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Longer-acting preexposure prophylaxis product and delivery preferences among U.S. populations disproportionately affected by HIV: a discrete choice experiment

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Abstract

Objective: Longer-acting preexposure prophylaxis (LA-PrEP) products have potential to increase PrEP uptake and continuation. This study sought to elicit preferences for LA-PrEP product and delivery program characteristics among populations disproportionately impacted by HIV to identify factors important to adoption and anticipate potential use challenges.

Design: Cross-sectional, online discrete choice experiment

Methods: We recruited 940 men who have sex with men (MSM), people who inject drugs (PWID), and Black heterosexual men and women (BHMW) with PrEP indications. In a series of 10 tasks, participants chose between two hypothetical LA-PrEP options composed of 5 attributes (product type, side effects, clinic type, appointment duration, cost), or neither (their current HIV prevention method). Analysis used random-parameters logit models.

Results: Respondents chose an LA-PrEP method over their current HIV prevention option in 96.8% of tasks. Cost was the most important determinant of LA-PrEP choice for all populations (relative importance [RI] of 10). Side effects and product type were 1/3 to 1/2 as important as cost (RI 3.5–5.1). MSM and PWID most preferred the 12-month implant followed by semiannual dual

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Conflicts of interest

The authors have no conflicts of interest to declare.

Data from this study are available through the National Archives and Records Administration (NARA).

injections and least preferred the monthly oral pill and 2-month single injection. BHMW most preferred the monthly pill and semiannual injections and least preferred the 12-month implant and 2-month injection. Clinic type and appointment duration had minimal influence (RI 0.1–2.1).

Conclusions: Results suggest high demand for LA-PrEP among populations with disproportionately high HIV incidence. To facilitate use, programs should offer a range of LA-PrEP products, minimize out-of-pocket costs, and counsel on side effects.

Keywords

black heterosexual men and women; discrete choice experiment; HIV prevention; longer-acting preexposure prophylaxis; men who have sex with men; people who inject drugs

Introduction

Despite successes in scale-up of daily oral preexposure prophylaxis (PrEP) as a biomedical HIV prevention product, studies consistently show obstacles to its uptake and continuation in the United States (U.S.) [1]. PrEP coverage remains low in populations disproportionately affected by the epidemic, including Black/African American (Black) men and women, and people who inject drugs (PWID) [2–4]. Though PrEP use among men who have sex with men (MSM) increased between 2014 and 2021, coverage was substantially lower among Black and Hispanic/Latino (Hispanic) MSM than White MSM [5].

The *Ending the HIV Epidemic in the U.S.* (EHE) initiative aims to increase PrEP use [6]. Achievement of this goal depends on addressing client-reported barriers including stigma, cost, frequency and duration of clinic visits, side effects, and fatigue associated with daily use [1]. Longer-acting PrEP (LA-PrEP) agents have potential to increase PrEP coverage by providing additional discretion and reducing the burden of product use and clinic engagement. When the current study was designed in early 2022, long-acting injectable cabotegravir, given every two months, was known to be safe and efficacious and had just received FDA approval, but was not widely available [7,8]. Two phase III clinical trials of six-month injectable lenacapavir were ongoing while similar trials of a monthly oral islatravir pill had just been paused for safety concerns ([NCT04652700](#) and [NCT04644029](#)), and a Phase 2a trial of a 12-month islatravir implant had not yet started enrollment ([NCT05115838](#)). Since then, lenacapavir has since been shown to be safe and highly efficacious and FDA approval is anticipated in June 2025 [9,10], while the islatravir trials were discontinued and alternate formulations are being pursued.

Potential users report high interest and willingness to use LA-PrEP, especially among those currently using daily oral PrEP [11–15]. However, despite their promise, some attributes of new LA-PrEP agents may reduce acceptability for some clients. For example, long-acting injections may require users to take daily oral pills for months after discontinuation to protect against drug-resistant HIV during the long pharmacokinetic tail; implants may cause pain upon insertion or removal and may be less discreet due to their palpability; and users of monthly oral pills may face challenges remembering when doses are due [7,16–19]. Cost, access locations, and other delivery-related factors may continue to influence uptake regardless of the products available.

Understanding clients' preferences for LA-PrEP will be critical to anticipating future uptake and implementation considerations. Discrete choice experiments (DCEs) offer a robust approach to assess preferences by examining the trade-offs individuals make when choosing between two options characterized by different attributes [20]. Although previous studies have conducted DCEs on preferences for LA-PrEP in the U.S., the majority have been among MSM [21–27], with only one study each among PWID [28], and Black women [29]. Further, results from these studies cannot be directly compared, as each presented participants with a different set of attributes, and DCEs can only assess relative preferences among the attributes under consideration. We conducted a DCE to elicit preferences for characteristics of LA-PrEP products and clinical delivery programs among multiple populations disproportionately affected by HIV. Results will be used to identify factors key to adoption and implementation of new LA-PrEP products within and across populations and will increase implementation efficiency by anticipating potential use challenges and identifying strategies to support product choice, uptake, and continuation.

Methods

Study design and participants

Choices for Prevention was a cross-sectional, online survey conducted from May to December 2023 among priority populations disproportionately affected by HIV [30]. This manuscript presents findings from six populations: Black, White, and Hispanic (of any race) cisgender MSM; PWID; and Black heterosexual men and women. Inclusion criteria were belonging to one of these populations, age ≥ 18 years, living in 1 of the 57 EHE jurisdictions where more than half of new HIV diagnoses occur in the U.S. [6], and either reporting current PrEP use or having an indication for PrEP per the 2021 U.S. Public Health Service guidelines [31]. These indications include: sexually active in the past 6 months and has requested or used PrEP or has any of the following: a partner living with unknown or undetectable viral load, inconsistent condom use with sex partner(s) of unknown HIV status, or a bacterial STI diagnosis; or has injected drugs not prescribed by a clinician in the past 6 months and has shared injection or drug preparation equipment. PWID enrolled in residential treatment programs or under court-ordered treatment were excluded. A sample size of 200 participants per priority population was calculated to have sufficient precision of preference estimates given the complexity of the DCE design (e.g., number of attributes and question format) [32].

