

# Heterogeneity in HIV/Sexually Transmitted Infection Prevalence and Prevention Among the Partners of Transgender and Nonbinary People

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**Background:** Transgender and nonbinary (TNB) people are diverse in their sexual orientation and partnerships. We describe the epidemiology of HIV/sexually transmitted infection (STI) prevalence and prevention utilization among the partners of TNB people in Washington State.

**Methods:** We pooled data from five 2017 to 2021 cross-sectional HIV surveillance data sources to generate a large sample of TNB people and cisgender people who had a TNB partner in the past year. We described characteristics of recent partners of trans women, trans men, and nonbinary people and used Poisson regression to assess if having a TNB partner was associated with self-reported HIV/STIs prevalence, testing, and preexposure prophylaxis (PrEP) use.

**Results:** Our analysis included 360 trans women, 316 trans men, 963 nonbinary people, 2896 cis women, and 7540 cis men. Overall, 9% of sexual minority cis men, 13% of sexual minority cis women, and 36% of TNB participants reported having any TNB partners. There was significant heterogeneity in HIV/STI prevalence, testing, and PrEP use among the partners of TNB people by study participant gender and the gender of their sex partners. In regression models, having a TNB partner was associated with a

higher likelihood of HIV/STI testing and PrEP use but was not associated with higher HIV prevalence.

**Conclusions:** We observed significant heterogeneity in HIV/STI prevalence and preventative behaviors among the partners of TNB people. Given that TNB people are diverse in their sexual partnerships, there is a need to better understand individual-, dyad-, and structural-level factors that facilitate HIV/STI prevention across these diverse partnerships.

Transgender and nonbinary (TNB) people are diverse in their sexual orientation and sexual partnerships. Although HIV/sexually transmitted infection (STI) prevalence and uptake of preventative behaviors (such as testing and preexposure prophylaxis [PrEP]) by the partners of TNB people play an important role in TNB people's sexual health, little is known about the partners of TNB people.

To date, most of the literature on the partners of TNB people has focused on cisgender (cis) men who have sex with trans women.<sup>1</sup> Overall, these men report high levels of stigma and syndemic factors (e.g., substance use, poverty) and low levels of HIV/STI prevention behaviors.<sup>1</sup> The remaining extant literature focuses on cis men who have sex with men (MSM) who report having any TNB partners, without distinguishing between partnerships with trans women, trans men, or nonbinary people.<sup>2,3</sup> A significant limitation of these studies is the assumption that HIV/STI behavioral factors are similar among cis MSM who partner with trans people, regardless of the gender identity of their trans partners. In reality, there are likely important differences in social and sexual identity and relationship stigma between, for example, cis men who partner with trans women compared with cis men who partner with trans men.<sup>4,5</sup> Existing evidence also suggests that trans women and trans men who have sex with cis men are more likely to acquire HIV<sup>6-10</sup> and STIs<sup>11,12</sup> compared with those who do not have sex with cis men. However, there has been little investigation of the HIV/STI prevalence and prevention behaviors among TNB people who partner with other TNB people and with cis women.<sup>10</sup>

These gaps in the literature have led to limited understanding of HIV/STI prevalence and prevention behaviors among the heterogeneous populations of TNB people and their partners. Therefore, the present study describes the epidemiology of HIV/STI prevalence, HIV/STI testing, and PrEP use among people with a recent TNB partner.

## METHODS

### Data Sources and Study Population

We pooled 6 cross-sectional surveys from 3 data sources from Washington state to generate a large sample of TNB people and cisgender partners of TNB people. All data sources were available through Public Health—Seattle & King County (PHSKC).

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Although participants were recruited across WA state, most participants resided in the Seattle-Tacoma region of King and Pierce Counties. Each data source is described briefly hereinafter, and additional details are available in the Supplementary Materials, <http://links.lww.com/OLQ/A928>.

### PHSKC Annual Pride Surveys

We used 3 years of data (2019, 2020, and 2021) from PHSKC's Pride Survey, an annual survey conducted for surveillance purposes through PHSKC's HIV/STD Program. The 2019 Pride Survey was conducted in person using anonymous paper surveys during 2 Pride Events: the Trans Pride festival held at Cal Anderson Park in the Capitol Hill neighborhood of Seattle and the Seattle Pride Parade held in downtown Seattle. Participants were eligible if they lived in Washington and identified as trans or nonbinary and/or as a gay, bisexual, or other MSM. The 2020 and 2021 Pride Surveys were conducted online through an anonymous RedCap survey, and the inclusion criteria were expanded to include anyone who lived in Washington and self-identified as LGBTQ+.

### National HIV Behavioral Surveillance

The National HIV Behavioral Surveillance (NHBS) survey is coordinated by the Centers for Disease Control and Prevention across 22 cities, including Seattle. Surveillance is conducted annually and rotates through different populations with high HIV incidence. We used de-identified Seattle site data from 2 NHBS cycles: the 2017 NHBS cycle conducted among cis MSM and the 2019 NHBS cycle conducted among trans women and nonbinary people assigned male at birth (AMAB), locally called *Project First*. The cycle among cis MSM used venue-based sampling, whereas the cycle among trans women recruited participants using respondent-driven sampling. Data for both NHBS surveys were collected via an in-person interview.

