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RESEARCH ARTICLE

Preference for Long-Acting Injectable PrEP Compared With Daily Oral PrEP Among Transgender Women in the U.S.: Findings From a Multisite Cohort

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Introduction: Pre-exposure prophylaxis (PrEP) use among transgender women in the U.S. has not reached levels optimal to change the trajectory of the HIV epidemic owing to multilevel barriers. Long-acting injectable PrEP received Food and Drug Administration approval in 2021 and may potentially address some of the barriers experienced in initiating and adhering to daily oral PrEP (e.g., pill fatigue, medication storage). However, preferences for long-acting injectable PrEP compared with daily oral PrEP have not been well studied among transgender women.

Methods: The authors analyzed data collected from transgender women not living with HIV in eastern and southern U.S. in 2020−2022. Using multivariable Poisson regression with robust standard errors, the authors estimated prevalence ratios and 95% CIs for factors associated with preference for long-acting injectable PrEP.

Results: The study sample (N=789) was racially and ethnically diverse, with 42.6% identifying as Black, Latina, and/or multiracial and 12% using daily oral PrEP. Fifty-eight percent preferred long-acting injectable PrEP to daily oral PrEP. In multivariable regression analyses, preference for long-acting injectable PrEP was associated with residence in Midwest (reference group=Northeast, adjusted prevalence ratio=1.33; 95% CI=1.10, 1.60), current PrEP indications (adjusted prevalence ratio=1.14; 95% CI=1.01, 1.30), and history of gender-affirming hormone injection (adjusted prevalence ratio=1.36; 95% CI=1.18, 1.57).

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Conclusions: Transgender women may prefer long-acting injectable PrEP to daily oral PrEP, especially those with current PrEP indications and experience with gender-affirming hormone injections. Increasing availability and access to long-acting injectable PrEP may improve PrEP uptake in transgender women, particularly in combination with other interventions to reduce multilevel PrEP barriers.

INTRODUCTION

HIV incidence among transgender women in the U.S. remains elevated and continues to disproportionately impact young, Black, and Latina transgender women and those living in the South despite Food and Drug Administration (FDA) approval of 2 highly efficacious biomedical HIV prevention options for transgender women: daily oral pre-exposure prophylaxis (PrEP) (oral PrEP) and long-acting injectable (LAI) PrEP.[1–5] Prior research has identified multilevel barriers to optimal PrEP use among transgender women, which include modality-specific issues, such as pill fatigue for oral PrEP and contraindications for gluteal injection for LAI PrEP due to gender-affirming implants or fillers, as well as structural and clinical impediments that impact healthcare access broadly (such as housing instability and transphobia) and barriers related to PrEP itself, specifically concerns about interactions with hormones.[6–14] Given the large number of barriers to PrEP at multiple socioecologic levels, interventions that address structural issues are likely necessary to improve accessibility of FDA-approved PrEP modalities and to achieve optimal PrEP uptake among transgender women.

Several modeling studies have explored how expanding access to and uptake of LAI PrEP could lead to reductions in HIV incidence among priority populations in the U.S.[15–17] Consequently, it is important to understand the extent to which preferences for LAI versus oral PrEP are associated with sociodemographic characteristics, structural vulnerabilities, healthcare access and utilization, and PrEP engagement history because differential uptake of particular PrEP modalities based on these factors could have implications for health equity.[18,19] For example, one recent survey of transgender and gender-expansive individuals in Texas found that higher levels of medical mistrust were associated with reduced intention to use LAI PrEP but not with intention to use a (hypothetical) monthly oral pill.[20] The same study found that individuals with higher levels of social vulnerability had greater intentions to use bimonthly injectable PrEP.[20] Another study on PrEP modality preferences among transgender women engaged in street-based sex work in Baltimore found that those who were interested in injectable PrEP were more likely to have experienced sexual violence and food insecurity.[9] A third study, which included transgender women and cisgender men, found that White individuals were more likely to prefer LAI PrEP than Black, Latino, Asian, and multiracial individuals; however, data were not disaggregated by gender identity, so it remains unclear whether there are racial differences in preference for LAI PrEP among transgender women.[10]

An additional area that has received relatively little research attention is preferences for newer PrEP modalities among PrEP-experienced individuals. In one study of gay and bisexual cisgender men who had used oral PrEP for at least 1 year, intention to switch to LAI PrEP was higher among those who reported that daily pills represent an emotional burden.[21] However, to the authors' knowledge, there are no existing studies that have assessed for LAI PrEP preference among transgender women who have used oral PrEP or assessed whether these preferences are associated with particular experiences while taking oral PrEP. In the authors' prior analyses of data from transgender women enrolled in the LITE (Leading Innovation for Transgender Women's Health and Empowerment) Study, the authors found that only 22% of participants were PrEP experienced and many remained vulnerable to HIV after discontinuing oral PrEP.[5,13] It is therefore important to understand how preferences for LAI PrEP may differ between transgender women who have experience with oral PrEP and PrEP-naïve individuals.

