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Gender Identity and Sexual Orientation in Chinese Men who Have Sex with Men: A Latent Class Analysis

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Abstract

Background: Men who have sex with men (MSM) are a diverse population yet are often treated as a monolithic risk group. In China, MSM have long been characterized as a “bridge population” of closeted men who are married to (or will marry) women due to sociocultural expectations. Latent class models can inform a more nuanced yet empirical characterization of this population.

Methods: 1424 eligible respondents recruited online provided self-reported behavioral data. Nine items related to constructs including sexual behaviors, sexual orientation, and gender identity informed the latent class model. Logistic regression was used to measure associations between latent class membership and HIV-related sexual and health-seeking behaviors.

Results: Model fit indicated a population structure made up of four classes that we characterized as “*Gender nonconforming*” (4.3%), “*Closeted-unmarried*” (29.9%), “*Closeted-married*” (24.6%), and “*Out*” (41.2%). Members of the “*gender nonconforming*” class were more likely to report HIV-related risk behaviors, and “*Closeted-unmarried*” class members were less likely to report health-seeking behaviors, both relative to “*Out*” members.

Discussion: The largest latent class was made up of members of the “*Out*” class, an enlightening revision of a population traditionally viewed as largely closeted men. Two types of “closeted” classes emerged, distinguished by divergent tendencies regarding marriage and health seeking. Findings suggest that current understandings of Chinese MSM are simplistic (regarding closeted behaviors) and too narrow (in its definition of MSM as cisgender men). A more nuanced

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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.

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understanding of MSM subgroups and their heterogeneous risk behaviors will be critical for provision of more meaningful prevention services.

Keywords

Men who have sex with men; latent class analysis; HIV risk behaviors; subgroup analysis

INTRODUCTION

The term “men who have sex with men” or “MSM” has been used to refer to people born male who have sex with other persons born male, and often includes people who identify as gay, bisexual, or non-binary (e.g. transgender women). It is commonly used in the context of HIV prevention, given the group’s higher HIV incidence relative to the heterosexual populations, a phenomenon attributed to the higher transmission probability of unprotected anal sex (Patel et al., 2014). In settings such as China, the term MSM has come to bear additional connotations of closeted men who marry due to sociocultural pressures and who are as such often referred to in the public health literature as potential “bridges” for HIV transmission to the general population through sex with women (Qun et al., 2009; Lin et al., 2015; Song et al., 2013; Tao et al., 2013; Wang et al., 2015; Yun et al., 2011; Zhang et al., 2001).

Since the earliest known characterizations of Chinese MSM as a monolithic group of married, closeted men (Zhang et al., 2000a; Zhang et al., 2000b), a sizeable body of research has improved our understanding of this population’s vulnerability to HIV. Identification of structural (Arreola et al., 2015; Choi et al., 2002; Liu et al., 2018) and sexual network (Choi et al., 2007; Liu et al., 2009; Ruan et al., 2011) drivers of HIV risk, for example, have provided more epidemiological context for observed transmission patterns and justified calls for systems-level interventions. A growing evidence base documenting substantial heterogeneity among participants in MSM studies has also informed a more realistic picture of diverse population with varied health and social needs (Parker et al., 2016; Poteat et al., 2016; Reisner et al., 2016). Last, the failure of a generalized HIV epidemic to materialize in China (as was once predicted by a 2001 policy report (The UN Theme Group on HIV/AIDS in China, 2002)) has led to a critical rethinking of the role of MSM in the larger epidemic (Liu et al., 2018; Wu et al., 2007).

These findings have emerged in the context of a rapidly expanding HIV epidemic among Chinese MSM (Mao et al., 2018; Xu et al., 2016)—as is the case in several other low/middle income countries (LMIC; Beyrer et al. 2012)—presenting an important opportunity to reexamine our current conceptualizations of this population. Moreover growing interest among China’s health authorities in biomedical interventions such as preexposure prophylaxis (PrEP; Zhang et al. 2018; Wei & Raymond, 2018) are expected to motivate strategies to target specialized services to the subgroups with greatest need, given the costliness of these drug and concerns about risk compensation and drug resistance (Baeten et al., 2014). Categorization of MSM into subgroups in the Chinese literature traditionally delineates individuals along lines such as migrant status (Chen et al., 2015; Hu et al., 2017; Wu et al., 2016), drug use habits (Chen et al., 2015; Xu et al., 2014) or commercial sex

behaviors (Tang et al., 2015; Zheng et al., 2016). However these groupings do not necessarily lend themselves to effective public health interventions, particularly if disclosure of illicit behaviors such as commercial sex or drug use becomes a prerequisite for community engagement. An improved understanding of the population structure of MSM will be critical to the provision of culturally appropriate and effective health engagement.

