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Using a Two-Step Method to Measure Transgender Identity in Latin America/the Caribbean, Portugal, and Spain

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Abstract

Few comparative data are available internationally to examine health differences by transgender identity. A barrier to monitoring the health and well-being of transgender people is the lack of inclusion of measures to assess natal sex/gender identity status in surveys. Data were from a cross-sectional anonymous online survey of members ($n > 36,000$) of a sexual networking website targeting men who have sex with men in Spanish- and Portuguese-speaking countries/territories in Latin America/the Caribbean, Portugal, and Spain. Natal sex/gender identity status was assessed using a two-step method (Step 1: assigned birth sex, Step 2: current gender identity). Male-to-female (MTF) and female-to-male (FTM) participants were compared to non-transgender males in age-adjusted regression models on socioeconomic status (SES) (education, income, sex work), masculine gender conformity, psychological health and well-being (lifetime suicidality, past-week depressive distress, positive self-worth, general self-rated health, gender related stressors), and sexual health (HIV-infection, past-year STIs, past-3 month unprotected anal or vaginal sex). The two-step method identified 190 transgender participants (0.54%; 158 MTF, 32 FTM). Of the 12 health-related variables, six showed significant differences between the three groups: SES, masculine gender conformity, lifetime suicidality, depressive distress, positive self-worth, and past-year genital herpes. A two-step approach is recommended for health surveillance efforts to assess natal sex/gender identity status. Cognitive testing to formally validate assigned birth sex and current gender identity survey items in Spanish and Portuguese is encouraged.

Keywords

transgender; gender identity; HIV; health; surveillance

INTRODUCTION

Sex and gender are recognized globally as core social determinants of health and well-being across a wide variety of geographic settings and contexts (World Health Organization, 2008). Sex refers to biological differences among males and females, such as genetics, hormones, secondary sex characteristics, and anatomy (Haig, 2004). The assignment of sex at birth (male or female) is done by medical providers and is typically based on the appearance of external genitalia. Sex is then labeled and documented on the birth certificate and categorized as male or female. Gender is a multi-dimensional sociocultural construct that includes identity (internal sense of being male, female, transgender, or another identity), behaviors (gender expression and behaviors, how a person expresses their identity through appearance and mannerisms), and beliefs (cognitive beliefs about gender and gender role conformity) (Institute of Medicine, 2011). Sex and gender are often used interchangeably in the scientific literature; however, they are distinct and not exchangeable terms (see Krieger, 2003). Moreover, although sex and gender represent key demographic characteristics of populations, measures of these constructs used in health surveillance vary widely and have unknown psychometric properties (Conron, Landers, Reisner, & Sell, 2014; The Gender Identity in U.S. Surveillance Group, [GenIUSS] 2013).

Transgender is a term used to refer to people whose sex assigned at birth is incongruent or different from their current gender identity. *Cisgender* refers to people whose birth is concordant with their gender identity (e.g., non-transgender). Transgender people are not routinely included in health surveillance efforts—more precisely, they are not distinctly counted. Transgender people are often classified by sex (conflation of sex and gender). Conflating sex and gender is problematic in health research and epidemiologic surveillance for many reasons. Clinically, male-to-female (MTF) and female-to-male (FTM) transgender patients require physical exams and preventive screening consistent with the organ system and anatomy present rather than on the perceived gender identity of the patient (Feldman & Bockting, 2003). Epidemiologically, prostate cancer cannot occur among people assigned a female sex at birth given the anatomical absence of a prostate; however, MTF transgender woman can and should be in the denominator of a prostate cancer prevalence estimate given their assigned male birth sex. Furthermore, FTM transgender people remain vastly understudied and nearly invisible in health research, particularly in HIV (Kenagy & Hsieh, 2005).

Gender identity and sexual orientation also often get conflated in health research. For example, in many HIV surveillance efforts (e.g., Dubois-Arber et al., 2010; Likatavicius, Klavs, Devaux, Alix, & Nardone, 2008; Sánchez et al., 2007; Suárez-Lozano et al., 2002; Tabet et al., 2002), MTF transgender women (assigned a male sex at birth who identify as female) are often included as a subgroup of men who have sex with men (MSM). However, gender identity is not synonymous with sexual orientation. Transgender people may be

sexually oriented in attractions, behaviors, and identities toward men, women, other transgender people, or any combination (Grant et al., 2011; Iantaffi & Bockting, 2011; Nuttbrock et al., 2011). Without precise measurement of both natal sex and current gender identity, misclassification bias in sexual orientation-related data will occur. For example, a natal female who identifies her gender identity as a woman and who is sexually oriented to men should be categorized as heterosexual. However, a natal female who identifies his gender as a man and is sexually attracted to men should be classified as gay. Capturing sex only without measurement of current gender identity would result in misclassification of these types of sexual orientation identity data.

Methodological issues aside, the conceptual lack of distinction between sex, gender identity, and sexual orientation in many studies limits our current understanding of the complex interrelationships between these connected but not identical phenomena. In HIV research, for example, cisgender MSM and transgender women may share sex-linked biological risk factors (e.g., engaging in unprotected anal sex); however, unique factors related to gender identity may influence HIV acquisition and transmission behaviors for transgender women (e.g., differential power dynamics in primary sex partnerships compared to transactional sex encounters, receptive anal sex with primary partners and insertive anal sex with transactional sex partners, validation/ affirmation of gender identity in sexual encounters, injection silicone use) (e.g., Clements-Nolle, Marx, Guzman, & Katz, 2001; DeSantis, 2009; Nemoto, Bodeker, Iwamoto, & Sakata, 2013; Nuttbrock et al., 2009, 2013; Silva-Santisteban et al., 2012).

The lack of validated tools available to measure the construct we term natal sex/gender identity status is a barrier to getting survey items into health surveillance systems to monitor the health of transgender populations. Natal sex/gender identity status refers to the biological and social cross-classification of participants based on assigned sex at birth and current gender identity; it is neither sex nor gender, but a third construct obtained from cross-classifying the two (sex and gender) (Reisner, Conron, Tardiff, Jarvi, Gordon, & Austin, 2013). It is termed a *status* because statuses can change over time and people's identities can shift over the lifecourse. A two-step method for identifying transgender participants has been used and recommended in the U.S. (e.g., Sausa, Sevelius, Keatley, Iñiguez, & Reyes, 2009; Tate, Ledbetter, & Youssef, 2013; for a history of this method, see GenIUSS, 2013). The specific survey questions used to implement the two-step method differ across recommendations, including the item stem and response options, as does the order in which the sex and gender identity questions are sometimes asked (Reisner et al., 2013; Sausa et al., 2009; Tate et al., 2013). However, the procedure always uses two steps: assigned sex at birth and current gender identity. Table 1 provides our conceptual overview of natal sex/gender identity status measurement using a two-step method. A strength of this approach is that it takes into account both sex (biological) and gender (social) processes, which are both key for health research (Krieger, 2003). It is also consistent with the shift in transgender health research from a disease-based model (transgender as disorder, where transgender "cases" are identified using clinical diagnoses of psychopathology) to an identity-based model in health (transgender as identity, transgender "cases" are counted based on self-identification) (Bockting, 2008, 2009).