Although a growing body of research has examined preferences for LAI PrEP among transgender women in the U.S. and suggested that LAI PrEP may be preferred among transgender women who could benefit from PrEP, existing research has generally been focused within individual cities or has included transgender women as a subset of broader study populations.[6,7,9,10,22] Given the unmet need for PrEP among transgender women throughout the U.S. and ongoing efforts to increase availability of LAI PrEP, additional research is needed to characterize transgender women's preferences for the 2 FDA-approved PrEP modalities and identify

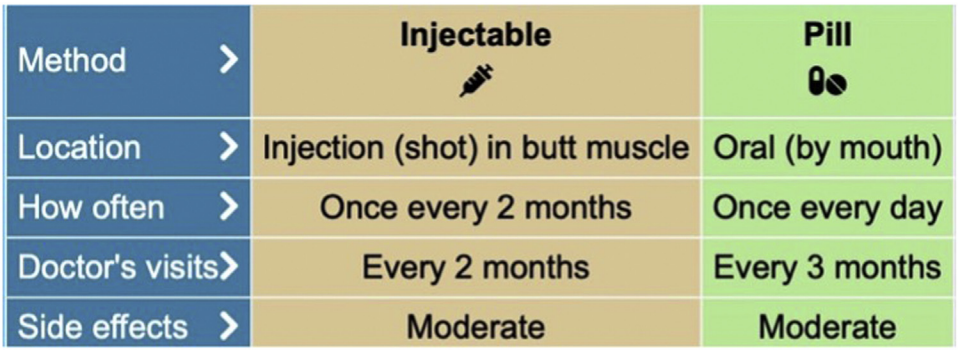

Figure 1. Head-to-head comparison of long-acting injectable with daily oral PrEP as displayed in the LITE survey questionnaire.
LITE, Leading Innovation for Transgender Women's Health and Empowerment; PrEP, pre-exposure prophylaxis.

factors associated with these preferences. Therefore, this study aimed to (1) describe the demographic characteristics and structural determinants of health of transgender women who prefer LAI to oral PrEP, (2) identify correlates of interest in LAI compared with those in oral PrEP, and (3) assess the extent to which experiences while taking oral PrEP were associated with preference for LAI PrEP.

METHODS

Study Population

The LITE Study prospectively followed more than 1,300 transgender women in the eastern and southern U.S. who were not living with HIV from 2018 to 2022. LITE participants were recruited through diverse methods, including through community-based organizations; clinics that specialize in lesbian, gay, bisexual, transgender, and queer health care; geospatial networking sites; and peer referral. Participants completed biobehavioral study procedures, including a sociobehavioral survey and HIV testing semiannually. Study participation was available in English and Spanish. Detailed study protocols have been published previously.[23,24] The present analysis utilizes survey data from the 24-month visit, which included a module on PrEP preferences. Surveys were administered between May 2020 and August 2022, which corresponded to the period after efficacy of LAI PrEP was demonstrated in Phase III trials but prior to widespread availability.

Measures

The primary outcome of interest was preference for LAI PrEP compared with daily oral PrEP using a forced-choice paired comparison (head-to-head) question format.[25] Participants were shown a figure comparing the attributes of LAI with those of oral PrEP, including location of administration, frequency of dosing, frequency of clinical visits, and severity of anticipated side effects (Figure 1). Participants were then asked, *Which option would you choose?*, and responses were restricted to *Injection* or *Pill*.

Demographic characteristics and structural determinants of health were self-reported at enrollment for time-invariant characteristics (e.g., race and ethnicity) and at every follow-up timepoint for potentially time-varying characteristics (e.g., income, food security). Age was self-reported at baseline and was verified by confirming the date of birth at enrollment. Race and ethnicity were asked in 2 separate questions based on U.S. Census standards using a select-all-that-apply format for race.[26] The distribution of combined race and ethnicity is presented in Table 1. Given the disparate HIV incidence rates among Black transgender women compared with that among transgender women of other racial identities, race was collapsed into a dichotomous variable in regression models (i.e., Black or African American, inclusive of multiracial Black participants and Afro-Latina/o/x participants; another race was the reference group). This approach is consistent with how Centers for Disease Control and Prevention operationalizes race in HIV surveillance for transgender women and with prior work demonstrating racial inequities in HIV incidence for Black women compared with that for women of all other races.[5] Similarly, all participants (regardless of race) who identified as Hispanic or Latina/o/x were dichotomized as Latina (non-Latina was the reference group in regression models). U.S. Census division was determined by classifying the reported ZIP code of residence at time of survey administration according to a publicly available U.S. Census database.[27] Participants' gross monthly household income and household size were used to dichotomize income into above or below the 2018 federal poverty level (for individuals living

Table 1. Sociodemographics of Sample Stratified by Preference for Long-Acting Injectable Compared With Daily Oral PrEP

