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HIV Risk Behaviors in the U.S. Transgender Population: Prevalence and Predictors in a Large Internet Sample

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Abstract

To study the influence of gender on HIV risk, a sample of the U.S. transgender population ($N = 1,229$) was recruited via the Internet. HIV risk and prevalence were lower than reported in prior studies of localized, urban samples, but higher than the overall U.S. population. Findings suggest that gender nonconformity alone does not itself result in markedly higher HIV risk. Sex with nontransgender men emerged as the strongest independent predictor of unsafe sex for both male-to-female (MtF) and female-to-male (FtM) participants. These sexual relationships constitute a process that may either affirm or problematize gender identity and sexual orientation, with different emphases for MtFs and FtMs, respectively.

Keywords

HIV; Transgender; United States; Internet; gender identity; unprotected sex; sexual orientation

Introduction

HIV/AIDS in the United States has a disproportionate impact on socially marginalized groups, including sexual minorities (Centers for Disease Control and Prevention, 2010). Transgender people are a largely hidden sexual minority, composed of a diverse group of individuals whose gender identity, expression, or behavior cross societal gender norms associated with sex at birth (Bockting, 2008). Some seek to bring their bodies into congruence with their identity through medical interventions of feminizing or masculinizing

hormones and/or surgeries (Coleman et al., 2011). Others choose to express their gender identity through varied presentations and behaviors rather than body modification (Lombardi & van Servellen, 2000). Although transgender identities encompass an ever-evolving spectrum, the four most commonly used categories include transsexuals – both male to female (MtF) and female to male (FtM) – cross-dressers (transvestites), drag kings and queens, and a rich variety of other terms denoting individuals who do not fit into traditional, binary categories of male or female (Bockting, 2008). Transgender individuals are also diverse in their sexual orientation; they may be attracted to men, women, and/or transgender persons across the gender spectrum (Bockting, Benner, & Coleman, 2009; Docter & Fleming, 2001; Iantaffi & Bockting, 2011; Lawrence, 2005).

No national surveillance data are currently available on the incidence or prevalence of HIV/AIDS within the U.S. transgender population. Previous studies of HIV risk in the transgender population indicate a high prevalence of both HIV and its risk factors (Nemoto, Luke, Mamo, Ching, & Patria, 1999; Simon, Reback, & Bemis, 2000), but are limited in their use of localized, highly urban samples, often drawn from clinic or social services populations (Clements-Nolle, Marx, Guzman, & Katz, 2001; Kenagy & Hsieh, 2005; Nemoto, Operario, Keatley, Han, & Soma, 2004; Xavier, Bobbin, Singer, & Budd, 2005). Herbst et al. (2008) performed a metaanalysis of 29 studies covering 10 states, Puerto Rico, and the District of Columbia. HIV infection prevalence rates for MtFs averaged 27.7% in studies that reported laboratory confirmed infection, and 11.8% in studies utilizing self-report. Prevalence among African-Americans was significantly higher than among Hispanics or Whites. Five studies reported HIV prevalence rates for FtM persons, with rates ranging from 0-3%.

Documented risk behaviors among MtF's include multiple sex partners (31.7%) who are predominantly male and sex with casual partners (48.3%) (Herbst et al., 2008). In addition, MtFs reported having sex with partners who were injection drug users (24.3%) and, to a lesser extent, with HIV seropositive partners (8.5%). Unprotected receptive anal intercourse was commonly reported (44.1%), with the highest rates with sex work clients or primary partners. Unprotected insertive anal intercourse was less commonly reported (27.4%). Nearly 40% reported having sex while drunk or high. A sizeable percentage of MtFs reported consuming alcohol, using crack or other illicit drugs, or smoking marijuana, and approximately 12% reported injection drug use. However, MtFs reported low rates of sharing needles when injecting street drugs, hormones or silicone (2-6%). More recently, Nuttbrock et al. (2009) reported that among MtFs of color, sexual orientation towards male partners and dressing in the female role in public were positively associated with HIV infection. A systematic literature review of transwomen sex workers (Operario, Soma, & Underhill, 2008) revealed a 4-fold higher risk for HIV than that of nontransgender female sex workers, and an overall higher prevalence of HIV compared to transgender women who were not sex workers. A mixed methods study of 50 Puerto Rican MtF revealed a discourse of a female self anchored in traditional feminine social, romantic and sexual roles, which undermines their possibilities for negotiating safer sex (Rodriguez-Madera & Toro-Alfonso, 2005).

HIV risk behaviors among FtM transgender persons are less well known and were not included in the metaanalysis conducted by Herbst et al. (2008) because of the limited number of findings. While two small studies (Conare, Cross, & Little, 1997; Kenagy, 2002) reported that over 90% of FtMs engaged in at least one high-risk sex behavior in the prior 3 months, the behaviors were not specified. Data on rates of unprotected vaginal or anal intercourse are mixed. In a study of 123 FtMs (Clements-Nolle et al., 2001), small percentages of FtMs engaged in receptive vaginal (7%) or anal (4%) sex, while 34% reported two or more partners during the last six months and 31% reporting a history of sex work. However, in another study of 60 FtMs (Xavier et al., 2005), a higher percentage (22%) reported unprotected “genital-genital contact” (22%). A study of 122 MtF and 62 FtM individuals (Kenagy & Hsieh, 2005) found that compared to MTFs, FTMs were significantly less likely to have used protection the last time they had sex and significantly more likely to have engaged in recent high risk sexual activity. This gender difference persisted after controlling for demographic variables, AIDS knowledge, perceived effectiveness of condom usage, perceived susceptibility to AIDS and self-esteem. Risk of unsafe sex among FtM persons appeared to increase with age, but was unrelated to sexual orientation.

Unfortunately, there are numerous limitations to generalizing the above findings to the U.S. transgender population as a whole. First, previous studies have been restricted in their geographic diversity. San Francisco has been significantly oversampled, composing 9 of the 29 studies included in the 2008 (Herbst et al.) metaanalysis. Only 3 studies had a state or regional focus (the West Coast, Northern California and Hawaii), while the remainder were restricted to large urban centers. Second, the vast majority of these studies used small convenience samples. In the 2007 metaanalysis, study sample sizes ranged from 19 to 515, with nearly half (48%) having samples fewer than 100 participants. By their nature, these small samples introduce considerable demographic bias into the data. For example, 72% of the studies in the metaanalysis were composed of predominantly non-white participants, and thus are more likely to reflect both a higher prevalence of HIV infection and HIV risk behaviors among people of color. In addition, a number of studies (Clements-Nolle et al., 2001; Kellogg, Clements-Nolle, Dilley, Katz, & McFarland, 2001; Kenagy & Hsieh, 2005; Nemoto et al., 2004; Simon et al., 2000) have sought to assess HIV prevalence and risk using local samples in which transgender sex workers were overrepresented. Herbst et al. (2008) note the large percentage of MtFs who report having participated in sex work, with rates ranging from 24 to 75% (weighted mean, 41.5%). Thus, these samples may overrepresent sex workers, bar patrons, and other urban-dwelling transgender persons who are more out, more obviously gender nonconforming, and, thus, more easily identifiable and accessible to researchers (Rosser, Oakes, Bocking, & Miner, 2007).

