

# Measuring PrEP Preferences Among U.S. Military Men Who Have Sex with Men: Results of an Adaptive Choice Based Conjoint Analysis Study

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## Research

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# Abstract

**Background** Pre-exposure prophylaxis (PrEP) effectively prevents HIV infection, yet its uptake remains low among U.S. military men who have sex with men (MSM). Research shows that health services matching preferences produce favorable outcomes. Therefore, an early step for planning program design is to characterize and identify preferences for improved PrEP delivery within this population.

**Methods** HIV-negative military MSM were recruited through a closed, LGBT military social media group. Participants completed an anonymous survey presenting five experimentally varied attributes of interest related to PrEP administration (dosing method, provider type, visit location, lab work evaluation location, and dispensing venue). Relative importance and part-worth utility scores were generated using Hierarchical Bayes (HB) estimation, and the randomized first choice model was used to examine participation interest across eight possible PrEP program scenarios.

**Results** Among the 429 participants and the eight scenarios that varied the five attributes into delivery profiles, the most preferred scenarios featured a daily tablet, PrEP injection, or PrEP implant, along with a military provider, smartphone/telehealth visit, and on-base locations for lab evaluation and medication pick-up. Responses emphasized the importance for providers to be familiar with PrEP prescription knowledge, and to provide interactions sensitive to sexual identity and mental health.

**Conclusion** These results suggest that a daily tablet PrEP program within a military healthcare setting is preferred over a civilian or off-site one, yet more importantly, it points to a high value placed on the quality of clinical interactions. High interest in long-acting implants and injections also suggest potential markets for future PrEP engagement.

## 1. Background

Each year, there are approximately 350 new cases of human immunodeficiency virus (HIV) infections within members of the U.S. military; with those most affected being younger, Black, and men who have sex with men.(1-6) When taken correctly, Pre-Exposure Prophylaxis (PrEP) effectively prevents HIV infection,(7-10) yet the current PrEP cascade within the U.S. military suggests sub-optimal uptake. With an estimated 16% of at-risk military members taking PrEP and members of color remaining under-represented in terms of uptake,(2) identifying the factors that drive uptake within this population remains a priority.

The field of PrEP science has explored multiple avenues of PrEP access pathways, delivery mechanisms, and dosing methods to circumvent the geographic, psychological, and adherence barriers that exist and impede PrEP engagement.(11-18) Currently, PrEP availability to military members largely depends on geographic proximity to a large medical facility with specialty services, as evidenced by 41% of all military PrEP prescriptions originating from military medical centers in three locations in the U.S. Additionally, 60% of all military PrEP prescriptions also occur only after consultation with an infectious

disease specialist.(2) Data are sparse on military MSM's most preferred program characteristics within a PrEP delivery program.

Health services designed around preferences in terms of product type, delivery method, and location settings have been shown to produce improved treatment outcomes and retention in care.(19-21) Stated preference methods, such as conjoint analysis, quantify preference data of new market entrants and product characteristics, also called *attributes*.(16, 17, 22-26) The central theory of conjoint analysis is that products or programs are viewed as a composition of various attributes that possess a certain amount of value (part-worth utility score) determined by preference. By quantifying these part-worth utility scores for preferred attributes, these scores can then be entered into market simulation models to predict how respondents might respond to *any* potential combination of attribute levels.(16, 17, 22-26) Using conjoint analysis, the purpose of this study is to identify the preferred attributes that are most influential to at-risk U.S. military MSM's decision to take PrEP within the military healthcare system.

## 2. Methods

A convenience sample of self-reported HIV-negative, U.S. military MSM and trans-individuals were recruited between March and April 2020 through a closed Facebook group with an internal membership of over 7,000 LGBT U.S. military members. The group administrators placed monthly advertisements describing the study on the group's main forum. Those interested could click on a link to access an online study disclosure form with a 'click to consent' procedure. An option to provide an e-mail address that was not linked to survey responses was offered to participants who opted to receive \$5 compensation for questionnaire completion. The study was approved by the Yale University Institutional Review Board.