Characteristics	Total N=789	Preference for daily oral PrEP *n*=335 (42%)	Preference for long-acting injection PrEP *n*=454 (58%)	*p*-value (chi-square)
Demographic characteristics				
Age, years				0.80
18–24	227 (28.8%)	98 (29.3%)	129 (28.4%)	
≥25	562 (71.2%)	237 (70.7%)	325 (71.6%)	
Race and ethnicity (combined)				0.53
Non-Hispanic White	453 (57.4%)	190 (56.7%)	263 (57.9%)	
Non-Hispanic Black	102 (12.9%)	46 (13.7%)	56 (12.3%)	
Hispanic White	51 (6.5%)	28 (8.4%)	23 (5.1%)	
Hispanic Black	11 (1.4%)	5 (1.5%)	6 (1.3%)	
Non-Hispanic and >1 race or another race	95 (12.0%)	37 (11.0%)	58 (12.8%)	
Hispanic and >1 race or another race	67 (8.5%)	26 (7.8%)	41 (9.0%)	
Black race				0.95
Yes (inclusive of multiracial Black and Afro-Latina/o/x)	161 (20.5%)	68 (20.5%)	93 (20.6%)	
No	623 (79.5%)	264 (79.5%)	359 (79.4%)	
Ethnicity				0.79
Latina/o/x or Hispanic	123 (15.7%)	55 (16.6%)	68 (15.1%)	
Not Latina/o/x or Hispanic	659 (84.3%)	276 (83.4%)	383 (84.9%)	
Census division				0.16
Northeast	306 (38.8%)	141 (42.1%)	165 (36.3%)	
Midwest	111 (14.1%)	40 (11.9%)	71 (15.6%)	
South	372 (47.1%)	154 (46.0%)	218 (48.0%)	
Structural determinants				
Income				0.12
Above federal poverty level	471 (59.7%)	199 (59.4%)	272 (59.9%)	
Below federal poverty level	214 (27.1%)	83 (24.8%)	131 (28.9%)	
Education				0.89
High school or less	183 (23.4%)	77 (23.2%)	106 (23.6%)	
Some college or higher	598 (76.6%)	255 (76.8%)	343 (76.4%)	
Food insecurity				0.88
Food secure	581 (74.5%)	246 (74.8%)	335 (74.3%)	
Food insecure	199 (25.5%)	83 (25.2%)	116 (25.7%)	
Current homelessness				0.47
Not experiencing homelessness	741 (93.9%)	317 (94.6%)	424 (93.4%)	
Experiencing homelessness	48 (6.1%)	18 (5.4%)	30 (6.6%)	
Healthcare access and utilization				
Most recent clinical visit				0.75
Within the last 6 months	637 (81.8%)	267 (80.9%)	370 (82.4%)	
6–12 months ago	78 (10.0%)	33 (10.0%)	45 (10.0%)	
More than a year ago	64 (8.2%)	30 (9.1%)	34 (7.6%)	
Currently have a primary care provider				0.33
No	198 (25.4%)	90 (27.2%)	108 (24.1%)	
Yes	581 (74.6%)	241 (72.8%)	340 (75.9%)	
				0.19

(*continued on next page*)

Table 1. Sociodemographics of Sample Stratified by Preference for Long-Acting Injectable Compared With Daily Oral PrEP (*continued*)

Characteristics	Total N=789	Preference for daily oral PrEP *n*=335 (42%)	Preference for long-acting injection PrEP *n*=454 (58%)	*p*-value (chi-square)
Unmet need for gender-affirming medical care				
No	526 (89.9%)	212 (88.0%)	314 (91.3%)	
Yes	59 (10.1%)	29 (12.0%)	30 (8.7%)	
Health insurance				0.85
Uninsured	75 (10.1%)	33 (10.5%)	42 (9.7%)	
Public insurance	308 (41.4%)	126 (40.3%)	182 (42.2%)	
Private insurance	361 (48.5%)	154 (49.2%)	207 (48.0%)	
Healthcare challenges				0.65
No barriers	145 (18.4%)	64 (19.1%)	81 (17.8%)	
1 or more healthcare barriers	644 (81.6%)	271 (80.9%)	373 (82.2%)	
PrEP indications and experience				
PrEP indications				0.007
No indications	521 (66.0%)	239 (71.3%)	282 (62.1%)	
1 or more indications	268 (34.0%)	96 (28.7%)	172 (37.9%)	
Current PrEP use (within the past 30 days)				0.12
Not using	670 (88.4%)	286 (90.5%)	384 (86.9%)	
Using	88 (11.6%)	30 (9.5%)	58 (13.1%)	
Ever PrEP use				0.027
Never used	577 (74.0%)	259 (78.0%)	318 (71.0%)	
Past or current use	203 (26.0%)	73 (22.0%)	130 (29.0%)	
Experience with hormone injections and fillers				
History of fillers (face or body)				0.63
No	704 (89.2%)	301 (89.9%)	403 (88.8%)	
Yes	85 (10.8%)	34 (10.1%)	51 (11.2%)	
History of gender-affirming hormone injections				<0.001
No	584 (74.0%)	270 (80.6%)	314 (69.2%)	
Yes	205 (26.0%)	65 (19.4%)	140 (30.8%)	

PrEP, pre-exposure prophylaxis.

alone, this equates to an annual income of $12,140).[28] Educational attainment was dichotomized as high school diploma or less versus some college or higher. Food insecurity was assessed using the U.S. Department of Agriculture's single-item measure of food insecurity and was dichotomized into food secure (seldom to never run out of food or money to purchase food) versus food insecure (sometimes to always run out of food or money to purchase food).[29] Finally, participants were asked, *In the past 6 months, were you homeless at any time? That is, you slept in a shelter for homeless people, on the streets, in a Single Room Occupancy (SRO), in a car, at a friend or relative's house for a few nights or weeks, or another place not intended for sleeping*, and responses were dichotomized by recent experience of homelessness (yes/no).

Healthcare access and utilization covariates included date of last healthcare encounter (trichotomized into <6 months ago, 6−12 months ago, or >1 year ago), having a current primary care provider (yes versus no), unmet need for gender-affirming care (received all needed/desired gender-affirming care versus unable to access all needed/desired gender-affirming care), health insurance (private, public, or uninsured), and healthcare challenges (reporting 1 or more barrier[s] to care such as transportation or cost versus no reported barriers).