In part to address the geographic and demographic limitations, we conducted a cross-sectional, Internet-based study examining the influence of transgender identity and gender nonconformity on HIV risk in a national sample of the U.S. transgender population. When examining small, stigmatized populations, the Internet provides the opportunity for researchers to reach a large, diverse, nonclinical sample (Mathy, Schillace, Coleman, & Berquist, 2002; Pequegnat et al., 2007). Studies using the Internet have been able to recruit samples that are four times as large as those obtained through in-person recruitment (Buchanan & Smith, 1999) and have found that Internet data collection more efficient and

cost effective than standard mail, telephone, or in-person surveys (Mehta & Sivadas, 1995; Pequegnat et al., 2007). The Internet was adopted early and used widely among members of the transgender community (Horvath, Iantaffi, Grey, & Bockting, 2012), allowing researchers to reach a broader segment of the population compared to previously identified HIV prevention research (Miner, Bockting, Swinburne Romine, & Raman, 2012).

This study thus provided the opportunity to:

1. Acquire potentially more generalizable data on the prevalence of HIV infection, unprotected sex and other HIV risk behaviors than have been previously reported for smaller and more biased samples of the transgender population.
2. Test whether cofactors of HIV risk (African American ethnicity, sex work, multiple sex partners, unprotected vaginal/anal intercourse, sex while drunk/high) previously identified in smaller transgender samples would predict unsafe sex in a larger and broader sample of the U.S. transgender population.

We expected that our findings would inform how best to focus future transgender-specific HIV prevention efforts.

As will be shown, one of our key findings was that sex with nontransgender men was the strongest predictor of unsafe sex. Therefore, we conducted a set of post-hoc analyses of the quantitative and qualitative data to advance our understanding of how sex with nontransgender men might differ for MtF and FtM transgender persons, and what should be addressed in future HIV prevention efforts targeting this subset of the transgender population.

Methods

The study protocol was approved by the Human Subjects Committee of the University of Minnesota Institutional Review Board.

Participants

In order to obtain a large, national, non-clinical sample and to protect anonymity (important to members of this stigmatized minority population) (Bockting, Robinson, & Rosser, 1998), we recruited participants and conducted the entire study via the Internet. Transgender persons were among the first minority groups to use the Internet to find similar others, create opportunities for peer support, and develop a sense of community (Shapiro, 2004). Participants were recruited via banners on transgender community web sites and in chat rooms, as well as messages posted to online mailing lists, journals, and forums. Individuals were eligible to participate if they self-identified as transgender, were age 18 years or older, and living in the United States. To be inclusive and obtain a sample representative of the gender diversity within this community, we stratified sampling by setting an enrollment quota to recruit equal numbers of each type of transgender identity: transsexual, cross-dresser, drag queen or king, or other (e.g., transgenderist, bigender, genderqueer, two-spirit).

All participants were asked to complete an online, quantitative survey. Twenty percent of participants were randomly selected to also partake in an online, qualitative interview

consisting of a combination of asynchronous and synchronous interview methods. A total of 1,373 participants enrolled in survey, of which 1,273 (93%) completed the survey. Forty-four surveys were identified as invalid due to having participated more than once or provided false or unreliable data (see “Procedures” below) and excluded. This resulted in a final sample of $N = 1,229$ (90% of enrollees). Of the 211 people invited to participate in the qualitative part of the study, 131 (62%) completed both the asynchronous and synchronous interview and another 22 complete the asynchronous portion only. Demographics of the interview participants did not differ significantly from those of the overall study sample.

Instruments

The internet-based survey instrument was tested for usability ($N = 10$), and the psychometric properties of scores were examined ($N = 60$) (Miner et al., 2012). The survey contained 10 sections covering such topics as demographics, gender identity and role, sexual behavior, social support, physical health, substance use, and mental health.

Demographic characteristics were assessed with 10 single items (including age, sex, race and ethnicity, education, income, marital status, and geographical and residential locations (Rosser et al., 2007). To permit comparison with the general U.S. population, demographic questions were chosen from the U.S. Census 2000 (U.S. Bureau of the Census, 2002) and then adapted as necessary for the transgender population. For example, the question on legal marital status needed clarification to cover emerging categories (e.g., civil unions) not covered in Census 2000.

The sex of participants was assessed with the following questions: “The sex that I was assigned at birth (the sex on my original birth certificate) is: (1) Male or (2) Female” and “When I was born, my external genitals were: (1) Male, (2) Female, or (3) Other, “Please describe.” Participants were asked to choose one of the following descriptions that best captured their transgender identity: (1) transsexual, “I was assigned male/female at birth and desire or have had hormone therapy and/or sex reassignment surgery to feminize/masculinize my body”; (2) cross-dresser or transvestite, “I wear clothes and adopt behaviors associated with the other sex for emotional or sexual gratification”; (3a) drag queen/king, “I do drag, dress up in women’s/men’s clothes, and adopt a very feminine/masculine presentation”; (3b) (fe)male impersonator: “I am male/female and impersonate women/men, usually for entertainment”; or (4) other: “My transgender identity does not fit in the above categories, such as transgenderist (I live in the gender role associated with the other sex, may take hormones but do not desire sex reassignment surgery), bigender (I identify as both man and women), genderqueer, two-spirit, etc.” According to their responses to these sex and gender identity questions, all participants were classified as either MtF or FtM.

The survey included a series of questions relevant to HIV risk, including HIV/STI status and testing, knowledge of partners’ HIV status, number of sexual partners in the last 3 months, types of sexual activities with primary, casual, and exchange partners, frequency of condom use, sharing of injection paraphernalia during drug or hormone use, alcohol and drug use, substance use before or during sexual activity, and exchange of money or drugs for sex.

The qualitative interview guide consisted of five open-ended questions: Describe your most recent sexual relationship or encounter in the male role (Q1) or in the female role (Q2); how did your attempts to conform to what a woman or man is supposed to look and be like affect your HIV risk? (Q3); if applicable, how have hormones affected your sex life? (Q4); and finally, how has sex made you feel affirmed, desired, or wanted as a woman, man, or other gender? (Q5).

Procedures

Before starting the survey, potential participants were guided through an online consent process and screener. Those eligible were asked to register with an e-mail address, user name, and password; participants could opt out of providing an e-mail address and still participate in the survey. To confirm eligibility and test for survey validity and uniqueness, we applied a computerized de-duplication, cross-validation protocol (Miner et al., 2012). Each participant's e-mail and IP address, user name, password, date of birth and age, zip code, and completion time were checked against other participants' responses to identify those who may have participated more than once or provided false or unreliable data. Detailed methods and procedures on recruitment and quantitative data collection have been previously reported (Rosser et al., 2007).

Twenty percent of the total sample was randomly selected to participate in a qualitative online interview. First, participants were asked to answer five main open-ended interview questions by logging onto a private bulletin board on the study website at their own convenience (asynchronous portion). Regular reminders were sent to non-respondents. Second, participants were contacted by an interviewer to schedule an appointment for a private, interactive interview using instant messaging technology (synchronous portion). This interactive interview was guided by the same open-ended questions as well as follow up questions based on the responses they previously posted on the private bulletin board (Miner et al., 2012). Participants were compensated \$30 for the survey and \$50 for the interview. Data collection was conducted in 2003.