### PHSKC Sexual Health Clinic

The PHSKC Sexual Health Clinic in Seattle provides walk-in STI/HIV testing and treatment on a sliding fee basis. All new patients complete a computer-assisted self-interview, which includes information on demographics, HIV/STI history, and sexual behaviors. We used de-identified computer-assisted self-interview data from patients who attended the Sexual Health Clinic, December 2018 to February 2020. We restricted our analysis to a patient's first visit during the study period.

The secondary analysis of these pooled data was conducted in collaboration with the Seattle Trans and Nonbinary Sexual Health (STARS) Advisory Board, a community advisory group of 9 TNB people from the Seattle area that met bimonthly from February 2021 to July 2022. Ethical approval was received from the University of Washington Institutional Review Board.

## Measures

The aforementioned data sources all used identical or similar questions to ascertain the following measures.

### Gender Identity

All data sources used a validated trans-inclusive 2-step question for ascertaining gender identity, which separately asks about sex assigned at birth and current gender, including nonbinary/genderqueer and write-in response options.

### Sexual Minority Status

We defined sexual minority participants as anyone who self-identified as gay, lesbian, bisexual, pansexual, or queer.

### Gender of Sex Partners

The Pride Surveys and Sexual Health Clinic asked participants about the gender of the sex partners they had in the past year using questions that included cis men, cis women, trans women, trans men, and nonbinary/genderqueer people as potential response options. Sex was defined as any oral, vaginal, or anal sex. The NHBS cycle among trans women only assessed the gender of a participant's last 3 sex partners and did not provide a nonbinary response option.

### HIV/STI-Related Measures

Self-reported HIV/STI-related measures included self-reported HIV testing (ever and in the last year), STI testing in the last year, HIV status, and history of any bacterial STIs (i.e., chlamydia, gonorrhea, and syphilis) in the last year. Among self-reported HIV-negative participants, PrEP questions included awareness of PrEP, ever discussing PrEP with a provider, current and ever PrEP use, and reasons for not using PrEP.

### Statistical Analyses

We estimated the proportion of participants who had a TNB partner in the past year, stratified by participants' gender identity and sexual minority status. Among cisgender participants who had a TNB partner in the last year, we report descriptive statistics for the participants' sexual orientation, the gender of their sex partners, and HIV/STI-related measures.

We used regression analysis to assess if HIV/STI prevalence, testing, or PrEP use was associated with having a TNB partner in the past year. To account for heterogeneity within the TNB population, we estimated separate regression models with the following binary dependent variables: (i) having any trans women sex partners in the past year, (ii) having any trans men sex partners in the past year, and (iii) having any nonbinary sex partners in the past year. Analyses were further stratified and conducted separately for cis men, cis women, and all TNB participants. We checked for effect modification by gender identity in our models conducted among all TNB participants by fitting an interaction term with a categorical variable for gender identity. These sensitivity analyses tested if there was heterogeneity in factors associated with having a trans partner between trans women, trans men, nonbinary people AMAB, and nonbinary people assigned female at birth (AFAB). We conducted additional sensitivity analyses to determine if our analyses were sensitive to inclusion of each of the data sources.

We used bivariate Poisson regression models with robust standard errors to estimate prevalence ratios and 95% confidence intervals (CIs), adjusted for the data source and year. Additional correlates (e.g., sexual behaviors and sociostructural factors) of having a recent TNB partner are reported in Supplementary Materials, <http://links.lww.com/OLQ/A928>. All analyses were conducted in R statistical software.

## RESULTS

The pooled sample included 12,084 participants: 360 trans women, 316 trans men, 963 nonbinary people, 2896 cis women, and 7540 cis men. Additional demographics are reported in Supplemental Table 2, <http://links.lww.com/OLQ/A928>.

### TNB Participants' Self-Reported Partnerships

Most TNB participants had a sexual minority identity: 76% of trans women, 95% of trans men, and >99% of nonbinary people

**TABLE 1.** Sexual Orientation and Gender of Sex Partners in the Last Year, Stratified by Gender and Sexual Minority Status, Pooled Data for Washington State, 2017 to 2021