PrEP indications were based on self-reported sociobehavioral indicators associated with HIV acquisition in the prior 6 months per Centers for Disease Control and Prevention guidelines at the time of survey completion (e.g., condomless sex with nonmonogamous partner[s],

use of shared injection equipment, sexually transmitted infection diagnosis in prior 6 months).[30] PrEP use was self-reported. Participants were asked *Have you ever used PrEP?* at enrollment and were asked *Are you currently using PrEP?* at every study visit. Participants who responded *yes* to this question at the 24-month visit were considered current PrEP users. Participants who responded *yes* to this item at any study visit and/or reported ever using PrEP at baseline were coded as having a history of PrEP use. Participants were also asked whether they had ever received injectable fillers (e.g., silicone) in their face or body. Finally, participants who reported taking gender-affirming hormones were asked *How do you currently take your hormones?* at each study visit in a select-all-that-apply format. Any participant who selected injection at 1 or more study visit was considered to have a history of injection hormone use. All participants provided written consent to participate, and all study procedures were approved by the Johns Hopkins School of Medicine IRB, which served as the single IRB for the multisite study.

Statistical Analysis

Participant characteristics were summarized using descriptive statistics for the entire analytic sample and stratified by preference for LAI PrEP versus preference for oral PrEP. Poisson regression models with robust variance were implemented to estimate prevalence ratios (PRs) and 95% CIs for correlates of preference for LAI to oral PrEP. Oral PrEP was selected as the reference group because the authors were interested in understanding the factors associated with interest in a newly approved PrEP modality compared with interest in a more widely available PrEP modality. Factors that were significant at $p<0.10$ in bivariate regression models were retained in multivariable models, which were also adjusted for age, race, ethnicity, and U.S. Census division. The threshold of $p<0.10$ in bivariate models reduces the likelihood that potentially important variables that may show stronger associations in the multivariable models are excluded at this stage.[31] To assess how robust these findings were among those most likely to benefit from PrEP, the authors conducted a sensitivity analysis restricted to participants with current PrEP indications and/or history of PrEP use. Given the potential compounding effect of social determinants of health, the authors generated a social vulnerability index[20] as well as composite scores for structural determinants, healthcare access and utilization, and social determinants of health (summative across structural and healthcare access and utilization domains) and assessed for correlation between each of these indices and PrEP preference in sensitivity analyses. Finally, to understand the extent to which experiences while taking oral PrEP were associated with preference for LAI to oral PrEP, the authors summarized preferences on the basis of the absence or presence of 9 potential experiences (e.g., side effects) among those who had reported using oral PrEP. All statistical analyses were conducted in Stata, Version 17 (STATA, College Station, TX).

RESULTS

Between May 2020 and August 2022, 789 transgender women from across the eastern and southern U.S. completed a 24-month LITE Study survey. Twenty percent identified as Black, and 16% identified as Latina. Twenty-nine percent were aged 18−24 years. Forty-seven percent resided in the South, 14% resided in the Midwest, and 39% resided in the Northeast. One third had 1 or more PrEP indication(s), 26% had ever used PrEP, and 12% were using daily oral PrEP at the time of the survey. In the head-to-head forced choice between the 2 modalities, LAI was preferred to oral PrEP by 58% −42%. Those who preferred LAI PrEP did not significantly differ in terms of race, ethnicity, geography, age, or PrEP indication from those who preferred oral PrEP. Those who preferred LAI PrEP were significantly more likely to have current PrEP indication(s), history of PrEP use, and history of injection hormone use than those who preferred oral PrEP (Table 1).

In bivariate regression models among the full analytic sample, statistically significant ($p<0.05$) correlates of interest in LAI PrEP were residence in Midwest, history of PrEP use, current PrEP indication, and history of hormone injection. In the multivariable model (adjusted for age, race, ethnicity, and all statistically significant correlates in bivariate analyses), variables that remained statistically significant were residence in Midwest (reference group: Northeast, adjusted PR=1.33; 95% CI=1.10, 1.60), current PrEP indication(s) (adjusted PR=1.14; 95% CI=1.01, 1.30), and history of gender-affirming hormone injection (adjusted PR=1.36; 95% CI=1.18, 1.57) (Table 2). In the sensitivity analysis restricted to those with current PrEP indication(s) and/or history of PrEP use, residence in the Midwest and history of hormone injection remained statistically significant correlates of preference for LAI PrEP in the final multivariable model (adjusted PR=1.40; 95% CI=1.07, 1.84 and adjusted PR=1.38; 95% CI=1.15, 1.67, respectively) (Appendix Table 1, available online). In sensitivity analyses exploring the compounding effect of social determinants of health, there was no association between composite measures of social determinants and PrEP preference (analyses not shown, available on request).