Little social and behavioral research has been conducted using the two-step method (e.g., Tate et al., 2013). Few studies that we are aware of from the published English-language scientific literature have examined this approach to natal sex/gender identity status measurement in languages other than English or outside of North America. Few comparative data are available in global contexts to compare the health of transgender and cisgender people. For example, depression appears to be a prevalent mental health problem in transgender communities (e.g., Bockting, Miner, Swinburne Romaine, Hamilton, & Coleman, 2013; Clements-Nolle et al., 2001; Iantaffi & Bockting, 2011; Nuttbrock et al., 2010), but very few studies offer a cisgender comparison group to assess whether transgender adults experience higher levels of mental health distress relative to other natal sex/gender identity groups. HIV has been shown to disproportionately affect transgender communities globally relative to cisgender people, particularly transgender women (Baral et al., 2013; Herbst et al., 2008; Operario, Soma, & Underhill, 2008); yet, no data are available documenting HIV prevalence among transgender men in international settings.

The current study aimed to begin to fill some of these methodological and scientific gaps. Secondary data analysis was conducted with a large online sample enrolled through an Internet website targeting men who have sex with men (MSM) in Latin America/the Caribbean, Spain, and Portugal. Although not a representative population sample, this dataset offers a “case study” of how a two-step method can be implemented and used to monitor the health of transgender people, in this case, a particular subset of transgender women, transgender men, and cisgender males frequenting an online sex-seeking website. Given the dearth of global health surveillance data about transgender people, even this non-generalizable sample provides valuable information, particularly about sexual health-related outcomes.

We first identified transgender and cisgender participants using a two-step method. We then examined differences in sociodemographics, gender expression, psychological health and well-being, and sexual health indicators, comparing MTF transgender, FTM transgender, and cisgender male participants. We expected transgender women would score significantly lower on masculine gender conformity, but that no significant difference between transgender men and cisgender males would be found on this measure. With respect to social stressors, we hypothesized that transgender women and men sampled would be of lower socioeconomic status (SES) and disproportionately report experiences of violence throughout the life-course relative to cisgender males, given data showing transgender adults disproportionately experience high rates of socioeconomic disenfranchisement (e.g., Conron, Scott, Stowell, & Landers, 2012) and lifetime violence (e.g., Nuttbrock et al., 2010), likely due to the discrimination and social stigma transgender people face in the world at large (Bockting et al., 2013; Grant et al., 2011). With respect to health, we expected transgender women and men in our sample would have significantly poorer psychological functioning and well-being than cisgender males sampled, but that sexual health indicators (e.g., HIV) would not significantly differ between the three natal sex/gender groups.

METHOD

Participants and Procedure

A cross-sectional anonymous online survey was conducted of adult members (age 18 years and older) of a sexual networking website targeting MSM in Spanish- and Portuguese-speaking countries/territories in Latin America/the Caribbean, Spain, and Portugal. The one-time survey was available in Spanish and Portuguese and was automatically administered in the language participants had selected in their online profile. Data were collected on sexual health and diverse risk factors. No incentives were offered for survey participation. To minimize potential duplication of responses, the survey could not be completed more than one time from the same IP address. The final sample was 36,063. For participants who did not complete the full survey, data were analyzed for all questions that were answered. The study was approved by the Institutional Review Board at the Fenway Institute, Fenway Health, in Boston, MA. Additional detail about the study methods can be found elsewhere (Biello et al., 2013).

Measures

Natal sex/gender identity status—Participants were first asked a question about their natal sex (Step 1): “What sex were you assigned at birth, on your original birth certificate? (*check one*)” with three response options: “Male,” “Female,” or “Prefer Not to Answer.” The overall proportion of participants who endorsed “Prefer Not to Answer” was low ($n = 44$). These participants were excluded from analysis. Next, participants were asked about their current gender identity (Step 2): “What is your current gender identity? (*check one*)” with six response options: “Male,” “Female,” “Male-to-Female,” “Female-to-Male,” “Other (Specify),” and “Prefer Not to Answer.” Participants who selected “Prefer Not to Answer” ($n = 101$) were excluded from analysis.

The response option “Other (Specify)” offered participants an open-ended write-in to describe their current gender identity. A total of 432 participants selected “Other (Specify)” of whom 4.6% ($n = 20$) left the write-in option blank. These 20 participants were excluded from analysis. Two independent coders sorted qualitative responses ($n = 412$) and grouped them by thematic category to examine potential problems with item interpretation. The majority of write-in participants interpreted gender identity to mean sexual orientation identity, most commonly gay (59.5%) or bisexual (28.2%). After confirming their assigned sex at birth was male and their write-in response was not a transgender or other gender identity, these participants were re-coded as cisgender male. Overall, 2.2% ($n = 9$) listed an “Other” write-in that was correctly classified as a gender identity (not sexual identity or a sexual role), most commonly *travesti* (66.7%; $n = 6$). These were categorized as other gender category.

Natal sex/gender identity status was operationalized by cross-classifying participants according to assigned sex at birth and current gender identity as follows: (1) “Male”: participants who checked “Male” assigned birth sex and checked “Male” for gender identity; (2) “MTF spectrum”: participants who checked “Male” assigned sex and who endorsed a “Female,” “MTF,” or “Other” (re-coded as described above) gender identity; (3) “FTM

spectrum”: participants who checked “Female” assigned birth sex and who endorsed a “Male,” “FTM,” or “Other” (re-coded as described above) gender identity. Table 2 (Column A) shows the initial coding using the two-step method. Thirty-five cases appeared misclassified after initial coding (30 cases assigned male birth sex who self-identified FTM, 4 cases of female birth sex who identified as female, and 1 case of female birth sex who identified as male-to-female). These were excluded from analysis. Cleaned and coded two-step categorized gender is shown in Table 2 (Column B). Overall, 190 (0.54%) transgender participants were identified.

Demographics—Age (continuous in years) was queried. Participants were asked where they currently lived. Geographic region was dichotomized as Latin American/the Caribbean versus all other geographic regions.

Masculine gender conformity—Socially assigned masculine gender conformity (herein, referred to as masculine gender conformity) refers to a perceived conforming masculine gender expression by others, rather than one’s own self-concept. A two-item measure (Wylie, Corliss, Boulanger, Prokop, & Austin, 2010) asked about “appearance, style, or dress” and “mannerisms” each on a 7-point Likert-scale ranging from 1 = very feminine to 7 = very masculine (higher scores indicated higher masculinity). The items were moderately correlated ($r = 0.66$, $df = 35,449$; $p < .0001$). Response scores were added so that higher scores (range, 2 to 14) indicated greater masculine gender conformity (Cronbach’s $\alpha = 0.79$). A dichotomous indicator of high masculine conformity (at or above the median) was coded (score = 12).