The study used a passive recruitment approach in which clinics and community-based organizations serving the priority populations were asked to share information about the study with their clients and colleagues. Organizations were identified through publicly available lists, online searches, and professional inquiries. Study staff asked these organizations to share E-Mail to listservs or post physical copies of a recruitment flyer that included information about the study goal, the focus population (people 18+ who think they might benefit from PrEP for HIV prevention), and a link or QR code to the online screening form. Those who accessed the link completed a CAPTCHA challenge to screen out bots [33], were prescreened for age and residence, then were directed to a consent form followed by a 5-min screening survey. Study staff reviewed screening data

to determine eligibility and remove fraudulent responses identified through assessment of response times and duplicate or nonsensical identifying information (e.g. E-Mail addresses, phone numbers). Eligible participants were sent a link to the main survey and a unique, single-use passcode. Participants who completed the survey received a \$20 Visa gift card. Survey activities were conducted in Voxco Online (Voxco Group Inc., Montreal, Canada), a secure, web-based system. The study was approved by the RTI International Institutional Review Board.

Discrete choice experiment development and design

To identify the features, or “attributes” and the variation in each attribute, or “levels” that are relevant to clients’ decision-making process, the study team reviewed published literature, clinical trial data, and prescribing information for LA-PrEP products, and sought input from subject matter experts. The DCE was pretested using cognitive interviews to evaluate comprehension and understand decision-making processes, then refined based on interview feedback. In the final design, LA-PrEP options were characterized by five attributes (Fig. 1): product type (monthly oral pill, 12-month implant, 2-month injection, or two 6-month [“semiannual”] injections); side effects (mild or moderate); clinic type (primary care or sexual health/HIV prevention); first appointment duration (30 min or 1 h); and cost (free, \$300 per year, or \$600 per year).

Each DCE question, or “choice task”, presented two hypothetical options composed of the five attributes and asked participants to select between the two options or neither - “I would use my current HIV prevention method.” The options were constructed using a D-efficient algorithm to ensure identification (i.e., all attribute levels varied independently) and good level balance (i.e., each respondent saw all attribute levels) [34]. The survey design was created using Lighthouse Studio 9.13.1 (Sawtooth Software Inc., Orem, Utah) and included 8 blocks of 10 choice tasks, so that all possible concepts were considered and tasks were as different as possible while still ensuring an orthogonal design to test main effects. Participants were randomly assigned to a block and completed their 10 assigned choice tasks plus one fixed task to compare model estimates to direct elicitation of their preference.

Survey instrument

The survey introduced PrEP and the study purpose, then described each attribute using animated video clips, written descriptions, and illustrations. Participants were asked direct questions about product acceptability (5-point Likert scale of likelihood of using each product), then the DCE question style was explained, with a warm-up question to confirm understanding. After the 11 choice tasks, participants answered additional questions on sociodemographic characteristics and PrEP use history.

Analysis. Random parameter logit models were used to estimate the relative preference of each attribute and attribute level. All attribute levels were categorical effects-coded variables so that the mean effect of each attribute was normalized to zero. Thus, model coefficients represent the average preference weight for a given attribute level relative to the mean attribute effect, with positive coefficients reflecting greater, and negative coefficients lower, preference than average effects. The relative importance (RI) of an attribute was defined

by the difference between the largest and smallest preference weights for that attribute. We scaled relative importance scores from 0 to 10 where the most important attribute is assigned a score of 10, and the importance of other attributes are presented relative to the most important. We used preference weights to examine trade-offs respondents were willing to make between pairs of attributes.

Because we did not achieve our target sample size in each priority population, we collapsed Black, White, and Hispanic MSM into one group and Black heterosexual men and women (BHMW) into another group to maximize power. Three models were estimated, one each for MSM, BHMW, and PWID. The PWID model was not mutually exclusive of the other two, given potential overlap in group membership. Subgroup analyses tested for differences by race/ethnicity among MSM and by sex among BHMW. The subgroup analysis by race/ethnicity compared non-Hispanic Black MSM with a combined category of MSM who identified as White and/or Hispanic (of any race) due to sample size limitations. We conducted a similar posthoc subgroup analysis among MSM by injection drug use status due to substantial overlap between those populations in our sample. Analyses were conducted using Stata 17.0 (StataCorp, College Station, TA, USA).

Results

Participant characteristics

Of 16 608 people who completed the screener, 1128 (7%) were eligible and invited to take the survey. Primary reasons for exclusion were not belonging to a priority population (52%) and not meeting other eligibility criteria (37%). From the focus populations for this analysis, 940 completed the survey out of 1046 invited (90%): 527 MSM (177 Hispanic, 252 Black non-Hispanic, 98 White non-Hispanic), 294 BHMW (96 women, 198 men), and 514 PWID. Among PWID, 352 (68%) were MSM and 43 (8%) were BHMW. Sociodemographic and behavioral characteristics are presented in Table 1. Most participants (89%) had multiple sex partners in the last 6 months and 37% had a primary sex partner with HIV. Three-quarters (76%) were currently using oral PrEP and one person was using injectable cabotegravir.

Main DCE findings

Across all priority populations, cost was the most important attribute influencing preference for LA-PrEP (RI of 10), with a strong preference for a free option over one costing \$300 or \$600 per year (Fig. 2, Table 2). Potential side effects and product type were each one-third to one-half as important as cost (RI 3.5–5.1), with some variation by subgroup. While all subgroups preferred mild side effects as expected (preference weight [PW] 0.22–0.89), preferences for product type differed: MSM and PWID most preferred the 12-month implant (PW 0.64 and 0.82, respectively) followed by semiannual injections (PW 0.28 and 0.21) and least preferred the monthly oral pill (PW –0.43 and –0.50) and 2-month injection (PW –0.49 and –0.53; Table S1, Supplemental Digital Content, <http://links.lww.com/QAD/D567>). BHMW preferred the monthly oral pill (PW 0.25) or the semiannual injections (PW 0.20) over the 12-month implant (PW –0.20) and 2-month injection (PW –0.24). Appointment duration exerted a modest influence on choice among BHMW only (RI 2.1), and clinic type was the least important attribute for all populations (RI 0.1–0.2).

Of the 9400 completed choice tasks, the ‘neither’ option was selected in only 304 (3.2%), indicating a strong interest in LA-PrEP over their current prevention method. Most participants (87%) always selected one of the LA-PrEP options over the ‘neither’ option. Only 2% selected ‘neither’ for 5 or more tasks.