To collect and quantify respondent preference data, an adaptive choice-based conjoint (ACBC) survey instrument was developed based on a starting set of PrEP program attributes resulting from review of the literature of previous PrEP preference conjoint experiments, which were then refined through in-depth, qualitative interviews from PrEP experts and U.S. military MSM.(2-5, 11, 12, 14, 15, 27-39) With a focus on modifiable PrEP program characteristics, the final survey design was composed of five different PrEP program delivery attributes of interest that included: **dosing method** (*daily oral tablet, on-demand tablet regimen [two tablets before sex, one tablet for two days after], rectal douche [before sex], injection [every 2 months], implant [once a year]*), **provider type** (*military, civilian*), **visit location** (*on-base, off-base, smartphone app*), **dispensing venue** (*on-base, off-base, mail delivery*), and **lab evaluation** (*on-base, off-base, home-based mail kit*). The survey was piloted by the author (JG) with a convenience sample of eleven military MSM members within the targeted social media group for concept testing, and the descriptions and wording of three attribute categories and two attribute level choices were revised for clarification based on feedback. Figure 1 shows a sample item of the conjoint survey, and Table 1 describes the program attributes presented within the survey. Additionally, we collected demographical data to include age, race, ethnicity, rank type (officer, enlisted or warrant officer), military branch, geographic region, PrEP experience ("Have you ever used PrEP [Pre-Exposure Prophylaxis]?"), depressive symptoms with the Patient Health Questionnaire-2 (PHQ2),(40, 41) and the HIV Incidence Risk Index for

MSM (HIRI-MSM).(42) Measures to explore levels of satisfaction with a current level of HIV protection and disclosure discomfort within interactions with a primary care provider were also collected.

## 2.1 Analysis

The final survey instrument was loaded into Lighthouse Studio 9, and an experimental design module was used to pre-test the design with 500 simulated respondents for optimal choice task configuration. The final design produced a survey where each level within an attribute was seen at least three times per respondent; achieving a high degree of precision at the individual level with a standard of error of  $<0.03$  and all efficiencies reporting at 1.00.(43)

Table 2 displays the CONSORT diagram of respondent enrollment and exclusion. To ensure the integrity of the data and eliminate random or duplicate responders, security features within the Sawtooth software and servers recognize returning study participants through the use of internet browser cookies and IP addresses. It also prevents repeated or duplicate attempts to retake the survey.(44) Additionally, as extensive pilot testing required at least 10 to 15 minutes, responses completed in less than 10 minutes (or if a respondent selected the same answer for all items) were excluded. Furthermore, the root likelihood (RLH) fit statistic for each respondent was analyzed to evaluate within-respondent choice consistency. RLH, which has a probability value from 0 to 1.0, was used to discriminate between respondents who answered choice-questions consistently or randomly.(45) The survey design was tested by 1,000 computer-generated mock respondents to determine the median RLH for 'random responders' at the 95% percentile (0.5178 RLH). Survey respondents with an RLH below this score were excluded, as the inclusion of 'random responders' can affect the calculation of preference scores and participation rates. (45)

For conjoint analyses, the Hierarchical Bayes (HB) procedure was used to estimate part-worth utility scores (PWUS) on an individual level for its accuracy and efficiency,(46, 47) and was used to analyze the PWUS of the aggregated sample across all 16 attribute levels. The resulting PWUS of the levels under each attribute category are zero-centered; meaning that the sum of the level scores under each attribute category equal to zero. Scores that are further away from zero (0) indicate a stronger positive or negative preference for the level choice in relation to the other level choices under the same attribute.(39, 43, 47) After identifying each attribute level PWUS, the attribute relative importance scores (RIS) can then be calculated to characterize the magnitude of influence that each attribute category has on the respondents preference decision-making. The RIS for this study was calculated by dividing the range of PWUS for levels under each attribute by the sum of the ranges, and then multiplying by 100.(48, 49) Therefore, if an attribute RIS is 45%, then this means that 45% of an individual's decision making for program engagement will be influenced by preferences within that attribute category. The PWUS were then used to predict the share of preference (participation interest) among eight hypothetical PrEP program scenarios. PrEP program scenarios were configured after a variety of currently available or hypothetical PrEP program models. For this study, participation rates for these PrEP scenarios were generated using the randomized first choice model; in which PWUS are summed across the levels