Participant Gender Sexual Minority Status	Cis Men		Cis Women		Trans Men		Trans Women		Nonbinary	
	Heterosexual	Sexual Minority	Heterosexual	Sexual Minority	Heterosexual	Sexual Minority	Heterosexual	Sexual Minority	AFAB	AMAB
N	2089	4883	782	1865	17	299	85	275	725	238
Data source, n (%)										
Pride 2021	0 (0.0)	609 (12.5)	0 (0.0)	889 (47.7)	1 (5.9)	134 (44.8)	6 (7.1)	66 (24.0)	394 (54.3)	76 (31.9)
Pride 2020	0 (0.0)	529 (10.8)	0 (0.0)	660 (35.4)	3 (17.6)	78 (26.1)	6 (7.1)	63 (22.9)	184 (25.4)	37 (15.5)
Pride 2019	0 (0.0)	444 (9.1)	0 (0.0)	0 (0.0)	3 (17.6)	68 (22.7)	4 (4.7)	57 (20.7)	97 (13.4)	45 (18.9)
NHBS	0 (0.0)	503 (10.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	50 (58.8)	59 (21.5)	0 (0.0)	8 (3.4)
Sexual Health Clinic	2089 (100.0)	2798 (57.3)	782 (100.0)	316 (16.9)	10 (58.8)	19 (6.4)	19 (22.4)	30 (10.9)	50 (6.9)	72 (30.3)
Sexual orientation, n (%)										
Heterosexual	2089 (100.0)		782 (100.0)		17 (100.0)		85 (100.0)		56 (7.7)	77 (32.4)
Gay		4038 (82.7)		113 (6.1)		78 (26.1)		31 (11.3)	107 (15.2)	4 (1.8)
Lesbian		0 (0.0)		614 (32.9)		0 (0.0)		83 (32.9)	167 (23.0)	39 (16.4)
Bisexual		625 (12.8)		863 (46.3)		93 (31.1)		76 (27.6)	201 (28.5)	45 (20.4)
Pansexual		127 (3.2)		293 (15.7)		43 (16.2)		54 (21.4)	440 (60.7)	128 (53.8)
Queer		247 (5.6)		500 (26.8)		158 (52.8)		82 (29.8)	70 (9.7)	17 (7.1)
Not listed		8 (0.2)		43 (2.3)		31 (10.4)		41 (14.9)		
Gender of sex partners, n (%)										
Any TNB	46 (2.2)	458 (9.4)	1 (0.1)	244 (13.1)	0 (0.0)	107 (35.8)	3 (8.3)	100 (44.1)	280 (38.6)	107 (46.1)
Trans men	12 (0.6)	204 (4.2)	0 (0.0)	63 (3.4)	0 (0.0)	60 (20.1)	1 (1.2)	31 (11.3)	72 (9.9)	23 (9.7)
Trans women	23 (1.1)	108 (2.2)	0 (0.0)	49 (2.6)	0 (0.0)	26 (8.7)	1 (1.2)	75 (27.3)	82 (11.3)	28 (11.8)
Nonbinary	14 (0.7)	278 (5.7)	1 (0.1)	174 (9.3)	0 (0.0)	69 (23.1)	1 (2.9)	54 (25.0)	237 (32.7)	101 (43.9)
Cis men	55 (2.6)	4394 (90.0)	757 (96.8)	813 (43.6)	5 (29.4)	102 (34.1)	68 (80.0)	110 (40.0)	255 (35.2)	145 (60.9)
Cis women	1986 (95.1)	458 (9.4)	21 (2.7)	730 (39.1)	9 (52.9)	85 (28.4)	3 (3.5)	63 (22.9)	190 (26.2)	51 (21.4)
Not listed/Don't know*							22 (25.9)	35 (12.7)		

Sexual minorities included any participant who identified as gay, bisexual, queer, lesbian, pansexual, or another sexual orientation not listed. Overall, 70% of cis men, 70% of cis women, 95% of trans men, 76% of trans women, and 99% of nonbinary participants reported a sexual minority identity. Only 4 nonbinary people AMAB and 1 nonbinary person AFAB reported being heterosexual/straight; therefore, we only include sexual minority nonbinary people in this table. In addition, there were 821 participants (8%) who did not provide data on their sexual orientation and are omitted from this table. Participants in the 2019, 2020, and 2021 Pride Surveys were able to select more than 1 sexual orientation, so some percentages may sum to greater than 100%.

\*The NHBS survey asks about a participants most recent 3 sexual partners, with the following response options: woman, man, transgender woman, transgender man, and a gender not listed here. Many NHBS participants reported that the gender of their partner was not listed (8.5%) or that they did not know the gender of their partner (47%).

(Table 1). Sexual minority TNB participants were diverse in their partnerships. Sexual minority trans women most commonly reported cis men partners (40%), and many also partnered with other women (27% with trans women and 23% with cis women) and nonbinary people (25%); 11% of trans women partnered with trans men. A quarter of trans women identified as heterosexual; these women primarily reported cis men partners (80%). Sexual minority trans men most commonly partnered with other men (34% with cis men and 20% with trans men), cis women (28%), and nonbinary people (23%). Only 5% of trans men identified as heterosexual, and these men reported having cis women or cis men partners. Nonbinary people AMAB most commonly reported partners who were cis men (61%) and other nonbinary people (44%). Similarly, nonbinary people AFAB most commonly partnered with cis men (35%) and other nonbinary people (33%). Detailed data on the gender of TNB people's sex partners stratified by specific sexual orientations and gender identities are reported in Supplementary Materials (Supplemental Tables 6–9, <http://links.lww.com/OLQ/A928>).