Table 2. Correlates of Preference for LAI PrEP in Head-to-Head Comparison (Pill/Injection) Among Transgender Women Enrolled in LITE and Completing a 24-Month Survey Between April 2020 and August 2022 (N=786)

	Bivariate model results				Multivariable model results			
Characteristics	**Prevalence ratio**	**95% CI**		***p*-value**	**Adjusted prevalence ratio[a]**	**95% CI**		***p*-value**
Demographic characteristics								
Aged 18–24 years (ref: aged ≥25 years)	0.98	0.86	1.12	0.80	1.00	0.88	1.15	0.96
Black race (ref: another race)	1.00	0.86	1.16	0.98	0.88	0.75	1.03	0.11
Latina/Hispanic ethnicity (ref: non-Latina/Hispanic)	0.95	0.80	1.13	0.57	0.86	0.72	1.02	0.09
Census region (ref: Northeast)								
Midwest	**1.19**	**1.00**	**1.41**	**0.05**	**1.33**	**1.10**	**1.60**	**0.003**
South	1.09	0.95	1.24	0.23	1.12	0.98	1.29	0.09
Structural determinants								
Income below FPL (ref: income above FPL)	1.06	0.93	1.21	0.39				
College education or higher (ref: high school or less)	0.99	0.86	1.14	0.89				
Food insecure (ref: food secure)	1.01	0.88	1.16	0.88				
Experiencing homelessness (current)	1.09	0.87	1.37	0.45				
Healthcare access and utilization								
Most recent clinical visit (ref: within the last 6 months)								
6–12 months ago	0.99	0.81	1.21	0.95				
More than a year ago	0.91	0.72	1.16	0.47				
Have a primary care provider (ref: do not have primary care provider)	1.07	0.93	1.24	0.34				
Unmet need for gender-affirming medical care (ref: all needs met)	0.85	0.66	1.11	0.23				
Health insurance (ref: private insurance)								
Uninsured	0.98	0.78	1.22	0.83				
Public insurance	1.03	0.91	1.17	0.65				
Healthcare barriers (ref: no reported barriers)	1.04	0.88	1.22	0.66				
PrEP indications and experience								
Ever used PrEP (ref: never used PrEP)	**1.16**	**1.02**	**1.32**	**0.02**	1.08	0.94	1.25	0.27
Currently using PrEP (within the last 30 days; ref: not currently using PrEP)	1.15	0.98	1.35	0.10				
Any PrEP indication (ref: no PrEP indications)	**1.19**	**1.05**	**1.34**	**0.01**	**1.14**	**1.01**	**1.30**	**0.04**
Experience with injectable hormones and fillers								
History of fillers (face or body; ref: no history of fillers)	1.05	0.87	1.26	0.62				
History of injectable hormones (ref: no history of injectable hormones)	**1.27**	**1.13**	**1.43**	**<0.001**	**1.36**	**1.18**	**1.57**	**<0.001**

Note: Boldface indicates statistical significance ($p<0.05$).
[a]Multivariable model was adjusted for age, race, ethnicity, and all statistically significant correlates in bivariate analyses.
FPL, federal poverty level; LAI, long-acting injectable; LITE, Leading Innovation for Transgender Women's Health and Empowerment; PrEP, pre-exposure prophylaxis.

For those taking daily oral PrEP, there was no association between any experiences while taking PrEP and preference for LAI PrEP compared with oral, nor was there an association between the total number of experiences and preference for LAI to oral PrEP (Table 3). Among all 203 participants who had used oral PrEP, 64% preferred LAI to oral PrEP. Experiences that were reported by a majority of oral PrEP users were disliking taking a pill every day (51.2%) and having others assume that the participant had a large number of sex partners (50.2%). Other commonly reported experiences were lower perceived HIV risk due to PrEP use (45.8%), disliking the clinical visits and laboratory testing to stay on PrEP (43.9%), side effects (40.9%), and partners not wanting to use condoms due to participant PrEP use (37.9%).

Table 3. Associations Between Side Effects, Challenges, and Stigmatizing Experiences While on Daily Oral PrEP and Preference for Daily Oral PrEP to Long-Acting Injectable PrEP Among PrEP-Experienced Transgender Women (*n*=203)

Experiences while on daily oral PrEP	Total	Preference for daily oral PrEP	Preference for long-acting injectable PrEP	*p*-value (chi-square)
n	203	73 (36%)	130 (64%)	
Side effects				0.58
No	120 (59.1%)	45 (61.6%)	75 (57.7%)	
Yes	83 (40.9%)	28 (38.4%)	55 (42.3%)	
People think you have HIV				0.72
No	150 (73.9%)	55 (75.3%)	95 (73.1%)	
Yes	53 (26.1%)	18 (24.7%)	35 (26.9%)	
Interaction with hormones				0.93
No	169 (83.3%)	61 (83.6%)	108 (83.1%)	
Yes	34 (16.7%)	12 (16.4%)	22 (16.9%)	
Don't like taking a pill every day				0.45
No	99 (48.8%)	33 (45.2%)	66 (50.8%)	
Yes	104 (51.2%)	40 (54.8%)	64 (49.2%)	
People think you have a lot of different sex partners				0.84
No	101 (49.8%)	37 (50.7%)	64 (49.2%)	
Yes	102 (50.2%)	36 (49.3%)	66 (50.8%)	
Your sex partner(s) don't want to use condoms because you're on PrEP				0.32
No	126 (62.1%)	42 (57.5%)	84 (64.6%)	
Yes	77 (37.9%)	31 (42.5%)	46 (35.4%)	
You feel like you're not at risk for HIV				0.87
No	110 (54.2%)	39 (53.4%)	71 (54.6%)	
Yes	93 (45.8%)	34 (46.6%)	59 (45.4%)	
Don't like the clinical visits and testing that are required to stay on PrEP				1.00
No	114 (56.2%)	41 (56.2%)	73 (56.2%)	
Yes	89 (43.8%)	32 (43.8%)	57 (43.8%)	
Other experiences				0.84
No	171 (84.2%)	61 (83.6%)	110 (84.6%)	
Yes	32 (15.8%)	12 (16.4%)	20 (15.4%)	
Total number of experiences while on PrEP (mean and SD)	3.29 (2.15)	3.33 (2.19)	3.26 (2.13)	0.83

PrEP, pre-exposure prophylaxis.