corresponding to each option, and then exponentiated and rescaled, so they sum to 100.(48, 49) This approach is based on the assumption that respondents or consumers will prefer a product with the highest composite utility (or value) adjusting for both attribute and program variability.(48) The randomized choice model accounts for variation in each participant's total utility for each option and error in point estimates of the utility, and has been shown to have better predictive ability than other shares of preference models.(49) All data analyses were performed using XLSTAT and Sawtooth Lighthouse Studio 9.0.

## 3. Results

### 3.1 Participants

Table 3 shows the descriptive statistics of the 429 respondents that met the required elapsed survey time and RLH consistency cut-off; stratified by PrEP experience. Overall, the mean age was 30 years old. Participants mostly identified as white (72%), cis-gendered male (96.7%), of officer rank (46.4%), and membership within the Army branch (48.7%). Additionally, the majority screened positive for depressive symptoms (62.7%) and scored as having a high objective risk for acquiring HIV (89.3%);(42) with 83.0% of participants reporting at least one episode of condomless receptive anal sex (CRAS) within the prior six months. In interactions with their primary care provider (PCP), 36.8% were "somewhat-" or "extremely" uncomfortable with talking about sex with their PCP.

When stratified by PrEP experience, those with no previous PrEP experience were mostly of non-Hispanic ethnicity, were stationed on the Western region of the U.S., and were more likely to report having only a high school education. These participants also reported a lower number of male and HIV-positive partners within the last six months, and tended to report being less satisfied with their current level of HIV protection.

### 3.2 Relative Importance and Part-Worth Utility Scores

Table 4 shows the relative importance scores (RIS) of the five attributes and Table 5 shows the part-worth utility scores (zero-centered) for each attribute level. Overall, the *dosing method* was the most important attribute among all the participants. This suggests that the participant's decision-making process to participate in a PrEP program is mostly influenced by the type of PrEP dosing method offered within a program; regardless of PrEP experience. For participants reporting experience with PrEP, the daily tablet was the most preferred dosing method option, followed by the on-demand tablet regimen. For those with no previous experience with PrEP, the bi-monthly PrEP injection was the most preferred dosing method option, with the yearly implant and daily tablet also preferred to a lesser degree. Among the remaining attributes, both groups generally preferred the option to see a military healthcare provider, to use a smartphone to conduct the PrEP visit, and to utilize an on-base location for laboratory evaluation and receipt of medication. In adaptive choice-based conjoint analysis experiments, an "opt-out" or "None" parameter score is calculated during the screener section of the experiment. This parameter represents the positive or negative magnitude in which a respondent is likely to select "None" or opt out of PrEP in

any scenario despite program configuration.(39) Thus, respondents with no PrEP experience are less likely to select “None” compared PrEP-experienced individuals, and are more likely to initiate PrEP regardless of program configuration.

### 3.3 Preferences for PrEP Program Scenarios

To examine preferences for PrEP across programs with different combinations of features, we utilized the randomized first choice model to estimate the percent of respondents that would prefer or have participation interest (share of preference) in each of the eight PrEP program scenarios based on the part-worth utility scores collected from the conjoint analysis survey.(49) Table 6 describes the eight PrEP program configurations and Table 7 displays the participation interest scores across each individual PrEP program scenario if it were available to them as an option.