Socioeconomics—Three socioeconomic indicators were assessed: (1) education (“What is the highest level of education you have completed?”, ranging from 1 = no formal education to 5 = post-graduate education); (2) reported perceived income (“How would you describe your income?” ranging from 1 = no income to 4 = high income/upper class); and (3) engaging in transactional sex in the past 12 months (“Did anyone pay you in exchange for engaging in any type of sexual activity?” 1 = yes, 2 = no).

Psychological health and well-being—Five indicators were assessed: (1) Lifetime suicide attempt: “Have you ever in your lifetime attempted suicide?” (1 = No, 2 = Yes, 3 = Prefer Not to Say). (2) Past-week depressive distress: Depressive distress was assessed using the validated and reliable 10-item Center for Epidemiologic Studies Depression (CES-D 10) Scale (Andresen, Malmgren, Carter, & Patrick, 1994). Participants were asked to indicate how often in the past week they felt or behaved certain ways on a response scale from 0 = Rarely/Never to 3 = All the time (e.g., “During the past week, I was bothered by things that usually don’t bother me”). After reverse coding two items, items were summed (range, 0 to 30) such that higher scores indicated more depressive distress (Cronbach’s $\alpha = 0.85$). A clinical cut point of CESD-10 score = 10 was used to categorize a positive screen-in for clinically significant depressive distress. (3) Positive self-worth: A single item taken from the Rosenberg Self Esteem Scale (Rosenberg, Schooler, & Schoenbach, 1989) assessed positive self-worth (“I take a positive attitude toward myself” 1 = Strongly Disagree to 4 = Strongly Agree). (4) General self-rated health: Self-rated health was assessed with a single-

item validated measure shown to be associated with morbidity and healthcare utilization (DeSalvo, Fan, McDonnell, & Fihn, 2005): “Would you say in general that your health is...” 1 = Poor to 5 = Excellent. (5) Gender-related stressors: Participants asked whether they were “made fun of or called names for being homosexual or effeminate” (1 = Many times to 4 = Never) in childhood (“As you were growing up”) and adulthood (“As an adult”) separately. Questions were from prior research on stressors experienced by gay men and lesbians (Lewis, Derlega, Berndt, Morris, & Rose, 2001). Responses were dichotomized and participants were classified on three indicators as having self-reported experiences of harassment in: childhood (yes/no) or adulthood (yes/no).

Sexual health—Five sexual health indicators were assessed: (1) HIV-infection: “Have you been told by a healthcare provider that you have HIV-infection?” 1 = Yes, 0 = No, excluded were “Don’t Know” and “Prefer Not to Answer.” (2) Past-year STIs: “In the past year, have you been told by a healthcare provider that you have [STI name]?” 1 = No, 0 = Yes, excluded were “Don’t Know,” “Prefer Not to Answer.” Queried separately were syphilis, gonorrhea, Chlamydia, HPV/genital warts, and genital herpes. (3) Any unprotected sex, past 3 months: Participants were asked a series of sexual risk questions adapted from Project EXPLORE (Chesney et al., 2003; Koblin et al., 2003). Individuals who reported any intercourse in the past 3 months (i.e., sexually active) were asked about the number of times they had sexual intercourse (receptive anal, insertive anal, and vaginal) by partner gender (male, female, and transgender) without a condom, including with “a partner of different or unknown HIV serostatus.” Composite variables categorized participants as having engaged in any unprotected anal or vaginal sex in the past 3 months (any unprotected sex yes/no) and having reported any serodiscordant anal or vaginal sex in the past 3 months (any unprotected sex with a partner of different or unknown HIV serostatus yes/no). (4) Gender of sexual partners, past 12 months: Participants were asked about the gender of their sexual partners in the past 12 months (non-transgender males, non-transgender females, MTF, FTM, other gender, prefer not to answer). (5) Sexual role: Preferred sexual role during intercourse was asked (top, bottom, versatile, other role, prefer not to answer). This survey item was a global assessment of preferred sexual role and was not tied to a specific timeframe or sexual behaviors.

Data Analysis

SAS v9.3.1 was used for all statistical analyses. The univariate distribution of all variables (frequency, proportion, mean, SD) was examined by natal sex/gender identity status. There was a statistically significant difference in age across the three gender groups: MTFs were significantly younger compared to cisgender males (M_{age} 29.1 versus 30.8 years; Table 3). All subsequent models were adjusted by age. There were no statistically significant differences in geographic region by gender natal sex/gender identity status. Age-adjusted regression models were fit to test for differences in health by natal sex/gender identity status. Gender was dummy coded to compare MTF and FTM participants, each to the cisgender male referent. Linear regression models were used for continuous outcomes (β and 95% confidence limit [CL]). Logistic regression models were used for binary outcomes (odds ratio [OR] and 95% confidence interval [CI]). *p*-values presented are from multiparameter joint tests of the global effect of natal sex/gender identity status in each of these models.

Specific comparisons to cisgender males for MTF and FTM participants are presented without *p*-values in order to minimize Type 1 error that can result from repeated multiple comparisons. Age-adjusted models were not fit for several variables, such as the 3-category specification of education or HIV-infected serostatus, due to small sample sizes. For example, χ^2 tests were performed on sexual risk variables due to small cell sizes (Fisher's exact tests for cell sizes ≤ 5). Given the small number of transgender participants in some categories, emphasis was placed on the direction and magnitude of associations rather than on statistical significance.

RESULTS

Masculine Gender Conformity and Socioeconomics

As shown in Table 3, there were statistically significant differences in masculine gender conformity, with MTFs reporting statistically significantly lower scores compared to cisgender males, but no statistically significant differences emerged for FTMs compared to the referent group. There was a gender effect in socioeconomics. MTF and FTM transgender participants each had significantly lower levels of income than cisgender males. For example, 32.4% of MTF and 40.7% of FTM participants reported low income compared to 19.4% of cisgender males. Natal sex/gender identity status differences in engaging in transactional sex in the past 12 months were in the predicted direction with a slightly higher proportion of transgender participants reporting sex work compared to cisgender males (11.4% MTF, 8.3% FTM, 7.0% cisgender males); however, these differences did not reach statistical significance.

Psychological Health and Well-being

The psychological health and well-being of transgender women and men were compared to cisgender males (Table 3). Few differences were noted in these variables for MTF versus cisgender male participants. However, FTM participants evidenced statistically significant differences compared to cisgender males: elevated depressive distress, lower ratings of positive attitude toward self, and the proportion with lifetime attempted suicide was higher. No significant differences in self-rated health or gender related harassment in childhood or adulthood were found across gender groups.

Sexual Health

Sexual health indicators are shown by natal sex/gender status in Table 4. The prevalence of HIV did not differ significantly across groups (6.9% MTF, 8.0% FTM, 9.1% cisgender males). Overall, 9.4% of MTF, 19.2% of FTM, and 14.3% of cisgender males had a past-year STI. FTMs were significantly more likely to have herpes than cisgender males. No other significant differences in specific past-year STIs by natal sex/gender identity status were found. Unprotected anal or vaginal sex was high among FTMs (78.9%) and compared to cisgender males (53.1%). However, FTMs reported the lowest proportion of unprotected serodiscordant anal or vaginal sex (26.7%) compared to MTFs (33.3%) and cisgender males (34.2%). Gender of sexual partners in the past 12 months and preferred sexual role are also shown in Table 4. Note the substantial heterogeneity in sex partner gender, particularly for MTFs, as well as diversity of preferred sexual role during sex. The versatile sexual role was

the most endorsed across all natal sex/gender identity status groups (53.0% MTF, 64.0% FTM, and 58.8% non-transgender male).

