HHS Public Access

Author manuscript

*AIDS Behav*. Author manuscript; available in PMC 2020 October 01.

Published in final edited form as:

*AIDS Behav*. 2019 October ; 23(10): 2694–2705. doi:10.1007/s10461-019-02446-3.

# PREVALENCE AND CORRELATES OF PREP AWARENESS AND USE AMONG BLACK MEN WHO HAVE SEX WITH MEN AND WOMEN (MSMW) IN THE UNITED STATES.

**M. Reuel Friedman**[1,2,*], **Jordan M. Sang**[2,3], **Leigh A. Bukowski**[2,3], **Cristian J. Chandler**[4], **James E. Egan**[2,3], **Lisa A. Eaton**[5], **Derrick D. Matthews**[6], **Ken Ho**[7], **Henry F. Raymond**[8], **Ron Stall**[2,3]

[1]Department of Infectious Diseases and Microbiology, Graduate School of Public Health, University of Pittsburgh, Pittsburgh, PA, USA

[2]Center for LGBT Health Research, Graduate School of Public Health, University of Pittsburgh, Pittsburgh, PA, USA

[3]Department of Behavioral and Community Health Sciences, Graduate School of Public Health, University of Pittsburgh, Pittsburgh, PA, USA

[4]Department of Epidemiology, Rollins School of Public Health, Emory University, Atlanta, GA, USA

[5]Department of Human Development and Family Studies, University of Connecticut, Hartford, CT, USA

[6]Department of Health Behavior, Gillings School of Global Public Health, University of North Carolina, Chapel Hill, NC, USA

[7]Division of Infectious Diseases, School of Medicine, University of Pittsburgh, University of Pittsburgh, Pittsburgh, PA, USA

[8]Department of Biostatistics and Epidemiology, School of Public Health, Rutgers University, Piscataway, NJ, USA

[*]Corresponding author: PO Box 7319, Pittsburgh, PA, USA, 15213. 412-383-3000 (office); 412-383-1513 (FAX). Mrf9@pitt.edu.

Preliminary analyses for this manuscript appeared in substantially different form in the following poster presentation: Friedman MR, Matthews DD, Egan JE, Chandler CJ, Eaton LA, Bukowski LA, Raymond HF, and Stall RD. “Prevalence and correlates of PrEP awareness and use among Black bisexual men in the United States.” International AIDS Conference 2018 (Amsterdam, Netherlands). Poster THPEC215.

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was approved by the University of Pittsburgh Human Research Protection Office (protocol number PRO13110137).

Informed consent: Informed consent was obtained from all individual participants included in the study.

Conflict of interest: Author MRF has received an honorarium and travel expenses reimbursement for serving as a consultant to Gilead Sciences, Inc. in June 2018 for the purposes of providing scientific input for a grant mechanism in development concentrating on HIV and aging. Authors MRF and RDS received travel expenses reimbursements from Gilead Sciences, Inc. for the purposes of speaking at AIDSImpact conference in July 2015, specifically for a symposium on syndemics and the HIV prevention and care continuum. Authors JMS, LAB, DDM, LAE, CJC, JEE, KH, and HRF have no conflicts of interest to declare.

## Abstract

Men who have sex with men and women (MSMW), including those who are Black, experience HIV-related disparities compared to men who have sex with men only (MSMO). Few studies have assessed the prevalence and correlates of pre-exposure prophylaxis (PrEP) awareness and use among Black MSMW. We recruited MSM ≥18 attending Black Gay Pride events between 2014—2017. We conducted multivariable logistic regressions to assess differences in PrEP awareness and use among HIV-negative Black MSM (n=2398) and within Black MSMW (n=419). MSMW were less likely than MSMO to report PrEP awareness ($p$<.001). Among PrEP-aware MSM, MSMW were more likely than MSMO to report PrEP use ($p$<.05). MSMW receiving gay community support were more likely to be PrEP-aware ($p$<.01). MSMW reporting any past-year STI diagnoses were more likely to report PrEP use ($p$<.01). Findings suggest that PrEP awareness campaigns tailored for Black MSMW, concomitant with STI-to-PrEP interventions, will facilitate greater PrEP uptake in this population.

## RESUMEN

Los hombres que tienen sexo con hombres y mujeres (MSMW, siglas in Inglés), incluyendo los que son Negros, experimentan disparidades relacionadas con el VIH en comparación con los hombres que tienen sexo con hombres solamente (MSMO, siglas en Inglés). Pocos estudios han evaluado la prevalencia y los correlatos de el conocimiento y el uso de la profilaxis pre-exposición (PrEP, siglas in Inglés) entre los MSMW Negros. Reclutamos a hombres que tienen sexo con hombres, o MSM (siglas en Inglés) ≥18 que asistieron a eventos del Orgullo Gay Negro entre 2014—2017. Realizamos regresiones logísticas multivariables para evaluar las diferencias en el conocimiento y uso de PrEP entre los MSM Negros VIH-negativos (n=2398) y dentro de los MSMW Negros (n=419). Los MSMW fueron menos probables que los MSMO a reportar sobre el conocimiento de la PrEP (p<.001). Entre los MSM con reconocimiento de PrEP, los MSMW fueron más probables que los MSMO a reportar el uso de PrEP (p<.05). Los MSMW que recibieron apoyo de la comunidad gay tenían más probabilidades de ser conscientes de la PrEP (p<.01). Los MSMW que informaron sobre cualquier diagnóstico de ITS el año anterior tenían más probabilidades de informar el uso de PrEP (p <.01). Los hallazgos sugieren que las campañas de concientización sobre la PrEP adaptadas para los MSMW Negros, concomitantes con las intervenciones de ITS-a-PrEP, facilitarán una mayor captación de PrEP en esta población.

### Keywords

HIV prevention; pre-exposure prophylaxis; Black/African American; men who have sex with men (MSM); bisexuality

## INTRODUCTION

The HIV epidemic in the United States (U.S.) remains a critical public health concern, in particular for marginalized populations. Black men who have sex with men (MSM) account for the highest incidence and prevalence of HIV infection among all groups at-risk for HIV (1). In general, Black MSM experience poorer HIV care outcomes, including lower rates of antiretroviral treatment (ART) and viral suppression, and lower social support relative to

White MSM (2, 3). Considering the impact of discrimination and inequities in HIV risk factors, Black MSM constitute a key population in addressing the HIV epidemic. Pre-exposure prophylaxis (PrEP) was approved by the Food and Drug Administration in 2012 as a once-daily pill to prevent HIV acquisition among HIV-negative individuals. Research has shown that PrEP is highly efficacious in preventing HIV transmission when users are adherent (4). Use among Black MSM, however, remains relatively low, despite interest in and willingness to use this prevention tool (5–8). Barriers associated with PrEP use among Black MSM include concerns over the potential side effects of the drug, cost of PrEP, potential problems associated with missing doses, medical mistrust, distrust with the pharmaceutical industry, accessibility, and sexuality-related stigma (9–12).