Scenario 1 (On-Base Military Daily Tablet) best represents the baseline, currently-available daily tablet PrEP program within the military healthcare system today; scoring a total participation interest rate of 66.4% for the aggregate sample. Incorporating a smartphone PrEP visit feature into a military daily tablet PrEP program can increase the convenience of accessing a PrEP provider without physically presenting to a clinic (Scenario 2, Smartphone Military Daily Tablet), and this program scenario results in a 3% increase in total sample participation interest to 69.6%. Scenario 2 also provides significant gains in participation interest among those with no PrEP experience at 78%. When offering an on-demand tablet regimen within a smartphone-based military PrEP program (Scenario 3, Smartphone Military On-Demand), participation interest increased slightly from Scenario 1 among those with PrEP experience (67.6%) and decreased significantly among respondents with no PrEP experience (67.4%).

Programs with longer-acting PrEP options in the form of injectables and implants (Scenarios 4 through 6) were configured for military members whose personal or work-related circumstances compel the individual to seek PrEP options with fewer dosing administrations or from a remote location with limited resources. When compared to the Scenario 1 baseline, an injectable PrEP option provided little impact on participation interest among PrEP-experienced individuals. However, these scenarios garnered a higher participation interest rate among those with no PrEP experience (80.5%) when injectable PrEP is offered within a smartphone-based military PrEP program (Scenario 4, Smartphone Military Injection), and a participation interest rate of 78.3% when offered through a distance-based military PrEP program (Scenario 5, Remote Military Injection). Similarly, a PrEP implant offered within a smartphone-based military PrEP program (Scenario 6, Smartphone Military Implant) provided little change in interest among PrEP-experienced respondents (66.4%) yet resulted in a higher participation rate of 78.7% among subjects without experience with PrEP.

Off-base program configurations (Scenario 7 & 8) were configured to represent civilian-equivalent, off-base, PrEP programs that circumvent the military and on-base aspects of a PrEP program. These programs scored the lowest among the total sample, with a participation interest rate of 57.7% among all respondents for an off-base, civilian daily tablet PrEP program, and a participation interest of 40.5% for an off-base, civilian rectal douche option.

## 4. Discussion

The significant findings from this study reveal that overall respondents prefer the convenience of daily tablet PrEP services at an on-base location compared with civilian and off-base settings, yet those with no previous PrEP experience have a stronger preference for longer-acting injectables and implants. Additionally, over half of all respondents have a positive screening score for depressive symptoms, the majority of respondents engage in risk behaviors that categorize them as having a high risk for acquiring HIV, and over one-third of respondents report a level of discomfort in discussing their sex life with a primary care provider. With a growing body of literature suggesting a link between depression and sexual risk behaviors among MSM,(50-52) it may be beneficial for PrEP-prescribing providers to provide PrEP clinics that are sensitive and inclusive to sexual identity and to remain vigilant to address factors related to mental and sexual health specific to MSM.

Results of the conjoint experiment found the *dosing method* attribute to be the most critical and influential preference factor within a PrEP delivery program, with a strong overall preference for a daily tablet among the total sample. Among those with no previous PrEP experience, a dominant preference for PrEP injectables and implants suggests that a demand for these longer-acting PrEP methods exists within this population once these alternatives become widely available. The preliminary results of cabotegravir injectable PrEP and MK-8591-eluting PrEP implants are promising(53, 54), yet the benefits to longer-acting agents is that it has high acceptability and lifts the burden of a daily tablet from a user;(55, 56) an advantage for an individual with adherence concerns or an unpredictable work schedule. Military service's expeditionary nature often entails military members to relocate, deploy, or miss regular follow-up appointments due to specific duties.(57, 58) Therefore, the availability of alternative, longer-acting PrEP modalities that can sustain a protective level of medication with fewer medication administrations may be an attractive component for military members interested in PrEP. While not as important as the dosing methods, respondents additionally preferred seeing a military provider, interacting through a smartphone telehealth visit, and utilizing on-base locations for laboratory evaluation and medication pick-up.

