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PrEP Indicators, Social Capital, and Social Group Memberships among Gay, Bisexual, and Other Men Who Have Sex with Men

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Abstract

Efforts to reduce HIV among gay, bisexual, and other men who have sex with men include increasing awareness and uptake of pre-exposure prophylaxis (PrEP). Social capital may facilitate engagement in HIV prevention. Membership of social groups including chosen families (i.e. friends as family relationships) - one potential indicator of social capital - may be protective against HIV risk and infection. In this cross-sectional quantitative study, we examine social capital items and social group membership in association with PrEP outcomes. In 2014, the New Orleans arm of the National HIV Behavioral Surveillance recruited 353 HIV negative men of whom 46% identified as Black, Latino or Other Race and 54% were Non-Hispanic White using venue-based sampling to complete a structured survey. Multivariable logistic regression models tested the relations between social group membership and social capital with PrEP indicators. Men who reported community group participation were more likely to be aware of PrEP compared to those who did not. Men in chosen families associated with a family name were least likely to be aware of and willing to take PrEP compared to those not in any other social groups. Social group membership are a potential social capital indicator for assessing HIV prevention among men.

Keywords

PrEP; social capital; HIV; gay; bisexual; men who have sex with men

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Introduction

Gay, bisexual and other men who have sex with men are at elevated risk for HIV in the USA and new infections persist among young, urban gay, bisexual and other men who have sex with men of colour (CDC 2017). The US CDC predicts that one in two Black men and one in four Latinx[1] men will become infected with HIV during their lifetime (CDC 2016). The southern USA experiences the highest burden of HIV infections nationally (Reif et al. 2015; Sutton et al. 2017). In 2016, the state of Louisiana ranked third in the nation for new HIV case rates, and eighth for the estimated number of HIV cases (Hess et al. 2016; Louisiana Department of Health 2017). That same year, 63% of all new diagnoses in New Orleans were among men who reported having sex with men, 69% of whom were Black, and 60% were among individuals younger than age 35 (Hess et al. 2016; Louisiana Department of Health 2017). The HIV prevalence among men of colour in New Orleans is comparable to some of the most severely affected populations globally. Effective public health strategies to prevent HIV and to encourage the uptake of pre-exposure prophylaxis (PrEP) among young gay and bisexual men of colour are urgently needed.

Many gay and bisexual men belong to social groups that are unique to the lesbian, gay, bisexual, transgender, and queer (LGBTQ) community in the USA (Holloway et al. 2012). Of particular focus in recent research is the formation of chosen families comprised of persons who are biologically or legally unrelated but refer to each other as parents and children. These friends-as-family relationships frequently form due to rejection by families of origin (Sanchez et al. 2010; Murrill et al. 2008; Holloway et al. 2012; Zarwell 2016; Horne et al. 2015; Dickson-Gomez et al. 2014; Oswald 2002; Muraco 2006; Zarwell and Robinson 2018). Chosen families are social support systems made up of friends who in practice function as family and provide social support, rights, statuses, materials, and duties for members. Schneider first described forms of chosen kinship among LGBTQ people in the 1980s (Schneider 1997; Weston 1991). Two forms of chosen family groups are especially prominent in the US public health literature: the house ball community and gay families.

House ball communities serve as important sources of identification and a foundation of support to LGBTQ people of colour who forge new kinship ties and friendships in large cities in the USA (Holloway et al. 2012). Houses, sometimes also referred to as families, often use adopted surnames or names of well-known fashion designers and fashion icons. House members attend balls wherein individuals compete for awards based on talent, fashion, and performance (Holloway et al. 2014). The “parents” in houses are founding members or appointed as parents by prior leaders (Arnold and Bailey 2009). House parents take their responsibility to house members seriously, often acting as opinion leaders who provide emotional, material and social support as a substitute for the lack of support from families of origin (Kipke et al. 2013). House “children” are typically unrelated to the parents by blood or marriage and are given kinship and performance-based titles based on successful competitions at balls (Kubicek et al. 2013).

[1]Latinx is a gender-neutral term for Latino or Latina which references Latin American cultural or racial identities.

Similarly, gay families, including drag families and pageant families, are associated with a family (i.e. a gay mother or a gay father) in the form of mentors and friends as family (Arnold and Bailey 2009; Arnold et al. 2018; Schrager et al. 2014; Kipke et al. 2013; Kubicek et al. 2013). Gay family membership may also be associated with pageantry or drag performances or primarily serve as mentorship relationships for gay and bisexual men. Members of gay families may also adopt family names which may act to further legitimise family membership and status, although gay families are not always associated with a family name (Oswald 2002; Horne et al. 2015; Levitt et al. 2017; Weston 1991; Zarwell and Robinson 2018).