### Participants Who Reported Having TNB Partners

Overall, 1349 participants reported having any TNB partners in the past year: 504 cis men, 245 cis women, 107 trans men, 103 trans women, and 387 nonbinary participants. Among cisgender participants, 70% of cis men and 70% cis women reported a sexual minority identity, among whom 9% of sexual minority cis men and 13% of sexual minority cis women reported having any TNB partners in the last year (Table 1). Among TNB participants, 36% reported having a partner who was also TNB in the past year. Only 2% of heterosexual cis men reported having

a TNB partner, most commonly trans women, and only one heterosexual cis woman reported having a nonbinary partner AMAB.

Among participants who reported having any TNB partners, most (84%) reported having sex partners of multiple genders, and concurrent partnerships are reported in Table 2. However, cis and trans women as well as nonbinary people AFAB were most likely to exclusively partner with transgender women (29%, 21%, and 23%, respectively). Similarly, cis women and trans men were most likely to exclusively partner with trans men (40% and 35%), and cis women and nonbinary people AFAB were most likely to exclusively partner with nonbinary people (27% and 29%). Additional characteristics of participants are reported in Supplemental Tables 3–5, <http://links.lww.com/OLQ/A928>.

### Self-Reported HIV Positivity

Self-reported HIV positivity (Fig. 1) was highest among cis men who partner with nonbinary people (14%) and cis men who partner with trans men (13%). In addition, 9% of nonbinary people AMAB who partner with trans men and 5% of cis men who partner with trans women were living with HIV. However, having a TNB partner was not associated with a higher HIV prevalence in any regression models (Tables 3–5).

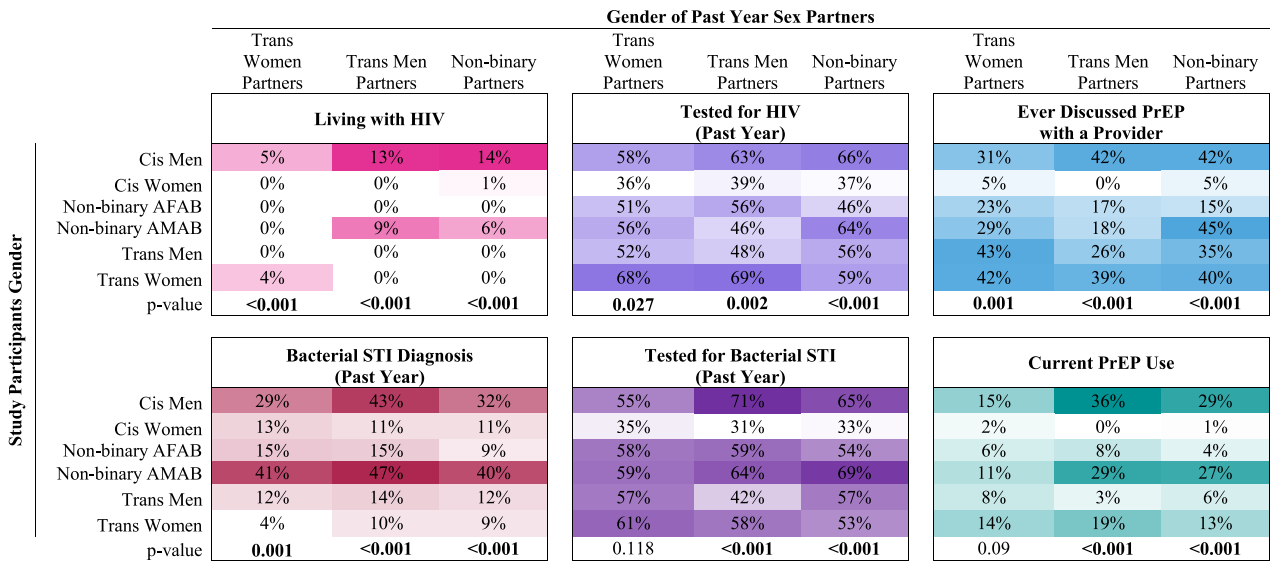
### Past-Year Bacterial STI Diagnoses

Self-reported history of having any bacterial STI within the last year was highest among cis men who partner with trans men (43%), with nonbinary people (32%), or with trans women (30%). Self-reported STI positivity was also high among nonbinary people AMAB who partner with trans men (47%), with trans women (41%), or with other nonbinary people (40%). Overall, only 4%

**TABLE 2.** Sexual Network of Participants Who Reported Having Any Transgender or Nonbinary Sex Partners in the Last Year, Pooled Data for Washington State, 2017 to 2021