Here we present an alternative strategy for identifying subgroups among MSM by using a latent class analysis (LCA) applied to data from participants of an HIV prevention trial. Unlike traditional methods such as risk scoring or regression modeling, LCA identifies groups by assessing distinct response patterns to multiple factors (Lanza, Rhoades, Greenberg, & Cox, 2011). LCAs of MSM are also increasingly common, and have examined subgroup structure as it pertains to factors such as sexual HIV risk (Chan et al., 2015; Janulis et al., 2017; Wilkinson et al., 2017), substance use (Lim et al., 2015), and chronic disease (Schwartz, 2016). We have refined and expanded on existing uses of LCAs to study MSM populations by informing our models with items related to a more multidimensional conceptualization of sexuality (Laumann et al., 1994). We then further examine differential HIV risk across identified latent classes. In so doing, our approach seeks to 1) identify a latent class structure more capable of aligning with participants' self-perceptions as sexually active adults and 2) to uncover a novel conceptualization of this population using elements beyond the traditional HIV risk factors.

METHODS

Defining Men Who Have Sex with Men

To use terminology consistent with prevailing norms in the public health literature (Egan et al., 2011; Stahlman et al., 2017; Wolitski & Fenton, 2011; Young & Meyer, 2005), we use the term MSM in this analysis to refer to gay, bisexual, or other persons born male who have sex with other persons born male. This adapts Mumtaz et al.'s definition which refers to people born biologically male who engage in sexual activities, specifically anal sex, with partners who were also born biologically male regardless of either partner's gender, sexual, social, or cultural identity (Mumtaz et al., 2011). The phrase "MSM" or "gay" was not directly used in our recruitment materials which minimized risk of inadvertent exclusion of any potentially eligible participants.

Study Participants

A nationwide online survey of MSM was conducted in 2014 as part of a trial to assess efficacy of an online intervention to improve HIV testing uptake (Tang et al., 2016). In total, 1424 people from two Chinese provinces (Shandong and Guangdong) were recruited and enrolled using banner advertisements on a widely used gay mobile dating app (Blued) and popular online portal for MSM (www.danlan.com). Eligible participants were born biologically male, reported ever having had anal intercourse with another person born male, were at least 16 years of age (the legal age of consent in China), and provided informed consent. As the survey was a self-administered online survey, biomarker data was not collected.

Measures

Participants provided socio-demographic information as well as responses to questions about their sexuality, recent sexual behaviors and exposures, and health seeking behaviors. Education and income levels were categorized according to the conventions of the Chinese national population census, in which those reporting a high school education or less were classified as “less educated” (Wang et al., 2017) and those with a monthly income below the median urban income of 5000 CNY (Chinese yuan; about 780 USD) were classified as lower income (National Bureau of Statistics of China, 2015). Participants were designated as “urban” or “rural” based on their classification in the national household registry system, a common proxy in China for the environment in which a person is born and raised (Afridi et al., 2015; Liu et al., 2018). Recent modes of finding new male sex partners was determined as the use of any online tools such as partner seeking mobile apps or websites, as opposed to in-person or at venues (e.g. bars, karaoke or dance halls, saunas, public parks). Drug use before or during sex in the previous 3 months only considered recreational drugs that have documented use in the Chinese MSM community including poppers, ecstasy, or crystal methamphetamine (Chen et al., 2015). Among other health seeking behaviors assessed, those pertinent to HIV testing were assessed only for respondents who indicated that they were HIV negative or unaware of their status (95.2%).