DISCUSSION

We used a two-step method to measure natal sex/gender identity status that incorporated assigned birth sex (Step 1) and current gender identity (Step 2). In an online sample of users of a sexual networking website targeting MSM in Spanish- and Portuguese-speaking countries/ territories in Latin America/the Caribbean, Portugal, and Spain, we found that 0.54% of participants were transgender. This prevalence estimate was consistent with another reported in the U.S. from a probability sample study in Massachusetts (Conron et al., 2012). Of note, however, participants who endorsed “Prefer Not to Answer” on assigned birth sex and current gender identity were excluded from the current analysis. It is possible that some of these excluded participants were transgender but did not want to identify themselves due to fears of confidentiality, social stigma, current questioning of their gender identity, or other reasons. Their exclusion from analysis may have therefore resulted in the prevalence of transgender being underestimated.

There appeared to be a lack of clarity in the gender item among participants who wrote in a qualitative response to “Other (Specify).” This could be due, in part, to gender being more tied to sexual orientation and sexual positioning in the Latin American context (e.g., Clark et al., 2013; Parker, 2009). Of those who wrote-in a response ($n = 412$), the majority described their sexual orientation instead of gender identity. We recommend a modified version of the measure for future research that adds a prompt to define gender identity and differentiate it from sexual orientation to address this issue. This will cognitively cue participants that the question is asking about gender identity and not about sexual orientation. Additional studies are needed using mixed methods to formally validate the survey items to measure natal sex/gender identity status using a two-step method. Cognitive testing of the modified survey items (Reisner et al., 2013; Sudman, Bradburn, & Schwarz, 1996) is recommended in different languages, and geographic contexts, using diverse samples. This would ideally include confirming accurate classification of transgender cases (i.e., that people checking cross-sex, transgender, or other gender are being classified correctly as transgender).

Differences between transgender and cisgender male participants were found on socioeconomic indicators. The socioeconomic disenfranchisement of transgender people compared to cisgender people has been previously documented (Conron et al., 2012). Future research would benefit from considering the socioeconomic realities of transgender people living in resource poor settings, including how this may influence access to and utilization of gender affirmative medical technologies such as hormones. Surprisingly, the prevalence of past 12-month transactional sex did not significantly differ by gender group. Our dichotomous measures of sex work may not capture differences in the frequency of transactional sex by gender groups, which may be higher among transgender people compared to cisgender males given socioeconomic marginalization. Also interesting and contrary to our hypothesis was that reported experiences of gender-related harassment either in childhood or adulthood did not differ by natal sex/gender identity. Again, the binary

specification of gender-related harassment may not capture differences in the frequency with which transgender people are harassed, which may differ from cisgender males.

No significant differences in psychological health and well-being were seen for MTF versus cisgender male participants; however, we did find significant differences between FTM and cisgender males in suicide, depression, and self-worth. Results should be interpreted cautiously given the very small number of FTMs in our sample. Nevertheless, the finding that depressive symptoms were heightened for FTMs compared to cisgender males may be supported. Examining depression among transgender people requires consideration of natal birth sex as well as current gender identity. Depression disproportionately affects females across the globe (Seedat et al., 2009). Thus, if we were to classify FTMs as male or transgender based on current gender identity without consideration of natal sex, we would be ignoring the sex-linked mechanisms (e.g., regulation of the hypothalamic pituitary adrenal axis and the sympathoadreno-medullary system) (Altemus, 2006), given biological determinants of depression (Nolen-Hoeksema, 2012). Similarly, without attention to current gender identity, we would be ignoring socialization processes that influence potentially modifiable intervention targets for depressive distress (e.g., emotional coping styles) (Hankin & Abramson, 2001; Nolen-Hoeksema, 2012).

In terms of sexual health, we found HIV-infection rates to be lower among both MTFs and cisgender males than in other studies in Latin America/the Caribbean (Baral et al., 2013; Caceres, Konda, Segura, & Lyerla, 2008; Silva-Santisteban et al., 2011). We also found similar prevalence of HIV and any past-year STIs by gender identity comparing MTFs and FTMs each to cisgender males. This was inconsistent with prior research, including a recent meta-analysis of HIV-infection globally among transgender women (Baral et al., 2013). These findings can likely be attributed to differences in data collection and sampling methods. For example, research in the U.S. has shown demographic and health differences between online versus in-person participants, including within transgender communities, with self-reported HIV-infection being much lower among online compared to in-person participants (Reisner et al., 2014a). Thus, it is likely the HIV and past-year STI prevalence estimates were lower than would be obtained from other data collection and sampling methods, such as those in-person methods used in studies included in meta-analysis findings.

Prior research in the U.S. and Canada documents self-reported HIV/STI sexual risk behaviors in FTMs who have sex with cisgender males (Bauer, Travers, Scanlon, & Coleman, 2012; Chen, McFarland, Thompson, & Raymond, 2011; Reisner, Perkovich, & Mimiaga, 2010; Reisner, White, Mayer, & Mimiaga, 2014b; Rowniak, Chesla, & Rose, 2011; Sevelius, 2009). The current study also documented HIV prevalence among FTMs (8.0%) outside of North America. We found differences in past-year genital herpes with FTM participants (11.5%) reporting a significantly higher prevalence than cisgender male participants (2.8%). A higher proportion of FTMs (78.9%) also reported unprotected anal or vaginal sex than cisgender male participants (53.1%). Additional research with larger samples is needed, including epidemiologic and HIV/STI prevention intervention studies that address the social, behavioral, and biological risk factors facing FTM transgender men, including changing sexual attractions, behaviors, and identities before, during, and after

gender transition and affirmation (Bockting, Benner, & Coleman, 2009; Meier, Pardo, Labuski, & Babcock, 2013).

Several limitations of this research are important to consider. First, cognitive testing of the survey items was not conducted prior to survey implementation and we did not confirm transgender cases. The assigned sex at birth measure was developed using input from transgender community members and has been used with transgender populations in the U.S. (Grant et al., 2011). Future research is needed to conduct measurement validation with diverse international samples that include cisgender female participants and using cognitive testing in different languages and geographic contexts. Consistent with U.S. recommendations (GenIUSS, 2013; Sausa et al., 2009; Tate et al., 2013), a two-step method for identifying transgender was implemented to identify transgender women and men in the current study. However, additional empirical work is needed to validate survey questions used to implement the two-step method, including information about the item stem and response options, and the order in which the sex and gender identity questions are asked.

