centers for Disease Control and Prevention; and AIDS, acquired immunodeficiency syndrome.

ter experienced symptoms of dysthymia during the previous 12 months. Twenty-one percent of the population screened positive for both major depression and dysthymia (data not shown). More people screened positive for GAD than panic attacks, and 5% of the population screened for both GAD and panic attacks (data not shown).

Multiple logistic regression analyses of participants who screened positive for any of the 4 psychiatric disorders during the previous 12 months (**Table 3**, column 1) showed that the likelihood of screening positive for a psychiatric disorder was lower among those aged 50 years or older compared with those younger than 35 years and was also lower among African Americans compared with whites. The likelihood of screening positive for a psychiatric disorder was greater among individuals who lived alone or lived with someone with whom they were not romantically involved compared with those who lived with a spouse. Sexual behavior, however, was not significantly related to screening positive for a psychiatric disorder. The likelihood of screening positive for a psychiatric disorder was greater among persons who were unemployed or disabled compared with those working full-time or part-time.

Clinical stage was not associated with screening positive for a psychiatric disorder; however, HIV-related symptoms were associated with screening positive for a psychiatric disorder and the strength of the association increased with increasing HIV-related symptoms. There were strong relationships between illicit drug use other than marijuana and drug dependence and screening positive for a psychiatric disorder. Individuals who used marijuana only, however, were not more likely to screen positive for a psychiatric disorder than those who did not use any drugs. Individuals who were heavy alcohol users compared with those who did not drink were more likely to screen positive for a psychiatric disorder than those who did not consume alcohol. In the analyses in which the drug use variable (data not shown) was removed from the model, the coefficients for most variables did not change substantially, with the exception of the alcohol variable. In the reduced model that excluded drug use,

**Table 2. Percentage of People Screening Positive for Conditions\***

| Condition                            | % Screening Positive (95% CI) |                       |
|--------------------------------------|-------------------------------|-----------------------|
|                                      | HCSUS<br>(N = 2864)           | NHSDA<br>(N = 22 181) |
| Major depression                     | 36.0<br>(33.6-38.3)           | 7.6                   |
| Dysthymia                            | 26.5<br>(23.5-29.5)           | ...                   |
| Generalized anxiety disorder         | 15.8<br>(14.0-17.7)           | 2.1                   |
| Panic attack                         | 10.5<br>(8.0-13.0)            | 2.5                   |
| No drug use                          | 49.9<br>(46.0-53.71)          | 89.7                  |
| Marijuana use only/<br>no dependence | 12.1<br>(10.2-14.8)           | ...                   |
| Other drug use/<br>no dependence     | 25.6<br>(22.1-29.1)           | ...                   |
| Drug dependence                      | 12.5<br>(10.2-14.8)           | ...                   |

\*CI indicates confidence interval; HCSUS, HIV [human immunodeficiency virus] Cost and Services Utilization Study; NHSDA, National Household Survey on Drug Abuse; and ellipses, these conditions were not assessed.

both heavy and frequent heavy drinking were independently associated with having a psychiatric disorder.

#### DRUG USE AND DRUG DEPENDENCE

Approximately half of the HCSUS population reported using an illicit drug during the previous 12 months (Table 2). Twelve percent reported only marijuana use, one quarter reported illicit drug use other than marijuana but were not drug dependent, and 12% screened positive for dependence with respect to at least 1 illicit drug during the previous 12 months.

Multiple logistic regression analyses results predicting drug dependence (Table 3, column 2) showed that persons 35 to 49 years old or older than 50 years compared with those who were younger were less likely to be drug dependent. Compared with persons living with spouses, those in each of the other living situations were more likely to be dependent on illicit drugs, with the adjusted odds being especially high among those who lived alone. Compared with heterosexuals, gays and individuals who were sexually abstinent were less likely to be drug dependent.

Clinical stage was not associated with drug dependence; however, individuals having many HIV-related symptoms (75%-100% of the total possible) were much more likely to screen positive for drug dependence than those without symptoms. Screening positive for a psychiatric disorder was independently associated with screening positive for drug dependence. As expected, frequent heavy drinking was positively associated with drug dependence. In the reduced model (data not shown) that excluded any psychiatric disorder as an independent variable, we found only minor changes in the coefficients for the other variables.