In the trade-off analysis, on average, MSM and PWID were not willing to pay \$300/year for their most-preferred product type compared to getting their least-preferred product type for free, holding all other attributes constant. On average, all groups were willing to pay \$600/year for their least preferred product type with moderate side effects over their current HIV prevention method.

Subgroup analyses

Differences in the relative importance of attributes were found by race/ethnicity among MSM, (Fig. 3, Panel a). Black MSM placed twice as much importance on cost than the combined group of White and Hispanic MSM [preference weight (PW) 2.06 and 1.09, respectively; Table S2, Supplemental Digital Content, <http://links.lww.com/QAD/D567>], but cost remained the most important attribute (RI 10) for both groups. For Hispanic and White MSM, side effects were nearly as important as cost (RI 8.5), and product type was half as important (RI 5.7). However, for Black MSM, product type (RI 3.0) and side effects (RI 2.6) were only about a third as important as cost. Both groups most preferred the 12-month implant followed by the semiannual injections.

The relative importance of attributes was similar between Black heterosexual men and women, but product type preferences differed (Fig. 3, Panel b and Table S3, Supplemental Digital Content, <http://links.lww.com/QAD/D567>). Men on average preferred a monthly oral pill (PW 0.36) or semiannual injections (PW 0.19) over a 12-month implant (PW -0.34) and 2-month injection (PW -0.20), but women on average preferred the semiannual injections (PW 0.21) or 12-month implant (PW 0.12) over a 2-month injection (PW -0.29) and monthly oral pill (PW -0.04).

In the posthoc analysis comparing MSM who were and were not injecting drugs, we found that MSM injecting drugs (PWID-MSM) put 2.8 times as much value on zero cost than MSM not injecting drugs (non-PWID-MSM) (PW 2.23 and 0.79 respectively; Table S4, Supplemental Digital Content, <http://links.lww.com/QAD/D567>), although cost was still the most important attribute for non-PWID MSM. The second most important attribute was product type for non-PWID MSM (RI 6.1), and side effects (RI 5.0) for PWID-MSM. There was no difference between the types of products preferred among MSM by injection drug use status.

Acceptability of each product type

In direct elicitation questions outside the DCE, the proportion of participants reporting a product was “acceptable” (i.e., that they would be very or extremely likely to use it) was highest for the 12-month implant (72%) and semiannual injections (68%; Table S5, Supplemental Digital Content, <http://links.lww.com/QAD/D567>). The 2-month injection had the lowest acceptability across all products (41%) with modest variability across subgroups

(38–42%). Acceptability of most products was lowest among BHMW (38–57%), and just 50% found the 12-month implant acceptable.

Discussion

This study assessed preferences for LA-PrEP product and program characteristics among a diverse sample of individuals from several populations disproportionately affected by HIV. To our knowledge, it is the first study to administer the same DCE to multiple U.S. populations who may be prioritized for LA-PrEP, allowing a direct comparison across these populations to understand differences in preference and the relative importance of each attribute. Our findings highlight high demand for LA-PrEP: all populations preferred an LA-PrEP product over their current HIV prevention method and most products were highly acceptable across populations. Participants were even willing to accept higher cost and side effects to choose LA-PrEP over their current method. This preference for LA-PrEP is consistent with findings of other studies among MSM in the U.S. [13,35] and Australia [36], though some studies among young MSM and MSM of color suggest preference for daily PrEP and a recent multicountry study showed a relatively even distribution of preference across multiple long- and short-acting PrEP products [27,37–39]. The high prevalence of daily oral PrEP use in this sample may partially explain these differences because previous daily PrEP use among MSM and people who use drugs has been shown to increase interest in LA-PrEP [13,15,36]. Fewer studies on preferences for LA-PrEP products have been conducted among women and PWID, but most have found a similar preference for LA-PrEP over other methods [35] or an equal interest between LA-PrEP and daily PrEP [29]. One study among Black women in the U.S. found a stronger preference for daily PrEP, however, women with concerns about healthcare costs and stigma were more likely to prefer injectable PrEP [12].

Cost was the most important factor influencing product choice for all populations. This finding is consistent with results from a global systematic review of DCEs investigating PrEP preferences [40] and from two more recent DCEs among U.S. populations [41,42]. Cost is a well documented barrier to PrEP access in the U.S. Despite the Affordable Care Act (ACA) requirement that private health plans and Medicaid expansion programs cover the costs of all PrEP services starting in 2021, about 30% of commercially-insured patients paid out-of-pocket costs for PrEP services after the ACA provision was in effect [43]. Medication assistance programs exist for uninsured or underinsured patients, but they do not consistently cover ancillary laboratory and clinical costs [44], many providers and clients are unaware of their existence, and navigation can be burdensome [45,46]. Consequently, lack of private insurance is associated with oral PrEP discontinuation and delays in injectable PrEP initiation, and clients continue to report cost as a significant barrier to use [46–48]. Our findings suggest that cost will drive LA-PrEP product choice and emphasize the importance of enforcing the ACA no-cost sharing requirement, ensuring that assistance programs cover ancillary costs, increasing awareness of these programs, and minimizing barriers to accessing financial support.

The importance of side effects varied widely across our priority populations; they were nearly as important as cost for White and Hispanic MSM, about half as important as cost

for PWID and BHMW, and much less important than cost for Black MSM. Tolerance for side effects may be driven by prior experience with PrEP and other medications, perceptions about HIV risk and potential benefits of LA-PrEP, and the degree of trust in product safety and concerns about the potential for long term harm [49–51]. When multiple LA-PrEP options become available, it will be critical for providers to assess the level and type of side effects that clients are willing to tolerate to help inform product choice, and to emphasize that side effects typically resolve quickly and are not associated with long-term harm.