Additional social ties maintained by gay and bisexual men include those within the Bear and Leather communities. The bear subculture initially emerged in San Francisco in the 1980s and has grown to represent an international community (Mosher, Levitt and Manley 2006). Bears are men who often exhibit masculine appearance and physical traitssuch as facial or body hair and larger body size (Kampf 2000; Suresha 2002; Wright 1997). While primarily cisgender men, a small percentage of lesbians and trans men also participate in bear culture. In comparison, the leather subculture is organised around style of dress and particular sexual preferences community whereby adorning leather clothing may display dominant masculine sexuality, kink, fetishism and sexual behaviour preferences (Mosher, Levitt and Manley 2006; Peacock et al. 2001). In addition to these social organisations, other social ties have been described within LGBTQ communities.

Because gay and bisexual men experience intersecting stigmas linked to race, gender and sexuality (Logie et al. 2011; Chakrapani et al. 2017; Pachankis et al. 2017; Parker et al. 2017), the social connections maintained outside of mainstream society and other elements of community embeddedness and resilience may be integral to success in public health programming and intervention with this population. Moreover, social groups may also form in reaction to the internal or external stigma experienced by and upheld within the LGBTQ community(Oswald 2002; Muraco 2006).

Social capital has multiple dimensions and has been operationalised at the network level (Bourdieu 1986) as well as at contextual levels such as communities or neighbourhoods (Putnam 2000). The underlying mechanism of social capital proposed in multiple theoretical frameworks is the exchange of information and resources by virtue of social connections (Kawachi and Subramanian 2018). Social capital in the public health literature is often operationalised through indicators that include membership and participation in voluntary community organisations (Campbell and Mzaidume 2002); collective norms, trust, reciprocity and knowledge (Kirst 2009); social network ties, communication and social norms (Friedman et al. 2007); and social leverage, informal social control and neighbourhood organisation participation (Carpiano 2006).

One potentially new aspect of social capital that has received less attention is subgroup-specific social capital, such as membership in social groups unique to men and other members of the LGBTQ community. Social group memberships may be a relevant indicator to study because men may be excluded from mainstream access to social capital due to marginalisation and heterosexual norms exhibited (Portes 2014). Previously, we found that

the social group memberships that gay and bisexual men maintain are protective against HIV risk behaviours, particularly for men who belong to chosen families with a family name, and men who do not report any social group memberships reported higher HIV risk behaviours (Zarwell 2016; Zarwell and Robinson 2018). The social embeddedness of gay and bisexual men within particular social groups may promote social capital through access to resources, the maintenance of a group identity and the acquisition of prestigious or meaningful social ties for men who experience multiple marginalisation by wider society, which may influence risk and protective behaviours.

The empirical evidence linking social capital to HIV-related outcomes is mixed, with some studies finding positive associations while others negative associations. In studies conducted internationally, social capital and social network norms have been linked to reduced HIV risk behaviours (Pronyk, Harpham, Morison, et al. 2008) and a decline in HIV incidence (Frumence et al. 2010). In Swaziland, researchers found that social capital, including measures of social cohesion and social participation in community clubs and organisations, was associated with increased HIV testing among gay, bisexual, and other men who have sex with men (Grover et al. 2016). Alternatively, one South African study found that membership in different voluntary community organisations was correlated with both increased and decreased HIV risk behaviours, which varied by gender and age (Campbell and Mzaidume 2002).

Although focused analysis of social capital in HIV prevention research has been limited in the USA (Ransome et al. 2018), social capital has been linked to affiliation within particular social networks among people who inject drugs and correlated to risky or protective injection behaviour (Lovell 2002; Kirst 2009). US studies have also identified correlations between social capital and HIV treatment and adherence (Phillips et al. 2013), HIV diagnosis (Ransome et al. 2016), and as a predictor of sexually transmitted diseases and AIDS cases (Holtgrave and Crosby 2003). A recent review found only 12 empirical studies investigating social capital and HIV-related indicators, seven of which incorporated previously validated social capital scales (Ransome et al. 2018). A more recent US study, published after the aforementioned review was conducted, found that social capital measures may buffer against depressive symptoms for gay and bisexual men of colour (Hussen et al. 2018).