	Cis Men	Cis Women	Nonbinary AFAB	Nonbinary AMAB	Trans Men	Trans Women	P
<b>Study participants with any trans women partners, N</b>	131	49	82	28	26	76	
Exclusively partnered with trans women, n (%)	6 (4.6)	14 (28.6)	19 (23.2)	3 (10.7)	4 (15.4)	16 (21.1)	<0.001
Gender of additional partners (last year), n (%)							
Cis men	91 (69.5)	23 (46.9)	37 (45.1)	15 (53.6)	19 (73.1)	36 (47.4)	0.001
Cis women	96 (73.3)	24 (49.0)	25 (30.5)	11 (39.3)	7 (26.9)	34 (44.7)	<0.001
Trans men	34 (26.0)	8 (16.3)	24 (29.3)	8 (28.6)	10 (38.5)	17 (22.4)	0.35
Nonbinary/genderqueer	44 (33.6)	16 (32.7)	53 (64.6)	23 (88.5)	17 (65.4)	36 (54.5)	<0.001
<b>Study participants with any trans men partners, N</b>	216	63	72	23	60	32	
Exclusively partnered with trans men, n (%)	4 (1.9)	25 (39.7)	11 (15.3)	0 (0.0)	21 (35.0)	3 (9.4)	<0.001
Gender of additional partners (last year), n (%)							
Cis men	195 (90.3)	25 (39.7)	32 (44.4)	17 (73.9)	23 (38.3)	18 (56.2)	<0.001
Cis women	80 (37.0)	26 (41.3)	28 (38.9)	10 (43.5)	18 (30.0)	16 (50.0)	0.513
Trans women	34 (15.7)	8 (12.7)	24 (33.3)	8 (34.8)	10 (16.7)	17 (53.1)	<0.001
Nonbinary/genderqueer	75 (34.7)	22 (34.9)	58 (80.6)	21 (91.3)	30 (50.0)	22 (73.3)	<0.001
<b>Study participants with any nonbinary partners, N</b>	292	175	237	101	69	55	
Exclusively partnered with nonbinary people, n (%)	14 (4.8)	48 (27.4)	69 (29.1)	6 (5.9)	8 (11.6)	9 (16.4)	<0.001
Gender of additional partners (last year), n (%)							
Cisgender men	240 (82.2)	84 (48.0)	97 (40.9)	75 (74.3)	37 (53.6)	23 (41.8)	<0.001
Cisgender women	93 (31.8)	97 (55.4)	92 (38.8)	28 (27.7)	28 (40.6)	25 (45.5)	<0.001
Transgender men	75 (25.7)	22 (12.6)	58 (24.5)	21 (20.8)	30 (43.5)	22 (40.0)	<0.001
Transgender women	44 (15.1)	16 (9.1)	53 (22.4)	23 (22.8)	17 (24.6)	36 (65.5)	<0.001





**Figure 1.** Heatmap of HIV/STI prevalence and prevention utilization among participants who reported having TNB partners in the past year, stratified by participant gender and gender of sex partner, pooled data for Washington State, 2017 to 2021. Counts are provided in Supplementary Materials, <http://links.lww.com/OLQ/A928>.

of trans women, 8% of nonbinary people AFAB, 11% of cis women, and 15% of trans men with any TNB partners reported having a bacterial STI within the last year. Chlamydia was the most common bacterial STI reported, followed by gonorrhea. Syphilis prevalences ranged from 0% to 4.8% for most groups, and was highest among cis men who partnered with trans men and nonbinary people (13% and 10%, respectively; Supplemental Tables 3–5, <http://links.lww.com/OLQ/A928>). In most regression models, cis men who partner with trans men (adjusted prevalence ratio [aPR], 2.42; 95% CI, 1.81–3.26; Table 4) and with nonbinary people (aPR, 1.66; 95% CI, 1.26–2.20; Table 5) had a higher likelihood of having had a bacterial STI in the past year, compared with cis men without TNB partners.

### HIV/STI Testing

Past-year STI testing varied between 42% and 71% for all participants who reported having a TNB partner, except for cis

women with TNB partners, among whom only a third had been tested for bacterial STIs in the past year (Fig. 1). Similar patterns were observed for past-year HIV testing. In all regression models, having a TNB partner was associated with a 2-fold increased likelihood of HIV testing compared with participants without a TNB partner (Tables 3–5). Among cis men and TNB participants, regression models suggest that having a TNB partner is also associated with higher likelihood of STI testing in the last year.

### PrEP Awareness/Use

Most participants who reported having a TNB partner had previously heard of PrEP (Supplemental Tables 3–5, <http://links.lww.com/OLQ/A928>). Current PrEP use was highest among cis men and nonbinary participants who partner with trans men (36% and 29%; Fig. 1) and with nonbinary people (29% and 27%). In regression analyses, cis men who partner with trans men and nonbinary people were also more likely to currently use

**TABLE 3.** Bivariate Regression Models of HIV/STI Prevalence, Testing, and PrEP Use Associated With Having a Trans Woman Sex Partner in the Last Year, Pooled Data for Washington State, 2017 to 2021