Men who have sex with men and women (MSMW) comprise a population that has been generally ignored in HIV prevention intervention development and deployment (13, 14). HIV prevention among MSM has historically focused on gay men, resulting in a severe shortage of interventions tailored for MSMW (14, 15). Literature specific to correlates and prevalence of PrEP awareness and use among MSMW is limited, particularly among those who are Black; PrEP research has generally conflated Black MSMW with Black men who have sex with men only (MSMO), without disaggregating these populations (16–18). However, Black MSMW experience unique health concerns (19). Recent research has demonstrated that they are more likely to experience psychosocial health morbidities, such as depression symptoms, intimate partner violence, and polydrug use compared to Black MSMO, and that these psychosocial health disparities are substantially explained by lower rates of sexual minority community support (20). Psychosocial morbidities have also been demonstrated to significantly contribute to HIV care continuum disparities among HIV-positive MSMW, including being more likely than MSMO to be unaware of HIV-positive status, and being less likely than MSMO to have suppressed viral load (21). Among HIV-negative Black MSM, MSMW are less likely than MSMO to have ever received an HIV test (22). Considering the efficacy of PrEP in preventing HIV infection, it is essential to understand awareness and utilization patterns, especially among those at higher risk for HIV acquisition. As a biomedical prevention tool, PrEP may prove especially relevant for populations such as Black MSMW who have been traditionally underserved by behavioral HIV prevention interventions.

We asked three key research questions. First, do Black MSMW have disparate rates of PrEP awareness and use relative to Black MSMO? Second, what factors explain differences in PrEP awareness and use between Black MSMW and Black MSMO? Third, what factors predict PrEP awareness and use within Black MSMW? For question one, we hypothesized that Black MSMW were less likely to be aware of and to use PrEP than Black MSMO, given previously described disparities among MSMW across the HIV prevention and care continuum (21–23). For question two, we hypothesized that a) differences in gay community support might explain differences in PrEP awareness between Black MSMW and MSMO, and that b) differences in recent diagnoses of sexually transmitted infections (STI) between Black MSMW and MSMO might contribute to differential rates of PrEP use in these groups, as a result of the emergence of STI-to-PrEP programs (24–27). For question three, we hypothesized that gay community support was associated with PrEP awareness and use within Black MSMW, as a result of substantial marketing to the gay community; and that

recent history of STI was associated with PrEP use within MSMW. We assessed these research questions using data from POWER (Promoting Our Worth, Equality, and Resilience), a community-derived sample of Black MSM that includes a substantial proportion of MSMW.

## METHODS

### Sample.

Between 2014—2017, POWER used time-location sampling at Black Gay Pride events in six U.S. cities (Atlanta, GA; Detroit, MI; Houston, TX; Memphis, TN; Philadelphia, PA; and Washington, DC) to recruit MSM and transgender women, predominately those who identify as Black. Eligibility criteria included being 1) 18 years or older; 2) having, in their lifetime, at least one male sexual partner; and 3) assigned male sex at birth. We used an analytic sample for this study including only those who: 1) had a current gender identity of "male"; 2) self-identified as "Black" or "African American"; 3) reported past-year anal sex with at least one other male; and 4) were confirmed to be HIV-negative via an onsite rapid HIV-testing procedure. Our analytic sub-sample included 2398 HIV-negative, sexually active Black MSM. Participants completed a self-administered questionnaire onsite via electronic tablet assessing psychosocial, behavioral, and biomedical domains. Further details on the study design can be found elsewhere (28). All study procedures were approved by the Institutional Review Board at the University of Pittsburgh (protocol PRO13110137).

### Measures.

**Sociodemographics.—**We used self-reported information conveying ethnicity, age, education, and yearly income. Covariates in multivariable models were consistent with sociodemographic differences that have been found among bisexually-behaving men in previous studies (15, 20) and that may act as confounders included Hispanic/Latino ethnicity, low income status (<$10,000 per year), older age (≥40 years old), and city and year sampled.

**PrEP awareness and use.—**We first asked participants whether they were aware of PrEP *["Have you ever heard of PrEP (pre-exposure prophylaxics)? PrEP is when HIV-negative people take anti-HIV medications (anti-retrovirals like Truvada) BEFORE HAVING SEX to prevent HIV infection"]*. Men who reported not being aware of PrEP were considered to have no current or historical PrEP use patterns. Men who reported being PrEP-aware were then asked if they were currently using PrEP; those who were not currently using PrEP were asked if they had ever used PrEP (29).

**Bisexual behavior.—**Men reporting vaginal or anal sex with at least one female partner and anal sex with at least one male partner in the past year were classified as MSMW. Men reporting anal sex with at least one male partner but neither vaginal nor anal sex with at least one female partner in the past year were classified as MSMO (20, 21).

**Gay community support.—**We assessed whether participants perceived receiving *any* gay community support, using a dichotomized version of a measure that has been shown to substantially explain psychosocial health disparities among Black MSMW (20).

**Psychosocial health disparities.—**We assessed past-year experiences of intimate partner violence (IPV), physical assault victimization, depression symptoms, and polydrug use. Further details on these measures can be found elsewhere (20, 21). Based on concurrent research on this sample demonstrating that psychosocial morbidity burden is associated with increased likelihood of PrEP use (30), we considered each of these psychosocial variables as independent dichotomous covariates for within-MSMW multivariable logistic regression analyses.

**Sexually transmitted infections (STI).—**We asked participants whether they had been diagnosed by a health care provider in the past year with 1) gonorrhea; 2) syphilis; 3) chlamydia; or 4) any other STI. Based on federal PrEP guidelines and emerging public health programs targeting STI-positive, but HIV-negative individuals for PrEP uptake (24–27), we created a dichotomous variable that denoted MSM who reported being diagnosed with at least one past-year STI.

### Statistical analysis.

First, we conducted chi-square and t-tests to delineate bivariate associations between bisexual behavior and sociodemographic covariates, and between bisexual behavior and PrEP awareness and use patterns. Then, we conducted multivariable logistic regressions to compare HIV-negative, sexually active Black MSMW with their MSMO counterparts in patterns of PrEP awareness and current PrEP use. Based on results from these analyses, we constructed two structural equation models (SEM) to assess 1) whether the relationship between bisexual behavior and PrEP awareness was mediated by gay community support; and 2) whether, among PrEP-aware participants, the relationship between bisexual behavior and current PrEP use was mediated by past-year STI history. Each of these SEM consisted of an observed predictor variable (MSMW status); an observed mediator (Model 1: gay community support; Model 2: any past-year STI diagnosis); and an observed outcome variable (Model 1: PrEP awareness; Model 2: current PrEP use). Each SEM was conducted using maximum likelihood estimation (SEM-ML) with an observed information matrix (OIM), and controlled for effects of covariates (older age; low-income status; Hispanic/Latino ethnicity; city; and year sampled) on both the mediator and outcome variables. Model fit for SEM was assessed via standardized root mean residuals (SRMR), assuming acceptable model fit at SRMR<.08; each model's $\chi^2$, comparative fit index (CFI), and root mean squared error of approximation (RMSEA) were also assessed, as the literature recommends (31, 32). Finally, we conducted separate multivariable logistic regressions specifically within Black MSMW to assess whether gay community support, psychosocial factors, and past-year STI history were associated with a) PrEP awareness (using the analytic sample of HIV-negative, sexually active Black MSMW); and b) current PrEP use (using the sub-sample of HIV-negative, sexually active, PrEP-aware MSMW). All multivariable models controlled for ethnicity, age, income, and city and year sampled. Within-MSMW models additionally controlled for psychosocial health conditions.