Quantitative analyses

We used multivariate logistic regression to examine potential predictors of unsafe sex. Unsafe sex was defined as any unprotected penis-anus or penis-vagina intercourse with any partner(s) in the last 3 months. The following potential predictors of unsafe sex were examined: Sex, age, race/ethnicity, education, income, current sex work, and having had sex with nontransgender men in the last three months. In the analysis presented here, we did not include substance use as a predictor of unsafe sex as this is the subject of a separate manuscript in preparation.

Because we found that sex with nontransgender men was the strongest predictor of unsafe sex, we examined this finding in more detail, using *t*-tests for independent samples and analysis of variance to examine differences in demographics, sexual identity, and HIV risk factors and cofactors between the following subgroups: (1) MtFs who had sex with men versus those who did not; (2) FtMs who had sex with men versus those who did not, and (3)

MtFs who had sex with men versus FtMs who had sex with men. The alpha was set at .005 to correct for multiple comparisons.

Qualitative analyses

Data from the original 153 synchronous and asynchronous interviews were entered into NVivo 2.0 and coded by two separate investigators (Bean Robinson, PhD, Noelle Gray, MPH) using narrative and immersion analysis techniques (Miller & Crabtree, 1999; Mishler, 1995; Mishler, 1986). The initial coding focused on the aims of the larger study on the influence of gender on HIV risk, of which the results will be published elsewhere. For the purpose of this current report, we conducted a post-hoc analysis of the interviews completed by transgender participants who reported having had sex with men in the last three months ($n = 32$; 20 MtF and 12 FtM). Two analysts separately examined these interviews for recurrent themes involving the nature of sexual relationships with male partners. Analysts identified similarities and differences between FtM and MtF participants; conflicts were resolved by consensus of the two analysts and the Principal Investigator (Bockting).

Results

Demographic characteristics of the entire online sample

Detailed sociodemographic characteristics of the study sample have been previously reported (Rosser et al., 2007). We summarize those data in Table 1, with the inclusion of comparison data from the U.S. 2000 census (Profile of General Demographic, Selected Social, and Selected Economic Characteristics: 2000) and other studies of transgender populations as reported in the meta-analysis by Herbst et al. (2008). The proportion of participants from the 15 most populated states in the U.S., with minor exceptions, approximated the relative population size of that state; however, participants from Minnesota, Oregon, Missouri, and Colorado were overrepresented. Just over one third (37.1%) of participants came from 5 states (in rank order): California, New York, Washington, Pennsylvania, and Florida.

Mean age of participants was 32.7 years ($SD = 11.95$; range 18-70). More than half (56.7%, $n = 697$) identified as MtF and 43.3% ($n = 532$) as FtM, a significantly higher percentage of FtM participants than noted in most of the studies analyzed by Herbst et al. (2008). The majority of MtF participants self-identified as transsexual (39.8%, $n = 278$) or crossdresser/transvestite (26.9%, $n = 188$), with the remainder identifying as drag queens, female impersonators, or other MtF transgender identities. While 49.2% ($n = 262$) FtM participants identified as transsexual, 34.9% ($n = 186$) endorsed a variety of other FtM transgender identities, excluding drag kings and male impersonators ($n = 54$).

Median annual household income was \$32,000, with 25.4 % noting annual incomes below the poverty level (annual household income under \$20,000). Most participants (97.5%) had a high school diploma or beyond, a higher proportion than reported in the U.S. Census. The majority of participants (78.6%) were non-Hispanic White and 21.4% were people of color, predominantly multiracial.

Prevalence of HIV testing, serostatus, and risk behaviors

Of the 60.4% ($n = 742$) who reported the results of HIV testing, 2.2% ($n = 16$) reported being HIV positive, compared to 0.5% for the U.S. population as a whole (McQuillan & Kruszon-Moran, 2008) and 11.8% (average self-reported prevalence) in the 2008 metanalysis (Herbst et al., 2008).

Risk behaviors traditionally associated with HIV were not uncommon among the entire study sample. During the last 3 months, 32.2% ($n = 224$) of MtFs and 15.8% ($n = 84$) of FtMs had unprotected anal/vaginal sex, while 29.5% ($n = 205$) of MtFs and 25.9% ($n = 138$) of FtMs had multiple sexual partners. As far as substance use immediately before or during sex, 21.3% ($n = 142$) of MtF's and 25.7% ($n = 131$) of FtMs reported alcohol use only, 4.3% ($n = 29$) of MtF's and 3.9% ($n = 20$) of FtMs report drug use only, and 13.5% ($n = 90$) of MtF's and 18.1% ($n = 92$) of FtMs reported both alcohol and drug use associated with sex.

Predictors of unprotected intercourse

In this large sample of transgender individuals from across the United States, we were interested in determining what demographic and sexual identity characteristics predicted unsafe sex. The multivariate logistic regression model for all participants (Table 2) indicated that MtFs were 1.85 times more likely than FtMs to report unprotected anal or vaginal intercourse in the last three months (95% C.I. = 1.31 – 2.59, $p < .001$). Because sex at birth emerged as a significant predictor, we also calculated separate models for MtF and FtM participants (Table 2). For MtFs, income (O.R. = 1.01; 95% C.I. = 1.00-1.01, $p = .012$) and particularly sex with men (O.R. = 3.10; 95% C.I. = 2.18-4.42, $p < .001$) emerged as independent predictors of unsafe sex, not age, education, race / ethnicity or sex work. For FtMs, only sex with men emerged as an independent predictor of unsafe sex (O.R. = 8.96, 95% C.I. = 5.17 - 15.53, $p < .001$).

Quantitative comparisons between transgender persons who reported sex with men in the last 3 months and those who did not

Because sex with men emerged as the strongest independent predictor of unsafe sex, we examined differences between transgender persons who reported sex with men and those who did not. We did this separately for MtFs and FtMs. Comparisons for demographic and sexual identity variables are reported in Table 3, and comparisons for HIV/STI status and HIV/STI risk factors and cofactors are reported in Table 4. Below, we describe results for the following specific comparisons of interest: (1) MtFs who had sex with men (MtFSM) versus those who did not (MtFnSM); (2) FtMs who had sex with men (FtMSM) versus those who did not (FtMnSM); and, lastly, (3) MtFSM versus FtMSM.

Of the 697 MtFs in our sample, 33.3% reported having had sex with men in the last 3 months. As shown in Table 3, MtFSM were significantly younger than MtF's who did not have sex with men, ($M = 35.1$ vs. 39.1 years), less likely to be White, and less likely to be married. The distribution of the various types of gender identities also differed significantly ($p < .001$) between these two groups. Compared to MtFnSM, MtFSM were less likely to identify as transsexual and more likely to identify as cross-dresser or drag queen. No group differences were observed in use of hormones or gender-related surgeries. As shown in

Table 4, MtFSM were significantly more likely than those not having sex with men to engage in the following risk-taking behaviors relevant to HIV: sex with multiple partners in the last 3 months ($Mdn = 3$ vs. 1, $p < .001$), receiving money or drugs for sex, and alcohol or drug use during sex. MtFSM were also more likely to have had one or more HIV tests in their lifetime and nearly five times as likely to be HIV+. As anticipated, significantly more MtFSM than those not having sex with men reported unprotected intercourse in last 3 months (47.8% vs. 24.5%, $p < .001$).

