Published in final edited form as:

J Behav Med. 2018 August ; 41(4): 450–457. doi:10.1007/s10865-018-9913-z.

Co-occurring psychosocial problems predict HIV status and increased health care costs and utilization among sexual minority men

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Abstract

Sexual orientation related health disparities are well documented. Sexual minority men appear to be at risk for mental health problems due to the stress they experience in establishing and maintaining a minority sexual identity. These mental health issues may combine synergistically and lead to higher medical costs to society. We examine whether sexual minority specific *syndemic* indicators were associated with higher health care costs, health care utilization, or the risk of being HIV-infected. Health care consumers at a community health center (N = 1211) completed a brief screening questionnaire collected over 12 months. Self-reported data were linked with participants’ clinical billing records. Adjusted logistic regression models identified that four syndemic indicators (suicidality, substance use, childhood sexual abuse, and intimate partner violence) were each significantly related to each other. Multiple syndemics significantly predicted higher medical care utilization and cost, and were associated with 2.5 times the risk of being HIV-infected (OR 2.49, 95% CI 1.45–4.25). Syndemic indicators did not significantly predict the number of mental health visits or costs per patient. These results confirm and extend earlier findings by relating syndemics to health services use and costs for sexual minority men.

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Conflict of interest Conall O’Cleirigh, David W. Pantalone, Abigail W. Batchelder, Mark L. Hatzenbuehler, Samantha M. Marquez, Chris Grasso, Steven A. Safren and Kenneth H. Mayer declare that they have no conflict of interest.

Compliance with ethical standards

Human and animal rights and Informed consent All procedures were in accordance with the ethical standards of the institutional research committees and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

Keywords

Syndemic; Sexual minority; Mental health; Medical cost

Introduction

Numerous studies detail health disparities between heterosexual and sexual minority men (Meyer, 2003). These disparities affect individual mental health (e.g., depression, anxiety, and suicide), health behaviors (e.g., illicit drug use), and physical health (e.g., HIV-infection), highlighting the importance of developing preventive interventions that reduce sexual orientation-related health disparities.

A growing body of evidence focuses on the psychosocial and behavioral factors that influence the health of sexual minority men. Stall and colleagues noted several specific health problems that cluster in populations of sexual minority men, and that appear to predict the men's overall health and their risk of acquiring HIV (Stall et al., 2003). Termed "syndemics," these clusters of co-occurring, interactive psychosocial factors are conceptualized as increasing developmental vulnerability to poor health outcomes (Singer & Clair, 2003). Syndemic indicators appear to be population-specific and, for sexual minority men, are thought to include victimization experiences, such as childhood sexual abuse (CSA) and intimate partner violence (IPV), as well as mental health problems, including depression and substance abuse. Factors such as sexual compulsivity, discrimination, concealment of sexual identity, and poverty, have also been identified as syndemic indicators among MSM but have not been as systematically evaluated (Parsons et al., 2012, 2015; Martinez et al., 2016; Oldenburg et al., 2014; Cole et al., 1996).

Various published studies have used a syndemics framework to examine the health of sexual minority men (Stall et al., 2003; Parsons et al., 2012, 2015; Martinez et al., 2016; Mimiaga et al., 2015; Mustanski et al., 2007, 2014). These studies consistently found that syndemic indicators were associated with one another, and that more syndemic indicators were associated with increased health risk behaviors (e.g., condomless anal sex; Stall et al., 2003; Mustanski et al., 2007). However, there is a dearth of evidence examining the physical health consequences (other than HIV-status) of syndemic indicators for sexual minority men. Some studies have reported associations between individual syndemic indicators and decreased health-related quality of life, increased functional impairment, emergency room visits, and higher viral load among HIV-infected sexual minority men (O'Cleirigh et al., 2009; Pantalone et al., 2010), these studies have not investigated the full range of syndemic indicators as predictors in the same sample. Published results suggest that syndemic indicators may increase risk for a variety of negative health outcomes among sexual minorities, which may translate into increased health care utilization and expenditures (Mustanski et al., 2011). Indeed, several studies have shown that sexual minority men utilize health care services, particularly mental health care, at higher rates than heterosexual men (Bakker et al., 2006; Cochran & Mays, 2000; Cochran et al., 2003), although we were not able to identify any published research examining syndemic indicators and health care costs. Further, historical context, such as the enactment of same-sex marriage laws, appears to

impact the healthcare utilization and cost among sexual minority men (Hatzenbuehler et al., 2012).