Statistical analyses, including SEM, were conducted using Stata (StataCorp, 2015; Stata Statistical Software: Release 14; College Station, TX: StataCorp LP).

## RESULTS

Of the 2398 HIV-negative, Black MSM in this analytic sample, 82.5% (n=1979) were MSMO and 17.5% (n=419) were MSMW. Table I shows that MSMW were more likely than MSMO to identify as Hispanic/Latino ($\chi^2$=3.90; p<.05), to be older (30.7 years vs. 28.8; t=3.83; *p*<.001), and to report annual income <$10,000 ($\chi^2$=14.82; *p*<.001). There were no significant differences in MSMW/MSMO proportions by year, although there were significant differences by city ($\chi^2$=45.10; *p*<.001), with higher relative proportions of MSMW in Detroit. MSMW were less likely to report being PrEP-aware than MSMO (46.3% vs. 55.2%; $\chi^2$=10.96; *p*<.01). A total of 1278 MSM (53.3%) reported being PrEP-aware; 189 MSM (7.9%) reported currently using PrEP. Overall, MSMW reported slightly higher rates than MSMO of historical PrEP use (10.1% vs. 9.6%) and current PrEP use (9.6% vs. 7.6%), although these differences were not significant in bivariate testing of associations. MSMW were significantly more likely than MSMO to report any past-year STI (22.5% vs. 16.4%; $\chi^2$=8.88; *p*<.01).

Table II shows associations between MSMW status and PrEP awareness among HIV-negative, sexually active Black MSM. MSMW were significantly less likely than MSMO to be PrEP-aware (aOR=0.76; 95% CI: 0.60, 0.95). MSM who were age 40 or older (aOR=0.71; 95% CI: 0.54, 0.93), who reported annual income <$10,000 (aOR=0.61; 95% CI: 0.49, 0.77), and who were sampled in Detroit (aOR=0.64; 95% CI: 0.44, 0.92) were significantly less likely than their respective reference groups to report being PrEP-aware. Hispanic/Latino MSM were more likely to report being aware of PrEP (aOR=1.75; 95% CI: 1.09, 2.81). Compared with MSM sampled in 2014, those sampled in 2015 (aOR=1.71; 95% CI: 1.38, 2.13), 2016 (aOR=3.22; 95% CI: 2.55, 4.07), and 2017 (aOR=3.23; 95% CI: 2.31, 4.51) were significantly more likely to report being PrEP-aware.

Table III shows associations between MSMW status and current PrEP use among HIV-negative, sexually active Black MSM who reported being PrEP-aware. Among this sub-sample of PrEP-aware MSM, MSMW were significantly more likely than MSMO to report currently using PrEP (aOR=1.66; 95% CI: 1.11, 2.47). In this sub-sample of PrEP-aware MSM, those who identified as Hispanic/Latino were also significantly more likely than their non-Hispanic/Latino counterparts to report PrEP use (aOR=3.36; 95% CI: 1.78, 6.35). There were no significant differences in current PrEP use among PrEP-aware MSM by low-income status, older age, or city and year sampled.

Structural equation model results are presented in Figures I and II and in Appendices (Supplementary Materials). Figure I illustrates the total and indirect effects of paths between bisexual behavior, gay community support, and PrEP awareness. Model fit was considered to be very good, with an SRMR<.001; $\chi^2$=252.78 (df=13), *p*<.001; RMSEA<.001; and CFI=1.00. Among HIV-negative, sexually active Black MSM, there were significant inverse total effects between bisexual behavior and PrEP awareness (β=−.07±.03; *p*<.01). Significant inverse total effects were found to exist between bisexual behavior and any gay

community support (β=−.14±.02; $p$<.0001). There were significant positive total effects between gay community support and PrEP awareness (β=.13±.03; $p$<.0001). Gay community support mediated the relationship between bisexual behavior and PrEP awareness, constituting a significant indirect effect (β=−.02±.00; $p$<.0001). Gay community support accounted for a substantial proportion (25.4%) of the total effect between bisexual behavior and PrEP awareness. Full data reflecting total, direct, and indirect effects pathways can be found in Appendix A; the model's variance/covariance matrix and matrix of correlation coefficients can be found in Appendices B and C, respectively (Supplementary Materials).

Figure II illustrates total and indirect effects of the relationships between bisexual behavior, any past-year STI diagnosis, and current PrEP use among HIV-negative, PrEP-aware Black MSM. Model fit was considered to be very good, with an SRMR<.001; $\chi^2$=143.86 (df=13), $p$<.001; RMSEA<.001; and CFI=1.00. There were significant total effects between bisexual behavior and current PrEP use (β=.07±.03; $p$<.05). Significant relationships were found to exist between bisexual behavior and reporting any past-year STI diagnoses (β=.09±.03; $p$<.01) and between any past-year STI diagnosis and current PrEP use (β=.18±.02; $p$<.0001). Reporting any past-year STI diagnosis mediated the relationship between bisexual behavior and current PrEP use, constituting a significant indirect effect (β=.02±.01; $p$<.01). Past-year STI burden accounted for a substantial proportion (23.1%) of the total effect between bisexual behavior and current PrEP use. Full data reflecting total, direct, and indirect effects pathways can be found in Appendix D; the model's variance/covariance matrix and matrix of correlation coefficients can be found in Appendices E and F, respectively (Supplementary Materials).

Within-MSMW predictors of PrEP awareness are shown in Table IV. In a multivariable logistic regression model controlling for sociodemographics and psychosocial health conditions, we found that Black MSMW who reported receiving any gay community support were significantly more likely to be PrEP-aware than those who did not (aOR=2.24; 95% CI: 1.34, 3.76). In addition, MSMW who reported any past-year STI diagnosis were significantly more likely to report being PrEP-aware (aOR=2.34; 95% CI: 1.32, 4.14). MSMW who reported recent polydrug use were significantly less likely than those who did not to be PrEP-aware (aOR=0.38; 95% CI: 0.17, 0.83). There were no significant differences in PrEP awareness within Black MSMW by income, age, ethnicity, city, depression symptoms, recent violence victimization, or recent IPV, and no consistent increase in PrEP awareness by year, though MSMW sampled in 2016 had higher levels of PrEP awareness than those sampled in 2014 (aOR=2.70; 95% CI: 1.47, 4.99).

Table V shows results from a multivariable logistic regression model assessing correlates of current PrEP use within HIV-negative, sexually active Black MSMW who reported being PrEP-aware. In this model, adjusting for sociodemographics and psychosocial health conditions, only reporting a past-year STI diagnosis was significantly associated with current PrEP use (aOR=5.11; 95% CI: 1.95, 13.39). Gay community support was not significantly associated with current PrEP use in this model. There were no differences in current PrEP use within Black MSMW by income, age, ethnicity, depression symptoms,

recent violence victimization, or recent IPV, and no significant differences in current PrEP use among MSMW by city or year sampled.