Of the 532 FtMs in our sample, 17.1% reported having had sex with men in the last 3 months. As shown in Table 3, FtMSM did not differ from FtMnSM, in age, race/ethnicity, education, poverty, or distribution of gender identities. FtMSM were, however, more likely to have ever used hormones or had gender-related surgery. As shown in Table 4, FtMSM were also significantly more likely to engage in the following risk-taking behaviors relevant to HIV: sex with multiple partners in the last 3 months ($Mdn = 3$ vs. 1, $p < .001$), receiving money or drugs for sex, and drug or alcohol use during sex. FtMSM were not more likely than those not having sex with men to report having a prior STI, and there was no difference in the number of HIV tests or prevalence of being HIV+ between the two groups. However, FtMSM, like their MtFSM counterparts, were significantly more likely to report unprotected intercourse in the last 3 months (45.1% vs. 9.8% for FtMnSM, $p = .001$), and significantly more FtMSM than MtF having sex with men reported a prior STI.

Of note, MtFSM and FtMSM differed in critical demographic, gender identity and sexual orientation variables (Table 3). FtMSM were significantly younger and reported lower income, with a greater percentage living in poverty compared to MtFSM. There were no educational or ethnic/racial differences between the two groups. Compared to FtMSM, MtFSM were more likely to identify as cross-dressers and drag queens/kings. MtFSM were significantly more likely than FtMSM to report predominantly or exclusively male partners as well as a greater attraction to men versus women. FtMSM reported a wider range of attractions, including being equally or somewhat more attracted to women, as well as less adherence to traditional gender ideologies than their MTF counterparts.

Both MtF and FtM having sex with men had similar degrees of unprotected intercourse and high risk behaviors (Table 4), despite significant differences in age, income, types of gender identity, and degree of exclusive attraction to male partners. Analysis of the qualitative data was used to elucidate how these findings, and how MtF and FtM differences in general, play out in the context of sexual relationships.

Qualitative results

We identified nine broad narrative categories: Gender and sexual identity, disclosure, the characteristics of male partners, relationships, opportunities for sex, sexual activities, HIV risk, safer sex negotiation, and hormones/surgery. Clear differences emerged between MtFSM and FtMSM, particularly regarding the relationship between sexual activity and gender identity.

MtFSM who identify as drag queens –a significant portion of our sample – experience the feminine as part of their identity but clearly speak of themselves sexually as men having sex with men:

Samantha is just a cock tease, while Sam actually puts out. Samantha flirts a lot and talks to everybody, but is never sexual, while Sam is a little more reserved and selective about who he talks to, but is able to sleep around (when not involved).

MtF

Dressing up in drag does not sexually stimulate me, nor would I live as the female gender role. I do like the male anatomy that god created for me, and so does my male partner. **MtF**

I STUDY women and IMPERSONATE them. I watch how they walk, their mannerisms, their facial expressions, I wax, pluck, moisturize, do makeup, wear wigs, wear womens cloths/ shoes. etc..i'm 100 % male, it's what I ADD that makes me female. **MtF**

This perspective is very different from that expressed in the narratives of MtFSM who identify as transsexual women.

For most transsexual MtFSM interviewees, sex with nontransgender, *straight* male partners affirms their identity as women:

When I have sex with a man that does not know, I definitely feel affirmed as a female. Especially being flirted with. When they find me attractive and desired as a female it is wonderful. **MtF**

I guess [**sex in the female role**] has affirmed my feminine feelings more than anything else, although I have dress most of my life. Its only been the last 5 years that I have engaged in any kind of sexual activity. I find that sex as ALicia is very warm from my part. I feel very feminine, and enjoy the satisfaction I give and get in return. **MtF**

If I am with a man who is gay, that experience will most likely turn out to be a negative experience for me because gay men usually don't want a woman...they want a man...that's the whole purpose of being gay. If I am with a man and he is very quick in taking off my panties, I am not affirmed as my true role. ..When I am with a man who treats me like a female, then the experience is more positive for me in affirmation. **MtF**

In contrast, several FtMSM report that sex with men provoked dissonance in their gender identity, mainly due to lack of a penis:

Sex is currently not particularly affirming, as I have had few gay male sexual experiences and I have found gay men to be less than open to me when I come out as FTM. An upcoming metadioplasty [genital surgery] may increase my confidence sexually. **FtM**

the actual act of sex does not make me feel affirmed as a man. to the contrary, i have had several encounters in which my partners made it clear that they could

only see me as a woman, and this was painful and caused me to retreat within myself. **FtM**

Other FtMSM experienced few contradictions, embracing a “genderqueer” identity outside of the male-female binary:

I don’t believe I want to live in a binary gender system, even one with fluid boundaries, nor do I want to dissolve gender altogether. I enjoy the intensity and tension that comes from alternate gender expressions. **FtM**

Ironically, as transitioning has been sweeping up a lot of my insecurities, I’ve found cross-gender sex play and other gender-bending exercises to be incredibly reaffirming... Identity being a personal relationship drawn between people, I identify with everything from drag to bearded ladies to genetic female femmes.

FtM

Sex with men for FtMSM participants, however, tended to affirm their sexual orientation as *gay* men, over and above the issue of gender identity itself:

Now I am seen as a gay man, which is how I identify, so for the most part the disjuncture between who I am and who I am taken to be is no longer a problem. The main problem is a physical one (genitalia). **FtM**

At any rate, that’s one area I think your HIV studies should really look at, because a lot of these new ftm guys are doing unbleievably bad stuff to themselves in the name of pursuing “gayness”. **FtM**

Sex with nontransgender gay men affirms their sexual orientation, their own identity as *gay* men. Living up to the perceived sexual norms of the gay community, particularly in the absence of a penis, serves as a potential driver of unsafe sexual behavior:

Because it’s a real concrete reminder that my genitals aren’t how I fantasize them to be. If I’m having anal sex, I can jack off (I have kind of a large clitoris, so I can stroke it like a penis) while having sex and feel very boyish ... very gay male which is often how I fantasize myself to be. **FtM**

I knew I was a gay man. I have had no experience in the lesbian community, as I knew my desires and interior role were very much gay male... but also among gay men there is such an acceptance, almost a mandate, about having casual sexual encounters and being somewhat sexually ravenous. I can tell that my attitude about myself as male and in that environment has changed the risks I’d now frame as “acceptable” which once would’ve been unthinkable. **FtM**

Participants’ perceptions of HIV risk reflect these differences in the relationship between sex and identity, as well as the effects of hormones. FtMSM generally see themselves at overall greater risk after transitioning due to a variety of factors, including the fact of having sex with other gay men. Participants discussed needing to fit into gay community’s attitudes towards sex and HIV risk, such as having more partners, more casual sex, and being more accepting of risky behaviors. In addition, FtMSM report higher libido due to testosterone use, resulting in a higher likelihood of casual and unprotected sex.

only in the sense that as a gay man, my risk for HIV has increased. I don't think it is necessarily correlated to being male or trans...only the fact that I'm gay. **FtM**

I also believe that my perception of myself as male and of gay males as more sexually adventurous has probably affected my HIV risk. Risk wise, I'd say I've relaxed quite a bit about HIV since taking hormones, largely because I'm not as anxious a person in general but also because I've seen more and been around more sex than I had before. **FtM**

However, other FtM participants reported being more attentive to safer sex, due to their heightened awareness of HIV risk.