Rigorous analyses that explicitly examine the associations between syndemic indicators and health care utilization and costs in a large sample of sexual minority men are lacking. In the current study, we aimed to address this gap in the literature, using similar syndemic indicators as described by Stall et al. (2003), a seminal publication in the field, as well as being conducted at a similar time in history. We surveyed sexual minority men accessing primary care to determine whether the presence of a greater number of syndemic indicators was significantly associated with increased health service utilization, increased health care costs, or increased odds of being HIV infected. Using this method, we provide novel outcomes with the use of standard indicators.

While data for this survey was collected in 2002, the findings detailed in the paper, specifically implications for healthcare cost and utilization, still have weight today. This study marks the first time that healthcare costs and utilization were examined in a large group of sexual minority men and depicts the psychosocial and economic factors that influenced healthcare during this time. In addition, even today, sexual identity information is not routinely available in medical health records and the relationships reported here have not previously been examined among gay and bisexual men. So in addition to advancing the science by providing an indicator, albeit an imperfect and dated one, of these relationships, these data can be used to better understand how difficulties around engagement in medical care may have impacted this population in the time before changes in insurance coverage occurred, (i.e., passing of the Affordable Care Act) which provided increased access to medical care. Information from this time may also be relevant, going forward, particularly in the fluid context of our current political climate.

Methods

Setting and population

Participants were patients from a large, urban community health center that offers specialized care for sexual and gender minorities. Sociodemographic characteristics of participants are shown in Table 1.

Procedures

For the calendar year 2002, all male clinic patients scheduled for a primary care visit were given the survey at registration and offered the opportunity to participate. Those who agreed completed a brief survey assessing sociodemographics, psychosocial, and health status variables. Medical and mental healthcare was assessed during the 2004 calendar year. The goal of the assessment was breadth (not depth) and, thus, only a few questions were asked about each domain of interest.

A total of 1309 male patients completed the survey. Comparison of these participants with the clinic's electronic medical record system demonstrated that this sample was representative of all clinic patients seen during the same time period with respect to a range of demographic variables.

We linked participants' survey responses to their clinic billing records for medical and mental health visits. Only those participants with at least 1 medical visit ($n = 612$) and at least 1 mental health visit ($n = 179$) were included in the medical care and mental health outcome models, respectively. This enabled us to examine self-report alongside objective data on health care utilization and expenditures. The clinic's institutional review board approved this research.

Measures

Demographic variables—Age was based upon self-report and used as a continuous variable in the models. Education was ranked in four ascending categories: some high school; high school graduate; some college; and college graduate. Participants reported their race and ethnicity as well as insurance status as depicted in Table 1. A dichotomous variable indicating racial or ethnic minority was included in adjusted models.

Sexual orientation classification—Participants indicated their sexual orientation, choosing from response options: heterosexual (straight); homosexual (gay); bisexual; not sure/undecided; and prefer not to say. Of the 1309 participants who did not identify as heterosexual, 1211 (92%) identified as gay or bisexual, and made up our final sample. Ninety-eight (7.5%) participants were excluded from analyses because they indicated either “not sure/undecided” or “prefer not to say”.

Syndemic indicators—Based on previous research, we examined four syndemic indicators, including substance use, childhood sexual abuse (CSA), mental health (i.e., suicidality), and intimate partner violence (IPV) (Stall et al., 2003; Parsons et al., 2012, 2015; Martinez et al., 2016; Mimiaga et al., 2015; Mustanski et al., 2014, 2007). Current substance use was assessed for cocaine, heroin, other injection drug, or other non-injection drug use in the previous 6 months. CSA was assessed with a single item: “Were you ever sexually harmed as a child (under 15 years old).” Suicidality was assessed with a single item: “In your lifetime, have you ever made a suicide attempt?” Finally, IPV was assessed by a single item: “Have you ever been slapped, punched, kicked, beaten up, or otherwise physically or sexually hurt by your spouse (or former spouse) a boyfriend or some other intimate partner?” All syndemic indicators were dichotomized: any drug use in the past 6 months, history of CSA versus none, any suicide attempt versus none, and any IPV versus none. A 4-level categorical “syndemic variable” was created indicating the presence of 0, 1, 2, or 3–4 indicators. The presence of 3 or 4 indicators was combined, as only 10 men endorsed 4 indicators. This categorization is consistent with previous work on syndemics in gay and bisexual men (Stall et al., 2003).