A subset of variables with a perceived relevance to the underlying latent class structure regarding sexuality was selected as LCA model inputs. Because the parent survey was designed for the purposes of evaluating a community HIV testing intervention, questions regarding sexual identity or orientation were limited in number and scope. In keeping with common practices in LCA modeling and to improve interpretability of model results, each latent class model item was coded as a binary variable as follows (further details in Supplemental Table S1). Sexual orientation was defined as those indicating that they identify as “gay” and “bisexual” as opposed to “straight” or “other.” Gender identity was categorized as “non-male” (i.e. identifying as “female” or “transgender”) as opposed to “male.” Respondents also indicated their preferred anal sex position which was categorized as “ever receptive” (i.e. “receptive” or “either”) as opposed to “insertive.” Desire for a sex change was acknowledged in those who either expressed an interest or who had already taken surgical or medical steps to transition, as opposed to those who expressed no desire. Cross dressing behaviors were assessed using the question, “do you ever dress up in women’s clothing?” Regarding disclosure of same sex behaviors to others, respondents were categorized as “closeted” if they had never discussed their history of same-sex behaviors with anyone, whether family, friends, healthcare providers, or others (see Table S1). Respondents who had ever had vaginal or anal sex with women were classified as having a history of sex with women, and those who reported having a “main sexual partner with whom you have anal or oral sex” who was also male were categorized as having a stable male sexual partner. The finalized list was determined over the course of iterative discussions among the authors, in consultation with LCA documentation (Lanza et al., 2011; Lanza et al., 2013) and by reviewing comparable analyses in the peer review literature (Chan et al., 2015; Noor et al., 2014; Rice et al., 2016).

Statistical Analyses

We performed our analyses using PROC LCA (Lanza et al., 2013), a SAS procedure developed specifically for latent class analyses. The model was used to identify the optimal number of classes based on the model fit, which was assessed with the G^2 statistic, the Akaike Information Criterion (AIC) and the sample size adjusted Bayesian Information Criterion (BIC). In all cases, lower values indicate better fit. Considerations of interpretability and class separation also informed choice of the optimal number of classes.

After finalizing the model-identified number of latent classes, we used the PROC LCA *outpost* option to calculate unique and mutually exclusive latent class assignments for every individual in each dataset, based on the maximum-probability assignment. We then used univariable logistic regression to identify independent predictors of class membership among key HIV related risk factors and health seeking behaviors.

Ethical Approval

Ethical approval was obtained from the institutional review committees at the Guangdong Provincial Center for Skin Diseases and STI Control (Guangzhou, China) and the University of North Carolina at Chapel Hill (Chapel Hill, NC).

RESULTS

Data from 1424 respondents who took part in the baseline trial visit were included in the final analysis. Participants had a median age of 24 (interquartile range, 21-29) among whom 11.1% were married and a quarter (25.9%) had less than a high school education. 81.9% reported a monthly income of less than 5000 CNY and about a tenth (11.1%) had a rural designation on their national household registry.

About three quarters of the sample identified as gay (72.9%), roughly half (46%) reported having a stable male sex partner, and slightly less than that reported having ever disclosed their same-sex behaviors to anyone (37.8%). Notably, whereas only 4.3% of respondents identified as female or transgender, a far larger proportion (28.6%) indicated tendencies of non-binary gender expression such as a desire for a sex change or a history of cross dressing. Regarding sexual behaviors, half (55.3%) had had condomless anal sex in the past 6 months and a fifth (18.1%) had used drugs before or during sex in the past 3 months, but only a small proportion reported commercial sex behaviors in the past year (5.8%). Regarding health seeking behaviors, a larger portion had ever been tested for HIV (46.8%) than those who had ever been tested for another sexually transmitted disease (STD; 32%).

Latent Class Analyses

We compared models with two through five latent classes to identify the most likely number of latent classes based on model fit. Based on AIC, BIC and G^2 fit criteria (Figure 1) as well as considerations of interpretability and class separation, we determined that the four-class model provided the optimal fit for our data.