I feel my risk level has gone up simply because of my increased interest in being sexually receptive, particularly with male partners. Because my risk level has gone up, I feel my attention to safer sex measures has also sharpened. **FtM**

MtFSM participants, in contrast, often saw themselves at decreased risk since transition, due to being more selective in their partners, seeking emotional relationships rather than casual sex. In addition, use of hormones results in decreased libido and less sexual activity:

However, being on hormones has decreased my risk for HIV because my sex drive has decreased...and I honestly believe that if I do have sex while on hormones, I will have safe sex as well. **MtF**

as a boy... i was very sexual, usually unprotected. then as a girl, i became more future orientated... i wanted to succeed, i started becoming more selective... looking for emotional fulfillment, i was with about 70 partners as a boy, and less than 10 in the 5 years as a girl... most of that in the beginning. i have had two long term relationships as a girl, none really as a boy. **MtF**

However, MtFSM also discussed a variety of risk factors not found in most FtM narratives, including unsafe sex related to use of alcohol or drugs. Pleasing their partner was a significant focus for MtF participants, who felt the need to have unsafe sex if they wanted to have an emotional or sexual relationship, perceived by them as unlike what nontransgender women experience:

I have had unsafe sex because we were drinking. Normally I practice safe sex. In a longterm relationship I am hesitant to use a condom because I feel it might be too desensitizing for him considering my vagina is not genetic. **MtF**

Being transsexual female, I feel you are forced to be a whole lot less cautious in your behavior as most others... And in the event of whether having safe sex as opposed to having unsafe sex, sometimes my need to be wanted and/or loved outweighs my need to be sexually safe. **MtF**

Both MtF and FtM participants noted the lack of available partners accepting of their trans status, and its impact on safer sex negotiation:

It's always a negotiation with myself to determine when and if I tell the guy that I'm trans (mostly that I don't have a dick like they think I do). So that's definitely an emotionally vulnerable and potentially unsafe (physically and emotionally) place to

be in. I also feel like I give a lot of control to my partner because I feel fortunate enough that they want me, so I would potentially let them do unsafe things to me.

FtM

I really like him.....but then again we (transsexuals) tend to like anyone who shows us the least amount of affection, and for my strong need to be with someone I may be willing to bend a little or a lot for it! **MtF**

Categorically, emotional and sexual relationships with nontransgender male partners distinguish transgender participants who have sex with men from those who do not, and, as expected, form an important part of their narratives. FtMSM were more likely than MtFSM to describe their male partners as being “queer” (rather than gay or straight) or gender variant themselves. At the same time, male partners were characterized as being uneducated or inexperienced with FtM partners, more desiring of their trans partner having a penis and more apt to take sexual risks. MtFSM overwhelmingly described their male partners as straight, sometimes married to a nontransgender woman. Men who seek out transgender women specifically are described as “weird,” and having an unusually high libido:

.....and as sexual risky behavior this is concerned here's just another chance you MUST take..... most men (85%) who involve themselves with transsexual women are extremely freaky by nature ie. they have such a sex drive that being with a natural female just isn't enough so they venture out to us hoping to find that ultimate sexual satisfaction.....in doing so they do not usually take the necessary protective measure that is needed. **MTF**

In both groups, relationships with men tended to be sexually focused, casual, and of short duration. If safer sex for anal or vaginal intercourse was negotiated, it was typically the trans partner who initiated the discussion, particularly among MtFSM. Participants reported not using barriers for oral sex, in long term relationships, or if both partners had been tested as HIV negative.

Overall, our qualitative results demonstrate that among transgender persons who have sex with men, sex carries different meanings and risks that appear strongly dependent on gender identity, but reach beyond gender identity in their scope to include sexual orientation, hormones and emotional relationships. These meanings appear to impact risk taking in terms of number of partners, safer sex negotiation and other risk taking behaviors.

Discussion

HIV prevalence and risk in the U.S. transgender population

Understanding the prevalence of HIV and its associated risk factors and behaviors among the U.S. transgender population remains a challenging task in the absence of nationally compiled surveillance data. Our study may represent a more accurate picture of the U.S. transgender population taken as a whole. As demonstrated by Rosser et al. (2007), a large-scale, Internet-based study can successfully assess transgender demographics on a national level, particularly given the absence of a sampling frame from which to draw a probability sample. As noted by Rosser et al. (2007) the geographic distribution of our online sample more closely approximates the Census data, while the samples in the Herbst analysis are

clustered in a few urban areas. The race/ethnicity profile of our sample is more similar to that of the Census population than the transgender samples in the studies analyzed by Herbst et al. (2008). Compared to census data, participants were less likely to live in metro areas (see Table 1); 27% of participants reported coming from rural areas or small towns, illustrating the success of the Internet in reaching these populations (Rosser et al., 2007). Our sample thus appeared demographically closer to the U.S. population as described by the Census than the various transgender samples analyzed by Herbst et al. (2008). This would include self-reported HIV prevalence, remarkably closer to the overall U.S. prevalence (2.2% versus 0.5%; McQuillan & Kruszon-Moran, 2008), than in previous studies of transgender populations (11.8% in Herbst et al., 2008). HIV screening is now recommended for all individuals ages 15 to 65 (U.S. Preventive Services Task Force, 2013). However, even the lower prevalence of HIV found in our study would meet the CDC criteria for a “high prevalence setting”: a geographic location or community with an HIV seroprevalence of at least 1% (U.S. Preventive Services Task Force. Screening for HIV: Final Recommendation Statement. AHRQ Publication No. 12-05173-EF-3. <http://www.uspreventiveservicestaskforce.org/uspstf13/hiv/hivfinalrs.htm>).