	Factors Associated With Having ≥1 Trans Women Partners in the Past Year					
	Cis Men Participants		Cis Women Participants		Transgender and Nonbinary Participants	
	aPR (95% CI)	P	aPR (95% CI)	P	aPR (95% CI)	P
N	7540		2896		1648	
HIV positive	0.53 (0.25–1.14)	0.105			0.48 (0.15–1.53)	0.214
Any bacterial STI (last year)	1.34 (0.89–2.02)	0.155	1.52 (0.45–5.15)	0.506	0.98 (0.61–1.57)	0.922
HIV testing						
Ever	1.43 (0.79–2.6)	0.236	1.22 (0.67–2.23)	0.510	<b>2.22 (1.49–3.31)</b>	<b>&lt;0.001</b>
In the last year	<b>1.69 (1.17–2.42)</b>	<b>0.005</b>	<b>2.08 (1.11–3.9)</b>	<b>0.022</b>	<b>2.23 (1.66–2.99)</b>	<b>&lt;0.001</b>
STI testing (last year)*	0.73 (0.4–1.36)	0.326	1.43 (0.61–3.35)	0.405	<b>2.05 (1.39–3.02)</b>	<b>&lt;0.001</b>
PrEP use						
Awareness*	0.59 (0.28–1.23)	0.159	2.12 (0.89–5.06)	0.088	<b>1.85 (1.11–3.1)</b>	<b>0.019</b>
Ever discussed with provider*	0.73 (0.4–1.35)	0.318	<b>4.85 (1.17–20.1)</b>	<b>0.029</b>	<b>2.84 (2.04–3.95)</b>	<b>&lt;0.001</b>
Ever used	<b>0.34 (0.22–0.53)</b>	<b>&lt;0.001</b>	<b>11.6 (2.84–48.7)</b>	<b>0.001</b>	<b>1.70 (1.14–2.52)</b>	<b>0.009</b>
Current use	0.68 (0.41–1.1)	0.115	<b>33.9 (4.54–252.2)</b>	<b>0.001</b>	<b>1.54 (0.95–2.49)</b>	<b>0.083</b>

All bivariate Poisson regression models are adjusted for the data source and year. Bolded results indicate factors significantly associated with the outcome variable with a P value <0.05.

\*These data are not collected at the Sexual Health Clinic. These data are only from participants in the Pride Surveys and NHBS.

**TABLE 4.** Bivariate Regression Models of HIV/STI Prevalence, Testing, and PrEP Use Associated With Having a Trans Man Sex Partner in the Last Year, Pooled Data for Washington State, 2017 to 2021

	Factors Associated With Having ≥1 Trans Men Partners in the Past Year					
	Cis Men Participants		Cis Women Participants		Transgender and Nonbinary Participants	
	aPR (95% CI)	P	aPR (95% CI)	P	aPR (95% CI)	P
N	7540		2896		1648	
HIV positive	1.30 (0.88–1.93)	0.193			0.52 (0.13–2.13)	0.363
Any bacterial STI (last year)	<b>2.43 (1.81–3.26)</b>	<b>&lt;0.001</b>	1.24 (0.37–4.15)	0.728	1.29 (0.80–2.10)	0.296
HIV testing						
Ever	<b>2.61 (1.38–4.94)</b>	<b>0.003</b>	<b>1.87 (1.05–3.36)</b>	<b>0.035</b>	<b>1.90 (1.28–2.82)</b>	<b>0.002</b>
In the last year	<b>1.84 (1.37–2.47)</b>	<b>&lt;0.001</b>	<b>2.55 (1.47–4.42)</b>	<b>0.001</b>	<b>1.86 (1.37–2.53)</b>	<b>&lt;0.001</b>
STI testing (last year)*	<b>1.65 (1.04–2.61)</b>	<b>0.033</b>	1.31 (0.59–2.89)	0.505	1.34 (0.91–1.98)	0.138
PrEP use						
Awareness*	0.81 (0.48–1.38)	0.444	18.46 (2.55–133.7)	0.004	<b>1.86 (1.07–3.22)</b>	<b>0.028</b>
Ever discussed with provider*	1.14 (0.78–1.66)	0.494	NA		<b>1.79 (1.21–2.63)</b>	<b>0.003</b>
Ever used	1.18 (0.85–1.63)	0.333	NA		<b>1.61 (1.06–2.43)</b>	<b>0.025</b>
Current use	<b>1.98 (1.47–2.67)</b>	<b>&lt;0.001</b>	NA		<b>1.85 (1.13–3.02)</b>	<b>0.014</b>

All bivariate Poisson regression models are adjusted for the data source and year. Bolded results indicate factors significantly associated with the outcome variable with a P value <0.05.

\*These data are not collected at the Sexual Health Clinic. These data are only from participants in the Pride Surveys and NHBS.

PrEP compared with cis men in the sample without a TNB partner (aPR, 1.98 [95% CI, 1.47–2.67], and aPR 1.60 [95% CI, 1.22–2.10]; Tables 4, 5). Cis men who partner with trans women were significantly less likely to have ever used PrEP (aPR, 0.34; 95% CI, 0.22–0.53; Table 3) compared with other cis men in the sample. Notably, only 5% of cis women who reported having a TNB partner had ever discussed PrEP with a provider, and only 3% had ever used PrEP. In regression models among TNB participants, PrEP awareness, discussing PrEP with a provider, ever and current PrEP use were all significantly and positively associated with partnering with other TNB people in the last year.