Second, this was not a representative sample or a probability sample. An online convenience sample of users of a popular Internet MSM sexual networking website is not generalizable beyond the parameters of that specific virtual environment and the universe that the sampling frame captures. Importantly, this sample was limited to a subset of cisgender males, transgender women, and transgender men who seek sex with men online; thus, data should be cautiously interpreted and are not generalizable to the general male adult population or the gender adult transgender population. We did not stratify cisgender MSM by sexual orientation identity and behaviors (e.g., gay MSM, bisexual MSM, etc.), which may obfuscate within- and between-group differences. We also did not ask transgender participants about their gender affirmation timeline so could not assess temporality of, for example, attempted suicide and gender identification.

Another limitation is that HIV and past-year STI data were self-reported. In addition, herpes was assessed as a past-year question as opposed to a lifetime diagnosis which may mean underreporting given its chronic nature. The current study's cross-sectional approach could be strengthened to enroll a longitudinal, repeated measures design to collect HIV/STI biomarker data, alongside test re-test reliability of assigned birth sex and gender identity for measurement validation. Limitations notwithstanding, the inclusion of assigned sex at birth and current gender identity survey items in our study offered a unique opportunity to use a two-step method to measure natal sex/gender identity status in an online modality, in two languages, and with a unique community-based sample of cisgender male and transgender website users who actively use the Internet to facilitate social and sexual encounters.

The complexity of sex and gender measurement matters for health. It has been suggested that a two-step approach offers a method of measuring transgender identity in the U.S. (Sausa et al., 2009; Tate et al., 2013). We view the two-step cross-classification procedure as a method to categorize the construct of natal sex/gender identity status in health research (Reisner et al., 2013a). The current study extended previous work by offering conceptual precision of the construct being measured, bringing the two-step method into a global context, and offering Spanish and Portuguese translations of two survey items for health

research. We fill an important methodological gap that will allow monitoring the health of transgender people globally, as well as potentially more accurate measurement of sex and gender among cisgender people. In the U.S., recent advocacy and research efforts have focused on adding questions to population-level surveys, with some success. For example, in the U.S., the Behavioral Risk Factor Surveillance System (BRFSS) in Massachusetts, which conducts surveillance on adult health using probability sampling methods, included an interviewer-administered item to identify transgender participants (Conron et al., 2012). Additional efforts are needed to add survey items to epidemiologic and health surveillance data in different countries in order to characterize transgender respondent populations across diverse global contexts and settings and understand their health and healthcare needs.

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References

- Altemus M. Sex differences in depression and anxiety disorders: Potential biological determinants. *Hormones and Behavior*. 2006; 50:534–538.10.1016/j.yhbeh.2006.06.031 [PubMed: 16920114]
- Andresen EM, Malmgren JA, Carter WB, Patrick DL. Screening for depression in well older adults: Evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression Scale). *American Journal of Preventive Medicine*. 1994; 10:77–84. [PubMed: 8037935]
- Baral SD, Poteat T, Strömdahl S, Wirtz AL, Guadamuz TE, Beyrer C. Worldwide burden of HIV in transgender women: A systematic review and meta-analysis. *Lancet Infectious Diseases*. 2013; 13:214–222.10.1016/S1473-3099(12)70315-8
- Bauer GR, Travers R, Scanlon K, Coleman TA. High heterogeneity of HIV-related sexual risk among transgender people in Ontario, Canada: A province-wide respondent-driven sampling survey. *BMC Public Health*. 2012; 12:292.10.1186/1471-2458-12-292 [PubMed: 22520027]
- Biello KB, Rosenberger JG, Novak DS, Robertson A, Mayer KH, Mimiaga MJ. Sexual behaviors, HIV and STI testing and prevalence among men who have sex with men in Spanish and Portuguese-speaking countries in Latin America and Europe recruited via a sexual networking site. 2013 Manuscript submitted for publication.
- Bockting WO. Psychotherapy and the real-life experience: From gender dichotomy to gender diversity. *Sexologies*. 2008; 17:211–224.10.1016/j.sexol.2008.08.001
- Bockting WO. Transforming the paradigm of transgender health: A field in transition. *Sexual and Relationship Therapy*. 2009; 24:103–107.10.1080/14681990903037660
- Bockting WO, Benner A, Coleman E. Gay and bisexual identity development among female-to-male transsexuals in North America: Emergence of a transgender sexuality. *Archives of Sexual Behavior*. 2009; 38:688–701.10.1007/s10508-009-9489-3 [PubMed: 19330439]
- Bockting WO, Miner MH, Swinburne Romine RE, Hamilton A, Coleman E. Stigma, mental health, and resilience in an online sample of the US transgender population. *American Journal of Public Health*. 2013; 103:943–951.10.2105/AJPH.2013.301241 [PubMed: 23488522]
- Caceres CF, Konda K, Segura ER, Lyerla R. Epidemiology of male same-sex behaviour and associated sexual health indicators in low- and middle-income countries: 2003–2007 estimates. *Sexually Transmitted Infections*. 2008; 84:i49–i56.10.1136/sti.2008.030569 [PubMed: 18647866]
- Chen S, McFarland W, Thompson HM, Raymond HF. Transmen in San Francisco: What do we know from HIV test site data? *AIDS and Behavior*. 2011; 15:659–662.10.1007/s10461-010-9859-9 [PubMed: 21153048]
- Chesney MA, Koblin BA, Barresi PJ, Husnik MJ, Celum CL, Colfax G. EXPLORE Study Team. An individually tailored intervention for HIV prevention: Baseline data from the EXPLORE Study.