**Table 3. Multiple Logistic Regression on 12-Month Positive Screener for Psychiatric Disorders and Drug Dependence in 2864 Subjects\***

|                                 | Adjusted Odds Ratio (95% CI)           |                                   |
|---------------------------------|--|-----------------------------------|
|                                 | Predicting Any<br>Psychiatric Disorder | Predicting Any<br>Drug Dependence |
| Sex                             |  |                                   |
| Male                            | 0.83 (0.65-1.08)                       | 1.47 (0.76-2.85)                  |
| Female                          | 1.00 (Referent)                        | 1.00 (Referent)                   |
| Age, y                          |  |                                   |
| 18-34                           | 1.00 (Referent)                        | 1.00 (Referent)                   |
| 35-49                           | 1.13 (0.95-1.34)                       | 0.69† (0.56-0.86)                 |
| ≥50                             | 0.54† (0.35-0.84)                      | 0.35‡ (0.20-0.62)                 |
| Race/ethnicity                  |  |                                   |
| White/other                     | 1.00 (Referent)                        | 1.00 (Referent)                   |
| African American                | 0.60‡ (0.47-0.77)                      | 0.87 (0.67-1.14)                  |
| Hispanic                        | 1.08 (0.77-1.51)                       | 1.07 (0.72-1.59)                  |
| Education                       |  |                                   |
| <High school                    | 1.47 (0.93-2.31)                       | 0.64 (0.36-1.12)                  |
| High school                     | 1.19 (0.80-1.78)                       | 0.83 (0.52-1.32)                  |
| Some college                    | 1.32 (0.89-1.94)                       | 0.89 (0.56-1.43)                  |
| College degree                  | 1.00 (Referent)                        | 1.00 (Referent)                   |
| Living arrangement              |  |                                   |
| Spouse                          | 1.00 (Referent)                        | 1.00 (Referent)                   |
| Unmarried partner               | 1.32 (0.94-1.86)                       | 1.99§ (1.05-3.78)                 |
| Other                           | 1.43§ (1.00-2.03)                      | 2.05§ (1.10-3.82)                 |
| Alone                           | 1.51§ (1.08-2.11)                      | 2.54† (1.31-4.95)                 |
| Sexual behavior                 |  |                                   |
| Heterosexual                    | 1.00 (Referent)                        | 1.00 (Referent)                   |
| Gay                             | 1.13 (0.88-1.44)                       | 0.42† (0.25-0.72)                 |
| Bisexual                        | 1.18 (0.82-1.70)                       | 0.85 (0.51-1.43)                  |
| Abstinent                       | 1.05 (0.72-1.53)                       | 0.48† (0.29-0.80)                 |
| Employment                      |  |                                   |
| Full- or part-time              | 1.00 (Referent)                        | 1.00 (Referent)                   |
| Unemployed                      | 1.59† (1.13-2.24)                      | 1.70 (0.98-2.96)                  |
| Disabled                        | 1.86‡ (1.48-2.32)                      | 1.14 (0.86-1.52)                  |
| Not working                     | 0.98 (0.62-1.53)                       | 1.60 (0.99-2.58)                  |
| Current annual income, \$       |  |                                   |
| 0-5000                          | 0.80 (0.56-1.12)                       | 1.39 (0.95-2.04)                  |
| 5001-10 000                     | 0.96 (0.67-1.38)                       | 0.86 (0.56-1.33)                  |
| 10 001-25 000                   | 1.24 (0.95-1.63)                       | 0.66§ (0.44-0.99)                 |
| ≥25 001                         | 1.00 (Referent)                        | 1.00 (Referent)                   |
| Current insurance               |  |                                   |
| None                            | 1.00 (Referent)                        | 1.00 (Referent)                   |
| Medicaid                        | 0.76 (0.55-1.05)                       | 1.24 (0.96-1.59)                  |
| Medicare or Veterans<br>Affairs | 0.89 (0.61-1.30)                       | 1.24 (0.70-2.20)                  |
| Private                         | 0.83 (0.58-1.19)                       | 0.71 (0.46-1.09)                  |
| MSA, millions of people         |  |                                   |
| Rural                           | 1.00 (Referent)                        | 1.00 (Referent)                   |
| 0-2.5                           | 1.26 (0.65-2.44)                       | 0.62 (0.33-1.18)                  |
| >2.5                            | 1.54 (0.79-3.00)                       | 0.81 (0.44-1.51)                  |
| Region                          |  |                                   |
| Northeast                       | 1.00 (Referent)                        | 1.00 (Referent)                   |
| Midwest                         | 1.22 (0.91-1.63)                       | 0.84 (0.35-2.00)                  |
| South                           | 1.04 (0.79-1.36)                       | 0.76 (0.53-1.09)                  |
| West                            | 0.89 (0.65-1.24)                       | 1.14 (0.82-1.59)                  |
| CDC AIDS                        |  |                                   |
| Asymptomatic                    | 1.00 (Referent)                        | 1.00 (Referent)                   |
| Symptomatic                     | 1.09 (0.78-1.53)                       | 0.65 (0.30-1.41)                  |
| AIDS                            | 0.71 (0.48-1.05)                       | 0.60 (0.29-1.26)                  |
| % of symptoms                   |  |                                   |
| 0                               | 1.00 (Referent)                        | 1.00 (Referent)                   |
| 25                              | 1.88† (1.18-2.97)                      | 1.10 (0.50-2.40)                  |
| 50                              | 3.51‡ (2.04-6.05)                      | 1.77 (0.79-3.93)                  |
| 75                              | 7.50‡ (4.43-12.70)                     | 1.73 (0.78-3.80)                  |
| 100                             | 17.61‡ (8.37-37.05)                    | 4.06‡ (1.76-9.37)                 |