## DISCUSSION

Low rates of PrEP awareness and use among HIV-negative Black MSM persist in the U.S. Our results, demonstrating that, overall, only 8% of HIV-negative Black MSM report currently using PrEP, are consistent with recent literature indicating low rates of PrEP use among HIV-negative Black MSM. For example, research has shown that rates of PrEP use among Black MSM range from 1% nationwide in 2015/2016 (33), to 2% in Atlanta in 2014 (34), to 2.5% in the 2014 National HIV Behavioral Surveillance System, representing a significantly lower use rate than that found among HIV-negative White MSM (5.3%) (35). The proportion of HIV-negative Black MSM in the POWER sample reporting current PrEP use is somewhat higher, however, than in these other samples. This may reflect the contemporaneity of this sample, which includes data from 2017, when almost 13% of the HIV-negative sample reported current PrEP use; it may also reflect the social marketing of PrEP to urban gay communities in the U.S., which likely aligns with the population attending Black Gay Pride events. We note also that Black Gay Pride attendees may be more likely than non-attendees to be socially connected to gay communities, which is likely associated with this sample's higher relative propensity for PrEP use.

Our findings suggest that although Black MSM appear to have relatively slow or stalled uptake of PrEP, some encouraging patterns have emerged. While MSMW in this sample had lower rates of PrEP awareness than MSMO, when MSMW were aware of PrEP, they had higher rates of use. These findings present an opportunity to delineate the unique factors for biomedical use among MSMW and the historical and practical explanations for observed PrEP differences. Our study is among the first to demonstrate rates of PrEP awareness and use among MSMW, particularly among MSMW who are Black. Social-behavioral and biobehavioral HIV prevention and care programs have not historically targeted MSMW (13–15, 36), tending to concentrate instead on men who have sex with men only (MSMO) during intervention design, recruitment, implementation, and evaluation. This may be a factor in the consistent disparities seen in HIV testing and care outcomes found among MSMW, including higher rates of being HIV-positive unaware, and lower rates of viral suppression (19, 21, 23). In this context, our findings that HIV-negative Black MSMW were less likely than their MSMO peers to report being aware of PrEP is unsurprising.

However, our findings show that, when they become aware of PrEP, Black MSMW may be even more likely than Black MSMO to use it. This promising finding highlights the potential impact of biobehavioral interventions for communities that have been traditionally underserved by HIV prevention programming and research initiatives, but who face substantial HIV acquisition and transmission risks, including MSMW, transgender women, sex workers, and injection drug users. While our findings demonstrate that higher past-year STI prevalence significantly contributes to higher relative odds of current PrEP use among MSMW, a majority of the variance in the relationship between MSMW status and PrEP use remains unexplained. The literature suggests that MSMW, particularly those who are Black, have been highly stigmatized for their perceived potential to acquire HIV from MSM and

transmit it to female partners (15, 37–39). At the same time, behavioral HIV prevention interventions tailored for MSMW are thin on the ground (13–15). PrEP may offer Black MSMW a wider-scale opportunity to receive efficacious HIV prevention, thereby lowering their risk for HIV acquisition and transmission and associated internalized bi-negativity (40), than existing behavioral interventions may offer them. Our results demonstrating that gay community support mediates the relationship between bisexual behavior and PrEP awareness among Black MSM provides additional confirmation for the value of sexual minority community support networks for public health promotion within sexual and gender minority communities. PrEP awareness and linkage campaigns tailored for Black MSMW (14), in conjunction with practitioner-based STI-to-PrEP interventions, will likely increase PrEP uptake in this group.

We found a significant association between PrEP use and past-year STI among MSMW. Because recent STI history has been associated with HIV incidence among MSM (41), federal guidelines include diagnosed bacterial STI within the past 6 months as a recommended indicator for PrEP prescribing to MSM (42). In response, state health departments are beginning to develop protocols to connect STI-positive individuals to PrEP programs; for example, the Pennsylvania Department of Health is piloting a demonstration project that targets individuals with multiple past-year STI for enhanced PrEP navigation services, given state surveillance data suggesting that time to HIV seroconversion is truncated for HIV-negative individuals with a fourth incident past-year STI (43). Our results may indicate substantial STI clinic-based PrEP delivery for populations at risk for HIV infection, an approach that has been pioneered by health departments (24–27). It is possible that national PrEP guidelines, which recommend STI testing every three months, may lead to more timely diagnoses of existing STI for those who are using PrEP compared to those who are not. However, we cannot discount the possibility of reverse causation, e.g. that PrEP use among Black MSMW in this study was associated with increased sexual risk-taking and lower rates of condom use, leading to higher STI incidence, as has been indicated in other populations using PrEP (44–46). We also note that our results demonstrate that Black MSMW were significantly more likely than Black MSMO to report any past-year STI diagnoses, and that a past-year STI diagnosis significantly mediated the effect found between bisexual behavior and higher PrEP use among PrEP-aware MSM. These findings contravene results from a recent meta-analysis that found no significant differences in STI prevalence between MSMW and MSMO (47), suggesting that STI disparities among MSMW in Black communities require additional inquiry. Given our findings that MSMW in this sample were more likely to report recent STI, a potentially promising new strategy is engaging this population into HIV prevention, including PrEP uptake, at point of STI diagnosis. Furthermore, strategies that utilize reportable STI health department data to identify individuals who are HIV-negative but STI-positive (e.g., STI data-to-PrEP strategies) may prove effective in recruiting substantial proportions of MSMW into HIV prevention interventions that include PrEP awareness and linkage. Future research on PrEP use among MSMW, including those who are Black, should prospectively explore the relationships between uptake, sexual risk behavior, HIV risk perception, and STI diagnosis and treatment.

This study contains limitations. These data come from a community-based sample of Black Gay Pride attendees in six cities, and thus may not be generalizable to HIV-negative Black MSM in the U.S. While we initially recruited participants using time-location sampling techniques to optimize representativeness, these techniques only account for individual venues and years; for this reason, we did not use pooled TLS weights in our analyses. The POWER sample was not specifically intended to characterize MSMW, and recruitment techniques did not engage in processes, such as oversampling, to better represent these men; therefore results may not be generalizable to groups of MSMW, such as those with lower affinities to LGBT communities, who do not attend Black Gay Pride events. Other than assessing HIV status via onsite HIV-antibody testing, our measures were self-reported. Though our anonymous, self-administered questionnaire was designed to reduce social desirability bias in response patterns, self-reported measures may not accurately reflect the true extent of PrEP use or of past-year STI diagnoses and/or current STI burden; for this reason, the STI data collected should be considered highly conservative, as it likely underestimates the actual proportion of MSM with recent STI history. Our mediation analyses, which considered gay community support as a mediator of the relationship between bisexual behavior and PrEP awareness, and any past-year STI as a mediator of the relationship between bisexual behavior and PrEP use, were cross-sectional, and thus should not be regarded as confirmation of potential causal or temporal associations. Though these models had substantial theoretical basis, we note that our mediators and outcomes may be bidirectional in nature, and that we were unable, given the measures used, to situate PrEP initiation and STI diagnosis, for example, in a clear temporal framework. Though we have shown that PrEP-aware MSMW were more likely to report current PrEP use than PrEP-aware MSMO, that they experienced higher STI burden than PrEP-aware MSMO, and that their higher STI burden had a significant indirect effect on their higher rates of current PrEP use, we cannot infer with certainty that MSMW were linked to PrEP at higher rates due to their relatively higher STI burden (e.g., from STI-to-PrEP programs). Increased STI screenings for PrEP users in general may explain these differences in reported STI diagnoses; even though MSMW and MSMO may be assumed to have equivalent STI screening protocols while on PrEP, it is possible that our results indicate background STI disparities between these populations that are magnified by increased STI screening frequency for PrEP users. Finally, though the serial cross-sectional design allowed us to assess trends over time, it did not allow us to longitudinally assess intra-individual patterns of PrEP awareness and use or STI diagnoses.