- American Journal of Public Health. 2003; 93:933–938.10.2105/AJPH.93.6.933 [PubMed: 12773358]
- Clark J, Salvatierra J, Segura E, Salazar X, Konda K, Perez-Brumer A, Coates T. Modern love: Sexual role-based identities and HIV/STI prevention among men who have sex with men in Lima, Peru. *AIDS and Behavior*. 2013; 17:1313–1328.10.1007/s10461-012-0210-5 [PubMed: 22614747]
- Clements-Nolle K, Marx R, Guzman R, Katz M. HIV prevalence, risk behaviors, health care use, and mental health status of transgender persons: Implications for public health intervention. *American Journal of Public Health*. 2001; 91:915–921. [PubMed: 11392934]
- Conron KJ, Scott G, Stowell GS, Landers SJ. Transgender health in Massachusetts: Results from a household probability sample of adults. *American Journal of Public Health*. 2012; 102:118–122.10.2105/AJPH.2011.300315 [PubMed: 22095354]
- Conron KJ, Landers SJ, Reisner SL, Sell R. Sex and gender in the U.S. health surveillance system: A call to action. *American Journal of Public Health*. 2014.10.2105/AJPH.2013.301831
- DeSalvo KB, Fan VS, McDonnell MB, Fihn SD. Predicting mortality and healthcare utilization with a single question. *Health Services Research*. 2005; 40:1234–1246.10.1111/j.1475-6773.2005.00404.x [PubMed: 16033502]
- De Santis JP. HIV infection risk factors among male-to-female transgender persons: A review of the literature. *Journal of the Association of Nurses in AIDS Care*. 2009; 20:362–372.10.1016/j.jana.2009.06.005 [PubMed: 19732695]
- Dubois-Arber F, Jeannin A, Spencer B, Gervasoni JP, Graz B, Elford J, Van de Laar M. Mapping HIV/STI behavioural surveillance in Europe. *BMC Infectious Diseases*. 2010; 10:290.10.1186/1471-2334-10-290 [PubMed: 20920339]
- Feldman J, Bockting W. Transgender health. *Minnesota Medicine*. 2003; 86:25–32. [PubMed: 12921373]
- Grant, JM.; Mottet, LA.; Tanis, JD.; Harrison, J.; Herman, JL.; Keisling, M. Injustice at every turn: A report of the National Transgender Discrimination Survey. Washington, DC: The National Center for Transgender Equality and National Gay and Lesbian Task Force; 2011. Retrieved from: http://www.thetaskforce.org/reports_and_research/ntds
- Haig D. The inexorable rise of gender and the decline of sex: Social change in academic titles, 1945–2001. *Archives of Sexual Behavior*. 2004; 33:87–96.10.1023/B:ASEB.0000014323.56281.0d [PubMed: 15146141]
- Hankin BL, Abramson LY. Development of gender differences in depression: An elaborated cognitive vulnerability-transactional stress theory. *Psychological Bulletin*. 2001; 127:773–796.10.1037/0033-2909.127.6.773 [PubMed: 11726071]
- Herbst JH, Jacobs ED, Finlayson TJ, McKleroy VS, Neumann MS, Crepaz N. HIV/AIDS Prevention Research Synthesis Team. Estimating HIV prevalence and risk behaviors of transgender persons in the United States: A systematic review. *AIDS and Behavior*. 2008; 12:1–17.10.1007/s10461-007-9299-3 [PubMed: 17694429]
- Iantaffi A, Bockting WO. Views from both sides of the bridge? Gender, sexual legitimacy and transgender people's experiences of relationships. *Culture, Health & Sexuality*. 2011; 13:355–370.10.1080/13691058.2010.537770
- Institute of Medicine. The health of lesbian, gay, bisexual, and transgender people: Building a foundation for better understanding. Washington, DC: The National Academic Press; 2011.
- Kenagy GP, Hsieh CM. The risk less known: Female-to-male transgender persons' vulnerability to HIV infection. *AIDS Care*. 2005; 17:195–207.10.1080/19540120512331325680 [PubMed: 15763714]
- Koblin BA, Chesney MA, Husnik MJ, Bozeman S, Celum CL, Buchbinder S. EXPLORE Study Team. High-risk behaviors among men who have sex with men in 6 US cities: Baseline data from the EXPLORE study. *American Journal of Public Health*. 2003; 93:926–932. [PubMed: 12773357]
- Krieger N. Genders, sexes, and health: What are the connections—and why does it matter? *International Journal of Epidemiology*. 2003; 32:652–657.10.1093/ije/dyg156 [PubMed: 12913047]

- Lewis RJ, Derlega VJ, Berndt A, Morris LM, Rose S. An empirical analysis of stressors for gay men and lesbians. *Journal of Homosexuality*. 2001; 42:63–88.10.1300/J082v42n01_04 [PubMed: 11991567]
- LikataVICIUS G, Klavs I, Devaux I, Alix J, Nardone A. An increase in newly diagnosed HIV cases reported among men who have sex with men in Europe, 2000-6: Implications for a European public health strategy. *Sexually Transmitted Infections*. 2008; 84:499–505.10.1136/sti.2008.031419 [PubMed: 19028955]
- Meier SC, Pardo ST, Labuski C, Babcock J. Measures of clinical health among female-to-male transgender persons as a function of sexual orientation. *Archives of Sexual Behavior*. 2013; 42:463–474.10.1007/s10508-012-0052-2 [PubMed: 23307422]
- Nemoto T, Bodeker B, Iwamoto M, Sakata M. Practices of receptive and insertive anal sex among transgender women in relation to partner types, sociocultural factors, and background variables. *AIDS Care*. 2013; 26:434–440.10.1080/09540121.2013.841832 [PubMed: 24160715]
- Nolen-Hoeksema S. Emotion regulation and psychopathology: The role of gender. *Annual Review of Clinical Psychology*. 2012; 8:161–187. doi:0.1146/annurev-clinpsy-032511-143109.
- Nuttbrock L, Bockting W, Mason M, Hwahng S, Rosenblum A, Macri M, Becker J. A further assessment of Blanchard's typology of homosexual versus non-homosexual or autogynephilic gender dysphoria. *Archives of Sexual Behavior*. 2011; 40:247–257. [PubMed: 20039113]
- Nuttbrock L, Bockting W, Rosenblum A, Hwahng S, Mason M, Macri M, Becker J. Gender abuse, depressive symptoms, and HIV and other sexually transmitted infections among male-to-female transgender persons. *American Journal of Public Health*. 2013; 103:300–307.10.2105/AJPH.2011.300568 [PubMed: 22698023]
- Nuttbrock L, Hwahng S, Bockting W, Rosenblum A, Mason M, Macri M, Becker J. Lifetime risk factors for HIV/sexually transmitted infections among male-to-female transgender persons. *Journal of Acquired Immune Deficiency Syndromes*. 2009; 52:417–421.10.1097/QAI.0b013e3181ab6ed8 [PubMed: 19550351]
- Nuttbrock L, Hwahng S, Bockting W, Rosenblum A, Mason M, Macri M, Becker J. Psychiatric impact of gender-related abuse across the life course of male-to-female transgender persons. *Journal of Sex Research*. 2010; 47:12–23.10.1080/0022449090306225810.1007/s10508-009-9579-2 [PubMed: 19568976]
- Operario D, Soma T, Underhill K. Sex work and HIV status among transgender women: Systematic review and meta-analysis. *Journal of Acquired Immune Deficiency Syndromes*. 2008; 48:97–103.10.1097/QAI.0b013e31816e3971 [PubMed: 18344875]
- Parker, RG. *Bodies, pleasures, and passions: Sexual culture in contemporary Brazil*. Nashville, TN: Vanderbilt University Press; 2009.
- Reisner SL, Perkovich B, Mimiaga MJ. A mixed methods study of the sexual health needs of New England transmen who have sex with non-transgender men. *AIDS Patient Care and STDs*. 2010; 24:501–513.10.1089/apc.2010.0059 [PubMed: 20666586]
- Reisner SL, Conron KJ, Tardiff KJ, Jarvi S, Gordon AR, Austin SB. Monitoring the health of gender minority populations: Cognitive of natal sex and gender identity items in a U.S. national cohort of young adults. 2013 Manuscript submitted for publication.
- Reisner SL, Conron KJ, Scout Nfn, Mimiaga MJ, Rosenberger JG, Novak DS, Austin SB. Comparing in-person and online survey respondents in the National Transgender Discrimination Survey: Implications for transgender health research in the U.S. *LGBT Health*. 2014a; 1:98–106.10.1089/lgbt.2013.0018
- Reisner SL, White JM, Mayer KH, Mimiaga MJ. Sexual risk and psychosocial health concerns of female-to-male transgender men screening for STDs at an urban community health center. *AIDS Care*. 2014b; 26:857–864.10.1080/09540121.2013.855701 [PubMed: 24206043]
- Rosenberg M, Schooler C, Schoenbach C. Self-esteem and adolescent problems: Modeling reciprocal effects. *American Sociological Review*. 1989; 54:1004–1018.10.2307/2095720
- Rowniak S, Chesla C, Rose CD. Transmen: The HIV risk of gay identity. *AIDS Education and Prevention*. 2011; 23:508–520.10.1521/aeap.2011.23.6.508 [PubMed: 22201235]
- Sánchez J, Lama JR, Kusunoki L, Manrique H, Goicochea P, Lucchetti A, Celum C. HIV-1, sexually transmitted infections, and sexual behavior trends among men who have sex with men in Lima,