The differences among our sample, the U.S. census data and the Herbst et al. (2008) metaanalysis might be attributable to bias from using an Internet sample. Seven Internet-based studies of gay men—two comparative online-offline studies in Sweden (Ross, Tikkanen, & Månsson, 2000; Ross, Månsson, Daneback, Cooper, & Tikkanen, 2005); two in the United Kingdom (Davis, Bolding, Hart, Sherr, & Elford, 2004; Elford, Bolding, Davis, Sherr, & Hart, 2004); and three in the United States (Horvath, Beadnell, & Bowen, 2006; Horvath, Bowen, & Williams, 2006; Rosser et al., 2009)—demonstrated that online samples of sexual minorities would appear to disproportionately recruit participants who are younger, in school, better educated, less likely to be in monogamous relationships, and more likely to be seeking sexual partners. They would thus represent a more sexually active population than found off-line. Our total sample is similar demographically, but not in terms of sexual behavior. Only those participants having sex with nontransgender men were relatively sexually active, and may not be any more so than the off-line populations described in prior studies of transgender communities (Herbst et al., 2008). Our results are similar to those more recently published by Bauer, Travers, Scanlon, and Coleman (2012) from a study of HIV-related sexual risk among transgender people in Ontario, Canada recruited through respondent driven sampling. As with our Internet-based sample, the Bauer et al. study found demographics for Ontario transgender people similar to overall Ontario 2006 Census data, except for younger age and lower income. Self-reported HIV prevalence among this sample was strikingly similar (2.2%), as was the degree of heterogeneity across gender. Thus, while HIV is a serious health problem within the transgender population, it may not nearly be as widespread as prior studies indicate.

In our study, sex with men emerged as by far the strongest independent predictor of unprotected intercourse, in contrast to previous research, which identified among other factors, race/ethnicity, education, income, and sex work as potential or actual predictors (De Santis, 2009; Herbst et al., 2008; Melendez & Pinto, 2007; Sevelius, 2009). One can reconcile this finding with the previous research by recognizing the diversity within the U.S. transgender population itself. Similar to Bauer et al.’s (2012) study in Ontario, Canada, our

sample more closely resembled that of the U.S. population as a whole in terms of race/ethnicity, education and geographic distribution than many of the other studies of transgender persons and HIV risk. Although many if not most transgender persons experience stigma, psychosocial stress, and reduced income (Bockting et al., 2013; Clements-Nolle, Marx, & Katz, 2006; Dean et al., 2000), the degree of negative experiences may vary considerably (Hwahng & Nuttbrock, 2007). Additive psychosocial health problems, known collectively as a syndemic (Operario & Nemoto, 2010; Singer, 2009; Stall et al., 2003), are likely to be overrepresented among the previously studied urban transgender communities, such as described in Herbst et al. (2008), but not in our broader, Internet-based sample of the U.S. transgender population. Our findings suggest that, within this broader transgender population, those who have sex with nontransgender men are at higher risk for HIV, not simply being transgender in and of itself.

As seen in Table 3, participants who did not report sex with men may report sex with nontransgender women as well as transgender persons. However, MtFs and FtMs who had sex with men had a higher number of partners, were more likely to have received drugs or money for sex and to have used drugs or alcohol during sex. Surprisingly, these findings held true for both MtFSM and FtMSM participants. Sexual relationships with nontransgender men are clearly a force in sexual risk taking overall.

Transgender persons having sex with nontransgender men: Reasons for increased risk

Our post-hoc quantitative and qualitative data analyses provide a few clues as to the factors involved in the observed increased sexual-related risk taking among transgender persons who have sex with men. We initially hypothesized that the increased risk would primarily concern MtFSM participants, given a growing body of literature on the challenges facing this population and their nontransgender male partners (Bockting, Miner, & Rosser, 2007; Coan, Schrager, & Packer, 2005; Crosby & Pitts, 2007; Mauk, 2008; Operario, Burton, Underhill, & Sevelius, 2008; Operario, Nemoto, Iwamoto, & Moore, 2011; Reback & Larkins, 2011; Reisner et al., 2012). However, our results clearly demonstrate that both MtFSM and FtMSM are at high risk for unprotected sex and risk-related behaviors. Our results also show that MtFs and FtMs who have sex with men represent distinct groups, with differences in demographics, the distribution of type of transgender identities, and degree of sexual attraction to men. As Schleifer (2006) noted, sexuality, gender and sex construct each other through sexual interactions. MtFSM and FtMSM thus may arrive at increased risk of unsafe sex through different trajectories of identity and experience.

MtFSM, unlike MtFs who do not have sex with men, included relatively more drag queens and crossdressers among our sample. While these participants experience the feminine as part of their identity, they seem to nonetheless construct themselves as men, having sex with men. Their experiences as gay men, coupled with the stigma associated with crossdressing, may best define the factors leading this subgroup to unsafe sex.

As seen in our qualitative results, MtFSM who define themselves as women seek out partners and situations that affirm this identity. Sex, even unsafe sex, with non-gay, nontransgender men are a powerful means of affirming their identity as *women* (Clements-Nolle, Marx, & Katz, 2006; Crosby & Pitts, 2007; Melendez & Pinto, 2007; Nemoto et al.,

2004; Sausa, Keatley, & Operario, 2007). Among MtFSM, gender appears to emerge more as a binary intersecting with a binary of sexual orientation: Male and female, gay and straight. Our findings lend weight to Crosby and Pitts (2007) speculation that transgender women may be more submissive to male sexual desires both as part of enacting the female gender role and of accessing male partners. However, findings from another not yet published analysis of our data indicated that MtF participants further along in their transition process were less likely to engage in unsafe sex. Therefore, as confidence in one's gender identity increases, the ongoing process of affirming womanhood through sexual interaction with straight men may become less encompassing.

Our findings are consistent with previous research that indicated that MtFSM experience a limited availability of accepting romantic partners due to their transgender status— (Crosby & Pitts, 2007) as well as a loss of social and economic power (Kammerer, Mason, Connors, & Durkee, 2001; Kenagy, 2005; Xavier et al., 2005, among others). MtFSM, in our sample were younger and less likely to be White than MtFnSM. This is consistent with previously cited studies of “high risk” populations: comparatively younger, economically disadvantaged and of color. How these expected factors impact sexual relationships with nontransgender men is important to applying current HIV prevention knowledge to the context of HIV risk for transgender people.

In contrast to MtF participants, FtMSM *differ little in demographic terms* from FtMnSM, yet have higher rates of unsafe sex and other HIV risk behaviors. Hormone use is higher among FtMSM than FtMnSM, and the real or perceived physiologic effects of testosterone may drive higher rates of sexual activity—both safe and unsafe (Bockting et al., 1998; Clements, Katz, & Marx, 1999). Sexual risk taking is a socially accepted element of masculinity (Butler, 1990), notably among the gay community (Halkitis & Parsons, 2003), and the performance of masculinity may also drive high risk behavior among FtM who have sex with men.

Where FtMSM differ from MtFSM is in their sexual orientation. Findings from these interviews suggest that MtFSM and FtMSM pathways to higher unsafe sex diverge based as much on issues surrounding sexual orientation as on gender identity. For FtMSM risk emerges through how one seeks affirmation of being gay as much, if not more, than through how one seeks affirmation of being a man. Acceptance as a member of the gay community, through adopting perceived cultural and sexual norms, at the same time serves as a litmus test for acceptance as a man. There are many kinds of gay men, but they are never women (Sánchez, Greenberg, Liu, & Vilain, 2009; Taywaditep, 2001). Similar findings have been reported in several needs assessments (Adams et al., 2008; Bockting et al., 1998; Sevelius, 2009; Thompson, Wall, & Roebuck, 2008). Having sex with a nontransman provides validation of one's male gender as well, in that gay nontransmen are being constructed as the ultimate arbiter of who is male (Sevelius, 2009). Thus the relationship between gender identity, sexual identity and unsafe sex is complex. For example, in our study, there were also examples of MtFSM participants who were confident in their identity as women and unlikely to compromise their sexual safety, and FtMSM who had an increased sense of efficacy in using condoms arising from their identities as gay men. As Valentine (2002) noted, “gender” and “sexuality” are cultural categorizations rather than separate realms of

experience and identification. Participants may have brought these particular meanings to the foreground based on the context of discussing their sexual experiences, rather than operating as always distinct from each other.