Outcome variables—We examined three primary outcome variables: HIV status, health care utilization (including medical care and mental health care), and health care costs. Participants self-reported their HIV status as positive ($n = 258$), negative ($n = 805$), or unknown ($n = 139$), with an option to refuse to answer ($n = 9$). A dichotomous variable was created, comparing HIV-infected to HIV-negative individuals yielding a total sample size of 1184 for this analysis. Participants whose HIV status was unknown or who refused to answer were not included in these analyses.

Medical care visits were provided by licensed medical doctors, physician assistants, nurse practitioners or registered nurses and included primary medical care, routine physical exams, episodic care, chronic care management, diagnostic procedures and screenings, minor office procedures (e.g., wart removal), and vaccinations. Lab tests were recorded in a different electronic system and, therefore, were not included. We excluded acupuncture and hospital/nursing visits from the medical care visits due to small sample sizes; complementary visits (including massage, chiropractor, and nutrition) were also excluded because they were not reimbursed by most insurances at the clinic. Mental health care visits were provided by independently licensed social workers, psychologists, and mental health counselors, and included 50-min visits for individual therapy and 75–90 min group therapy visits for a variety of psychological problems (e.g., depression, substance use, and stress management). Psychopharmacology visits were provided by psychiatrists. Health care expenditures were determined by summing the cost of each visit that was billed to the patients and/or their insurance companies. Medical and mental health care were assessed during the 2004 calendar year in order to predict future visits and cost.

We examined the distribution of all four health care variables, including skewness and kurtosis values. All distributions approached normality; consequently, no correction was made to adjust for outliers. We also compared participants who attended 1 medical or mental health visit ($n = 649$) to those in the larger sample who did not attend any medical or mental health visits ($n = 562$). These samples did not differ by race, education, income, or any syndemic indicators, including number of indicators. These samples did differ by age and sexual orientation. Those who attended 1 medical or mental health visit(s) were older ($M = 40.1$, $SD = 9.3$ vs $M = 36.8$ years-old, $SD = 9.3$); $t(1196) = -6.13$, $p < 0.000$. Additionally, those who attended 1 medical or mental health visit(s) were less likely to be bisexual (4 vs 8% bisexual; $\chi^2 = 9.41$, $p = 0.002$) compared to those who did not attend any visits. In addition to the covariates selected a priori (age, education, and race/ethnicity), we added sexual orientation posthoc based on the identified difference.

Statistical analysis

Analyses were conducted in 2016 and preceded in steps. First, we examined the interrelations between the syndemic indicators using adjusted logistic regression models, in which one indicator was regressed on another using the full sample. Second, we evaluated the relations between syndemics and the four health care utilization outcomes (medical costs, number of medical visits, mental health costs, number of mental health visits) using adjusted multiple linear regression models. Third, we evaluated the relationships between syndemics and odds of being HIV-infected using adjusted logistic regression in the full sample of gay and bisexual men. Finally, we conducted post hoc analyses to assess the role of insurance status on the results.

Results

Among the four syndemic indicators, CSA was the most commonly reported indicator (23.5%), followed up substance use (22.8%), and IPV (16.2%; Table 1). Lifetime suicide

attempts were reported by 11.2% of the men. Slightly more than half the men in the sample (52.2%) reported no syndemic indicators; only 6.3% reported three or four indicators.

The odds of experiencing each of the indicators were all significantly related to the likelihood of experiencing the other indicators (Table 2). Most dramatically, a history of CSA was associated with an almost four-fold increase in the lifetime odds of a suicide attempt and a four-fold increase in the odds of reporting IPV.

Additionally, we conducted post hoc ANOVAs, comparing outcomes (cost and utilization of medical and mental healthcare) in regards to insurance status (no insurance, private insurance including self-pay, and public insurance including Medicare and Medicaid). We found that cost of medical care, number of medical appointments, and number of syndemic factors varied significantly by type of insurance. For those with public insurance, the mean cost of medical care was higher, as were the number of medical visits. Those with public insurance also endorsed a significantly higher number of syndemic indicators. No significant differences were found between mental healthcare costs and mental health appointments, with the caveat that few mental health appointments were reported among those with private or no health insurance.