None of the aforementioned studies were conducted solely among gay and bisexual men nor did any studies investigate the association between social capital or social group memberships with PrEP indicators either nationally or in local settings such as the southern USA where the HIV burden is highest. The boundedness of social group memberships among gay and bisexual men likely offer security, safety, companionship and a sense of purpose through a shared social identity or chosen kinship network. In addition, social cohesion within social groups may provide trust, connectedness, reciprocity, values and important network ties to a marginalised population. When combined, social cohesion and boundedness proffered through social group memberships lay the foundation for social capital (Carpiano 2006).

The purpose of this study is to consider the impact of social group memberships as a potential indicator of social capital for GMB beyond indicators previously developed by Onyx and Bullen to measure social capital in the general population (Onyx and Bullen 2000). We hypothesise that social group memberships among men will be a predictor for social capital above and beyond Onyx and Bullen's social capital measures because these particular social groups provide social cohesion and boundedness to marginalised gay and bisexual men.

Materials and Methods

During the CDC's National HIV Behavioral Surveillance (NHBS) MSM4 cycle[2], a total of 553 participants were surveyed, of whom 407 were HIV-negative. Eligible participants were 18 years of age or older, residents of New Orleans, English speakers, born and self-identified as cisgender male who reported ever having sex with a man. The final analytic sample size of 353 was restricted to men whose self-reported HIV status was negative at the time of the interview and for whom there was complete data on community group participation, both PrEP indicators, and social group membership. Nearly half of the participants identified as Black, Latino or Other Race (46%) followed by Non-Hispanic White (54%).

Recruitment

Prior to primary data collection, NHBS staff spend months establishing ties and garnering support from the community in the context of the venues where data collection takes place. Participants were recruited using venue-based time-space sampling between July and December 2014. This kind of sampling involves formative research to identify the venues frequented by gay and bisexual men and to establish day-time periods for recruitment. Monthly, a calendar was used to schedule days and times for the recruitment events at bars, sex clubs and dance clubs in New Orleans. At recruitment events, men who crossed a designated line of recruitment (i.e. threshold) were systematically approached by members of the NHBS team and screened. Eligible and consenting participants completed a survey on a handheld device with the assistance of field interviewers who also administered HIV testing in a private location on-site at each venue. All study participants received $50 cash-value gift cards for participation in the survey and testing, information about HIV and STI prevention and testing in New Orleans, and referrals to relevant services. This study was approved by the Louisiana State University Health Sciences Center and Louisiana Department of Health's Institutional Review Boards.

Measures

Survey data were collected using the core NHBS survey and additional survey questions developed by the New Orleans study team. Each interview lasted approximately 45 minutes and was followed by administration of a rapid HIV test.

[2]NHBS conducts behavioural surveillance in annual, rotating cycles in three different populations at increased risk for HIV. During each cycle, a minimum of 500 eligible persons from each participating project area are interviewed using a standardised, anonymous questionnaire to collect information on HIV-related risk behaviours, HIV testing, and the use of HIV prevention services. Participants are additionally offered an HIV test.

Demographics—Age was calculated from the self-reported date of birth and categorised 18–29, 30–39, and 40+. As relatively few participants (13%) identified as some race or ethnicity other than White or Black, race was dichotomised into two categories of "White" and "Black, Latinx or Other Race". The race/ethnicity measure was dichotomised because 114 participants (33%) identified as "Black", 9 (2%) identified as "Black and Another Race", 19 (5%) identified as "Hispanic", and only 5 individuals (1%) identified as any other race. Education level was defined as high school equivalent or less, some college, and college graduate. Other yes/no measures included health insurance, having a female sexual partner in the past 12 months, and HIV and other STI testing in the past 12 months.

Social Capital—The social capital indicators were modified from items identified in a previously validated scale (Onyx and Bullen 2000). We included items with the highest factor loadings under each of the following eight domains: (*Value of Life*: Do you feel valued by society? *Work Connections*: Are your co-workers or classmates also your friends? *Tolerance of Diversity*: Do you enjoy living among people of different lifestyles? *Community Group Participation:* Are you an active member of a local organisation or club? *Social Agency*: If you need information to make a life decision, do you know where to find that information? *Trust/Safety*: Do you feel safe walking down your street after dark? *Neighbourhood Connections*: Have you visited a neighbour in the past week? And *Friend Communication*: In the past week, how many times did you communicate with friends using your phone? These measures were asked in the form of yes/no/don't know questions to all participants with the exception of friend communication, a continuous variable, which was dichotomised for analyses. The decision to dichotomise based on the median value was made due to extreme outliers and because this variable was not significantly related to any of the outcomes measures. Participants who reported speaking to their friends fewer than 40 times per week were considered to communicate less frequently, than those who did communicate 40 or more times per week.