The relative prevalence of “genderqueer” identities among FtM participants in our study, also noted by Factor and Rothblum (2008), is reflected in our qualitative interviews. For FtMSM with a non-binary, genderqueer identity, the gender of their partners is merely individual preference rather than constructive of their own identity. For the genderqueer population, increased risk may stem from a higher level of sexual activity, greater acceptance of or desire for risk taking that is distinct from constructs of sexual orientation and gender. However, the literature on this population is scarce and more research is clearly needed.

Study limitations

By definition, this study would select for participants with access to and greater comfort with Internet use, tending to underrepresent people with extremely low incomes, low literacy and non-English/non-native English speakers. While there is no evidence that the prevalence of gender nonconformity differs among ethnic or racial groups, African-Americans, Hispanics, Asian/Pacific Islanders, and Native Americans are clearly underrepresented in our study. Most importantly, their voices and perspectives are less represented in the qualitative interview data, limiting the richness and depth of the analysis. These limitations are offset, to some degree, by the geographic diversity of the population, including representation of non-urban participants, as well as the significant inclusion of FtM participants. The large sample size, both for quantitative and qualitative data, enhances the breadth and generalizability of our findings.

Self-reported HIV status provides an imprecise estimate of actual HIV prevalence, although several studies indicate strong reliability of self report (Mota et al., 2011; Dolcini, Catania, Stall, & Pollack, 2003). While some infections in our study sample have gone undiagnosed (and unreported), a higher percentage may have been reported than in previous studies due to the anonymity available in this Internet-based methodology.

While there is a time lag between data collection and this report, it has allowed time to triangulate our findings with recent large studies using other methodologies: Bauer et al (2012; respondent driven sampling, N = 433, Ontario) and the National Transgender Discrimination Survey (Grant et al., 2011). The latter study, which combined an online and paper survey with a very large convenience sample size of 6,436, reported a self-report HIV prevalence rate of 2.6%. As both the Herbst et al. (2008) and the National Transgender Discrimination Survey (Grant et al., 2011) demonstrate, when transgender status is combined with other minority statuses or marginalization (e.g. racial/ethnicity, sex work), the risk of HIV infection rises exponentially.

Conclusions

In a large and geographically diverse online sample of the U.S. transgender population, HIV risk and prevalence were lower than that reported in prior transgender-focused studies but significantly higher than that in the U.S. population as whole. Our study suggests that gender

nonconformity, despite its accompanying social marginalization, income loss, and risk of violence, does not in and of itself result in markedly higher HIV risk compared to other socially disadvantaged groups. Rather, sex with nontransgender men emerged as the strongest independent predictor of unprotected intercourse and high risk behavior for both MtF and FtM participants; the meanings enacted through these relationships appear a driving force in sexual risk taking for both transgender men and women. However, MtF and FtM persons represent distinct groups, arriving at increased risk of unsafe sex through different trajectories of identity and experience, including types of gender identity, age, and use of hormones and gender related surgery. Sexual relationships with nontransgender men constitute a process that may either affirm or problematize gender identity and sexual orientation, with different emphases for MtFSM and FtMSM. Future research in transgender HIV risk and prevention should account for the complexity and diversity of the transgender population, and utilize methods that address not only risk behaviors, but also the meaning underlying those behaviors for a particular individual in the larger sociocultural context.

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Table 1

Demographic, Socioeconomic and HIV prevalence Comparisons

	Our online sample of the U.S. transgender population (Rosser et al., 2007)	Census 2000 (U.S. Bureau of the Census, 2002)	Herbst et al., 2008 metanalysis (29 studies)
Mean Age	32.7	Median 35.3	34
Gender Identity			
MtF	57%	Not available	53-89%
FtM	43%	Not available	12-44%
Race/ethnicity			
Caucasian	78.6%	75.1%	21 of 29 (72%) studies were majority non-white participants
African-American	2.8%	12.3%	
Hispanic	4.1%	12.5%	
Multi racial	8.2%	2.4%	
Other	3.7%	9.1%	
Education (highest completed)			
Less than High School	2.0%	19.6%	Median of 11.7 years
High school	10.9%	28.6%	
Trade school	4.3%	n/a	
Some college	42.8%	27.1%	
College grad	24.9%	15.5%	
Graduate/professional	12.4%	8.9%	
Median Income	\$45,670	\$41, 994	Unknown
State of Residence (top 5)	California, New York, Washington, Pennsylvania and Florida	California, Texas, New York, Florida, Pennsylvania	San Francisco (N. California), New York City, Philadelphia, Minneapolis, Chicago
HIV-positive prevalence estimate (diagnosed)	2.2% (self report)	0.45% (CDC, 2006)*	11.8%

* Using a refined data set, CDC estimates the HIV prevalence to have increased 11.3% from 2003 to 2006 (Campsmith, Rhodes, Hall, & Green, 2008).

Table 2

Associations between Demographics and Unprotected Anal/Vaginal Intercourse

		<i>B</i>	S.E.	<i>p</i> -value	O.R.	95% C.I. for O.R.	
						Lower	Upper
Total sample (<i>N</i> = 1,229)	Natal Sex	-.592	.170	< .001	(.55)1.85	(.40)1.31	(.77)2.59
	Age	.006	.007	.391	1.01	.99	1.02
	Race/ethnicity (Caucasian or not)	.283	.178	.112	1.33	.94	1.88
	Education	-.039	.109	.721	(.96)1.03	.78	1.19
	Income (in thousands)	.004	.002	.005	1.00	1.00	1.00
	History of sex for money or drugs, last 3 months	-.370	.373	.321	(.69)1.07	.33	1.43
	Sex with men, last 3 months	1.458	.153	< .001	4.30	3.19	5.80
Model χ^2 (7) = 143.599, <i>p</i> < .001							
Male to Female (<i>N</i> = 697)	Age	-.001	.007	.866	1.00	.98	1.01
	Race/ethnicity (Caucasian or not)	.357	.221	.106	1.43	.93	2.20
	Education	-.015	.129	.910	.99	.77	1.27
	Income (in thousands)	.005	.002	.012	1.01	1.00	1.01
	History of sex for money or drugs, last 3 months	-.114	.428	.791	(.89)1.18	(.39).74	(2.07)1.89
	Sex with men, last 3 months	1.133	.180	< .001	3.10	2.18	4.42
	Model χ^2 (6) = 47.773, <i>p</i> < .001						
Female to Male (<i>N</i> = 532)	Age	.033	.017	.052	1.03	1.00	1.07
	Race/ethnicity (Caucasian or not)	.243	.308	.431	1.28	.70	2.33
	Education	-.158	.209	.449	.85	.57	1.29
	Income (in thousands)	.004	.003	.287	1.00	1.00	1.01
	History of sex for money or drugs, last 3 months	-1.012	.820	.217	.36	.07	1.81
	Sex with men, last 3 months	2.193	.281	< .001	8.96	5.17	15.53
	Model χ^2 (6) = 64.664, <i>p</i> < .001						