Product type, combining duration and route of administration, was about one-half to one-third as important as cost to MSM, PWID, and BHMW. Consistent with previous studies, duration influenced preference [40]; the 12-month implant and the semiannual injections were preferred over the monthly oral pill or 2-month injection by MSM and PWID (in the primary analysis) and by Black heterosexual women (in the subgroup analysis). In some populations, the 12-month implant was strongly preferred over the semiannual injections, while in others preference for the two products was similar. In contrast, Black heterosexual men had a strong preference for the monthly oral pill and semiannual injections over the 12-month implant and 2-month injection. There is a dearth of research on PrEP preferences among Black heterosexual men in the U.S., but heterosexual men in South Africa also preferred a monthly oral pill and semiannual injection over a 12-month implant and 2-month injection [19]. In that study, concerns about the implant included side effects, pain during insertion and removal, feeling the implant during manual labor, and having it move after insertion; reasons for preferring the monthly pill were not reported. The 2-month injection was the least popular or acceptable option for most groups, which is likely attributable to the more frequent clinic visits. Although our trade-off analysis showed that all population groups would prefer any of the LA-PrEP products over their current HIV prevention method, the heterogeneity of preferences suggests that offering a choice of products could improve uptake and continuation [52].

This study has several limitations. First, DCEs measure hypothetical acceptability of LA-PrEP. The preferences and trade-offs evaluated are based only on the attributes included in the design, and stated preferences may not align perfectly with real-world choices. Second, due to challenges recruiting White MSM and Black heterosexual women, we had small sample sizes for these groups and needed to combine MSM by race/ethnicity and BHMW by sex in our primary analysis models. In addition, there was a high degree of overlap in our PWID and MSM samples. However, we were able to conduct subgroup analyses to identify differences in preferences among Black vs. non-Black MSM, and among Black heterosexual men vs. women, while confirming that preferences among MSM were similar regardless of injection drug use. Finally, a large proportion of our sample were experienced PrEP users. Though results may not be generalizable to PrEP-naïve clients, findings may improve continuation, and therefore coverage, among current users.

Conclusion

Among groups with disproportionately high HIV incidence, LA-PrEP products are highly desirable and acceptable. However, costs and side effects are concerns, and product preferences varied. To support PrEP uptake and continuation to reduce disparities in the

HIV epidemic, programs should offer a range of LA-PrEP products, minimize or eliminate out-of-pocket costs, and provide counseling to address side effects as a key influencer of product choice, initiation and discontinuation.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

1. Mayer KH, Agwu A, Malebranche D. Barriers to the wider use of preexposure prophylaxis in the United States: a narrative review. *Adv Ther* 2020; 37:1778–1811. [PubMed: 32232664]
2. Sullivan PS, DuBose SN, Castel AD, Hoover KW, Juhasz M, Guest JL, et al. Equity of PrEP uptake by race, ethnicity, sex and region in the United States in the first decade of PrEP: a population-based analysis. *Lancet Reg Health Am* 2024; 33:100738. [PubMed: 38659491]
3. Morris E, Teplinskaya A, Olansky E, Rinderle JK, Chapin-Bardales J, National HIV Behavioral Surveillance Among Transgender Women Study Group. Characteristics associated with pre-exposure prophylaxis discussion and use among transgender women without HIV infection – National HIV Behavioral Surveillance Among Transgender Women, Seven Urban Areas, United States, 2019–2020. *MMWR Suppl* 2024; 73:9–20. [PubMed: 38261546]
4. Streed CG Jr, Morgan JR, Gai MJ, Larochelle MR, Paasche-Orlow MK, Taylor JL. Prevalence of HIV preexposure prophylaxis prescribing among persons with commercial insurance and likely injection drug use. *JAMA Netw Open* 2022; 5: e2221346. [PubMed: 35819784]
5. Centers for Disease Control and Prevention. HIV infection risk, prevention, and testing behaviors among men who have sex with men—National HIV Behavioral Surveillance, 13 U.S. Cities, 2021. January 2023. Report No.: 31.
6. The White House. National HIV/AIDS Strategy for the United States 2022–2025. Washington, DC.; 2021.
7. Landovitz RJ, Donnell D, Clement ME, Hanscom B, Cottle L, Coelho L, et al. Cabotegravir for HIV prevention in cisgender men and transgender women. *N Engl J Med* 2021; 385:595–608. [PubMed: 34379922]
8. Delany-Moretlwe S, Hughes JP, Bock P, Ouma SG, Hunidzarira P, Kalonji D, et al. Cabotegravir for the prevention of HIV-1 in women: results from HPTN 084, a phase 3, randomised clinical trial. *Lancet* 2022; 399:1779–1789. [PubMed: 35378077]
9. Bekker LG, Das M, Abdool Karim Q, Ahmed K, Batting J, Brumskine W, et al. Twice-yearly lenacapavir or daily F/TAF for HIV prevention in cisgender women. *N Engl J Med* 2024; 391:1179–1192. [PubMed: 39046157]
10. Kelley CF, Acevedo-Quinones M, Agwu AL, Avihingsanon A, Benson P, Blumenthal J, et al. Twice-yearly lenacapavir for HIV prevention in men and gender-diverse persons. *N Engl J Med* 2025; 392:1261–1276. [PubMed: 39602624]