Social Group Membership—Participants indicated whether they belonged to any of a number of social groups known to the LGBTQ community, which were identified during formative research. Response categories included: gay family, pageant family, house ball community, faerie community, gay fraternity, bear community, leather community, other and none. Participants who were members of a chosen family category (i.e. gay family, pageant family, or house) were additionally asked if the family had a name. Nearly half (46%) of participants in a reported that their chosen family did not have a family name. The final operationalisation of group type included the following four categories: named families, non-named families, other social groups and none (no social group membership). Thus, "other social group" includes any participant who reported belonging to social groups, clubs, or organisations with predominantly male members, such as a gay fraternity, bear community, leather community, etc.

PrEP Indicators—Two yes/no measures were used to assess awareness of and willingness to take PrEP: "Before today, have you ever heard of people who do not have HIV taking antiretroviral medicines, to keep from getting HIV?" and "Would you be willing to take anti-HIV medicines every day to lower your chances of getting HIV?"

Analysis

Data were analysed using SAS 9.3. Descriptive statistics were generated for all demographic and study variables followed by a bivariate analysis to examine associations between social capital, social group memberships and PrEP indicators. Demographic measures with significant p-values were included in regression models to predict PrEP awareness and willingness. Multivariable logistic regression models controlled for the following covariates: age, race, education level, health insurance status, and having a female sexual partner in the past 12 months. Full models included each of the eight social capital measures and the social group membership measure.

Results

Nearly half of the participants were Black or Other Race (46%) and under the age of 30 (42%). About half of the participants had a least some college education and 18% had had a female sexual partner within the past 12 months. Seventy percent of the sample had health insurance. Participants reported relatively recent testing experiences in the past 12 months: 67% had had an HIV test and 58% had had an STI test. The majority of the sample (63%) did not report belonging to any LGBTQ specific social groups identified from formative research (i.e. chosen families, bear community, leather community, etc.). Approximately 24% of participants belonged to a chosen family. Of those, 13% belonged to a chosen family with a family name and 11% reported chosen families without names. Thirteen percent of participants reportedly belonged to some other social group within the LGBTQ community. In comparison, the standard social capital measure community group participation (i.e. being an active member of a local organisation or club) was reported among 25% of the sample.

Social group membership was associated with race, age, health insurance, having a recent female sexual partner and community group participation. Membership in a Named chosen family was most common among men of colour, whereas chosen families without names and other social organisations were more common among Non-Hispanic White men ($p=<.0001$, $\chi^2=31.23$). Participants who were younger (aged 18–29 and 30–39) were more likely to belong to chosen families, whereas other social group memberships were highest among participants aged 30 and up ($p=0.0005$, $\chi^2=24.26$). Gay and bisexual men who reported no social group membership were mostly aged 18–29 (41%), followed by individuals age 40 and up (36%).

While health insurance was fairly high across the sample, 47% of men in named chosen families did not have health insurance ($p=0.0305$, $\chi^2=8.91$). Having a female sexual partner in the past 12 months was most common among men who were not a member of any social group ($p=0.0027$, $\chi^2=14.14$). Interestingly, despite belonging to a chosen family or other social group, membership in each of the three social group categories was not synonymous with community group participation. In addition, 13% of participants who were reportedly not members of any LGBTQ social groups reported community group participation ($p=<.0001$, $\chi^2=56.17$).

Community group participation was associated with education level, health insurance, having a female sexual partner in the past 12 months and recent STI screening. College

graduates were most likely to report community group participation (p=0.0041, χ^2=10.98). Eighty-four percent of men who reported community group participation currently had health insurance (p=0.0010, χ^2=10.74). Having a female sex partner was more common among men who did not report community group participation (p=0.0489, χ^2=3.88). STI testing in the past 12 months was more common among men who reported community group participation (p=0.0154, χ^2=5.87).

Table 2 presents associations with PrEP outcomes. Black and Other Race men were less likely to be aware of PrEP than Non-Hispanic White men (p=0.0016, χ^2=9.93). Awareness of PrEP was also significantly related to age (p=<.0001, χ^2=37.83), recent STI testing (p=<.0001. χ^2=15.36), LGBTQ social group membership (p=<.0001, χ^2=35.04), and community group participation (p=<.0001, χ^2=19.41). Willingness to take PrEP was associated with age (p=0.0036, χ^2=11.30), recent STI testing (p=0.0012, χ^2=10.51), and social group membership (p=0.0003, χ^2=18.84). The remaining social capital indicators (social agency, trust and safety, neighbourhood connections, value of life, work connections, tolerance of diversity and friend communication) were not significantly associated with either PrEP indicator.

