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# Specific Psychiatric Correlates of Acute Care Utilization among Unstably Housed HIV-Positive Adults

**Maggie Chartier**[a,b,*], **Adam W. Carrico**[c,d], **Sheri D. Weiser**[c,e], **Margot B. Kushel**[f], and **Iise D. Riley**[g]

[a]San Francisco Veterans Affairs Medical Center, San Francisco, CA, USA

[b]Department of Psychiatry, University of California, San Francisco, CA, USA

[c]School of Medicine, Center for AIDS Prevention Studies, University of California, San Francisco, CA, USA

[d]School of Nursing, Department of Community Health Systems, University of California, San Francisco, CA, USA

[e]Division of HIV/AIDS, San Francisco General Hospital, University of California, San Francisco, CA, USA

[f]Division of General Internal Medicine, UCSF/San Francisco General Hospital, CA, USA

[g]Department of Medicine, University of California, San Francisco, CA, USA

## Abstract

The role of specific psychiatric diagnoses in emergency department use and/or inpatient hospitalizations (acute care) has not been extensively examined among HIV-infected, unstably housed persons. A community-recruited sample of 284 HIV-infected, unstably housed adults completed the Diagnostic Interview Schedule for DSM-IV. One-third of participants screened positive for major depression and stimulant use disorders. Sleeping on the street (Adjusted Odds Ratio [AOR] = 4.21), major depression (AOR=2.88) and stimulant use disorders (AOR=4.45) were associated with greater odds of acute care use. Housing and effective treatment of depression and stimulant use disorders may decrease use of acute care services in this population.

### Keywords

HIV/AIDS; homelessness; depression; stimulant abuse; health care utilization; acute care

## Background

Rates of HIV infection are disproportionately higher among homeless persons, with an estimated prevalence of 3.4% (National Coalition for the Homeless, 2009) compared to 0.4% in the general population (CDC, 2006). Persons experiencing housing instability and HIV infection have high rates of mental illness (Bing, et. al, 2001; Gaynes, Pence, Eron, & Miller, 2008) and frequently use acute care services, including Emergency Department (ED) visits and inpatient hospitalizations (Kidder, Wolitski, Campsmith, & Nakamura, 2007; Nosyk, Li, Sun, & Anis, 2007; Sadowski, Kee, VanderWeele, & Buchanan, 2009; Smith et al., 2000).

*Corresponding author. maggie.chartier@ucsf.edu.

Although several studies have examined the associations of mental health and substance use with health care utilization (Larkin et al., 2009; Merrick, Perloff, & Tompkins, 2010), few have directly assessed the contribution of specific psychiatric diagnoses among HIV-infected persons. Even fewer have assessed more than one mental health condition simltaneously, which is important in highly comorbid populations (Coughlin, 2001; Riley, Sorensen, Tulsky, Bangsberg, & Neilands, 2011). Instead, surrogate markers of mental health status, such mental health visits, psychiatric medication, or self-reported symptom check-lists have been most often used (C. O. Cunningham et al., 2007; W. E. Cunningham et al., 2006; Small, 2010). To our knowledge, no prior research has examined specific psychiatric correlates of acute care use among HIV-positive, unstably housed adults.

The burden of psychiatric co-morbidities among HIV-infected, unstably housed persons is high and has been linked to hastened HIV disease progression and poor health outcomes (Carrico et al., 2011; Leserman et al., 2007). This study considers associations of specific psychiatric conditions with acute services utilization in a highly co-morbid, community-recruited probability sample of unstably housed HIV-infected adults.

## Methods

From July 2004–May 2006, a probability sample of homeless and unstably housed adults was recruited from San Francisco homeless shelters, free food programs, and a random sample of single room occupancy (SRO) hotels. Recruitment methods were specifically designed to locate individuals transitioning in and out of homelessness, (Burnam & Koegel, 2988) and have been successfully used in previous research regarding the health of HIV-infected unstably housed adults (Kushel et al., 2006; Riley, et. al, in press). All individuals who tested HIV positive were invited to participate in the Shelter, Health and Drug Outcomes Among Women (SHADOW; Riley, et. al, 2011) and Research on Access to Care in the Homeless (REACH; Kushel et al., 2006) cohort studies. The Committee on Human Research at the University of California, San Francisco approved all study procedures.

Data for the current study were self-reported. Participants completed psychiatric assessments annually, while standardized interviewer-administered assessments regarding behavior and use of acute health care services were conducted every 90 days. These data are from the first psychiatric assessment and restricted to participants who had a study visit within 90 days of that assessment (Median = 22 days).