Posterior probabilities represent the conditional probabilities of reporting a given behavior given membership in a certain class (Table 2). A probability greater than 50% for a certain

item is considered an indication that members of a given class are more likely to endorse (i.e. to report) that risk factor. These probabilities formed the basis for the labeling of each class as follows. Class 1 made up of 4.3% of the sample and was labeled *Gender nonconforming* (GNC) based on their comparatively higher likelihoods of endorsing a non-male identity, cross-dressing behaviors, and a desire to transition to female gender. Classes 2 and 3, respectively the *Closeted-unmarried* and *Closeted-married* classes, each made up roughly a third of the sample (29.9% and 24.6%) whose shared distinction was their relatively high likelihood of endorsing the “closeted” item. These two groups differed from each other most notably in terms of marital status, history of sex with women and preferred sexual position (“insertive” versus “ever receptive”). Our decision to distinguish these groups by their marital status rather than sexual behaviors (e.g. referring to the two groups as *Closeted-bisexual* and *Closeted-homosexual*) was part of a deliberate attempt to define classes using characteristics unrelated to partner choice, as doing so may have reintroduce many of the labeling issues our analysis was seeking to address. The fourth and largest class (41.2%) was labeled the *Out* class for the notably lower likelihood of endorsing the “closeted” item vis-à-vis the other classes.

Associations between Latent Class and Sexual Behaviors

Using the *Out* class as the referent group, we assessed the likelihood of each class (*GNC*, *Closeted-unmarried*, *Closeted-married*) to report HIV-related risk factors. Those in the *GNC* class had greater odds of reporting the most risk behaviors relative to the *Out* class, including having more than one sexual partner in the past 6 months (odds ratio [OR], 2.12; 95% confidence interval [CI], 1.10-4.09), participating in any group sex in the past year (OR, 9.19; 95% CI, 4.95-17.05), exchanging gifts or money for sex (OR, 12.61; 95% CI, 6.56-24.27), and ever having been forced to have sex (OR, 4.81; 95% CI, 2.76-8.38). In contrast, those assigned to the *Closeted-unmarried* and *Closeted-married* classes experienced lower odds relative to their *Out* class counterparts for similar behaviors, including finding sex partners primarily online (OR, 0.59; 95% CI, 0.42-0.82 for *Unmarried* and OR, 0.57; 95% CI, 0.41-0.80 for *Married*) and having one’s first same sex experience before age 20 (OR, 0.57; 95% CI, 0.44-0.74 for *Unmarried* and OR, 0.33; 95% CI, 0.25-0.42 for *Married*). *Closeted-Unmarried* class members additionally had a lower odds of reporting any condomless sex in the past 3 months (OR, 0.76; 95% CI, 0.59-0.99) relative to their *Out* class counterparts. Whereas the only instance of higher odds of any type of sexual behavior was in the greater likelihood of *Closeted-Married* class members to report any group sex in the past year (OR, 2.90; 95% CI, 1.90-4.43).

Associations between Latent Class and Health Seeking Behaviors

Notably, the only class with statistically significant associations with health-seeking behaviors were those in the *Closeted-unmarried* class, in whom odds of every type of health seeking behavior—whether having ever been HIV tested (OR, 0.53; 95% CI, 0.40-0.69), more frequent HIV testing in the past year (OR, 0.50; 95% CI, 0.35-0.71), ever being STD tested (OR, 0.58; 95% CI, 0.44-0.78), more frequent STD testing in the past year (OR, 0.37; 95% CI, 0.22-0.63), or receipt of health promotion materials in the past 6 months (OR, 0.22; 95% CI, 0.06-0.90)—were all lower than those in the *Out* class.

DISCUSSION

Analysis of the latent class structure of Chinese MSM according to a multidimensional conceptualization of sexuality indicates the likely presence of four distinct classes in this population. In addition to a large *Out* class, our LCA models identified additional classes distinguished by their non-male gender identity (*GNC* class) and two additional classes defined by both their closeted and marital status (*Closeted-unmarried* and *Closeted-married* classes).