PrEP Awareness

The multiple regression analyses for social capital measures, social group memberships and PrEP outcomes are shown in Table 3. Three models tested for associations between the social capital measures and PrEP awareness. The first model presents eight of Onyx and Bullen's (2000) social capital measures, controlling for age, race, education, health insurance and recent female sexual partners. Higher education levels were associated with PrEP awareness. The only social capital measure from this scale associated with PrEP awareness in Model 1 was community group participation. Participants who reported belonging to a community group were 2.65 times more likely to be aware of PrEP (95% CI 1.52, 4.62). The second model examines the relationship between LGBTQ specific social groups and PrEP awareness. Participants who belonged to social groups other than chosen families were over 10 times as likely to be aware of PrEP (95% CI 4.11, 25.40) followed by those in chosen families without a shared family name (AOR 3.10 95% 1.41, 6.83). In the third model, which includes all social capital measures and social group memberships, the relationship between community group participation and PrEP awareness weakens. Thus, the relationship between social group memberships and PrEP awareness remained significant when controlling for all eight measures of social capital.

PrEP Willingness

Three models tested for associations between the social capital measures and PrEP willingness. In each model, younger ages and higher education were associated with PrEP willingness. In Model 1, men who reported belonging to a community group participation (the Onyx and Bullen social capital measure) were more likely to report PrEP willingness (AOR 1.78 95% CI 1.20, 3.10). In the second model, in comparison to participants who reportedly did not belong to any LGBTQ groups, participants who belonged to a social organisation (other than chosen families) were more than four times as likely to be willing to take PrEP (95% CI 2.04, 10.72). Participants who belonged to chosen families were also

more likely to be willing to take PrEP than participants who did not belong to any social groups. In the full model, social group memberships influenced PrEP willingness; however, the relationship between the social capital indicator weakened and was no longer significant.

Discussion

Addressing the HIV epidemic among gay, bisexual, and other men who have sex with men requires engaging communities and expanding prevention programmes for disproportionately affected communities (Ransome et al. 2018). Peer influence through embeddedness in sports or club activities has been previously associated with decreased substance use behaviours among adolescents, and social networks affiliated with specific venues have been shown to influence HIV risk behaviour among male sex workers (Fujimoto et al. 2015; Fujimoto, Williams and Ross 2013). These findings are consistent with more recent literature demonstrating PrEP awareness as associated with social embeddedness or network size. For example, one recent study found that young Black men who have sex with men in Chicago who were members in the House and Ball community were more likely to be aware of PrEP (Khanna et al. 2016) and another found that larger networks comprised of younger gay and bisexual men were more likely to take PrEP (Kuhns et al. 2017).

In our sample, PrEP outcomes varied significantly by social participation indicators, including community group participation and LGBTQ social group memberships. None of the other social capital measures were associated with PrEP outcomes. These results indicate that social capital measures which incorporate community participation have some bearing on PrEP awareness and attitudes among gay and bisexual men. While Onyx and Bullen's (2000) community group participation measure significantly influenced awareness and willingness to take PrEP, the association between our social group and both PrEP indicators may be a more direct indicator of protective social capital.

Our findings extend previous social capital research by arguing that there may be population-specific and disease-specific contexts to consider when measuring social capital constructs and social relationships (Kawachi and Subramanian 2018). If the underlying basic paradigm of social capital holds that the sum of resources made available by an individual's network impacts health outcomes, then it is important to consider associations between social capital measures and PrEP outcomes among men specifically. In other words, broad or more general measures of social capital, such as Onyx and Bullen's (2000) participation in local organisations or clubs (i.e. local "sport, craft, or social club"), may not fully encapsulate social capital specific to men who join social group memberships within the wider LGBTQ community. Thus, this research highlights the importance of measurement development normed on target populations and the need for ongoing formative research to develop better subgroup specific indicators of social capital. Therefore, research on the development of social capital scales to measure social capital specifically among gay and bisexual men who belong to LGBTQ specific social groups, as have been recently developed by our study team (Zarwell and Robinson Forthcoming), are needed.