11. Biello KB, Edeza A, Salhaney P, Biancarelli DL, Mimiaga MJ, Drainoni ML, et al. A missing perspective: injectable preexposure prophylaxis for people who inject drugs. *AIDS Care* 2019; 31:1214–1220. [PubMed: 30822103]
12. Irie WC, Calabrese SK, Patel RR, Mayer KH, Geng EH, Marcus JL. Preferences for HIV preexposure prophylaxis products among Black women in the U.S. *AIDS Behav* 2022; 26: 2212–2223. [PubMed: 34985607]
13. Mansergh G, Kota KK, Stephenson R, Hirshfield S, Sullivan P. Preference for using a variety of future HIV preexposure prophylaxis products among men who have sex with men in three US cities. *J Int AIDS Soc* 2021; 24:e25664. [PubMed: 33481359]
14. Rael CT, Martinez M, Giguere R, Bockting W, MacCrate C, Mellman W, 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; 24:1452–1462. [PubMed: 31654172]
15. Shrestha R, DiDomizio EE, Kim RS, Altice FL, Wickersham JA, Copenhaver MM. Awareness about and willingness to use long-acting injectable preexposure prophylaxis (LAI-PrEP) among people who use drugs. *J Subst Abuse Treat* 2020; 117:108058. [PubMed: 32811633]
16. Matthews RP, Patel M, Barrett SE, Haspeslagh L, Reyniers T, Zhang S, et al. Safety and pharmacokinetics of islatravir subdermal implant for HIV-1 preexposure prophylaxis: a randomized, placebo-controlled phase 1 trial. *Nat Med* 2021; 27: 1712–1717. [PubMed: 34608329]
17. Gilead Sciences. Study to assess the effectiveness and safety of lenacapavir for human immunodeficiency virus (HIV) pre-exposure prophylaxis (PURPOSE 2). [NCT04925752](https://clinicaltrials.gov/ct2/show/NCT04925752).: [ClinicalTrials.gov](https://clinicaltrials.gov/ct2/show/NCT04925752); 2021. Available at: <https://clinicaltrials.gov/ct2/show/NCT04925752> [Accessed January 25, 2022].
18. Patel M, Zang X, Cao Y, Matthews RP, Plank RM, Sklar P, et al. Islatravir PK threshold & dose selection for monthly oral HIV-1 PrEP. Conference on Retroviruses and Opportunistic Infections (CROI); March 6–11, 2021; Virtual2021.
19. Mthimkhulu N, Chidumwa G, Kutwayo A, Mataboge P, Martin CE, Kwatsha K, et al. Factors influencing the uptake of a mono-PrEP implant for the prevention of HIV: Males' perspectives from three South African provinces. *PLoS One* 2024; 19: e0296341. [PubMed: 38166044]
20. de Bekker-Grob EW, Donkers B, Jonker MF, Stolk EA. Sample size requirements for discrete-choice experiments in healthcare: a practical guide. *Patient* 2015; 8:373–384. [PubMed: 25726010]
21. Beckham SW, Sanchez T, Fowler R, Zlotorzynska M, Rai M, Sullivan P, et al. Variation in preferences for long-acting injectable pre-exposure prophylaxis among US men who have sex with men: a latent class analysis. *AIDS Patient Care STDS* 2023; 37:495–503. [PubMed: 37862078]
22. Cole SW, Glick JL, Campoamor NB, Sanchez TH, Sarkar S, Vannappagari V, et al. Willingness and preferences for long-acting injectable PrEP among US men who have sex with men: a discrete choice experiment. *BMJ Open* 2024; 14: e083837.
23. Dawit R, Predmore Z, Raifman J, Chan PA, Skinner A, Napoleon S, et al. Identifying HIV PrEP attributes to increase PrEP use among different groups of gay, bisexual, and other men who have sex with men: a latent class analysis of a discrete choice experiment. *AIDS Behav* 2024; 28:125–134. [PubMed: 37474623]
24. Dean LT, Predmore Z, Skinner A, Napoleon S, Chan PA, Raifman J. Optimizing uptake of long-acting injectable preexposure prophylaxis for HIV prevention for men who have sex with men. *AIDS Behav* 2023; 27:2606–2616. [PubMed: 36670210]
25. Gutierrez JI, Dubov A, Altice FL, Vlahov D. Preferences for preexposure prophylaxis among U.S. military men who have sex with men: results of an adaptive choice based conjoint analysis study. *Mil Med Res* 2021; 8:32. [PubMed: 34006328]
26. Dubov A, Ogunbajo A, Altice FL, Fraenkel L. Optimizing access to PrEP based on MSM preferences: results of a discrete choice experiment. *AIDS Care* 2019; 31:545–553. [PubMed: 30554519]
27. Biello KB, Valente PK, da Silva DT, Lin W, Drab R, Hightow-Weidman L, et al. Who prefers what? Correlates of preferences for next-generation HIV prevention products among a national

- U.S. sample of young men who have sex with men. *J Int AIDS Soc* 2023; 26 (Suppl 2):e26096. [PubMed: 37439061]
28. Eger WH, Bazzi AR, Valasek CJ, Vera CF, Harvey-Vera A, Strathdee SA, Pines HA. HIV preexposure prophylaxis programmatic preferences among people who inject drugs: findings from a discrete choice experiment. *Addict Sci Clin Pract* 2024; 19:81. [PubMed: 39533335]
 29. Eloppe L, Boutwell A, Gordon B, Johnson B, Marrazzo J, Van Der Pol B, Mugavero MJ. PrEP service delivery preferences of black Cis-gender women living in the Southern United States. *AIDS Behav* 2022; 26:3469–3479. [PubMed: 35445992]
 30. Centers for Disease Control and Prevention. HIV Surveillance Report, 2021; vol. 34. Published May 2023. May 2023. Available at: <http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html>.
 31. Centers for Disease Control and Prevention. US Public Health Service: Preexposure prophylaxis for the prevention of HIV infection in the United States—2021 Update: a clinical practice guideline December 2021. Available at: <https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2021.pdf>.
 32. Orme BK. Getting started with conjoint analysis: strategies for product design and pricing research. 2nd ed. Madison, WI: Research Publishers; 2010.
 33. Von Ahn L, Blum M, Hopper N, O, editors. Captcha: Telling humans and computers apart automatically. *Proceedings of Eurocrypt*; 2003.
 34. Reed Johnson F, Lancsar E, Marshall D, Kilambi V, Muhlbacher A, Regier DA, et al. Constructing experimental designs for discrete-choice experiments: report of the ISPOR Conjoint Analysis Experimental Design Good Research Practices Task Force. *Value Health* 2013; 16:3–13. [PubMed: 23337210]
 35. Lorenzetti L, Dinh N, van der Straten A, Fonner V, Ridgeway K, Rodolph M, et al. Systematic review of the values and preferences regarding the use of injectable preexposure prophylaxis to prevent HIV acquisition. *J Int AIDS Soc* 2023; 26 (Suppl 2): e26107. [PubMed: 37439057]
 36. Chan C, Vaccher S, Fraser D, Grulich AE, Holt M, Zablotska-Manos I, et al. Preferences for current and future PrEP modalities among PrEP-experienced gay and bisexual men in Australia. *AIDS Behav* 2022; 26:88–95. [PubMed: 34142274]
 37. Beymer MR, Gildner JL, Holloway IW, Landovitz RJ. Acceptability of injectable and on-demand pre-exposure prophylaxis among an online sample of young men who have sex with men in California. *LGBT Health* 2018; 5:341–349. [PubMed: 30118399]
 38. Patel RR, Crane JS, Lopez J, Chan PA, Liu AY, Tooba R, James AS. Preexposure prophylaxis for HIV prevention preferences among young adult African American men who have sex with men. *PLoS One* 2018; 13:e0209484. [PubMed: 30592756]
 39. Tagliaferri Rael C, Giguere R, Bryndza T, Sutton S, Horn E, Schieffer RJ, et al. The global impact of diversifying PrEP options: results of an international discrete choice experiment of existing and potential PrEP strategies with gay and bisexual men and physicians. *AIDS Res Hum Retroviruses* 2024; 40:591–605. [PubMed: 38753738]
 40. Wulandari LPL, He SY, Fairley CK, Bavinton BR, Marie-Schmidt H, Wiseman V, et al. Preferences for preexposure prophylaxis for HIV: a systematic review of discrete choice experiments. *EClinicalMedicine* 2022; 51:101507. [PubMed: 35844771]
 41. Watson DL, Listerud L, Drab RA, Lin WY, Momplaisir FM, Bauermeister JA. HIV preexposure prophylaxis programme preferences among sexually active HIV-negative transgender and gender diverse adults in the United States: a conjoint analysis. *J Int AIDS Soc* 2024; 27:e26211. [PubMed: 38332521]
 42. Shrestha R, Karki P, Altice FL, Dubov O, Fraenkel L, Huedo-Medina T, Copenhaver M. Measuring acceptability and preferences for implementation of preexposure prophylaxis (PrEP) using conjoint analysis: an application to primary HIV prevention among high risk drug users. *AIDS Behav* 2018; 22:1228–1238. [PubMed: 28695388]
 43. Huang YA, Zhu W, Bowman SA, Hoover KW. Out-of-pocket payments for PrEP ancillary services among US commercially-insured persons, 2017–2021. *Conference on Retroviruses and Opportunistic Infections (CROI)*; Denver. CO2024.