DISCUSSION

When presented with a forced choice, head-to-head comparison between LAI and daily oral PrEP, a majority of transgender women in the study sample (58%) preferred LAI PrEP. Those who preferred LAI to daily oral PrEP did not differ across most sociodemographic characteristics, structural determinants of health, and healthcare access and utilization indicators but were more likely to have PrEP indications. These findings suggest that LAI PrEP is preferred among transgender women who are likely to benefit from PrEP, which is consistent with the findings of other studies of LAI PrEP preferences among transgender women in Baltimore, Boston, Chicago, New York, and Los Angeles.[7,9,10,32] It is critical to note that more than 40% preferred oral PrEP, highlighting the importance of offering both oral and LAI PrEP modalities to maximize the likelihood that the preferred option is accessible to each individual who could benefit from PrEP.

The finding that those in the Midwest were 19% more likely to prefer LAI PrEP than those in the Northeast (40% more likely among those with PrEP indications or prior PrEP experience) might be explained by regional variations in stigma and discrimination because injectable PrEP would require fewer pharmacy interactions and eliminate the need to store the medication at home, which may be more of a priority for individuals living in geographic regions with higher levels of stigma.[33] Although the association was only marginally significant for the South, the association was in the same direction as that for the Midwest (adjusted PR=1.12; 95% CI=0.98, 1.29; p=0.09). However, because the authors did not ask participants why they preferred a given modality and were unable to assess whether anticipated stigma was associated with PrEP preference in the sample, future research is needed to better understand this finding and empirically test this possible explanation.

The authors found that transgender women who preferred LAI PrEP were more likely to have used both oral PrEP and gender-affirming hormone injections, which suggests not only a preference for but also a willingness to use novel biomedical HIV prevention approaches and injectable medications for this group. The finding that LAI PrEP was preferred to oral PrEP by 64%−36% among PrEP-experienced transgender women was not surprising given that early adopters of new innovations are more likely to be early adopters of subsequent novel innovations.[21,34,35] Furthermore, the finding that negative experiences while taking oral PrEP were not associated with preference for LAI to oral PrEP may suggest that PrEP-experienced transgender women have developed strategies to effectively manage these experiences or that these experiences are not modality specific and therefore do not drive PrEP preferences. For example, the authors found that half of PrEP-experienced transgender women reported that they did not like taking a pill everyday but that this proportion did not differ among those who preferred oral PrEP to LAI PrEP. Further qualitative research may help to contextualize these findings and determine which experiences can be managed without impacting PrEP use versus which need to be mitigated to optimize PrEP use.

Limitations

This study is subject to several limitations. First, although the authors displayed a side-by-side comparison of LAI with oral PrEP to highlight key differences between the 2 modalities, the authors were limited in the amount of detail that they could provide given space constraints on the survey. It is possible that providing additional details on each attribute (e.g., listing out the types of side effects that have been reported and their likelihood of occurring) or including additional attributes (e.g., possibility of same-day start or self-administration) could impact preferences. Similarly, because the survey was designed before clinical guidance for safe discontinuation of injectable PrEP was established, the authors did not mention the potential need for oral PrEP after discontinuation of injectable PrEP to prevent development of integrase-inhibitor resistance in the context of ongoing risk for HIV acquisition. It is possible that inclusion of the recommended information about the pharmacokinetic tail for cabotegravir and safe discontinuation practices may have impacted preferences.[36,37] Second, the authors cannot assume that these preferences translate to behavior (i.e., LAI PrEP uptake) given the limitations inherent in stated preference survey data (i.e., cognition-driven hypothetical decision making can differ from real-world decision making).[38] Furthermore, the importance of social determinants of health in healthcare access means that social determinants of health may be correlated with PrEP use and adherence even if these determinants were not associated with preference. Finally, these data were collected from 2020 to 2022, which spanned from pre-FDA approval of LAI PrEP to the early postapproval phase. It is possible that these preferences will change as LAI PrEP becomes more widely available and awareness of and experience with LAI PrEP become more widespread.

CONCLUSIONS

The findings of this study highlight that transgender women may prefer LAI PrEP to daily oral PrEP, especially those with current PrEP indications and experience of gender-affirming hormone injections. Increasing availability and access to LAI PrEP may improve PrEP uptake in transgender women, particularly in combination with other interventions to reduce multilevel PrEP barriers.