The results of our study are both disconcerting and promising for biobehavioral HIV prevention among HIV-negative Black MSMW. It is promising that PrEP use was comparatively higher among MSMW when they were PrEP-aware, but disconcerting that the disparate STI rates reported by MSMW substantially accounted for their higher current PrEP use. It is also concerning that PrEP awareness campaigns may be following a well-tread path of HIV prevention efforts detouring around communities that may derive the greatest benefits. Our results point to several topic areas that future research studies can explore. These include assessing whether associations between STI burden and PrEP use among Black MSMW are related to risk compensation; reflective of increased rates of STI testing while on PrEP; or associated with STI-to-PrEP initiatives. In addition, it is paramount to

explore whether high-volume, community-based venues, such as Black Gay Pride events, can provide feasible recruitment opportunities for both longitudinal research efforts and dedicated PrEP awareness and culturally congruent intervention delivery for traditionally under-researched and underserved populations such as Black MSMW. Finally, it remains unknown whether STI-to-PrEP (including STI data-to-PrEP) initiatives can meaningfully increase PrEP uptake among underserved key populations, including Black MSMW, and impact HIV incidence rates in the United States. Future research that concentrates on assessing and developing biobehavioral prevention campaigns for MSMW specific to their cultural understandings is critical. Such inquiry will ensure that MSMW, including those who are Black, are provided the public health resources and attention necessary to reduce the sexual health disparities that they have been shown so consistently to face.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## ACKNOWLEDGMENTS

The authors thank the Center for Black Equity and local Black Pride organizations for partnering with us to implement POWER, the community-based organizations who performed onsite HIV testing on the study's behalf, the thousands of study participants who volunteered their time to contribute to this research, and members of the POWER Study Team who made data collection possible. The local Black Pride organizations are as follows: D.C. Black Pride, Detroit's Hotter than July, Houston Splash, In the Life Atlanta, Memphis Black Pride, and Philadelphia Black Pride. The community-based organizations that performed onsite HIV testing are as follows: Atlanta: AID Atlanta, AIDS Health Care Foundation, NAESM; Detroit: Community Health Awareness Group, Horizons Project, Unified; Houston: Avenue 360, Houston AIDS Foundation, Positive Efforts; Memphis: Friends for Life; Philadelphia: Access Matters, Philadelphia FIGHT; Washington, D.C.: Us Helping Us. The members of POWER study team are as follows: Center for Black Equity: Earl D. Fowlkes, Jr., Michael S. Hinson, Jr.; Columbia University: Patrick A. Wilson; University of Connecticut: Lisa A. Eaton; Rutgers University: Henry Fisher-Raymond; University of Pittsburgh: Leigh A. Bukowski, Cristian J. Chandler, Derrick D. Matthews, Steven P. Meanley, Jordan M. Sang, and Ronald D. Stall. We are grateful to Luis Archila for his translation of our abstract into Spanish.

This study was funded by the National Institutes of Minority Health and Health Disparities, National Institutes of Health (5R01NR013865).

## REFERENCES

1. Prevention CfDCa. HIV Among African American Gay and Bisexual Men 2018 [cited 2018 March 27]. Available from: https://www.cdc.gov/hiv/group/msm/bmsm.html.
2. Friedman MR, Coulter RW, Silvestre AJ, Stall R, Teplin L, Shoptaw S, Surkan PJ, & Plankey MW. Someone to count on: social support as an effect modifier of viral load suppression in a prospective cohort study. . AIDS Care. 2016(1–12).
3. Friedman MR, Stall R, Silvestre AJ, Wei C, Shoptaw S, Herrick A, et al. Effects of syndemics on HIV viral load and medication adherence in the multicentre AIDS cohort study. AIDS (London, England). 2015;29(9):1087–96.
4. Underhill K, Morrow KM, Colleran C, Calabrese SK, Operario D, Salovey P, et al. Explaining the Efficacy of Pre-exposure Prophylaxis (PrEP) for HIV Prevention: A Qualitative Study of Message Framing and Messaging Preferences Among US Men Who have Sex with Men. AIDS and Behavior. 2016;20(7):1514–26. [PubMed: 25963772]
5. Arrington-Sanders RMDMPHSM, Morgan A, Oidtman JSM, Qian I, Celentano DSD, Beyrer CMDMPH. A Medical Care Missed Opportunity: Preexposure Prophylaxis and Young Black Men Who Have Sex With Men. Journal of Adolescent Health. 2016;59(6):725–8. [PubMed: 27720357]