Associations between syndemics and health outcomes

Annual sum of medical cost ranged from \$0 to \$3660. One person had an annual cost of \$0 and was removed from the mean comparison. Annual sum of mental health cost ranged from \$0 to \$9365. Ten participants had an annual cost of \$0, and were removed from the mean comparison. Using adjusted linear regression analyses, reporting two or more syndemic conditions predicted a significantly higher number of medical visits ($\beta = 0.16$, $t(603) = 3.91$, $p < 0.001$) and greater medical care costs ($\beta = 0.20$, $t(603) = 4.92$, $p < 0.001$) among sexual minority men (Table 3). To illustrate the impact of the number of syndemic indicators on cost, in adjusted models we found that having 2 syndemic indicators was significantly associated with 2.2-fold increase ($p = 0.003$) in likelihood of annual cost above the mean (\$461) and having 3–4 syndemic indicators was associated with a 3.5-fold increase ($p = 0.001$) in likelihood of an annual cost above the mean. Similarly, in adjusted models, having 2 syndemic indicators was associated with 2.2-fold increase ($p = 0.003$) of attending the mean number of annual visits (19.8) or more, and having 3–4 syndemic indicators was associated with 3.5-fold increase of attending the mean or greater number of annual medical visits ($p = 0.001$). Syndemic conditions were not significantly related to mental health visits ($\beta = -0.01$, $t(176) = 0.06$, $p = 0.952$) or mental health costs ($\beta = -0.03$, $t(176) = -0.43$, $p = 0.669$). The inclusion of HIV-status did not change the results significantly.

The syndemic variable was associated with a significantly increased likelihood of a participant being HIV-infected. Specifically, compared to those who reported no syndemic indicators, reporting 2 indicators was associated with a 1.6-fold increased likelihood of being HIV-infected (OR 1.65, 95% CI 1.07–2.54), and reporting 3–4 syndemic indicators was significantly associated with an almost 2.5 increased likelihood of being HIV-infected (OR 2.49, 95% CI 1.45–4.25). One reported syndemic indicator conferred no increase in likelihood of being HIV-infected (Table 4).

Being older (Wald = 53.94, $\text{Exp}(B) = 1.06$, $p < 0.001$, [95% CI 1.04–1.08]) was uniquely associated with increased odds of being HIV-infected. Self-reporting white (Wald = 9.55, $\text{Exp}(B) = 0.55$, $p = 0.002$, [95% CI 0.37–0.80]) and having a college (Wald = 9.89, $\text{Exp}(B) = 0.47$, $p = 0.002$, [95% CI 0.29–0.75]) or post graduate education (Wald = 10.85, $\text{Exp}(B) = 0.43$, $p = 0.001$, [95% CI 0.26–0.71]) were each associated with reduced odds of being HIV-infected.

Discussion

Previous studies have indicated that sexual minority men experience clusters of interactive psychosocial factors—termed syndemics—that, in turn, increase risk for negative health outcomes, most notably HIV seroconversion. The findings of the current study replicate previous work in two ways (Stall et al., 2003; Safren et al., 2010, 2011). First, similar to prior studies, we showed that four syndemic indicators (CSA, IPV, suicide attempts, and substance use) are common in a sample of sexual minority men (Stall et al., 2003; Martinez et al., 2016; Mimiaga et al., 2015; Mustanski et al., 2007, 2014); over 40% reported at least one of these psychosocial risk factors, and 15% reported two or more. Moreover, the experience of one of these risk factors significantly increased the odds of reporting the others. Second, we identified a link between these four syndemic factors and HIV status among gay and bisexual men.

Additionally, we extend earlier studies by showing that experiencing syndemic conditions increases medical utilization and expenditures among sexual minority men. Several studies have shown that sexual minority men utilize health services at higher rates than heterosexual men (Bakker et al., 2006; Cochran & Mays, 2000; Cochran et al., 2003). While the association between syndemic indicators and medical care use and costs has been investigated among sexual minority women (Valentine et al., 2015), this is the first study to investigate these relations among sexual minority men. Our results suggest that experiencing several psychosocial risk factors increases vulnerability to an increased need for medical services.