A preference to see a military provider for PrEP services remains prevalent among the total sample, signaling that it is the military healthcare provider that will be central to the success of a military PrEP program. However, a survey of military health care providers regarding PrEP knowledge and prescription habits revealed that 49% rated their knowledge as poor and only 29% had ever prescribed it.(2) Additionally, most military members receive their PrEP prescription only after seeing an infectious disease specialist,(2) which suggests that military primary care providers may not feel comfortable prescribing PrEP or may be referring military members to infectious disease specialists for PrEP services. This lower level of PrEP knowledge and prescription practice may contribute to the heterogenous nature of PrEP availability that currently seems dependent on a military member's geographic location,(2) and could explain the statistically significant difference in respondents' regions of station within this study when stratified by PrEP experience. However, it's been shown that an increase in PrEP knowledge has been associated with an increase in prescribing habits,(59) therefore supporting military primary care providers with the necessary training and resources to comfortably prescribe PrEP may help military members

engage in a wider availability of PrEP services without the extra step of a referral to an infectious disease specialist. Further research will need to explore the preference for a military provider within this context, and how this preference can best be leveraged to improve uptake.

Finally, respondents with no previous PrEP experience tend to report fewer male sexual partners and fewer HIV-positive partners within the last six months, yet are also more likely to report being unsatisfied with their current level of HIV protection. Given that sexual contact with men and condomless sex have been found to be the most common indications for initiating PrEP among military MSM,(2) further studies will need to explore if a desire for more intimacy with male partners with the absence of condoms is not being met with the currently available options for PrEP through access or availability.

This study has limitations. First, this study utilized self-report measures from a convenience sample recruited from an online social media group comprised of U.S. military members who identify as LGBT. While there was no way to verify actual eligibility for inclusion/exclusion criteria due to the anonymous nature of the survey, the literature examining MSM recruitment via online methods versus in-person had found similar samples of HIV/STI prevalence and HIV-testing patterns among MSM.(60, 61) Furthermore, these findings may not be generalizable to at-risk military members who have sex with men yet do not identify as being MSM or LGBT, and further qualitative studies are needed to further explore the foundation of these preferences within this context. Also of note is the large number of respondents excluded to RLH cut-offs. There is a rising trend of “random responders” and “survey-bots” that attempt duplicate submission of surveys that provide financial compensation and can impact preference data if included within final the analyses.(45) These RLH standards follow evidence-based consistency cut-offs to eliminate these “random responders,” yet further studies should examine additional methods to address this rising phenomenon. Finally, while quantifying preferences does not guarantee intention or ultimately behavior, it can be an innovative first step and provide a foundation to successfully inform PrEP initiatives. Ultimately, subsequent steps will translate this preference data into an implementation science hybrid design that refines service delivery approaches to optimize uptake and sustained use of this effective HIV-prevention tool.

## **4.1 Conclusion**

This study provides an initial description of the preferences and interest for PrEP by U.S. military members with a high risk of acquiring HIV. Our results indicate that PrEP interest among this population is most likely to be successful when PrEP is offered as a daily tablet, injection, or implant, with a medical visit performed with a military healthcare provider through a telehealth smartphone app. Additionally, allowing on-base locations to provide laboratory samples and to receive PrEP medication can also facilitate program preference. PrEP engagement and availability will further be enhanced by ensuring that medical providers and facilities are knowledgeable and comfortable prescribing PrEP services. Offering an affirming environment sensitive to health care concerns related to mental and sexual health will also be important. Consequently, key populations, stakeholders, and policymakers will be better equipped for scale-up of PrEP among at-risk populations within the U.S. military.