6. Eaton LA, Kalichman SC, Price D, Finneran S, Allen A, Maksut J. Stigma and Conspiracy Beliefs Related to Pre-exposure Prophylaxis (PrEP) and Interest in Using PrEP Among Black and White Men and Transgender Women Who Have Sex with Men. AIDS and Behavior. 2017;21(5):1236–46. [PubMed: 28108878]
7. Kuhns LM, Hotton AL, Schneider J, Garofalo R, Fujimoto K. Use of Pre-exposure Prophylaxis (PrEP) in Young Men Who Have Sex with Men is Associated with Race, Sexual Risk Behavior and Peer Network Size. AIDS and Behavior. 2017;21(5):1376–82. [PubMed: 28238119]
8. Hoots BE, Finlayson T, Nerlander L, Paz-Bailey G, National HIVBSSG. Willingness to Take, Use of, and Indications for Pre-exposure Prophylaxis Among Men Who Have Sex With Men-20 US Cities, 2014. Clinical infectious diseases : an official publication of the Infectious Diseases Society of America. 2016;63(5):672–7.
9. Philbin MM, Parker CM, Parker RG, Wilson PA, Garcia J, Hirsch JS. The Promise of Pre-Exposure Prophylaxis for Black Men Who Have Sex with Men: An Ecological Approach to Attitudes, Beliefs, and Barriers. AIDS Patient Care and STDs. 2016;30(6):282–90. [PubMed: 27220036]
10. Brooks RA, Kaplan RL, Lieber E, Landovitz RJ, Lee S-J, Leibowitz AA. Motivators, concerns, and barriers to adoption of preexposure prophylaxis for HIV prevention among gay and bisexual men in HIV-serodiscordant male relationships. AIDS Care. 2011;23(9):1136–45. [PubMed: 21476147]
11. Brooks RA, Landovitz RJ, Kaplan RL, Lieber E, Lee S-J, Barkley TW. Sexual Risk Behaviors and Acceptability of HIV Pre-Exposure Prophylaxis Among HIV-Negative Gay and Bisexual Men in Serodiscordant Relationships: A Mixed Methods Study. AIDS Patient Care and STDs. 2012;26(2): 87–94. [PubMed: 22149764]
12. Cahill S, Taylor SW, Elsesser SA, Mena L, Hickson D, & Mayer KH Stigma, medical mistrust, and perceived racism may affect PrEP awareness and uptake in black compared to white gay and bisexual men in Jackson, Mississippi and Boston, Massachusetts. AIDS Care. 2017;29(11):1352–8.
13. Friedman MR, Dodge BM. The role of syndemic in explaining health disparities among bisexual men: a blueprint for a theoretically informed perspective. Understanding the HIV/AIDS epidemic in the United States: Springer; 2016 p. 71–98.
14. McCree DH, Oster AM, Jeffries WL IV, Denson DJ, Lima AC, Whitman H, et al. HIV acquisition and transmission among men who have sex with men and women: what we know and how to prevent it. Preventive medicine. 2017;100:132–4. [PubMed: 28450120]
15. Jeffries WL IV. Beyond the bisexual bridge: sexual health among US men who have sex with men and women. American journal of preventive medicine. 2014;47(3):320–9. [PubMed: 24970239]
16. Grov C, Whitfield THF, Rendina HJ, Ventuneac A, Parsons JT. Willingness to Take PrEP and Potential for Risk Compensation Among Highly Sexually Active Gay and Bisexual Men. AIDS and Behavior. 2015;19(12):2234–44. [PubMed: 25735243]
17. Parsons JT, Rendina HJ, Whitfield THF, Grov C. Familiarity with and Preferences for Oral and Long-Acting Injectable HIV Pre-exposure Prophylaxis (PrEP) in a National Sample of Gay and Bisexual Men in the U.S. AIDS and Behavior. 2016;20(7):1390–9. [PubMed: 27000145]
18. Rendina HJ, Whitfield THF, Grov C, Starks TJ, Parsons JT. Distinguishing hypothetical willingness from behavioral intentions to initiate HIV pre-exposure prophylaxis (PrEP): Findings from a large cohort of gay and bisexual men in the U.S. Social Science & Medicine. 2017;172:115–23. [PubMed: 27866750]
19. Friedman MR, Stall R, Silvestre AJ, Mustanski B, Shoptaw S, Surkan PJ, et al. Stuck in the Middle: Longitudinal HIV-Related Health Disparities Among Men Who Have Sex With Men and Women. JAIDS Journal of Acquired Immune Deficiency Syndromes. 2014;66(2):213–20. [PubMed: 24662298]
20. Friedman MR, Bukowski L, Eaton LA, Matthews DD, Dyer TV, Siconolfi D, et al. Psychosocial Health Disparities Among Black Bisexual Men in the US: Effects of Sexuality Nondisclosure and Gay Community Support. Archives of sexual behavior. 2018:1–12. [PubMed: 28608293]
21. Friedman MR, Sang JM, Bukowski LA, Matthews DD, Eaton LA, Raymond HF, et al. HIV Care Continuum Disparities Among Black Bisexual Men and the Mediating Effect of Psychosocial Comorbidities. JAIDS Journal of Acquired Immune Deficiency Syndromes. 2018;77(5):451–8. [PubMed: 29337847]

22. Sang JM, Matthews DD, Meanley SP, Eaton LA, Stall RD. Assessing HIV Stigma on Prevention Strategies for Black Men Who Have Sex with Men in the United States. AIDS and Behavior. 2018:1–8.
23. Singh S, Hu X, Wheeler W, Hall HI. HIV Diagnoses Among Men Who Have Sex With Men and Women—United States and 6 Dependent Areas, 2008–2011. American journal of public health. 2014;104(9):1700–6. [PubMed: 25033139]
24. Hacker E, Cohn J, Golden MR, Heumann C, editors. HIV Pre-Exposure Prophylaxis (PrEP) Uptake, Initiation, and Persistence in the Detroit Public Health STD Clinic Open forum infectious diseases; 2017: Oxford University Press US.
25. Weiss G, Smith D, Ye J, Newman S, Kitlas A, editors. Implementing PrEP in STD clinics: findings from a 2015 assessment of local health department engagement in PrEP implementation 2016 National STD Prevention Conference Atlanta: CDC; 2016.
26. Liu A, Cohen S, Follansbee S, Cohan D, Weber S, Sachdev D, et al. Early experiences implementing pre-exposure prophylaxis (PrEP) for HIV prevention in San Francisco. PLoS medicine. 2014;11(3):e1001613. [PubMed: 24595035]
27. Barash EA, Golden M. Awareness and use of HIV pre-exposure prophylaxis among attendees of a seattle gay pride event and sexually transmitted disease clinic. AIDS patient care and STDs. 2010;24(11):689–91. [PubMed: 20863247]
28. Bukowski LA, Chandler CJ, Creasy SL, Matthews DD, Friedman MR, Stall RD. Characterizing the HIV Care Continuum and Identifying Barriers and Facilitators to HIV Diagnosis and Viral Suppression among Black Transgender Women in the United States. Journal of acquired immune deficiency syndromes (1999). 2018.
29. Eaton LA, Matthews DD, Driffin DD, Bukowski L, Wilson PA, Stall RD, et al. A multi-US city assessment of awareness and uptake of pre-exposure prophylaxis (PrEP) for HIV prevention among black men and transgender women who have sex with men. Prevention Science. 2017;18(5):505–16. [PubMed: 28101813]
30. Chandler C, Bukowski L, Matthews D, Egan J, Hawk M, Markovic N, et al. Documenting differences among BMSM at risk for HIV: BMSM using and not usingPrEP in the POWER Study AIDS Education and Prevention (under review). 2018.
31. Hoyle RH. Handbook of structural equation modeling: Guilford press; 2012.
32. Kline RB. Principles and practice of structural equation modeling: Guilford publications; 2015.
33. Dea Smith, editor Abstract 86. Conference on Retroviruses and Opportunistic Infections; 2018; Boston (MA).
34. Eaton LA, Driffin DD, Bauermeister J, Smith H, Conway-Washington C. Minimal awareness and stalled uptake of pre-exposure prophylaxis (PrEP) among at risk, HIV-negative, black men who have sex with men. AIDS patient care and STDs. 2015;29(8):423–9. [PubMed: 26083143]
35. Hoots BE, Finlayson T, Nerlander L, Paz-Bailey G, Group NHBSS, Wortley P, et al. Willingness to take, use of, and indications for pre-exposure prophylaxis among men who have sex with men—20 US cities, 2014. Clinical Infectious Diseases. 2016;63(5):672–7. [PubMed: 27282710]
36. Feinstein BA, Dyar C. Bisexuality, minority stress, and health. Current sexual health reports. 2017;9(1):42–9. [PubMed: 28943815]
37. Friedman MR, Dodge B, Schick V, Herbenick D, Hubach RD, Bowling J, et al. From bias to bisexual health disparities: Attitudes toward bisexual men and women in the United States. LGBT health. 2014;1(4):309–18. [PubMed: 25568885]
38. Dodge B, Jeffries WL, Sandfort TG. Beyond the down low: Sexual risk, protection, and disclosure among at-risk Black men who have sex with both men and women (MSMW). Archives of sexual behavior. 2008;37(5):683–96. [PubMed: 18512140]
39. Malebranche DJ. Bisexually active Black men in the United States and HIV: Acknowledging more than the “down low”. Archives of Sexual Behavior. 2008;37(5):810–6. [PubMed: 18506612]
40. Beach L, Bartelt E, Dodge B, Bostwick W, Schick V, Fu T-CJ, et al. Meta-Perceptions of Others’ Attitudes Toward Bisexual Men and Women Among a Nationally Representative Probability Sample. Archives of sexual behavior. 2018:1–7. [PubMed: 28608293]

41. Pathela P, Braunstein SL, Blank S, Schillinger JA. HIV incidence among men with and those without sexually transmitted rectal infections: estimates from matching against an HIV case registry. Clinical infectious diseases. 2013;57(8):1203–9. [PubMed: 23800942]

42. Service UPH. PREEXPOSURE PROPHYLAXIS FOR THE PREVENTION OF HIV INFECTION IN THE UNITED STATES – 2017 UPDATE In: Prevention CfDCa, editor. 2017.