In contrast to the results for medical care, we do not find evidence that the syndemic indicators predict mental health use or costs. The fact that syndemics are not significantly related to mental health service utilization or cost suggests the possibility that these often-debilitating conditions are not being identified or treated through patients' primary care settings in a way that results in mental health referrals and intakes (O'Cleirigh et al., 2015; Feldman et al., 2007). Future studies examining associations between syndemics and mental health care use and costs in both primary care and non-primary care settings are sorely needed to better understand and potentially replicate this finding.

These results may have implications for public health interventions. As co-occurring psychosocial factors appear to be common among sexual minority men, the implementation of routine, culturally competent mental health screening (especially for trauma history, suicidality, IPV, and substance use) within primary care may help identify cases that can be referred for mental health treatment, if needed (Safren et al., 2011). This screening process would require both identifying sexual minorities within primary care settings, and

developing efficacious prevention programs of relevance to them (e.g., Pachankis, 2015). The improved identification and early remediation of highly prevalent, co-occurring health issues among sexual minority men may both improve their health and also could contribute to lower health care costs—thereby conferring additional social and economic benefits. However, many primary care facilities remain inhospitable to sexual minority men, and few evidence-based health interventions exist for this population (Cochran et al., 2003). These remain critical priorities for public health researchers and practitioners.

Further, the results highlight the importance of preventing syndemic factors within this population, including working to diminish violence exposure and reduce the minority stressors that contribute to mental health problems among sexual minorities. In particular, recent research on structural stigma and sexual orientation-related health disparities has demonstrated that improving social climates—including social policies that differentially target gays and lesbians (e.g., same-sex marriage and adoption)—may reduce mental health problems within sexual minority populations (Hatzenbuehler et al., 2010; Oldenburg et al., 2015; Pachankis et al., 2017). Thus, developing and evaluating structural interventions that reduce sexual minority stigma and discrimination, the major drivers of syndemic processes, represent an important avenue for future research.

Although this study provides novel information regarding syndemic factors and health care use and costs among sexual minority men, there are several limitations. First, the measures of the syndemic indicators were self-reported, rather than clinically assessed, and we relied on single items with unestablished reliability. In order to reach as many of the health center's patients as possible, the research team decided to focus on breadth of constructs over depth; although we would have liked to use measures with more items that allow for greater nuance, the setting and study goals precluded that option in this case. Therefore, responses may underestimate the true prevalence of the syndemic indicators. Additionally, these syndemic indicators differed slightly from those used in previous studies. Specifically, we used an item of lifetime suicide attempts, rather than depression, and substance use, rather than polysubstance use. Our measure of CSA was also more restrictive than previous measures. Despite these measurement limitations, we found similar associations between syndemics and HIV seroconversion as earlier reports. Moreover, because these items are brief, they can be utilized in resource-poor clinic settings to identify sexual minority men at high risk of developing health problems and, therefore, in need of additional preventive services. Second, the clinic where the study was conducted is housed in a large metropolitan city. Consequently, these results may not be generalizable to sexual minority men living in rural communities. In addition, sexual minority men who attend a sexual minority focused clinic likely differ from other sexual minority men (e.g., greater community support, greater comfort with a gay identity), which may also restrict generalizability. However, a comparison of our sample with a general population sample of gay and bisexual men obtained from the Massachusetts Behavioral Risk Factor Surveillance surveys revealed no differences in the age and racial/ethnic composition, and only minor differences with respect to socioeconomic status (Conron et al., 2010). Third, although there are multiple ways to operationalize sexual orientation (i.e., attraction, sexual behavior, and self-identification), only self-identification was assessed in the current study. Consequently, we are unsure whether similar results would be observed among individuals with same-sex attractions

and/or same-sex sexual behaviors. Further, although we used data on syndemic indicators to predict subsequent health care utilization and costs, these results do not establish causal relations.

In addition, the data used in this study was collected between 2001 and 2005 in an urban community health center. The HIV prevention and treatment landscape has changed substantially since then, including treatment as prevention (TasP) and the use of pre-exposure prophylaxis (PrEP) (Cohen et al., 2016; Rodger et al., 2016; Grant et al., 2010). Therefore, the generalizability of the results is unclear within the current HIV-prevention and treatment context.