- Peru. *Journal of Acquired Immune Deficiency Syndromes*. 2007; 44:578–585. [PubMed: 17279049]
- Sausa, LA.; Sevelius, J.; Keatley, J.; Iñiguez, JR.; Reyes, M. Policy recommendations for inclusive data collection of trans people in HIV prevention, care & services. San Francisco, CA: Center of Excellence for Transgender HIV Prevention, University of California, San Francisco; 2009. Retrieved from <http://transhealth.ucsf.edu/trans?page=lib-data-collection>
- Seedat S, Scott KM, Angermeyer MC, Berglund P, Bromet EJ, Brugha TS, Kessler RC. Cross-national associations between gender and mental disorders in the World Health Organization World Mental Health Surveys. *Archives of General Psychiatry*. 2009; 66:785–795.10.1001/archgenpsychiatry.2009.36 [PubMed: 19581570]
- Sevelius J. “There’s no pamphlet for the kind of sex I have”: HIV-related risk factors and protective behaviors among transgender men who have sex with nontransgender men. *Journal of the Association of Nurses in AIDS Care*. 2009; 20:398–410.10.1016/j.jana.2009.06.001 [PubMed: 19732698]
- Silva-Santisteban A, Raymond HF, Salazar X, Villayzan J, Leon S, McFarland W, Caceres CF. Understanding the HIV/AIDS epidemic in transgender women of Lima, Peru: Results from a sero-epidemiologic study using respondent driven sampling. *AIDS and Behavior*. 2012; 16:872–881.10.1007/s10461-011-0053-5 [PubMed: 21983694]
- Suárez-Lozano I, Fajardo JM, Garrido M, Roca B, Garvia-Alcalde ML, Geijo P, Lacalle JR. Epidemiological trends of HIV infection in Spain: Preventative plans have to be oriented to new target populations (Spanish VACH Cohort). *AIDS*. 2002; 16:2496–2499. [PubMed: 12461432]
- Sudman, S.; Bradburn, NM.; Schwarz, N. Thinking about answers: The application of cognitive processes to survey methodology. 1. San Francisco, CA: Jossey-Bass Publishers; 1996.
- Tabet S, Sánchez J, Lama J, Goicochea P, Campos P, Rouillon M, Holmes KK. HIV, syphilis and heterosexual bridging among Peruvian men who have sex with men. *AIDS*. 2002; 16:1271–1277. [PubMed: 12045493]
- Tate CC, Ledbetter JN, Youssef CP. A two-question method for assessing gender categories in the social and medical sciences. *Journal of Sex Research*. 2013; 50:767–776.10.1080/00224499.2012.690110 [PubMed: 22989000]
- The Gender Identity in U.S. Surveillance Group (GenIUSS). Gender-related measures overview. Los Angeles, CA: The Williams Institute at the University of California Los Angeles School of Law; 2013. Retrieved from <http://williamsinstitute.law.ucla.edu/research/census-lgbt-demographics-studies/geniuss-group-overview-feb-2013/>
- World Health Organization. Closing the gap in a generation: Health equity through action on the social determinants of health. Geneva, Switzerland: Author; 2008. Retrieved from http://www.who.int/social_determinants/thecommission/finalreport/en/index.html
- Wylie SA, Corliss HL, Boulanger V, Prokop LA, Austin SB. Socially assigned gender nonconformity: A brief measure for use in surveillance and investigation of health disparities. *Sex Roles*. 2010; 63:264–276.10.1007/s11199-010-9798-y [PubMed: 24077680]

Table 1

Natal Sex/Gender Status Measurement Using a Two-Step Method.

	Assigned Sex at Birth	
	Male (infant designated a male sex on original birth certificate)	Female (infant designated a female sex on original birth certificate)
Gender Identity		
Male	Cisgender/Non-Transgender Male (male birth sex, male gender identity)	Cross-Sex Identified Transgender Male (female birth sex, male gender identity)
Female	Cross-Sex Identified Transgender Female (male birth sex, female gender identity)	Cisgender/Non-Transgender Female (female birth sex, female gender identity)
Male-to-Female (MTF)	Male-to-Female (MTF) (male birth sex, MTF gender identity)	Potential Measurement Error (female birth sex, MTF gender identity)
Female-to-Male (FTM)	Potential Measurement Error (male birth sex, FTM gender identity)	Female-to-Male (FTM) (female birth sex, FTM gender identity)
Other Gender (Specify)	Other Transgender Identity (male birth sex, other gender identity)	Other Transgender Identity (female birth sex, other gender identity)

Table 2
Two-Step Method of Measuring Natal Sex/Gender Status; Assigned Sex at Birth and Gender Identity.

	Column A		Column B		
	Initial Two-Step Coding		Cleaned Two-Step Coding		
	Assigned Sex at Birth		Assigned Sex at Birth		
	Male n (%)	Female n (%)	Male n (%)	Female n (%)	Total n (%)
Current Gender Identity					
Male	35,293 (99.47)	32 (86.49)	35,293 (99.55)	32 (100.00)	35,325 (99.55)
Female	84 (.24)	4 (10.81)	84 (.24)	0 (.00)	84 (.24)
Male-to-Female (MTF)	65 (.18)	1 (2.70)	65 (.18)	0 (.00)	65 (.18)
Female-to-Male (FTM)	30 (.08)	0 (.00)	0 (.00)	0 (.00)	0 (.00)
Other Gender	9 (.03)	0 (.00)	9 (.03)	0 (.00)	9 (.03)

Any Transgender = Cross-Sex Identified, MTF, FTM, or Other Gender. Overall, .54% (n = 190/35,483) were transgender.

Table 3

Age, Geographic Survey Location, Masculine Gender Conformity, Socioeconomic Position, and Psychological Functioning and Wellbeing by Natal Sex/Gender Identity Status.