### DISCUSSION

Our study found that a majority of TNB participants had a sexual minority identity and were diverse in their sexual partnerships. More than a third of TNB people reported having trans-trans

partnerships, which were positively associated with HIV/STI prevention utilization. Among cisgender study participants with TNB partners, we observed significant heterogeneity in self-reported HIV positivity and history of STIs as well as HIV/STI testing behaviors and PrEP use. Overall, cis men who partner with trans men and nonbinary people had the highest self-reported HIV prevalence and history of STIs, although these men were also the most likely to engage in high levels of testing and current PrEP use. In contrast, cis men who partner with trans women were least likely to access PrEP or recent HIV/STI testing. Overall, cis women with TNB partners reported very low rates of HIV/STI testing and indicated significant missed opportunities to discuss PrEP with their healthcare providers.

Previous studies have found that 1% to 4% of cisgender people report having TNB partners.<sup>2,4,13,14</sup> In our study, stratifying by sexual minority status revealed that 9% of sexual minority cis men and 13% of sexual minority cis women had a TNB partner in the last

**TABLE 5.** Bivariate Regression Models of HIV/STI Prevalence, Testing, and PrEP Use Associated With Having a Nonbinary Sex Partner in the Past Year, Pooled Data for Washington State, 2017 to 2021

	Factors Associated With Having ≥1 Nonbinary Partners in the Past Year					
	Cis Men Participants		Cis Women Participants		Transgender and Nonbinary Participants	
	aPR (95% CI)	P	aPR (95% CI)	P	aPR (95% CI)	P
N	7540		2896		1648	
HIV positive	1.32 (0.94–1.85)	0.107	1.58 (0.22–11.33)	0.648	0.69 (0.30–1.54)	0.362
Any bacterial STI (last year)	<b>1.66 (1.26–2.20)</b>	<b>&lt;0.001</b>	1.37 (0.65–2.88)	0.406	1.27 (0.94–1.74)	0.125
HIV testing						
Ever	<b>2.10 (1.29–3.44)</b>	<b>0.003</b>	<b>2.47 (1.69–3.59)</b>	<b>&lt;0.001</b>	<b>2.60 (1.97–3.43)</b>	<b>&lt;0.001</b>
In the last year	<b>2.23 (1.71–2.90)</b>	<b>&lt;0.001</b>	<b>2.36 (1.69–3.30)</b>	<b>&lt;0.001</b>	<b>1.84 (1.52–2.24)</b>	<b>&lt;0.001</b>
STI testing (last year)*	<b>1.99 (1.29–3.05)</b>	<b>0.002</b>	1.32 (0.83–2.11)	0.240	<b>2.12 (1.59–2.83)</b>	<b>&lt;0.001</b>
PrEP use						
Awareness*	0.85 (0.53–1.37)	0.511	<b>1.85 (1.21–2.85)</b>	<b>0.005</b>	<b>2.15 (1.49–3.11)</b>	<b>&lt;0.001</b>
Ever discussed with provider*	<b>1.36 (1.01–1.84)</b>	<b>0.040</b>	<b>5.32 (2.61–10.85)</b>	<b>&lt;0.001</b>	<b>2.28 (1.80–2.90)</b>	<b>&lt;0.001</b>
Ever used	1.11 (0.85–1.47)	0.439	<b>6.34 (2.35–17.1)</b>	<b>&lt;0.001</b>	<b>2.00 (1.55–2.59)</b>	<b>&lt;0.001</b>
Current use	<b>1.60 (1.22–2.10)</b>	<b>0.001</b>	<b>10.3 (1.42–73.9)</b>	<b>0.021</b>	<b>1.88 (1.36–2.58)</b>	<b>&lt;0.001</b>

All bivariate Poisson regression models are adjusted for the data source and year. Bolded results indicate factors significantly associated with the outcome variable with a P value <0.05.

\*These data are not collected at the Sexual Health Clinic. These data are only from participants in the Pride Surveys and NHBS.

year. A much smaller proportion of heterosexual cis men and cis women (<1.0%) reported recent partnerships with TNB people.