Finally, a limitation in the interpretation of our findings is that the socio-political climate has changed in the time since this data was collected. Although the change in social norms can be difficult to estimate the most relevant changes include the change in Massachusetts State law allowing for same sex marriage in 2013 and the repeal by the Federal Supreme Court of portions of the Defense of Marriage Act in 2015. There is emerging evidence that the changing political climate can exert a positive influence on sexual minority mental health (e.g., Hatzenbuehler et al., 2010; Pachankis et al., 2017) and may impact the present day relevance of the current findings. In addition the passing of the Affordable Care Act, and subsequent legislation has changed access to health insurance and health care for many Americans, which may limit the current applicability of our findings. Although a recent report suggests that there sexual minority relevant barriers to healthcare access continue (Qureshi et al. 2018).

Despite these limitations, this study makes an important contribution to the literature on determinants of adverse health outcomes among sexual minority populations. The literature on syndemics highlights what may be one of the most significant aspects of these experiences—the way in which they layer together. It could be that the combination of multiple, co-occurring factors is what portends an exponentially greater risk for health problems among sexual minorities. This study provides insight into the utility of a brief screener for syndemics, employed during the context of routine medical care, for identifying the additive effects of psychosocial vulnerabilities on poor health outcomes and heightened use of health care services. The results of the current study extend the growing body of research on syndemics and sexual minority health, and suggest that adopting a syndemic approach across settings can provide a useful framework for identifying determinants of sexual orientation-related health disparities.

Acknowledgments

5R01MH095624-05 from National Institute of Mental Health supported Drs. O'Cleirigh and Batchelder's time on this manuscript. 5P30AI060354-12 from National Institute of Allergy and Infectious Disease supported Drs. O'Cleirigh and Mayer's time on this manuscript. 9K24DA040489 from the National Institute of Drug Abuse supported Dr. Safren's time and intuitional support was provided by Fenway Health.

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Table 1

Mean and frequencies of background, demographic, and syndemic indicators

Demographic characteristics	n = 1211 (%)
Age	38.56 (SD = 9.49)
Sexual orientation	
Gay	1139 (94.1%)
Bisexual	72 (5.9%)
Race	
White	1018 (84.1%)
Black/African American	55 (4.5%)
Hispanic/Latino	75 (6.2%)
Other	63 (5.2%)
Education	
High school	123 (10.2%)
Some college	303 (25.1%)
College graduate	464 (38.3%)
Post graduate	319 (26.3%)
Family income	
< \$20,000	213 (17.6%)
\$20,000–\$34,999	240 (19.8%)
\$35,000–\$49,999	253 (20.9%)
\$50,000	466 (38.5%)
Insurance	
None	204 (12.9%)
Public insurance (Medicare or Medicaid)	115 (7.3%)
Private or self-pay	1104 (69.9%)
Other	104 (8.6%)
Syndemic indicators	
Substance use	276 (22.8%)
Intimate partner violence	194 (16.2%)
Childhood sexual abuse history	279 (23.5%)
Suicide attempt	135 (11.2%)
Number of syndemic indicators reported	
0	630 (52.2%)
1	358 (29.7%)
2	143 (11.8%)
3 or 4	76 (6.3%)

Table 2

The interrelationships between the four syndemic indicators (expressed as odds ratios, with 95% confidence intervals) adjusted for age, education, and race/ethnicity (white versus racial or ethnic minority)

n = 1211	Childhood sexual abuse	Substance use	Intimate partner violence	Suicide attempt
Childhood sexual abuse	–	–	–	–
Substance use	1.51 (1.11–2.06)	–	–	–
Intimate partner violence	4.14 (2.97–5.76)	1.92 (1.36–2.71)	–	–
Suicide attempt	3.95 (2.71–5.74)	1.63 (1.09–2.43)	3.83 (2.57–5.69)	–

Table 3

Adjusted linear regression models of the relationship between syndemics and medical care utilization and cost and mental health utilization and cost

Health care outcomes	Standardized beta	t (df)	p
Medical care visits (range 1–34)	0.16	3.91 (603)	< 0.001
Medical care costs (range \$0–\$3660)	0.20	4.92 (603)	< 0.001
Mental health care visits (range 1–83)	0.01	0.06 (df = 176)	0.952
Mental health care costs (range \$0–\$9365)	– 0.03	– 0.43 (df = 176)	0.669

Table 4

Adjust logistic regression model of the relationship between syndemics and the likelihood of being HIV-infected (n = 1184)

Syndemics conditions	Exp (B)	95% CI	<i>p</i>
0 (ref)			0.003
1	1.15	0.82–1.62	0.418
2	1.65	1.07–2.54	0.024
3 or more	2.49	1.45–4.25	0.001