Our findings also support intervention efforts that strive to intentionally create social capital by maximising on existing community strengths (Pronyk, Harpham, Busza et al. 2008). Previous studies have pointed to potential interventions to augment social capital in populations at elevated risk for HIV (Hussen et al. 2018; USAID 2013) including community empowerment interventions, fostering support groups, developing economic empowerment and microfinance interventions, and peer-led interventions through popular opinion leaders (Campbell and MacPhail 2002; Blanchard et al. 2013; Pronyk, Harpham, Busza et al. 2008). Interventions established in the USA should take into careful consideration cultural, social, demographic and geographic variations in social group memberships that already exist in the lives of gay and bisexual men and which may be important for intervention efforts (Hussen et al. 2018). In addition, this study provides further support for leveraging social capital in HIV prevention interventions which build upon established social networks and mentoring relationships in chosen families among gay and bisexual men and transgender women (Horne et al. 2015; Levitt et al. 2017; Perez-Brumer et al. 2017). For example, particular social groups may be targeted to increase awareness of PrEP or to further investigate barriers to PrEP including attitudes and norms which may be shared by group members. Conversely, social groups that are more inclined to take PrEP may provide information on strategies to promote PrEP effectively among men. Among gay and bisexual men who do not belong to any social groups, additional resources to promote PrEP or opportunities to join social groups that currently exist may be called for. Thus, health promotion interventions may be facilitated and bolstered by involving known mentors such as parents in chosen families, whose influence may be particularly relevant to young gay and bisexual men of colour at elevated risk for HIV infection (Reed et al. 2018).

Future studies should aim to understand how men who belong to specific groups, particularly chosen families, may perceive their risk for HIV –a key factor which may influence interest in and uptake of PrEP. In addition, it remains to be seen whether social capital afforded by social group memberships may overcome other previously identified barriers to PrEP uptake including perceived stigma, cost and accessibility (Spinner et al. 2016; Kuhns et al. 2017; Eaton et al. 2017; Golub, Gamarel and Surace 2017).

Limitations

There are several limitations to this study. First, NHBS relies on self-report data with potential for recall and social desirability bias. Despite this limitation, NHBS provides reliable data and utilises skilled interviewers trained to develop rapport with participants. The non-probability VBTS sampling strategy may omit otherwise eligible men who do not attend venues, however, this form of recruitment is well established as the optimal strategy to recruit multisite national samples of gay and bisexual men. While weighting procedures to improve VBTS are currently under development, this study investigates relationships, not point prevalence estimates. Lastly, this exploratory study dichotomised eight items with high factor loadings from previously developed domains of a social capital scale (Onyx and Bullen 2000) and developed a measure of social group memberships based upon formative research in New Orleans. As such, we have no reference for the validity of our approach to measure social capital in comparison to the larger formal scale or the generalisability of the social group memberships we found in New Orleans. Nonetheless, our use of the NHBS

environment to additionally measure social capital and social group memberships among men is novel. Finally, this is one of the first studies to situate participation in chosen families as a measure of social capital that is associated with PrEP outcomes among gay and bisexual men. Finally, we were unable to adjust for structural barriers and potential biases in healthcare settings which may negatively influence PrEP uptake regardless of social capital.

Conclusion

In conclusion, these results illuminate an opportunity to engage in renewed efforts to inform the LGBTQ community about PrEP by accessing endogenous social networks among gay and bisexual men. Efforts to inform the community about PrEP and destigmatise its uptake within identified social groups of gay and bisexual men are warranted. Moreover, previously developed HIV prevention programs that are traditionally predicated upon individual behaviour change may not be the best approach to improve PrEP outcomes among gay and bisexual men (Campbell and Mzaidume 2002). This work supports calls for the incorporation of social groups which may influence the success or failure of new biomedical prevention efforts among young men of colour. If participation in social groups is one mechanism of social capital that influences PrEP awareness and interest, above and beyond standard indicators of social capital such as wider community group participation, then social networks such as chosen families are a viable avenue for intervention efforts. Targeted interventions may involve strategies to facilitate peer leaders, such as the ‘parents’ in chosen families, to encourage HIV prevention and treatment among their children. Social network research may strengthen this line of inquiry by identifying sociometric routes and effective strategies to disseminate information about PrEP within existing social environments, including accessing online support groups and networks (Young, Fujimoto, and Schneider 2018).