Our findings are also consistent with several US-based studies that found that many (21%–55%) TNB people report having partners who are also TNB.<sup>7,14–17</sup> Despite the diversity of partnerships among TNB people, most literature on the partners of TNB people to date has focused on cis men who partner with trans women. We observed that, although 80% of heterosexual trans women partner with cis men, only 40% of sexual minority trans women do. In fact, many sexual minority trans women partner with other trans women, nonbinary people, and cis women. The scarcity of studies that report on the diversity of trans women's partnerships may reflect assumptions that trans women only partner with cis men, or it may be a by-product of HIV study inclusion criteria, which limit enrollment to participants who report sex with people AMAB.<sup>18,19</sup>

Our study also adds to a small but growing body of research on trans men who have sex with cis men. We observed that cis men who partner with trans men had high self-reported HIV/STI prevalence, but also engaged in the highest level of HIV/STI prevention activities (e.g., recent testing and PrEP use). It was unsurprising that nearly all cis men in our sample who partnered with trans men also reported sex with cis men and identified as gay, bisexual or pansexual, and queer. Similar to these findings, a study of trans men in San Francisco found that 83% of their cis man partners also reported sex with a cis man in the past 6 months.<sup>17</sup>

Our study leveraged data sources that were designed for HIV/STI surveillance purposes, and therefore, most of these surveys did not assess specific constructs related to relationship stigma, dyad-level characteristics, or sociostructural barriers to care. Although we were unable to assess stigma in our study, it is important for contextualizing our findings. Stigma and minority stress are key structural factors that disproportionately create the contexts (e.g., sex work, unequal power in relationships) and behaviors (e.g., substance use during sex, decreased condom use) that increase TNB people's vulnerability to HIV/STI acquisition.<sup>20–24</sup> Among TNB people, experiences of stigma from cisgender sex partners are negatively associated with HIV/STI prevention.<sup>25</sup> Cisgender partners of TNB people may also experience antitransgender stigma from friends and family due to their relationships with TNB people.<sup>1,26,27</sup> Furthermore, antitransgender stigma may have a differential impact on cis men with trans women partners based on their sexual orientation. For example, a recent study found that stigma had different associations with HIV-related behaviors (e.g., increased likelihood of condomless sex or recent STI diagnosis) for gay-identified compared with heterosexually-identified cis men in primary partnerships with trans women.<sup>5</sup>

In contrast, minority group identification can facilitate a sense of in-group community that can be protective.<sup>26,28</sup> In supportive partnerships, increased communication related to sex can be gender-affirming<sup>29</sup> and can facilitate HIV/STI prevention (through clear sexual agreements, negotiating condom use, talking about HIV/STI status and testing, etc.). This may be especially true of trans people who partner with other trans or nonbinary individuals, because trans people in relationships with trans partners report higher levels of support compared with those in relationships with cisgender people.<sup>30</sup> Our study found that TNB people with trans partners were more likely to engage in HIV/STI testing and PrEP use compared with TNB people who only had cisgender partners. Members of the STARS advisory board reflected that these findings align with what they observed within their community—that trans people support one another to access HIV/STI prevention and care. However, the literature on trans-trans relationships is sparse, and this topic warrants further research, especially given that nearly half of all TNB participants reported having TNB sex partners.

Our study should be interpreted in light of the following limitations. First, our data come from regional convenience samples, including one clinical sample, which likely bias our sample in the following ways. All our data sources on cis men were heavily biased toward MSM and other sexual minority men because of their inclusion criteria (e.g., the 2017 cycle of the NHBS among MSM and the Pride Surveys) and because cis MSM comprise the majority of the PHSKC Sexual Health Clinic patient population. Thus, we likely significantly undersampled heterosexual identified cis men who partner with trans women and overrepresented the number of gay, bisexual, and other sexual minority men who partner with trans women. This is important given that most heterosexual trans women report that they partner with cis men who identify as heterosexual or bisexual and exclusively partner with cis and trans women. Although we did not see this pattern in our data, we believe that it is likely due to sampling biases.

In addition, the self-reported HIV positivity and STI history in our study are likely overestimates due to inclusion of Sexual Health Clinic patients. However, the HIV prevalence among cis men who partner with trans women in our study was significantly lower (5%) than a recent meta-analysis estimate (18.1%–43.0%).<sup>27</sup> This may reflect geographic differences in study populations, because a majority of the studies included in the meta-analysis were conducted in San Francisco and Los Angeles. Our study also relied on self-report for both HIV status and recent STI diagnoses, which may be vulnerable to recall bias, social desirability bias, and low levels of recent testing among certain subsets of our study participants. Future research should examine laboratory-confirmed HIV/STIs experienced by these populations. We were also unable to assess the prevalence of viral STIs, like HPV or HSV, although prior studies demonstrate that trans men who had front hole/vaginal-penile sex in the last year had a 5-fold increased odds of cervical HPV,<sup>11</sup> and that trans women have elevated rates of HPV.

Our study findings suggest that there is significant heterogeneity in HIV/STI prevalence and preventative behaviors among the partners of TNB people. Sexual minority cisgender people much more commonly reported having a TNB partner in the last year (approximately 1 in 10) compared with what has been reported in previous studies, and more than a third of TNB participants reported having trans-trans partnerships in the last year. These data underscore the importance for explicitly including TNB response options when collecting sexual partner data. It also points to the importance of broadening the inclusion criteria for MSM in HIV/STI research and surveillance to include transgender and cisgender men who have sex with transgender and/or cisgender men. Lastly, given that TNB people are diverse in their sexual and romantic partnerships, there is a need to better understand individual-, dyad-, and structural-level factors that facilitate HIV/STI prevention across these diverse partnerships.

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