44. Bonacci RA, Van Handel M, Huggins R, Inusah S, Smith DK. Estimated uncovered costs for HIV preexposure prophylaxis in the US, 2018. *Health Aff (Millwood)* 2023; 42:546–555. [PubMed: 37011310]
45. Pleuhs B, Quinn KG, Walsh JL, Petroll AE, John SA. Healthcare provider barriers to HIV pre-exposure prophylaxis in the united states: a systematic review. *AIDS Patient Care STDS* 2020; 34:111–123. [PubMed: 32109141]
46. Sosnowy C, Predmore Z, Dean LT, Raifman J, Chu C, Galipeau D, et al. Paying for PrEP: a qualitative study of cost factors that impact preexposure prophylaxis uptake in the US. *Int J STD AIDS* 2022; 33:1199–1205. [PubMed: 36271632]
47. Huang W, Sanchez TH, Hannah MJ, Coy KC, Acero CS, Siegler AJ. Characterizing HIV preexposure prophylaxis (PrEP) discontinuation among men who have sex with men. Conference on Retroviruses and Opportunistic Infections; Denver, CO2024.
48. Harza A, Schneider J, Murray M, Williams J, Halbur J, Creticos C. Insurance type drives cabotegravir delays: real-world long-acting PrEP outcomes in the midwest US. Conference on Retroviruses and Opportunistic Infections; Denver, CO2024.
49. John SA, Whitfield THF, Rendina HJ, Parsons JT, Grov C. Will gay and bisexual men taking oral preexposure prophylaxis (PrEP) switch to long-acting injectable PrEP should it become available? *AIDS Behav* 2018; 22:1184–1189. [PubMed: 28913659]
50. Cahill S, Taylor SW, Elsesser SA, Mena L, Hickson D, Mayer KH. Stigma, medical mistrust, and perceived racism may affect PrEP awareness and uptake in black compared to white gay and bisexual men in Jackson, Mississippi and Boston, Massachusetts. *AIDS Care* 2017; 29:1351–1358. [PubMed: 28286983]
51. El-Krab R, Brousseau N, Kalichman SC. Medical mistrust as a barrier to HIV prevention and care. *J Behav Med* 2023; 46:897–911. [PubMed: 37698802]
52. Kanya MR, Balzer LB, Ayieko J, Kabami J, Kakande E, Chamie G, et al. Randomized trial of SEARCH dynamic choice HIV prevention including injectable cabotegravir (CAB-LA). Conference on Retroviruses and Opportunistic Infections (CROI); March 3–6, 2024; Denver, CO2024.

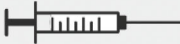
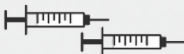
Attribute	Level 1	Level 2	Level 3	Level 4
Product Type ^a	Oral pill every 1 month 	Implant every 12 months 	Injection every 2 months 	Two injections every 6 months 
Side Effects ^b	Mild 	Moderate 		
Clinic Type ^c	Primary care 	Sexual health / HIV prevention 		
First Appointment Duration ^d	30 minutes 	1 hour 		
Cost ^e	Free, \$ 0 per year (\$ 0 per month) 	\$ 300 per year (\$ 25 per month) 	\$ 600 per year (\$ 50 per month) 	

Fig. 1. Design of the Choices for Prevention discrete choice experiment: attributes and levels.

^a We specified that the implant would be placed under the skin on the upper arm, the 2-month injection would be given “into the buttock” and the two 6-month injections would be given “into the skin over the belly.”

^b Mild side effects were described as lasting for a few days after starting the product or getting a new dose, not interfering with daily activities, and not requiring treatment. Moderate side effects were described as lasting for a few days or weeks, making it harder to do day-to-day activities, and potentially needing treatment. Each product description summarized the probability of specific side effects based on the existing literature.

^c Full descriptions were “a primary care, general medicine health center,” or “a clinic that specializes in sexual health and focuses on providing HIV prevention services and STI testing.”

^d Described as the time taken to meet with a healthcare provider for HIV testing, consultation, lab work, and to receive a prescription, injection, or have an implant placed.

^e Described as how much they would pay after any contributions from insurance or assistance programs. The likely range of costs was determined by experts at the Center for Disease Control and Prevention Center for HIV Prevention.