The outcome of interest was having used acute care services during the 90 days prior to the interview. Following a model used in recent clinical trials regarding the effects of housing on hospitalizations (Sadowski et al., 2009), acute care was defined as any use of the emergency department or inpatient hospitalization. This approach does not differentiate psychiatric care, but instead recognizes that there are strong correlations between physical and psychiatric conditions in this population (Carrico et al., 2011), as well as overlap in the treatment of physical conditions in psychiatric units, and the treatment of psychiatric conditions in hospital ED's (Rockett, Putnam, Jia, Chang, & Smith, 2005; Shumway, Boccellari, O'Brien, & Okin, 2008).

Primary independent variables were psychiatric conditions assessed by the Diagnostic Interview Schedule (DIS). The DIS is a structured interview with good reliability and validity, and is explicitly designed for non-clinicians to generate DSM-IV psychiatric diagnoses (Erdman et al., 1987; Segal, 2010). A composite variable for Serious Mental Illness (SMI) included Schizophrenia, Schizophreniform Disorder, Schizoaffective Disorder or a manic/hypomanic episode; major depressive episodes were examined separately from SMI. A separate composite variable was created for Stimulant Use Disorders, defined as a

positive DIS assessment for abuse or dependence of cocaine/crack or amphetamines. Applying the Gelberg-Andersen behavioral model for vulnerable populations (Gelberg & Leake, 2000; Stein, Andersen, & Gelberg, 2007) to health services use in this population, secondary independent variables included additional predisposing factors (age, sex, ethnicity, amount of time spent sleeping in a shelter or on the street; Weiser et al., 2009) and enabling factors (health insurance, income; Table 1).

Associations between acute care and predisposing, enabling, and psychiatric factors were examined using logistic regression. A multiple logistic regression model included all potential correlates of acute care utilization, irrespective of whether the univariate Odds Ratio (OR) was significant (Table 2), to examine their independent associations with this outcome. Variables that may be in the causal pathway between psychiatric factors and acute services use, such as viral load, were not included in the current analysis.

## Results

Among 313 study participants, outcomes were assessed on the 284 who completed all measures. The majority of the sample was male (60%) and non-Caucasian (63%), with a mean age was 42 (SD=7). In the last 90 days, 16% had slept in a shelter or on the street and 86% reported continuous health insurance. The mean CD4+ count was 419 (SD=333) and 30% of participants had an undetectable HIV viral load. Just over half of participants (53%) with a CD4+ ≤350 were currently on highly active anti-retroviral therapy (HAART). Nearly a third (27%) reported any stimulant use in the three months prior to the interview and 31% screened positive for a stimulant use disorder. One-third (32%) screened positive for a major depressive episode.

In adjusted analyses, screening positive for a major depressive episode (AOR=2.88; 95% CI: 1.06 – 7.77), and screening positive for a stimulant use disorder (AOR=4.45; 95% CI: 1.68 – 11.76; Table 2) were associated with acute care utilization. Additional independent correlates of acute care utilization included being continuously insured (adjusted odds ratio [AOR]=8.77; 95% CI: 1.30 – 59.42), and sleeping on the street (AOR=4.21; 95% CI: 1.08 – 16.41),

## Discussion

Among HIV-infected homeless and unstably housed adults, screening positive for a major depressive episode and a stimulant use disorder were independently associated with increased acute care use within the past 90 days. These results expand on previous findings that have linked markers of psychiatric disorders to patterns of healthcare utilization (C. O. Cunningham et al., 2007; W. E. Cunningham et al., 2006). Treatment of substance use disorders (O'Toole, Pollini, Ford, & Bigelow, 2007) and co-morbid depression (Worley, Trim, Tate, Hall, & Brown, 2010) may reduce emergency department visits and result in shorter hospital admissions among HIV-positive persons. There are cost effective and evidence-based therapies for these conditions that can be employed. For example, cognitive-behavioral treatments have proven effective for individuals with stimulant use disorders (Reback & Shoptaw, 2011) and there is preliminary support for the efficacy of psychotropic medications such as mirtazapine (Colfax et al., 2011) for methamphetamine dependence. Similarly, cognitive-behavioral and pharmacologic treatments for depression have been shown to reduce HIV viral load (Antoni et al., 2006; Tsai, Weiser, Petersen, Ragland, & Kushel, 2010).

Prior research suggests that emergency room use is associated with unmet subsistence needs (Rodriguez, Fortman, Chee, Ng, & Poon, 2009) and homelessness has been consistently

linked to mental illness. However, studies conducted exclusively among unstably housed persons more clearly delineate findings. A recent randomized trial, for example, found that housing and case management in a population of homeless adults with chronic medical illnesses resulted in fewer hospital days and emergency department visits, compared with usual care (Sadowski et al., 2009). In addition, contemporary studies suggest that housing first models are associated with a relative decrease in costs (Larimer et al., 2009). Findings reported here suggest that housing and case management systems addressing depression and stimulant addiction, in addition to chronic medical conditions, may further reduce use of acute services and related costs.