	Natal Sex/Gender Identity Status				Age-Adjusted Natal Sex/Gender Status Comparisons (Referent=Male)			
	n	MTF	FTM	Male	MTF	FTM	Multi-parameter tests	
		M (SD)			β (95% CL)	β (95% CL)	p	
Age (in years)	35451							
		29.13 (10.24) [range 18–60]	28.66 (9.82) [range 19–50]	30.80 (9.39) [range 18–61]	–1.67 (–3.14, –0.20)	–2.14 (–5.40, 1.12)	.037	
		n (%)			OR (95% CI)	OR (95% CI)		
Geographic Survey Location	35451							
Latin America		119/158 (75.32)	24/32 (75.00)	25063/35261 (71.08)	1.24 (0.86, 1.78)	1.21 (0.55, 2.70)	ns	
Not Latin America		39/158 (24.68)	8/32 (25.00)	10198/35261 (28.92)				
Masculine Gender Conformity	35451							
High Conformity (Median)		57 (36.08)	12 (37.50)	18553 (52.62)	0.53 (0.38, 0.74)	0.58 (0.28, 1.20)	.0004	
		M (SD)			β (95% CL)	β (95% CL)		
Socioeconomic Position								
Education (range, 1–5)	33222	3.82 (0.76)	3.79 (0.77)	3.96 (0.65)	–0.11 (–0.21, 0.01)	–0.13 (–0.36, 0.09)	.076	
Income (range, 1–4)	33290	2.60 (0.79)	2.41 (0.89)	2.79 (0.72)	–0.14 (–0.25, –0.03)	–0.33 (–0.60, –0.07)	.003	
		n (%)			OR (95% CI)	OR (95% CI)		
Education	33222							
No Formal Education		3/134 (2.24)	1/29 (3.45)	42/33059 (0.13)	^^^	--	<.0001	
Primary or Secondary		35/134 (26.12)	6/29 (20.69)	7047/33059 (21.32)	--	--	--	
University or Post-Graduate		96/134 (71.64)	22/29 (75.86)	25970/33059 (78.55)	--	--	--	
Income	33290							
Low Income		47/145 (32.41)	11/27 (40.74)	6416/33118 (19.37)	1.71 (1.19, 2.46)	2.49 (1.10, 5.63)	.001	
Transactional Sex, Past 12 Mo	29246	13/114 (11.40)	2/24 (8.33)	2049/29108 (7.04)	1.50 (0.84, 2.70)	1.08 (0.25, 4.65)	ns	
Psychological Health and Well-being								
Suicide Attempt, Ever	26951	18/102 (17.65)	7/21 (33.33)	4229/26828 (15.76)	1.09 (0.65, 1.81)	2.63 (1.05, 6.56)	ns	
Depressive Distress, Past-Week	26480	33/101 (32.67)	10/23 (43.48)	7605/26356 (28.85)	1.14 (0.75, 1.74)	1.84 (0.80, 4.22)	ns	
		M (SD)			β (95% CL)	β (95% CL)		

	Natal Sex/Gender Identity Status			Age-Adjusted Natal Sex/Gender Status Comparisons (Referent=Male)		
	n	MTF	FTM	Male	MTF	FTM
CESD-10 score (range, 0–30)	26480	7.87 (5.43)	9.91 (6.35)	7.50 (5.43)	0.23 (–0.83, 1.28)	2.30 (0.10, 4.51)
Positive Attitude Toward Self (range, 1–4)	26209	3.62 (0.66)	3.21 (1.03)	3.55 (0.66)	0.07 (–0.06, 0.20)	–0.34 (–0.64, –0.04)
General Self-Rated Health (range, 1–5)	33040	3.72 (0.93)	3.88 (0.86)	3.79 (0.88)	–0.08 (–0.23, 0.07)	0.08 (–0.26, 0.42)
Gender-Related Harassment	n (%)				OR (95% CI)	OR (95% CI)
Childhood	25544	69/99 (66.67)	16/19 (84.21)	18737/25426 (73.69)	0.68 (0.44, 1.03)	1.90 (0.55, 6.56)
Adulthood	25536	66/99 (66.67)	14/19 (73.68)	14527/25418 (57.15)	1.44 (0.95, 2.20)	2.11 (0.75, 5.88)

Note. *p*-values are from multi-parameter tests that test the null hypothesis that the two coefficients of interest (MTF and FTM) and simultaneously equal to zero. The exception was the 3-category specification of education which presents the *p*-value from an unadjusted bivariate comparison (Fisher's exact). MTF = Male-to-Female spectrum (assigned male sex at birth, identify as female, MTF, or other gender). FTM = Female-to-Male spectrum (assigned female sex at birth, identify as male, FTM, or other gender).

Table 4

Sexual Health and Sexual Behavior Indicators by Natal/Sex Gender Identity Status.

	Natal Sex/Gender Identity Status				χ^2 test (df)	<i>p</i>
	MTF	FTM	Male			
	n (%)					
Sexually Transmitted Infections (STIs)						
HIV-Infection (self-report)	9/131 (6.87)	2/25 (8.00)	2940/32117 (9.15)		<1 (2)	ns
Any STI, Past 12 Months	12/128 (9.38)	5/26 (19.23)	4540/31826 (14.27)		3.02 (2)	ns
Syphilis	4/126 (3.17)	0/26 (0.00)	1383/31645 (4.37)		1.62 (2)	ns
Gonorrhea	5/128 (3.91)	1/26 (3.85)	1058/31587 (3.35)		<1 (2)	ns
Chlamydia	2/128 (1.56)	0/26 (0.00)	482/31465 (1.53)		<1 (2)	ns
Human Papillomavirus (HPV)/Genital Warts	5/123 (4.07)	2/26 (7.69)	1834/31315 (5.86)		<1 (2)	ns
Genital Herpes	2/126 (1.59)	3/26 (11.54)	895/31478 (2.84)		7.83 (2)	.020
Sexual Risk, Past 3 Months						
Any Unprotected Sexual Intercourse+	50/98 (51.02)	15/19 (78.95)	13044/24549 (53.13)		5.26 (2)	ns
Any Serodiscordant Unprotected Sexual Intercourse	15/45 (33.33)	4/15 (26.67)	3836/11221 (34.19)		<1 (2)	ns
Gender of Sexual Partners, Past 12 Months	n = 122	n = 22	n = 30771			
Non-Transgender Male	96 (78.69)	15 (68.18)	27019 (87.81)		67.12 (10)	<.0001
Non-Transgender Female	11 (9.02)	5 (22.73)	2581 (8.39)			
MTF	8 (6.56)	2 (9.09)	321 (1.04)			
FTM	2 (1.64)	0 (0.00)	75 (0.24)			
Other Gender	3 (2.46)	0 (0.00)	367 (1.19)			
Prefer Not to Answer	2 (1.64)	0 (0.00)	408 (1.33)			
Preferred Sexual Role During Intercourse	n = 134	n = 25	n = 32331			
Top	6 (4.48)	5 (20.00)	6201 (19.18)		43.32 (8)	<.0001
Bottom	50 (37.31)	3 (12.00)	6305 (19.50)			
Versatile	71 (52.99)	16 (64.00)	19009 (58.79)			
Other Role	6 (4.48)	1 (4.00)	637 (1.97)			
Prefer Not to Answer	1 (0.75)	0 (0.00)	179 (0.55)			

Note. Any unprotected Sexual Intercourse: Any unprotected anal or vaginal sexual intercourse with a male, female, or transgender sex partner in the past 3 months.