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SUPPLEMENTARY MATERIALS

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REFERENCES

1. Becasen JS, Denard CL, Mullins MM, Higa DH, Sipe TA. Estimating the prevalence of HIV and sexual behaviors among the U.S. transgender population: a systematic review and meta-analysis, 2006–2017. *Am J Public Health*. 2019;109(1):e1–e8. https://doi.org/10.2105/AJPH.2018.304727.
2. Centers for Disease Control and Prevention. HIV Infection, Risk, Prevention, and Testing BehaviorsAmong Transgender Women—National HIV Behavioral Surveillance, 7 U.S. Cities, 2019–2020. HIV Surveillance Special Report 27. http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html. Published April 2021. Accessed December 11, 2024.
3. Buchbinder SP, Glidden DV, Liu AY, et al. HIV pre-exposure prophylaxis in men who have sex with men and transgender women: a secondary analysis of a phase 3 randomised controlled efficacy trial. *Lancet Infect Dis*. 2014;14(6):468–475. https://doi.org/10.1016/S1473-3099(14)70025-8.
4. Landovitz RJ, Donnell D, Clement ME, et al. Cabotegravir for HIV prevention in cisgender men and transgender women. *N Engl J Med*. 2021;385(7):595–608. https://doi.org/10.1056/NEJMoa2101016.
5. Wirtz AL, Humes E, Althoff KN, et al. American Cohort to Study HIV Acquisition Among Transgender Women (LITE) Study Group. HIV incidence and mortality in transgender women in the eastern and southern USA: a multisite cohort study. *Lancet HIV*. 2023;10(5):e308–e319. https://doi.org/10.1016/S2352-3018(23)00008-5.
6. Biello KB, Hosek S, Drucker MT, et al. Preferences for injectable PrEP among Young U.S. cisgender men and transgender women and men who have sex with men. *Arch Sex Behav*. 2018;47(7):2101–2107. https://doi.org/10.1007/s10508-017-1049-7.
7. Rael CT, Lopez-Ríos J, McKenna SA, et al. Transgender women's barriers, facilitators, and preferences on tailored injection delivery strategies to administer long-acting injectable cabotegravir (CAB-LA) for HIV pre-exposure prophylaxis (PrEP). *AIDS Behav*. 2021;25(12):4180–4192. https://doi.org/10.1007/s10461-021-03357-y.
8. Rael CT, Martinez M, Giguere R, et al. Barriers and facilitators to oral PrEP use among transgender women in New York City. *AIDS Behav*. 2018;22(11):3627–3636. https://doi.org/10.1007/s10461-018-2102-9.
9. Rosen JG, Beckham SW, Glick JL, et al. Acceptability of event-driven and long-acting HIV pre-exposure prophylaxis formulations among