(continued)

**Table 3. Multiple Logistic Regression on 12-Month Positive Screener for Psychiatric Disorders and Drug Dependence in 2864 Subjects\* (cont)**

|                              | Adjusted Odds Ratio (95% CI)        |                                |
|------------------------------|-------------------------------------|--------------------------------|
|                              | Predicting Any Psychiatric Disorder | Predicting Any Drug Dependence |
| Any psychiatric disorder     |                                     |                                |
| Yes                          | ...                                 | 3.06‡ (2.29-4.08)              |
| No                           | ...                                 | 1.00                           |
| Drug use/dependence          |                                     |                                |
| None                         | 1.00 (Referent)                     | ...                            |
| Marijuana only/no dependence | 1.03 (0.72-1.46)                    | ...                            |
| Other drugs/no dependence    | 1.64‡ (1.25-2.16)                   | ...                            |
| Drug dependence              | 3.70‡ (2.75-4.96)                   | ...                            |
| Drinking (alcohol)           |                                     |                                |
| None                         | 1.00 (Referent)                     | 1.00 (Referent)                |
| Nonheavy                     | 1.02 (0.80-1.30)                    | 0.86 (0.66-1.13)               |
| Heavy                        | 1.35§ (1.03-1.75)                   | 1.40 (0.97-2.02)               |
| Frequent heavy               | 1.42 (0.95-2.13)                    | 2.14§ (1.18-3.88)              |

\*CI indicates confidence interval; MSA, metropolitan statistical area; CDC, Centers for Disease Control and Prevention; and AIDS, acquired immunodeficiency syndrome.

† $P \leq .01$ .

‡ $P \leq .001$ .

§ $P \leq .05$ .

### COMMENT

The prevalence of psychiatric disorders, drug use, and drug dependence among people receiving care for HIV disease in the United States appears to be high, as indicated by the high proportion of respondents in this nationally representative sample who screened positive for these disorders. Nearly half of the population screened positive for a psychiatric disorder and half reported using illicit drugs (including marijuana) during the past year.

The proportion of people screening positive for disorders in this sample is considerably higher than that obtained in general population samples. The National Household Survey on Drug Abuse (NHSDA), which interviewed a sample of 22 181 people in 1994, used the same UM-CIDI screeners for major depression, GAD, and panic attacks as those used in the HCSUS.<sup>43</sup> As shown in Table 2, the proportion of people screening positive for major depression in HCSUS is nearly 5 times greater than in the NHSDA (36.0% vs 7.6%), while the proportion for GAD is nearly 8 times higher (15.8% vs 2.1%) and for panic attacks is more than 4 times higher (10.5% vs 2.5%). In addition, the prevalence of drug abstinence is much lower than reported in the NHSDA.