This analysis represents a departure from past classifications of MSM into subgroups whether in China (Chen, Li et al., 2015; Chen, Yu et al., 2015; C. Liu et al., 2018; Tang et al., 2015; J. Wu et al., 2016; J. Xu et al., 2014; C. Zheng et al., 2016) or elsewhere (Abu-Raddad et al., 2010; Dilley, 2005; Mumtaz et al., 2011; Prestage et al., 2015) both for its use of an empirical approach (i.e. LCA) and of novel constructs related to sexuality inform the model. By identifying subgroups informed by a more comprehensive understanding of MSM sexuality, our findings fill an important knowledge gap by characterizing MSM population structures and associated behaviors. Moreover, factors such as gender identity and self-described sexual preferences have been linked to motivations for partner selection and specific sexual practices within relationships (Johns et al., 2012; Zheng, Hart, & Zheng, 2012, 2015), insights which could unlock new approaches to behavioral risk reduction. Of note, we do not propose a rejection of the term MSM but rather wish to improve awareness of ways in which choice of terms can inadvertently exclude subsets of a population (e.g. the term “men who have sex with men” may alienate transgender persons who do not identify as men) or perpetuate ignorance about particular subgroups and their needs (e.g. the US National Institutes of Health discourages use of the term “homosexual” given its potential to “reduce people’s lives to purely sexual terms” (National Institutes of Health, 2018)). We also hope to add to the growing discussion on possible ways in discussion of the heavy HIV burden in gender and sexual minorities can shift the source of the problem away from individual behaviors (i.e. men having sex with men) to the societal health barriers faced by such groups whether due to homophobia (Beyrer, Diouf, Drame, Ndaw, & Traore, 2014) or lack of sexual education resources for MSM (Fonner et al., 2014; Gao et al., 2001; Zou et al., 2018). In these ways a reconsideration of not only our language but our engagement strategies can allow for renewed and better intervention efforts.

Our identification of two types of “closeted” MSM differing from each other in terms of marital status (*Closeted-unmarried* and *Closeted-married*) invites a reexamination of the still dominant typology in the literature on HIV in China, some of which characterizes them as a monolithic group of closeted and married men (He et al., 2009; Lin et al., 2015; Song et al., 2013; Tao et al., 2013; S. Wang et al., 2015; Yun et al., 2011; Zhang et al., 2001). The two “closeted” groups also differed in two other noteworthy ways: namely their preferred sexual position (*Closeted-unmarried* were more likely to be the ever receptive partner) and health-seeking behaviors (*Closeted-unmarried* were far less likely to report health seeking behaviors). Past research on cognitive facets of sexual position preference in Chinese MSM (Zheng, Hart, & Zheng, 2012, 2015; Zheng, Lippa, et al., 2011) suggest that sexual self-labels such as “top” or “bottom” may play a role in how individuals navigate sexual health decisions (a trend echoed in findings among American MSM (Johns et al., 2012)). The fact

that *Closeted-unmarried* men in our sample reported more condomless sex and fewer health seeking behaviors may therefore signal a service gap faced by individuals who are unable to access MSM-specific services (e.g. free condoms or HIV testing at gay men's clinics) due to being closeted but who may also feel alienated by generic health settings where they may feel more vulnerable to healthcare discrimination. Insights into the specific barriers to healthcare faced by members of this class, possibly with the use of mixed methods approaches, could greatly inform outreach efforts to address this gap.

Members of the *GNC* class reported certain riskier sex behaviors relative to *Out* class members, reflecting trends found in the global literature (Baral et al., 2013; Winter et al., 2016; Wylie et al., 2016). Research on GNC individuals in China, though nascent, have identified elevated rates of myriad health outcomes including depression (Yang et al., 2015), suboptimal HIV/STD testing (Zhang et al., 2016), and more frequent of intimate partner violence (Best et al., 2015) in this population. Current Chinese health policy does not formally acknowledge GNC individuals as a key population (Z. Wu & Wang, 2010), however, underscoring the need for improved research and surveillance to inform tailored interventions that address the multi-layered and compounded risk factors these individuals face. Of note, the majority of participants who reported gender non-conforming tendencies in our sample (88.7%), such as cross dressing or desire for a sex change, also indicated that their gender identity was male (as opposed to “female” or “transgender”). Although cross dressing is an inadequate proxy for gender identity—particularly in cultures such as China where historical precedent of such practices (Altenburger, 2005; Li, 2003) and their modern manifestations (Wu, 2012) are common—these findings nonetheless signal the complexity of gender fluidity and need for less gendered terms (e.g. “transgender women” or “men who have sex with men”) to ensure that outreach efforts resonate with intended audiences.