transgender women engaged in street-based sex work in Baltimore, Maryland. *Transgend Health.* 2024;9(2):185–191. https://doi.org/10.1089/trgh.2022.0057.
10. Weeden T, Garofalo R, Johnson AK, et al. Assessing preferences for long-acting injectable pre-exposure prophylaxis among young adult sexual minority men and transgender women. *Acad Pediatr.* 2024;24(7):1110–1115. https://doi.org/10.1016/j.acap.2024.04.005.
11. Cooney EE, Footer KHA, Glick JL, Passaniti A, Howes M, Sherman SG. Understanding the social and structural context of oral PrEP delivery: an ethnography exploring barriers and facilitators impacting transgender women who engage in street-based sex work. *AIDS Res Ther.* 2023;20(1):69. https://doi.org/10.1186/s12981-023-00556-6.
12. Cooney EE, Reisner SL, Saleem HT, et al. Prevention-effective adherence trajectories among transgender women indicated for PrEP in the United States: a prospective cohort study. *Ann Epidemiol.* 2022;70:23–31. https://doi.org/10.1016/j.annepidem.2022.03.016.
13. Cooney EE, Saleem HT, Stevenson M, et al. PrEP initiation and discontinuation among transgender women in the United States: a longitudinal, mixed methods cohort study. *J Int AIDS Soc.* 2023;26(12):e26199. https://doi.org/10.1002/jia2.26199.
14. Cooney EE, Stevenson M, Aguayo-Romero RA, et al. Interest in long-acting injectable PrEP among transgender women in eastern and southern United States. *AIDS Behav.* 2024 In press. Online December 5. https://doi.org/10.1007/s10461-024-04561-2..
15. Stansfield SE, Heitner J, Mitchell KM, et al. Population-level impact of expanding PrEP coverage by offering long-acting injectable PrEP to MSM in three high-resource settings: a model comparison analysis. *J Int AIDS Soc.* 2023;26(suppl 2):e26109. https://doi.org/10.1002/jia2.26109.
16. Marshall BDL, Goedel WC, King MRF, et al. Potential effectiveness of long-acting injectable pre-exposure prophylaxis for HIV prevention in men who have sex with men: a modelling study. *Lancet HIV.* 2018;5(9):e498–e505. https://doi.org/10.1016/S2352-3018(18)30097-3.
17. Maloney KM, Le Guillou A, Driggers RA, et al. Projected impact of concurrently available long-acting injectable and daily-oral human immunodeficiency virus preexposure prophylaxis: a mathematical model. *J Infect Dis.* 2021;223(1):72–82. https://doi.org/10.1093/infdis/jiaa552.
18. Hojilla JC, Gandhi M, Satre DD, Johnson MO, Saberi P. Equity in access to long-acting injectables in the USA. *Lancet HIV.* 2022;9(3):e145–e147. https://doi.org/10.1016/S2352-3018(22)00031-5.
19. Marshall BDL, Goedel WC, King MRF, et al. Potential effectiveness of long-acting injectable pre-exposure prophylaxis for HIV prevention in men who have sex with men: a modelling study. *Lancet HIV.* 2018;5(9):e498–e505. https://doi.org/10.1016/S2352-3018(18)30097-3.
20. Schnarrs PW, Zuñiga J, Benitez G, et al. Intention to use different formulations of longer acting HIV pre-exposure prophylaxis among transgender and gender expansive individuals: the roles of social vulnerability and medical mistrust. *AIDS Patient Care STDs.* 2024;38(2):51–60. https://doi.org/10.1089/apc.2023.0211.
21. Meyers K, Wu Y, Brill A, Sandfort T, Golub SA. To switch or not to switch: intentions to switch to injectable PrEP among gay and bisexual men with at least twelve months oral PrEP experience. *PLoS One.* 2018;13(7):e0200296. https://doi.org/10.1371/journal.pone.0200296.
22. Rael CT, Martinez M, Giguere R, et al. Transgender women's concerns and preferences on potential future long-acting biomedical HIV prevention strategies: the case of injections and implanted medication delivery devices (IMDDs). *AIDS Behav.* 2020;24(5):1452–1462. https://doi.org/10.1007/s10461-019-02703-5.
23. Wirtz AL, Cooney EE, Stevenson M, et al. Digital epidemiologic research on multilevel risks for HIV acquisition and other health outcomes among transgender women in eastern and Southern United States: protocol for an online cohort. *JMIR Res Protoc.* 2021;10(4):e29152. https://doi.org/10.2196/29152.
24. Wirtz AL, Poteat T, Radix A, et al. American cohort to study HIV acquisition among transgender women in high-risk areas (the LITE study): protocol for a multisite prospective cohort study in the eastern and Southern United States. *JMIR Res Protoc.* 2019;8(10):e14704. https://doi.org/10.2196/14704.
25. Day RL. Systematic paired comparisons in preference analysis. *J Mark Res.* 1965;2(4):406–412. https://doi.org/10.1177/002224376500200410.
26. Jones NA. Update on the U.S. Census Bureau's race and ethnic research for the 2020 Census. *Survey News.* 2017;3(5). https://www.census.gov/content/dam/Census/newsroom/press-kits/2014/article_race_ethnic_research_2020census_jones.pdf. Accessed February 13, 2025.
27. Wilson R, Din A. Understanding and enhancing the U.S. Department of Housing and Urban Development's ZIP code crosswalk files. *Cityscape.* 2018;20(2):277–294. https://www.huduser.gov/portal/periodicals/cityscpe/vol20num2/article16.html. Accessed February 13, 2025.
28. Benson C. Poverty: 2018 and 2019. *Am Community Surv Briefs.* 2020. https://www.census.gov/content/dam/Census/library/publications/2020/acs/acsbr20-04.pdf. Accessed February 13, 2025.
29. Gundersen C, Engelhard EE, Crumbaugh AS, Seligman HK. Brief assessment of food insecurity accurately identifies high-risk U.S. adults. *Public Health Nutr.* 2017;20(8):1367–1371. https://doi.org/10.1017/S1368980017000180.
30. Malone J, Reisner SL, Cooney EE, et al. Perceived HIV acquisition risk and low uptake of PrEP among a cohort of transgender women with PrEP indication in the eastern and Southern United States. *J Acquir Immune Defic Syndr.* 2021;88(1):10–18. https://doi.org/10.1097/QAI.0000000000002726.
31. Bursac Z, Gauss CH, Williams DK, Hosmer DW. Purposeful selection of variables in logistic regression. *Source Code Biol Med.* 2008;3:17. https://doi.org/10.1186/1751-0473-3-17.
32. Biello KB, Hosek S, Drucker MT, et al. Preferences for injectable PrEP among young U.S. cisgender men and transgender women and men who have sex with men. *Arch Sex Behav.* 2018;47(7):2101–2107. https://doi.org/10.1007/s10508-017-1049-7.
33. Tran NK, Baker KE, Lett E, Scheim AI. State-level heterogeneity in associations between structural stigma and individual health care access: a multilevel analysis of transgender adults in the United States. *J Health Serv Res Policy.* 2023;28(2):109–118. https://doi.org/10.1177/13558196221123413.
34. Holt M, Lea T, Bear B, et al. Trends in attitudes to and the use of HIV pre-exposure prophylaxis by Australian gay and bisexual men, 2011−2017: implications for further implementation from a diffusion of innovations perspective. *AIDS Behav.* 2019;23(7):1939–1950. https://doi.org/10.1007/s10461-018-2368-y.
35. Schuyler A, Alidina Z, Dolcini MM, et al. Pre-exposure prophylaxis (PrEP) dissemination: adapting diffusion theory to examine PrEP adoption. *AIDS Behav.* 2021;25(10):3145–3158. https://doi.org/10.1007/s10461-021-03345-2.
36. Meyers K, Nguyen N, Zucker JE, et al. The long-acting cabotegravir tail as an implementation challenge: planning for safe discontinuation. *AIDS Behav.* 2023;27(1):4–9. https://doi.org/10.1007/s10461-022-03816-0.
37. Henderson M, Schmidt HA, Chitembo L, et al. The future of pre-exposure prophylaxis (PrEP) for HIV prevention: a global qualitative consultation on provider perspectives on new products and differentiated service delivery. *AIDS Behav.* 2023;27(11):3755–3766. https://doi.org/10.1007/s10461-023-04093-1.
38. Bauermeister JA, Downs JS, Krakower DS. PrEP product acceptability and dual process decision-making among men who have sex with men. *Curr HIV AIDS Rep.* 2020;17(3):161–170. https://doi.org/10.1007/s11904-020-00497-z.