Note. Using logistic regression

Table 3

Demographic and Sexual Identity Information by Gender and Sex with Men ($N = 1,229$)

	MtFSM ($N = 232$)	MtFnSM ($N = 465$)	MtFSM vs. MtFnSM	FtFSM ($N = 91$)	FtFnSM ($N = 441$)	FtFSM vs. FtFnSM	MtFSM vs. FtFSM
Demographics							
Mean age (SD)	35.06 (10.810)	39.05 (12.807)	$p < .001$	26.25 (7.725)	26.01 (6.439)	n.s.	$p < .001$
Race/ethnicity							
			$p = .002$			n.s.	n.s.
-White	170 (73.3%)	388 (83.4%)		60 (65.9%)	348 (78.9%)		
-Of color	62 (26.7%)	77 (16.6%)		31 (34.1%)	93 (21.1%)		
Education							
			n.s.			n.s.	n.s.
-High school or less	37 (15.9%)	56 (12.0%)		12 (13.2%)	59 (13.4%)		
-Some college	107 (46.1%)	208 (44.7%)		47 (51.6%)	235 (53.3%)		
-College degree or higher	88 (37.9%)	201 (43.2%)		32 (35.2%)	147 (33.3%)		
Income							
	\$ 46,467.18	\$ 55,659.98	n.s.	\$ 31,440.82	\$ 37,667.70	n.s.	$p < .001$
Poverty (Income < \$20,000)	56(24.5%)	93 (20.5%)	n.s.	47 (52.2%)	166 (38.7%)	n.s.	$p < .001$
Marital status							
			$p < .001$			n.s.	n.s.
-Single, never married	138 (59.5%)	194 (41.7%)		73 (80.2%)	387 (88.0%)		
-Married	43 (18.5%)	154 (33.1%)		12 (13.2%)	32 (7.3%)		
-Separated/divorced/widowed	51 (22.0%)	117 (25.2%)		6 (6.6%)	21 (4.8%)		
Sexual Identity Information							
Type of transgender identity			$p < .001$			n.s.	$p < .001$
-Transsexual	74 (32.3%)	204 (44.2%)		40 (44.4%)	220 (50.3%)		
-Crossdresser	50 (21.7%)	136 (29.4%)		8 (8.9%)	20 (4.6%)		

	MtFSM (N = 232)	MtFnSM (N = 465)	MtFSM vs. MtFnSM	FtFSM (N = 91)	FtMnSM (N = 441)	FtFSM vs. FtMnSM	MtFSM vs. FtFSM
-Drag queen/king	45 (19.6%)	8 (1.7%)		6 (6.7%)	48 (11.0%)		
-Other	61 (26.5%)	114 (24.7%)		36 (40.0%)	149 (34.1%)		
Hormones, ever	126 (54.3%)	266 (57.5%)	n.s.	48 (52.7%)	171 (38.9%)	n.s.	n.s.
Had any gender-related surgery	35 (15.3%)	50 (10.8%)	n.s.	31 (34.1%)	90 (20.6%)	p = .005	p < .001
Desires surgery, future	86 (37.6%)	216 (46.6%)	n.s.	42 (46.2%)	222 (50.7%)	n.s.	p = .001
Sexual attraction -Attracted to men only	79 (34.1%)	20 (4.3%)	p < .001	12 (13.3%)	2 (0.5%)	n.s.	n.s.
Gender of sexual partners (other than men)							
-Female	80 (35.6%)	239 (52.0%)	p < .001	44 (48.9%)	277 (64.3%)	n.s.	n.s.
-MtF	43 (19.3%)	35 (7.8%)	p < .001	9 (10.1%)	22 (5.2%)	n.s.	n.s.
-FtM	8 (3.6%)	16 (3.6%)	n.s.	24 (27.0%)	70 (16.5%)	n.s.	p < .001

Differences between groups were tested using *t*-tests or analysis of variance followed by post-hoc tests for differences between groups using a Bonferroni correction, to reduce the chances of obtaining type I errors when multiple pair wise tests are performed on a single set of data.

MtFSM = Male to Female having sex with men in last 3 months

MtFnSM = Male to Female not having sex with men in last 3 months

FtFSM = Female to Male having sex with men in last 3 months

FtMnSM = Female to Male not having sex with men in last 3 months

Table 4HIV/STI Status and Risk (Co)Factors by Gender and Sex with Men(*N* = 1229)

	MtFSM (<i>N</i> = 232)	MtFnSM (<i>N</i> = 465)	MtFSM vs. MtFnSM	FtMSM (<i>N</i> = 91)	FtMnSM (<i>N</i> = 441)	FtMSM vs. FtMnSM	MtFSM vs. FtMSM
HIV/STI Status and Testing							
HIV status			<i>p</i> < .001			n.s.	n.s.
-Positive	10 (4.8%)	4 (0.9%)		1(1.3%)	1 (0.3%)		
-Negative	163 (78.0%)	229(53.5%)		55 (70.5%)	254(64.0%)		
-Unknown	6 (2.9%)	5 (1.2%)		6 (2.9%)	9 (2.3%)		
-Never tested	30 (14.4%)	190(44.4%)		19 (24.4%)	133(33.5%)		
Any prior STI	61 (29.6%)	80 (19.1%)	<i>p</i> < .01	39(52.7%)	196(50.0%)	n.s.	<i>p</i> < .001
Mean number of HIV tests, lifetime	4.61	2.33	<i>p</i> < .001	3.05	2.30	n.s.	n.s.
HIV/STI Risk Factors							
Unprotected anal or vaginal sex, last 3 month	111 (47.8%)	114(24.5%)	<i>p</i> < .001	41(45.1%)	43 (9.8%)	<i>p</i> < .001	n.s.
Median number of partners, last 3 months	3	1	<i>p</i> < .001	3	1	<i>p</i> < .001	n.s.
Drug use during sex, last 3 months	66 (30.1%)	53 (11.8%)	<i>p</i> < .001	27 (31.0%)	85 (20.1%)	<i>p</i> = .001	n.s.
Needle sharing, last 3 months, illicit drugs only	1 (.4%)	1 (.2%)	n.s.	1 (1.1%)	0	n.s.	n.s.
HIV/STI Risk Cofactors							
Received money / drugs for sex, last 3 months	23 (9.9%)	3 (0.6%)	<i>p</i> < .001	8 (8.8%)	6 (1.4%)	<i>p</i> < .001	n.s.
Alcohol use during sex, last 3 months	121 (55.3%)	111(24.7%)	<i>p</i> < .001	53 (60.9%)	170(40.3%)	<i>p</i> = .001	n.s.

Differences between groups were tested using *t*-tests or analysis of variance followed by post-hoc tests for differences between groups using a Bonferroni correction, to reduce the chances of obtaining type I errors when multiple pair wise tests are performed on a single set of data.