43. Jill Garland D, Division of HIV Disease, Pennsylvania Department of Health. 2018.

44. Montano MA, Dombrowski JC, Barbee LA, Golden MR, Khosropour CM. Changes in sexual behavior and STI diagnoses among MSM using PrEP in Seattle, WA. Age. 2017;30:87.

45. Harawa NT, Holloway IW, Leibowitz A, Weiss R, Gildner J, Landovitz RJ, et al. Serious concerns regarding a meta-analysis of preexposure prophylaxis use and STI acquisition. AIDS (London, England). 2017;31(5):739.

46. Kojima N, Davey DJ, Klausner JD. Pre-exposure prophylaxis for HIV infection and new sexually transmitted infections among men who have sex with men. Aids. 2016;30(14):2251–2. [PubMed: 27314179]

47. Friedman MR, Wei C, Klem ML, Silvestre AJ, Markovic N, Stall R. HIV infection and sexual risk among men who have sex with men and women (MSMW): a systematic review and meta-analysis. PloS one. 2014;9(1):e87139. [PubMed: 24498030]

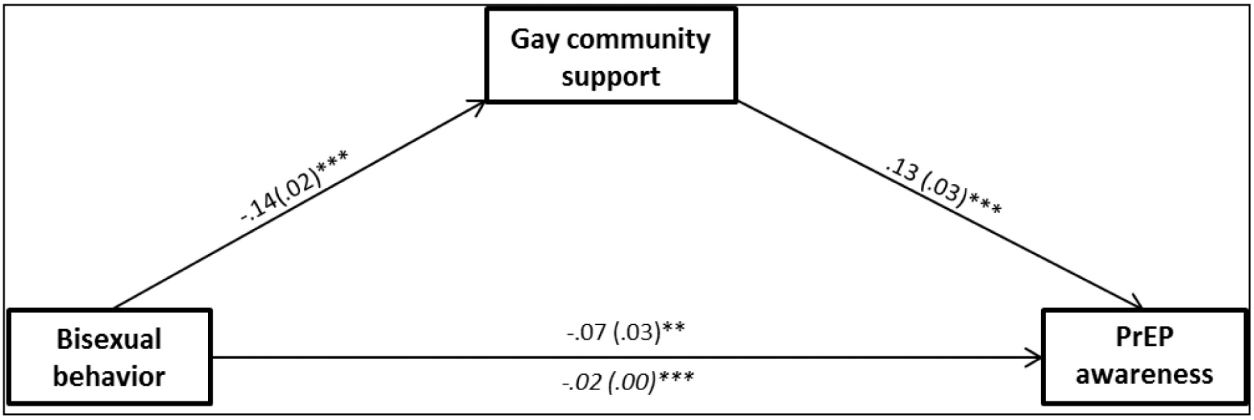


**Figure I.**

Structural equation model assessing total and indirect effects between bisexual behavior, reporting any gay community support, and PrEP awareness among HIV-negative, sexually active Black MSM in POWER, 2014—2017.

Path coefficients and standard errors (parenthesized) shown: ***=p<.001; **=p<.01; *=p<.05. Model adjusted for age, ethnicity, income, and city and year sampled (covariate effects not shown). Indirect effects and standard errors (c' path, parenthesized) shown in italics. SRMR<.001; $\chi^2$<.001; RMSEA<.001; CFI=1.00.

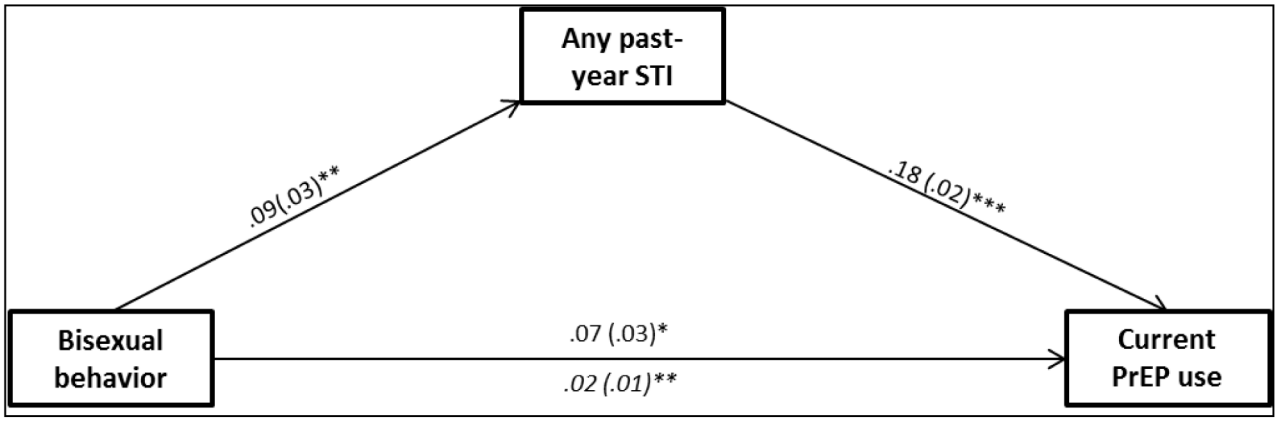


**Figure II.**

Structural equation model assessing total and indirect effects between bisexual behavior, pastyear sexually transmitted infection burden, and current PrEP use among HIV-negative, sexually active, PrEP-aware Black MSM in POWER, 2014—2017.

Path coefficients and standard errors (parenthesized) shown: ***=p<.001; **=p<.01; *=p<.05. Model adjusted for age, ethnicity, income, and city and year sampled (covariate effects not shown). Indirect effects and standard errors (c' path, parenthesized) shown in italics. SRMR<.001. $\chi^2$<.001; RMSEA<.001; CFI=1.00.