# Availability of data and material

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Abbreviations

ACBC (adaptive choice-based conjoint), CONSORT (Consolidated Standards of Reporting Trials), HB (Hierarchical Bayes), HIRI-MSM (HIV Incidence Risk Index for men who have sex with men), HIV (human immunodeficiency virus), IP (internet protocol), LGBT (lesbian, gay, bi & transgender), MSM (men who have sex with men), PHQ2 (Patient Health Questionnaire-2), PrEP (Pre-exposure prophylaxis), PCP (primary care provider), PWUS (part-worth utility scores), RIS (relative importance score), RLH (root likelihood)

## Declarations

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## **Authors' contributions**

JG, AD, and FA analyzed and interpreted the preference data regarding PrEP delivery program preferences, as well as demographical descriptive statistics. JG and DV were major contributors in writing the manuscript. All authors read and approved the final manuscript.

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## **Ethics declarations**

## **Ethics approval and consent to participate**

The study was approved by the Yale University Institutional Review Board (IRB Protocol ID: 2000024612). Social media group administrators placed monthly advertisement links describing the study on the group's main forum. Interested participants could click on a link to access an online study disclosure form with a 'click to consent' procedure.

## **Consent for publication**

Not applicable.

# Competing interests

The authors declare that they have no competing interests.

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## Tables

<b>Table 1.</b> Description of conjoint survey attributes and associated level options presented to respondents.	
<b>Attributes and Levels</b>	<b>Survey Description</b>
<u><i>Dosing Method</i></u>	
Daily oral tablet	<b>Daily oral tablet</b> means that you would have to take an oral tablet every day (daily) to maintain a protective level of PrEP medication.
PrEP injection	<b>PrEP injection</b> means that you get an injection or shot that would provide a protective level of PrEP medication for 2 months.
PrEP implant	<b>PrEP implant</b> means that you would get a small implant that would slowly release a protective level of PrEP medication for at least a year.
On-demand regimen	<b>On-demand regimen</b> means you take two tablets 24 hours before sex and then one tablet daily for the next two days. This dosing method would protect you from HIV for that single sexual encounter only.
PrEP rectal douche	<b>Rectal PrEP douche</b> means that you would use a rectal douche or enema prior to having sex that leaves behind protective level of PrEP medication for that sexual encounter.
<u><i>Provider Type</i></u>	
Military	<b>Military provider</b> means that you prefer a medical visit with a healthcare provider that is a member of the military.
Civilian	<b>Civilian provider</b> means that you prefer a medical visit with a healthcare provider that is a civilian or not a member of the military.
<u><i>PrEP Visit Location</i></u>	
Smartphone	<b>Smartphone/mobile app visit</b> means that you prefer to have a virtual medical visit with a healthcare provider through a smartphone call or mobile app.
On-Base	<b>On-Base medical visit</b> means that you prefer an in-person medical visit with a healthcare provider that is in a clinic on-base.
Off-Base	<b>Off-Base medical</b> Visit means that you prefer an in-person medical visit with a healthcare provider that is in a clinic off-base.
<u><i>Lab Evaluation Location</i></u>	
Provide labs on-base	<b>Provide lab work on-base</b> means that you prefer to do you lab work at a laboratory or clinic on-base.
Provide labs off-base	<b>Provide lab work off-base</b> means that you prefer to do you lab work at a laboratory or clinic off-base.



Home-based mail-in kit	<b>Home-based mail-in kit</b> means that you prefer to receive a home-based lab testing kit in the mail. You will provide self-collected, small samples of blood and urine and mail the kit back to the laboratory for evaluation. Your PrEP provider would then see the lab results after processing.
<u>PrEP</u> <u>Dispensing</u> <u>Venue</u>	
Receive PrEP on-base	<b>Receive PrEP on-base</b> means that you prefer to pick up or receive your PrEP medication from a pharmacy/clinic on-base.
Receive PrEP off-base	<b>Receive PrEP off-base</b> means that you prefer to pick up or receive your PrEP medication from a pharmacy/clinic off-base.
Receive PrEP by mail	<b>Receive PrEP by mail delivery</b> means that you prefer to receive your PrEP medication in the mail at your home or APO.