Having many HIV-related symptoms was a strong predictor of having a psychiatric disorder within the previous year. In addition to being intrinsically unpleasant, HIV-related symptoms may serve as a salient reminder of disease status and thereby increase psychological distress and anxiety. Alternatively, preexisting psychiatric disorders may influence the perception and subjective report of symptoms. It is also possible that use of illicit drugs may be associated with factors, such as poor health maintenance behaviors that may weaken the immune sys-

tem and lead to increased symptomatology. Although causal inferences cannot be made, these results highlight the important connection between the experience of HIV-related symptoms and psychiatric disorders and drug dependence. Multivariate analyses supported earlier clinical observations that more HIV-related symptoms are associated with psychiatric disorders.<sup>44</sup>

Some of our findings differ from those of prior research among the general population as well as among HIV-positive samples. Contrary to previous reports of much higher rates of psychiatric disorders among gay men compared with heterosexual men,<sup>35,36</sup> sexual behavior was unrelated to having a psychiatric disorder in multivariate analyses. Gay persons were also less likely to report dependence on illicit drugs than heterosexuals, which may reflect the strong relationship between heterosexual transmission of HIV and injection drug use. Consistent with other studies, psychiatric disorders and drug dependence were more common among younger respondents.<sup>23</sup>

Unemployment and work-related disability were found to be independent predictors of screening positive for a psychiatric disorder. This may be because people with psychiatric problems have more difficulty obtaining and maintaining employment. Another explanation may be that as HIV disease progresses, infected individuals may lose the ability to work, and may not feel like productive members of society. The lack of ability to work may lead to decreased personal income, which may also contribute to distress.

Living alone or with someone other than a spouse or partner was predictive of screening positive for a psychiatric disorder and drug dependence. This may be because of the stability and social support that one may obtain in a committed relationship. It may also be because individuals who have emotional and/or drug problems may have difficulty sustaining relationships or successfully living with others.

Several limitations of this study should be recognized. The HCSUS sample represents persons with HIV who are receiving regular care in the general outpatient setting. Persons infected with HIV who received care exclusively in military, prison, emergency, psychiatric, or drug treatment settings were not studied. The prevalence of psychiatric disorders, illicit drug use, and drug dependence may be higher in many of these subpopulations. A second limitation is that we did not screen for all possible psychiatric disorders due to resource constraints, but rather focused on the disorders believed to be common in this population and for which effective treatments exist. Measuring other important disorders, such as psychotic disorders, organic disorders, personality disorders, and alcohol dependence, would have increased our already high prevalence estimates. A third limitation is inherent in any cross-sectional study: unambiguous causal inferences cannot be made from observed associations. Several associations, such as those involving employment, household composition, and income, could have arisen as a result of psychiatric disorder or illicit drug use, rather than causing them.

A final limitation of the study lies with our use of diagnostic screeners rather than formal diagnostic interviews. We did not wish to overburden participants with

a lengthy interview. Although these screeners are reported to have high sensitivity and specificity for disorders in general population samples,<sup>40</sup> they have never been validated in an HIV-infected population. Analyses to validate the HCSUS screeners using data from a subsample of HCSUS participants who completed the UM-CIDI screeners and at a later date completed the full UM-CIDI suggest that the sensitivity and specificity of the screeners may be lower than that reported by Kessler et al.<sup>40</sup> The “any psychiatric disorder” variable in HCSUS has a sensitivity of 0.80 and a specificity of 0.76.<sup>45</sup> The UM-CIDI screeners used in HCSUS appear to have worked better among individuals with fewer HIV-related symptoms and for those who did not experience a lag time between the administration of the UM-CIDI brief screener and full UM-CIDI. Thus, our prevalence estimates should be interpreted as indicating a high probability of disorder rather than a clinically confirmed diagnosis.

Despite its limitations, this study has important clinical and health care policy implications. This study highlights the high proportion of people with HIV in care that may also have psychiatric and drug use problems. These disorders may decrease quality of life, interfere with ability to adhere to antiretroviral treatment, and increase caregiver burden and health care costs. Fortunately, each of the disorders examined in this study is readily treatable; however, before individuals with these disorders can be treated, they first must be identified and referred to appropriate services. Clinicians and policymakers must recognize that to effectively treat people with HIV, mental health and substance abuse services must be available, accessible, and limited to medical care.

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