Findings presented here are best interpreted in light of several study limitations. The relatively small size of the *GNC* class may have impaired precision in estimations of associations between this class assignment and various risk factors. Although this is a byproduct of ours being a secondary analysis of data from a parent study powered to answer a different question, research to date on this population showing high HIV prevalence and social marginalization dictates that we learn as much as possible from available data sources. Moreover, the numerous statistically significant associations observed even with suboptimal precision emphasizes the robustness of observed effects. Second, generalizability of our study findings is limited to urban MSM, as confirmed by a comparative LCA conducted by several of the authors (Smith et al., 2019). Third, latent class structures based on culturally specific concepts such as sexuality are best interpreted as case studies to inform similar analyses rather than as a model to directly map onto other cultures and settings. Future research in this area could also benefit from a prospective collection of sexuality related data to inform a more comprehensive understanding of latent structures that relate to these domains. Finally, participants' status of having ever disclosed same sex behaviors to others was coded as a dichotomous variable (“out” vs. “not out”); a massive oversimplification of a far more nuanced phenomenon (Beijing LGBT Center & Department of Sociology, 2017) but one necessitated by the demands of interpretable variables as inputs for the LCA model.

Our findings may play a timely role as two clinical trials prepare to launch in China regarding the efficacy of preexposure prophylaxis (Key Laboratory for AIDS Immunology at China Medical University, 2018, Viiv Healthcare, 2018). The likelihood of China's eventual approval and rollout of PrEP underscores the need for engagement strategies capable of identifying and engaging with sexual and gender minorities. In such an event, formative research may consider applying methods such as LCA to identify key subgroups informed by not only conventional HIV risk factors but also items salient to PrEP access and uptake, such as self-perception of risk, health literacy, or social support. Analytical approaches capable of informing a more holistic understanding of this population are critical to mapping their diverse needs and the ways in which we might meet them.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1. Plot of the G^2 , AIC, and BIC for models with 2 through 5 latent classes for gender identity and sexual orientation among 1424 Chinese MSM.

Table 1:

Descriptive characteristics of the 1424 participants of the nationwide online survey.

	N (%)
Total	1424
Demographics	
Age [Median (IQR)]	24 (21-29)
Less than a high school education	369 (25.9%)
Married ¹	158 (11.1%)
Rural classification in national registry ²	158 (11.1%)
Income <5000 CNY a month	1166 (81.9%)
Sexuality	
Identify as gay ³	1038 (72.9%)
Identify as other than male ⁴	61 (4.3%)
Have ever cross dressed	257 (18%)
Desire/have taken steps to transition to female gender ⁵	121 (8.5%)
Prefer receptive anal sex (vs. insertive)	900 (63.2%)
Never disclosed same sex behaviors to others ("closeted") ⁶	538 (37.8%)
Has stable male partner ⁷	655 (46%)
Sexual behaviors and exposures	
>1 sex partner in past 6 months	904 (63.5%)
Any condomless anal sex in the past 3 months	787 (55.3%)
Find most new partners online ⁸	1170 (82.2%)
Ever has had sex with a woman	414 (29.1%)
Age at first sex with another man <20	656 (46.1%)
Missing	9 (0.6%)
Drugs before or during sex in the past 3 months ⁹	258 (18.1%)
Ever been forced by a man to have sex	294 (20.6%)
Missing	4 (0.3%)
Exchanged gifts/money for sex in past year	82 (5.8%)
Had group sex (sex between 3 people) in past year	141 (9.9%)
Health-seeking Behaviors	
Ever STD tested	456 (32%)
Tested for STD >1 time in past year	155 (10.9%)
Missing	146 (10.3%)
Among the 1356 (95.2%) HIV uninfected or infected but undiagnosed	
Ever HIV tested	635 (46.8%)
HIV tested in past year	506 (37.3%)
Tested for HIV >1 time in past year	284 (20.9%)

IQR: interquartile range; CNY: Chinese yuan; STD: sexually transmitted disease

- ^{1.} Married defined as currently married or engaged (versus unmarried, divorced, separated or widowed).
- ^{2.} Rural/urban classification in the national registry can proxy for the environment in which one was born and raised.
- ^{3.} Identifying as gay defined as describing oneself as "gay" (versus "bisexual," "straight," or "other").
- ^{4.} Identify as other than male define as considering one's own gender to be female or "other" (versus male).
- ^{5.} Desire for sex change defined as desiring or having taken steps to change one's gender, including hormonal or surgical procedures.
- ^{6.} "Closeted" defined as never having told anyone about one's own sexual history with men, whether it be family members, friends, coworkers or medical providers.
- ^{7.} Male stable partner defined as a "main partner" who is male and with whom respondent has anal or oral sex.
- ^{8.} Finding partners online includes internet dating websites, male partner seeking apps (versus in person venues such as parties, karaoke bars, dance clubs, parks, or saunas).
- ^{9.} Drug use includes use of any of the following substances: poppers ("rush"), ecstasy, crystal methamphetamine, or other recreational drugs.