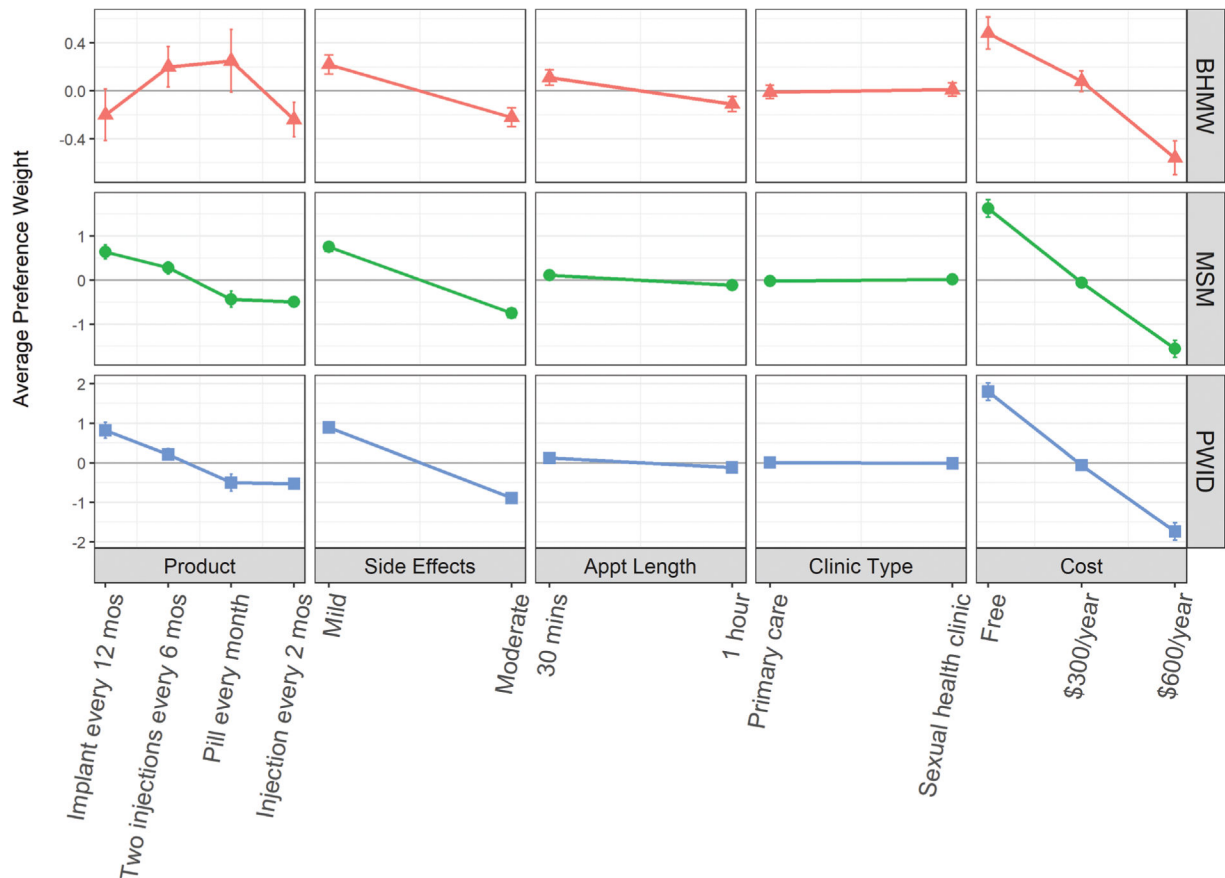


Fig. 2. Normalized preference weights with 95% confidence intervals from random parameters logit models for Black heterosexual men and women (BHMW), men who have sex with men (MSM), and people who inject drugs (PWID) in the Choices for Prevention discrete choice experiment ($n = 940$).
Note: Numeric data are shown in Table 1, Supplemental Digital Content, <http://links.lww.com/QAD/D567>.