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Table 1:

Demographic Characteristics and Associations with LGBT Social Group Memberships and Community Group Participation among GBM

	Total		Social Group Memberships										Community Group Participation					
			Named CF		No-Name CF		Other Group		None		X^2	*p* value	Yes		No		X^2	*p* value
Race											31.23	**<.0001**					0.35	0.5559
Black/ Other	162	46%	34	76%	14	36%	9	19%	105	47%			38	43%	124	47%		
Non-Hispanic White	191	54%	11	24%	25	64%	38	81%	117	53%			50	57%	141	53%		
Age											24.26	**0.0005**					1.21	0.5456
18–29	150	42%	31	69%	18	46%	11	23%	90	41%			33	38%	117	44%		
30–39	90	26%	10	22%	9	23%	18	38%	53	24%			24	27%	66	25%		
40+	113	32%	4	9%	12	31%	18	38%	79	36%			31	35%	82	31%		
Education											8.39	0.2112					10.98	**0.0041**
High school or less	89	25%	17	38%	8	21%	9	19%	55	25%			13	15%	76	29%		
Some college	91	26%	9	20%	15	38%	13	28%	54	24%			19	21%	72	27%		
College graduate	173	49%	19	42%	16	41%	25	53%	25	51%			56	64%	117	44%		
Health Insurance											8.91	**0.0305**					10.74	**0.0010**
Yes	248	70%	24	53%	27	69%	38	81%	159	72%			74	84%	174	66%		
No	105	30%	21	47%	12	31%	9	19%	63	28%			14	16%	91	34%		
Female sex partner[a]											14.14	**0.0027**					3.88	**0.0489**
Yes	65	18%	4	9%	4	10%	3	6%	54	24%			10	11%	55	21%		
No	288	82%	41	91%	35	90%	44	94%	168	76%			78	89%	210	79%		
HIV Test[a]											5.98	0.1126						0.1211
Yes	237	67%	34	76%	26	67%	37	79%	140	63%			65	74%	172	65%		
No	116	33%	11	24%	13	33%	10	21%	82	37%			23	26%	93	35%		
STI Test[a]											5.48	0.1400					5.87	**0.0154**
Yes	147	58%	26	58%	15	38%	19	40%	87	39%			46	53%	101	38%		
No	205	42%	19	42%	24	62%	28	60%	134	61%			41	47%	164	62%		
Community Participation											56.17	**<.0001**					-	-
Yes	88	25%	24	53%	10	26%	25	53%	29	13%			-	-	-	-		
No	265	75%	21	47%	29	74%	22	47%	193	87%			-	-	-	-		
TOTAL			**45**	**13%**	**39**	**11%**	**47**	**13%**	**222**	**63%**			**-**	**-**	**-**	**-**		

[a]past 12 months

Table 2:

Associations with PrEP Indicators among GBM

	PrEP Awareness						PrEP Willingness					
	Yes		No		X^2	*p* value	Yes		No		X^2	*p* value
Race					9.93	**0.0016**					1.46	0.2264
Black/Other	61	37%	101	54%			106	48%	56	42%		
Non-Hispanic White	104	63%	87	46%			113	52%	78	58%		
Age					5.35	0.0690					11.3	**0.0036**
18–29	62	38%	88	47%			100	46%	50	37%		
30–39	51	31%	39	21%			63	29%	27	20%		
40+	52	31%	61	32%			56	25%	57	43%		
Education											2.73	0.2548
High school or less	20	12%	69	37%	37.83	**<.0001**	50	23%	39	29%		
Some college	38	23%	53	28%			62	28%	29	22%		
College graduate	107	65%	66	35%			107	49%	66	49%		
Health Insurance					0.52	0.4724					0.86	0.3546
Yes	119	72%	129	69%			150	68%	98	73%		
No	46	28%	59	31%			69	32%	36	27%		
Female sex partner[a]					3.09	0.0790					0.01	0.9266
Yes	24	15%	41	22%			40	18%	25	19%		
No	141	85%	147	78%			179	82%	109	81%		
HIV Test[a]					3.49	0.0619					3.46	0.0629
Yes	119	72%	118	63%			155	71%	82	61%		
No	46	28%	70	37%			64	29%	52	39%		
STI Test[a]					15.36	**<.0001**					10.51	**0.0012**
Yes	87	53%	60	32%			106	48%	41	31%		
No	78	47%	127	68%			113	52%	92	69%		
Social Group Membership					35.04	**<.0001**					18.84	**0.0003**
Named Constructed Family	20	12%	25	13%			34	16%	11	8%		
Non-Named Family	23	14%	16	9%			28	13%	11	8%		
Other Social Group	39	24%	8	4%			38	17%	9	7%		
None	83	50%	139	74%			119	54%	103	77%		
Community Participation					19.41	**<.0001**					3.52	0.0605
Yes	59	36%	29	15%			62	28%	26	19%		
No	106	64%	159	85%			157	72%	108	81%		

[a] past 12 months

Table 3:

Multivariate logistic regression models for predictors of PrEP awareness and willingness and community participation, adjusted odds ratios and 95% confidence intervals