Although findings from the present study provide new insight into the psychiatric and structural correlates of acute care utilization, it is noteworthy that SMI was not significantly associated with acute care use. This could be due to intensive outreach in the city of San Francisco in persons with co-morbid SMI and HIV. Given the small sample and cross-sectional nature of the current study, further longitudinal research is needed to examine the role of SMI in acute care utilization in different contexts. Over and above these limitations, findings from the present study indicate that psychiatric (i.e., major depression and stimulant use disorders) and structural (i.e., sleeping on the street) factors are independently associated with increased odds of acute care utilization among unstably housed, HIV-positive adults. High rates of acute health care services among homeless persons are costly to state and local healthcare budgets (Gilmer, Stefancic, Ettner, Manning, & Tsemberis, 2010; Kushel, Perry, Bangsberg, Clark, & Moss, 2002; National Alliance to End Homelessness, 2007), and future research should examine the cost-effectiveness of delivering integrated psychiatric and housing services to this population.

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## Table 1
### Socio-demographics characteristics of the sample

| | Total (N=282) | |
|---|---|---|
| | **N** | **%** |
| Male | 171 | 60.6% |
| Female | 91 | 32.3% |
| Transgender | 22 | 7.8% |
| Ethnicity | | |
| caucasian | 106 | 37.6% |
| African American | 142 | 50.4% |
| Other ethnic minority | 36 | 12.8% |
| Less than high school education | 85 | 30.1% |
| Continuously insured (past 90 days) | 244 | 86.5% |
| On HAART | 152 | 53.9% |
| Any nights spent on the street | 22 | 7.8% |
| Current Major Depressive Episode | 90 | 31.9% |
| Current Post Traumatic Stress Disorder | 48 | 17.0% |
| Current SMI[†] | 46 | 16.3% |
| Current Alcohol Use Disorder | 27 | 9.6% |
| Current Opiod Use Disorder | 21 | 7.4% |
| Current Stimulant Use Disorder[‡] | 89 | 31.6% |
| Acute Care Utilization (past 90 days) | 28 | 9.9% |

[†]Includes Schizophrenia, Schizophreniform Disorder, or Schizoaffective Disorder or a manic/hypomanic episode

[‡]Includes Amphetamine Disorders and Cocaine Use Disorders

## Table 2

**Correlates of acute care utilization in past 90 days among HIV-positive unstably housed adults living in San Francisco, CA, July 2004–May 2006 (N = 284)**

| | Unadjusted dds Ratio 95% CI) | Adjusted dds Ratio ull Model 95% CI) |
|---|---|---|
| Male (Reference) | 1.00 | 1.00 |
| Female | 1.43 (0.63 – 3.26) | 2.12 (0.77 – 5.82) |
| Transgender | 1.04 (0.22 – 4.89) | 1.13 (0.19 – 6.83) |
| Caucasian (Reference) | 1.00 | 1.00 |
| African American | 0.59 (0.25 – 1.43) | 0.65 (0.23 – 1.85) |
| Other ethnic minority | 1.57 (0.54 – 4.53) | 1.55 (0.46 – 5.26) |
| Age (decade) | 0.84 (0.49 – 1.45) | 0.83 (0.41 – 1.68) |
| Less than high school education | 1.12 (0.49 – 2.59) | 0.52 (0.18 – 1.50) |
| Median monthly income or greater | 0.84 (0.39 – 1.84) | 0.54 (0.20 – 1.43) |
| Currently on HAART | 1.00 (0.46 – 2.19) | 1.51 (0.58 – 3.96) |
| Continuous health insurance coverage (past 90 days) | 2.27 (0.52 – 9.94) | 8.77 (1.30 – 59.42) * |
| Any nights spent on street (past 90 days) | 4.09 (1.45 – 11.52) ** | 4.21 (1.08 – 16.41) * |
| Any nights spent in a shelter (past 90 days) | 2.57 (0.88 – 7.47) | 1.44 (0.38 – 5.42) |
| Current major depressive episode | 2.79 (1.26– 6.14) * | 2.88 (1.06 – 7.77) * |
| Current PTSD | 1.75 (0.70 – 4.38) | 0.81 (0.25 – 2.60) |
| Current SMI † | 1.47 (0.56 – 3.86) | 1.29 (0.41 – 4.07) |
| Current alcohol use disorder | 0.71 (0.16 – 3.17) | 0.47 (0.09 – 2.39) |
| Current opiate use disorder | 2.34 (0.73 – 7.53) | 1.45 (0.32 – 6.66) |
| Current stimulant use disorder | 3.95 (1.76 – 8.84) ** | 4.45 (1.68 – 11.76) ** |

* $p < .05$;

** $p < .01$;

† SMI included: defined as reporting symptoms consistent with a psychotic disorder (i.e. Schizophrenia, Schizophreniform Disorder, or Schizoaffective Disorder) or a manic/hypomanic episode