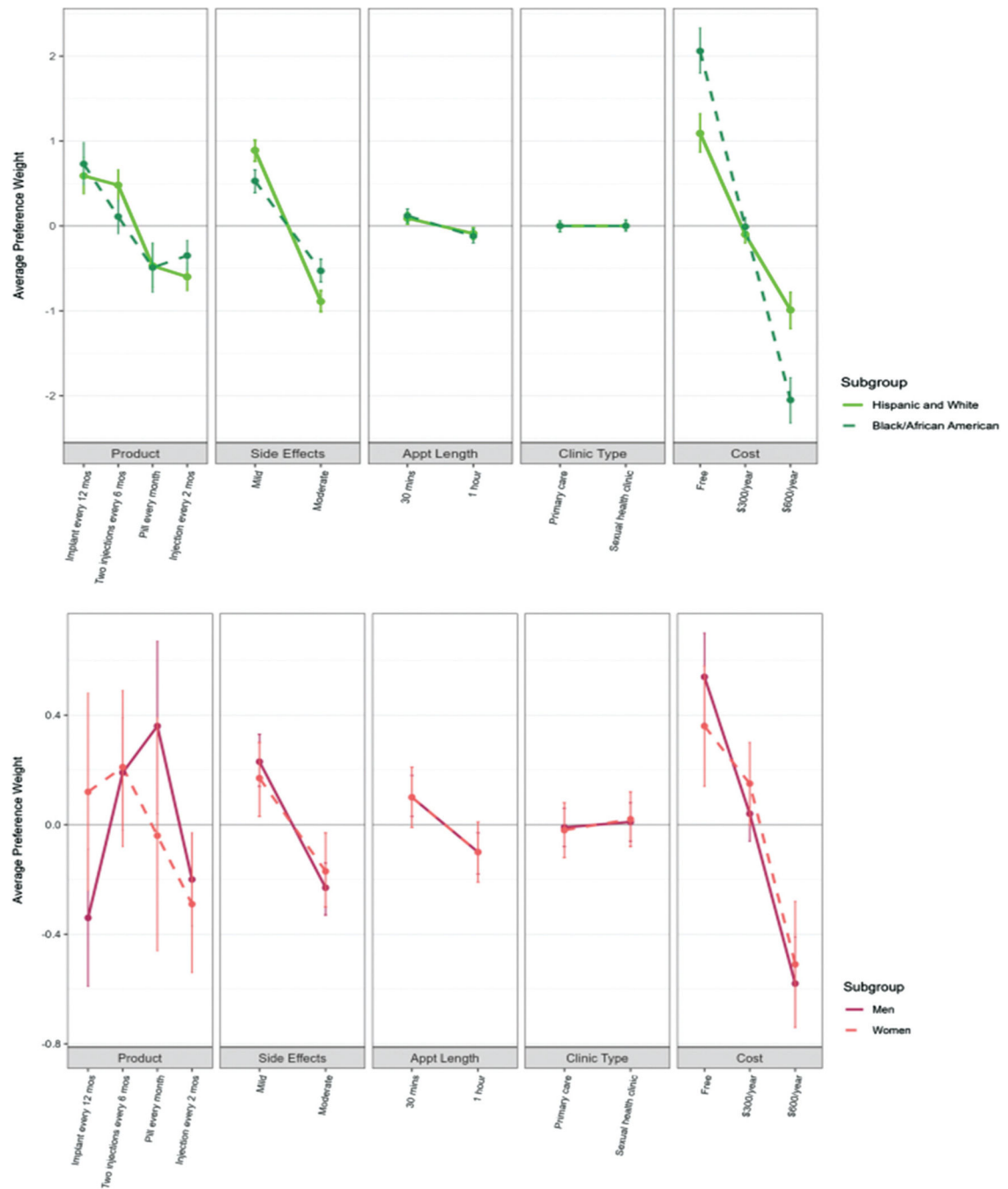


Fig. 3. Normalized preference weights with 95% confidence intervals for sample subgroups in the Choices for Prevention discrete choice experiment: Black MSM vs. White and Hispanic MSM (Panel a; $n = 527$); Black heterosexual men vs. women (Panel b; $n = 294$).

Note: Numeric data and relative importance scores are shown in Tables 2 and 3, Supplemental Digital Content, <http://links.lww.com/QAD/D567>.

Table 1.

Summary of Choices for Prevention participant characteristics, by priority population.

	Total			Men who have sex with men			Black heterosexual men and women			People who inject drugs ^a		
	N	%		N	%		N	%		N	%	
Total	940	(100)		527	(100)		294	(100)		514	(100)	
Age – median, range	29	18–56		30	18–56		26	18–55		30	18–56	
Current gender identity (self-reported)												
Female	179	(19)		0	(0)		96	(33)		98	(19)	
Male	745	(79)		527	(100)		198	(67)		400	(78)	
Transgender	16	(2)		0	(0)		0	(0)		16	(3)	
Racial identity ^b												
American Indian or Alaska Native	3	(0)		1	(0)		2	(1)		2	(0)	
Asian	14	(2)		6	(1)		0	(0)		8	(2)	
Black or African American	597	(63)		265	(50)		294	(100)		270	(53)	
Native Hawaiian or Other Pacific Islander	3	(0)		0	(0)		1	(0)		3	(1)	
White	343	(37)		264	(50)		8	(3)		238	(46)	
Hispanic ^c	250	(27)		177	(34)		37	(13)		187	(36)	
Completed 4-year/graduate degree	438	(47)		214	(41)		186	(63)		195	(38)	
Currently employed ^d	885	(94)		516	(98)		262	(89)		494	(96)	
US region of residency												
Northeast	239	(25)		137	(26)		79	(27)		136	(27)	
Midwest	116	(12)		73	(14)		23	(8)		84	(16)	
South	314	(33)		173	(33)		98	(33)		170	(33)	
West	271	(29)		144	(27)		94	(32)		124	(24)	
Ever tested for HIV	879	(94)		510	(97)		268	(91)		479	(93)	
Ever used oral PrEP	769	(82)		455	(86)		224	(76)		451	(88)	
Currently using oral PrEP ^e	710	(76)		434	(82)		190	(65)		441	(86)	
Duration of oral PrEP use (years) – median, IQR	1.4	1.2–2.2		1.3	1.1–2.1		1.7	1.4–3.3		1.3	1.1–1.6	
Have medical insurance	888	(95)		518	(98)		254	(86)		507	(99)	
Private	504	(54)		298	(57)		139	(47)		278	(54)	
Medicaid/Medicare	468	(50)		272	(52)		135	(46)		287	(56)	

	Total		Men who have sex with men		Black heterosexual men and women		People who inject drugs ^d	
	N	%	N	%	N	%	N	%
<i>In the past 6 months:</i>								
Infrequent condom use ^f	707	(75)	454	(86)	157	(53)	464	(90)
Sexually transmitted infection	116	(12)	35	(7)	65	(22)	38	(7)
# sex partners – median, IQR	3	2–4	3	3–4	3	2–5	3	3–4
Primary sex partner with HIV ^g	352	(37)	318	(60)	74	(25)	316	(66)
Injected drugs	514	(51)	352	(67)	43	(15)	514	(100)
Have ever shared syringes/needles	469	(46)	338	(64)	26	(9)	469	(91)

IQR, Interquartile range; PrEP, preexposure prophylaxis.

^aNot mutually exclusive of other subgroup categories.

^bParticipants could choose more than one racial identity.

^cIncludes persons of any race.

^dIncludes full-time, part-time, and self-employment.

^eOne additional participant was using injectable cabotegravir for PrEP.

^fNever or sometimes used condoms in the past 6 months, compared to often or always.

^gKnows or suspects primary partner is living with HIV.

Scaled relative importance scores for each attribute's influence on choice of LA-PrEP option in the Choices for Prevention discrete choice experiment ($n = 940$).

Table 2.

Attribute	MSM Model 1 ($n = 527$)			BHMW Model 2 ($n = 294$)			PWID Model 3 ($n = 514$)		
	RI	95% CI	P	RI	95% CI	P	RI	95% CI	P
Product	3.5	2.8, 4.3	<0.001	4.7	1.4, 8.0	<0.001	3.8	3.1, 4.6	<0.001
Potential side effects	4.7	4.0, 5.4	<0.001	4.2	2.4, 5.9	<0.001	5.1	4.3, 5.8	<0.001
Clinic type	0.1	0.0, 0.4	0.45	0.2	0.0, 1.2	0.76	0.1	0.0, 0.4	0.65
First appointment duration	0.7	0.4, 1.0	<0.001	2.1	0.8, 3.4	<0.001	0.7	0.3, 1.0	<0.001
Cost	10.0	8.8, 11.2	<0.001	10.0	7.5, 12.5	<0.001	10.0	8.8, 11.2	<0.001

The most important attribute is assigned score of 10, and other attributes are rescaled relative to the most important. BHMW, Black heterosexual men and women; MSM, men who have sex with men; PWID, people who inject drugs; RI, relative importance.