	PrEP Awareness			PrEP Willingness		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Age						
18–29	1.40 (0.76, 2.59)	1.32 (0.69, 2.53)	1.37 (0.71, 2.63)	**2.33 (1.28, 4.23)**	**2.15 (1.16, 3.98)**	**2.17 (1.17, 4.03)**
30–39	1.86 (0.99, 3.48)	1.59 (0.82, 3.07)	1.63 (0.84, 3.17)	**2.56 (1.38, 4.75)**	**2.28 (1.21, 4.29)**	**2.30 (1.22, 4.33)**
40+ (ref)						
Race						
Black/Other	0.66 (0.40, 1.09)	0.87 (0.51, 1.49)	0.86 (0.50, 1.47)	1.24 (0.75, 2.04)	1.43 (0.84, 2.43)	1.43 (0.84, 2.42)
Non-Hispanic White (ref)						
Education						
High school or less (ref)						
Some college	**2.09 (1.04, 4.21)**	**2.40 (1.15, 5.0)**	**2.31 (1.10, 4.83)**	**2.16 (1.10, 4.24)**	**2.39 (1.20, 4.78)**	**2.38 (1.19, 4.76)**
College graduate	**5.08 (2.61, 9.92)**	**7.83 (3.81, 16.12)**	**7.10 (3.44, 14.67)**	1.70 (0.91, 3.15)	**2.06 (1.09, 3.89)**	**2.01 (1.06, 3.82)**
Health Insurance						
Yes versus No	0.68 (0.39, 1.19)	0.68 (0.38, 1.23)	0.62 (0.35, 1.14)	0.79 (0.46, 1.36)	0.84 (0.48, 1.47)	0.83 (0.47, 1.45)
Female sex partner*						
Yes Vs. No	0.83 (0.45, 1.56)	1.06 (0.55,2.02)	1.04 (0.54, 2.00)	0.99 (0.55, 1.80)	1.24 (0.67, 2.29)	1.24 (0.70, 2.28)
Social Group Membership						
Named CF	-	1.57 (0.74, 3.33)	1.18 (0.52, 2.659)	-	**2.24 (1.02, 4.96)**	2.10 (0.92, 4.82)
No Name CF	-	**3.10 (1.41, 6.83)**	**2.82 (1.28, 6.23)**	-	**2.28 (1.03, 5.04)**	**2.23 (1.01, 4.95)**
Social Organization	-	**10.21 (4.11, 25.40)**	**8.13 (3.20, 20.73)**	-	**4.68 (2.04, 10.72)**	**4.42 (1.87, 10.44)**
None (ref)						
Social Capital Variables (ref=0)						
Community Group Participation	**2.65 (1.52, 4.62)**	-	1.87 (0.99, 3.50)	**1.78 (1.02, 3.10)**	-	1.16 (0.63, 2.16)
Social Agency	1.32 (0.63, 2.78)	1.16 (0.53, 2.55)	1.11 (0.51, 2.42)	0.61 (0.30, 1.27)	0.55 (0.26, 1.16)	0.55 (0.26, 1.15)
Trust and Safety	1.07 (0.61, 1.87)	1.11 (0.63, 1.98)	1.12 (0.62, 1.97)	0.95 (0.55, 1.63)	0.96 (0.55, 1.67)	0.96 (0.55, 1.67)
Neighborhood Connections	1.31 (0.80, 2.15)	1.38 (0.83, 2.31)	1.34 (0.80, 2.25)	1.00 (0.62, 1.62)	0.98 (0.60, 1.60)	0.97 (0.60, 1.59)
Value	0.94 (0.48, 1.83)	1.04 (0.51, 2.12)	1.08 (0.53, 2.22)	1.13 (0.60, 2.13)	1.19 (0.62, 2.29)	1.20 (0.62, 2.31)
Work Connections	0.79 (0.44, 1.43)	0.78 (0.42, 1.44)	0.82 (0.44, 1.52)	0.78 (0.44, 1.38)	0.79 (0.44, 1.42)	0.80 (0.45, 1.44)

	PrEP Awareness			PrEP Willingness		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Tolerance of Diversity	0.80 (0.23, 2.82)	060 (0.16, 2.17)	0.57 (0.15, 2.11)	2.17 (0.67, 7.02)	1.99 (0.60, 6.64)	1.99 (0.59, 6.64)
Friend Communication	0.93 (0.57, 1.54)	1.10 (0.66, 1.83)	1.03 (0.61, 1.73)	0.91 (0.56, 1.48)	0.99 (0.61, 1.63)	0.98 (0.60, 1.61)

Note: numbers in bold are statistically significant at $p < 0.05$

* In the past 12 months