Table 2.

Posterior probabilities for 4-class model. Probabilities greater than 50% are bolded to indicate items that members of a given class were more likely to endorse.

<i>Class Label</i>	Class 1 <i>Gender non-conforming</i>	Class 2 <i>Closeted-Unmarried</i>	Class 3 <i>Closeted-Married</i>	Class 4 <i>Out</i>
Overall class size	4.3%	29.9%	24.6%	41.2%
Identify as "gay" ¹	60.6%	63.7%	43.6%	98.4%
Ever the receptive partner (vs. only insertive)	51.5%	63.9%	37.6%	79.2%
Identify as non-male ²	44.4%	1.5%	3.8%	2.4%
Have ever cross-dressed	82.8%	5.8%	15.2%	21.9%
Desire/have taken steps to transition to female gender ³	97.1%	2.6%	4.9%	5.7%
Never disclosed same sex behaviors to others ("closeted") ⁴	45.1%	58.3%	56.8%	10.8%
Married ⁵	20.4%	5.3%	34.2%	0.5%
Has stable male partner ⁶	72.6%	33.3%	50.3%	49.9%
Ever has had sex with a woman	60.5%	0.2%	99.5%	4.6%

¹Identifying as gay defined as describing oneself as "gay" (versus "bisexual," "straight," or other").

²Gender identity defined as considering one's own gender to be female or "other" (versus male).

³Desire for sex change was defined as desiring or having taken steps to change one's gender, including hormonal or surgical procedures.

⁴"Closeted" was defined as never having told anyone about one's own sexual history with men, whether it be family members, friends, coworkers or medical providers.

⁵Married was defined as currently married or engaged (versus unmarried, divorced, separated or widowed).

⁶Stable male partner was defined as a "main partner" who is male with whom respondent has anal/oral sex.

Table 3.

Associations between class assignment and reported HIV related risk behaviors and health seeking behaviors.

Effect	GNC vs. Out		Closeted- Unmarried vs. Out		Closeted- Married vs. Out	
	OR	95% CI	OR	95% CI	OR	95% CI
HIV related risk behaviors						
Any condomless anal sex in past 3 months	1.45	(0.82-2.57)	0.76	(0.59-0.99)	0.81	(0.62-1.05)
>1 sexual partner in past 6 months	2.12	(1.10-4.09)	0.88	(0.67-1.14)	0.97	(0.74-1.27)
Any group sex in past year	9.19	(4.95-17.05)	0.84	(0.49-1.46)	2.90	(1.90-4.43)
Drugs before or during sex in past 3 months	2.32	(0.51-10.59)	1.60	(0.78-3.27)	1.28	(0.64-2.55)
Exchanged gifts/money for sex in past year	12.61	(6.56-24.27)	0.67	(0.33-1.35)	1.41	(0.79-2.50)
Finds sex partners mostly online	0.67	(0.33-1.33)	0.59	(0.42-0.82)	0.57	(0.41-0.80)
Sexual debut at age <20	0.96	(0.55-1.66)	0.57	(0.44-0.74)	0.33	(0.25-0.43)
Ever been forced to have sex	4.81	(2.76-8.38)	1.01	(0.73-1.39)	0.85	(0.61-1.19)
Health seeking behaviors						
Ever tested for HIV	0.66	(0.36-1.19)	0.53	(0.40-0.69)	0.88	(0.67-1.15)
ATested for HIV >1x in last year	0.64	(0.31-1.33)	0.50	(0.35-0.71)	1.01	(0.74-1.38)
Ever been STD tested	1.24	(0.71-2.16)	0.58	(0.44-0.78)	1.18	(0.90-1.55)
STD tested >1x in last year	1.39	(0.67-2.86)	0.37	(0.22-0.63)	1.10	(0.74-1.62)
Received any health promotion materials in the past 6 months	0.29	(0.03-2.86)	0.22	(0.06-0.90)	0.28	(0.07-1.20)

LC: latent class; GNC: gender non-conforming; OR: odds ratio; CI: confidence interval; STD: sexually transmitted disease.