**Table I.**

Sociodemographics and sexual health characteristics of HIV-negative, sexually active Black MSMW (n=419) and MSMO (n=1979) in POWER, 2014—2017.

| Sociodemographics | Subcategory | MSMW (419) | MSMO (1979) | Chi-square or t-test value |
|---|---|---|---|---|
| Ethnicity | | | | 3.90* |
| | Hispanic/Latino | 21 (5.0%) | 61 (3.1%) | |
| City | | | | 45.10*** |
| | Philadelphia | 69 (16.5%) | 287 (14.5%) | |
| | Houston | 77 (18.4%) | 416 (21.0%) | |
| | Washington, D.C. | 78 (18.6%) | 476 (24.1%) | |
| | Detroit | 71 (16.9%) | 142 (7.2%) | |
| | Atlanta | 118 (28.2%) | 624 (31.5%) | |
| | Memphis | 6 (1.4%) | 34 (1.7%) | |
| Year | | | | 2.30 |
| | 2014 | 121 (28.9%) | 528 (26.7%) | |
| | 2015 | 156 (37.2%) | 717 (36.2%) | |
| | 2016 | 100 (23.9%) | 541 (27.3%) | |
| | 2017 | 42 (10.0%) | 193 (9.8%) | |
| Age | | | | t=3.83*** |
| | Mean age (s.d.) | 30.7 (0.5) | 28.8 (0.2) | |
| Annual income | | | | 14.82*** |
| | <$10,000 | 105 (25.4%) | 337 (17.2%) | |
| **Sexual health** | | | | |
| | PrEP-aware | 192 (46.3%) | 1086 (55.2%) | 10.96** |
| | Ever used PrEP | 42 (10.1%) | 190 (9.6%) | 0.10 |
| | Current PrEP use | 40 (9.6%) | 149 (7.6%) | 2.01 |
| | Any past-year STI | 93 (22.5%) | 322 (16.4%) | 8.88** |

* p<.05;

** p<.01;

*** p<.001

**Table II.**

Adjusted odds ratios (aOR) from multivariable logistic regression model assessing association between bisexual behavior (predictor) and PrEP awareness (outcome) among HIV-negative, sexually active Black MSM in POWER, 2014—2017 (n=2398).

| Outcome | Predictor/covariate | Subcategory | aOR (95% CI) |
|---|---|---|---|
| PrEP-aware | MSMW | | **0.76 (0.60, 0.95)** |
| | Age 40 or older | | **0.71 (0.54, 0.93)** |
| | Annual income <$10,000 | | **0.61 (0.49, 0.77)** |
| | Hispanic/Latino ethnicity | | **1.75 (1.09, 2.81)** |
| | City | Philadelphia (REF) | 1.00 |
| | | Houston | 0.89 (0.66, 1.19) |
| | | Washington, D.C. | 0.79 (0.59, 1.04) |
| | | Detroit | **0.64 (0.44, 0.92)** |
| | | Atlanta | 1.09 (0.83, 1.43) |
| | | Memphis | 0.62 (0.31, 1.23) |
| | Year | 2014 (REF) | 1.00 |
| | | 2015 | **1.71 (1.38, 2.13)** |
| | | 2016 | **3.22 (2.55, 4.07)** |
| | | 2017 | **3.23 (2.31, 4.51)** |

Bold aOR values indicate significance at p<.05.

**Table III.**

Adjusted odds ratios (aOR) from multivariable logistic regression model assessing association between bisexual behavior (predictor) and current PrEP use (outcome) among PrEP-aware, HIV-negative, sexually active Black MSM in POWER, 2014—2017 (n=1278).

| Outcome | Predictor/covariate | Subcategory | aOR (95% CI) |
|---|---|---|---|
| Current PrEP use | MSMW | | **1.66 (1.11, 2.47)** |
| | Age 40 or older | | 1.10 (0.65, 1.87) |
| | Annual income <$10,000 | | 1.22 (0.78, 1.89) |
| | Hispanic/Latino ethnicity | | **3.36 (1.78, 6.35)** |
| | City | Philadelphia (REF) | 1.00 |
| | | Houston | 0.82 (0.49, 1.39) |
| | | Washington, D.C. | 0.77 (0.46, 1.29) |
| | | Detroit | 0.68 (0.32, 1.47) |
| | | Atlanta | 0.79 (0.49, 1.27) |
| | | Memphis | 0.32 (0.04, 2.56) |
| | Year | 2014 (REF) | 1.00 |
| | | 2015 | 1.33 (0.82, 2.16) |
| | | 2016 | 1.36 (0.85, 2.19) |
| | | 2017 | 1.68 (0.84, 2.99) |

Bold aOR values indicate significance at p<.05.

**Table IV.**

Adjusted odds ratios (aOR) from multivariable logistic regression model assessing predictors of PrEP awareness within HIV-negative, sexually active Black MSMW in POWER, 2014—2017 (n=404).

| Outcome | Predictor/covariate | Subcategory | aOR (95% CI) |
|---|---|---|---|
| PrEP-aware | Any gay community support | | **2.24 (1.34, 3.76)** |
| | Any past-year STI diagnoses | | **2.34 (1.32, 4.14)** |
| | Intimate partner violence, past year | | 1.78 (0.81, 3.92) |
| | Physically assaulted, past year | | 0.71 (0.31, 1.63) |
| | Polydrug use, past 3 months | | **0.38 (0.17, 0.83)** |
| | Depression symptoms | | 0.71 (0.42, 1.22) |
| | Age 40 or older | | 0.71 (0.39, 1.30) |
| | Annual income <$10,000 | | 0.65 (0.37, 1.13) |
| | Hispanic ethnicity | | 1.64 (0.61, 4.42) |
| | City | Philadelphia (REF) | 1.00 |
| | | Houston | 0.86 (0.42, 1.77) |
| | | Washington, D.C. | 0.72 (0.35, 1.49) |
| | | Detroit | 0.45 (0.20, 1.01) |
| | | Atlanta | 1.22 (0.63, 2.38) |
| | | Memphis | 0.65 (0.09, 4.48) |
| | Year | 2014 (REF) | 1.00 |
| | | 2015 | 1.58 (0.91, 2.75) |
| | | 2016 | **2.70 (1.47, 4.99)** |
| | | 2017 | 1.46 (0.65, 3.27) |

Bold aOR values indicate significance at p<.05.

**Table V.**

Adjusted odds ratios (aOR) from multivariable logistic regression model assessing predictors of current PrEP use within HIV-negative, sexually active, PrEP-aware Black MSMW in POWER, 2014—2017 (n=187).

| Outcome | Predictor | Subcategory | aOR (95% CI) |
|---|---|---|---|
| Current PrEP use | Any gay community support | | 1.42 (0.42, 4.77) |
| | Any past-year STI diagnoses | | **5.11 (1.95, 13.39)** |
| | Intimate partner violence, past year | | 2.50 (0.62, 10.02) |
| | Physically assaulted, past year | | 2.30 (0.51, 10.33) |
| | Polydrug use, past 3 months | | 3.87 (0.82, 18.17) |
| | Depression symptoms | | 0.69 (0.23, 2.11) |
| | Age 40 or older | | 1.19 (0.28, 5.00) |
| | Hispanic ethnicity | | 1.04 (0.18, 5.85) |
| | City | Philadelphia (REF) | 1.00 |
| | | Houston | 0.98 (0.26, 3.65) |
| | | Washington, D.C. | 0.40 (0.09, 1.81) |
| | | Detroit | 0.35 (0.04, 2.92) |
| | | Atlanta | 1.35 (0.42, 4.39) |
| | | Memphis | 1.09 (0.04, 32.54) |
| | Year | 2014 (REF) | 1.00 |
| | | 2015 | 1.28 (0.38, 4.32) |
| | | 2016 | 1.17 (0.33, 4.16) |
| | | 2017 | 0.99 (0.18, 5.56) |

Bold aOR values indicate significance at p<.05.