## Tables

<b>Table 2.</b> CONSORT diagram for participant enrollment and exclusion	
<b><i>Enrollment</i></b>	<b><i>Exclusion</i></b>
1238 completed survey responses	
	_____ Demographics Ineligibility ( $n=351$ ) <sup>a</sup> <ul style="list-style-type: none"> <li>· Cis-gendered women (<math>n=139</math>)</li> <li>· HIV-positive (<math>n=66</math>)</li> <li>· No MSM activity (<math>n=72</math>)</li> <li>· Service impossibility (<math>n=74</math>)<sup>b</sup></li> </ul>
	_____ Data Quality Parameters ( $n=458$ ) <ul style="list-style-type: none"> <li>· Below 95<sup>th</sup> percentile RLH (<math>n=432</math>)</li> <li>· Below 10-minute survey time completion (<math>n=26</math>)</li> </ul>
<b>429</b> total completed responses included	
<b>Notes:</b>	
<p><i>a</i>: Inclusion criteria demographics were assessed twice; at consent screen for eligibility, and again after conjoint experiment.</p> <p><i>b</i>: Omitted responses indicated a service impossibility, such as self-identifying as an Air Force warrant officer (does not exist)</p>	

<b>Table 3.</b> Characteristics of the participant demographics, stratified by PrEP experience.				
<b>Variable</b>	<b>Total Sample (n=429)</b>	<b>PrEP- Experienced (n=357)</b>	<b>No PrEP Experience (n=72)</b>	<b>F/<math>\chi^2</math> (p- value)</b>
<i>Age: Mean (<math>\pm</math>SD)</i>	29.9 ( $\pm$ 4.7)	30 ( $\pm$ 4.4)	29.5 ( $\pm$ 5.7)	0.42
<i>Gender:</i>				0.48
Male	415 (96.7%)	346 (96.9%)	69 (95.8%)	
Trans Female	11 (2.6%)	8 (2.2%)	3 (4.2%)	
Trans Male	3 (0.7%)	3 (0.8%)	0 (0.0%)	
<i>Race:</i>				0.46
White	309 (72.0%)	253 (70.9%)	56 (77.8%)	
Black	78 (18.2%)	70 (19.6%)	8 (11.1%)	
All Other Race	42 (9.8%)	34 (9.5%)	8 (11.1%)	
<i>Ethnicity:</i>				<0.01**
Hispanic	118 (27.5%)	109 (30.5%)	9 (12.5%)	
Non-Hispanic	311 (72.5%)	248 (69.5%)	63 (87.5%)	
<i>Rank:</i>				0.27
Enlisted	161 (37.5%)	133 (37.3%)	28 (38.9%)	
Officer	199 (46.4%)	161 (45.1%)	38 (52.8%)	
Warrant	69 (16.1%)	63 (17.6%)	6 (8.3%)	
<i>Education:</i>				<0.05***
High School	28 (6.5%)	18 (5%)	10 (13.9%)	
AD or Some College	169 (39.4%)	147 (41.2%)	22 (30.6%)	
Bachelor's Degree	188 (43.8%)	159 (44.5%)	29 (40.3%)	
Grad/Prof Degree	44 (10.3%)	33 (9.2%)	11 (15.3%)	

<b>Table 3.</b> Characteristics of the participant demographics, stratified by PrEP experience.				
<b>Variable</b>	<b>Total Sample (n=429)</b>	<b>PrEP-Experienced (n=357)</b>	<b>No PrEP Experience (n=72)</b>	<b>F/<math>\chi^2</math> (p-value)</b>
<i>Military Branch:</i>				0.07
Air Force	65 (15.2%)	47 (13.2%)	18 (25%)	
Army	209 (48.7%)	181 (50.7%)	28 (38.9%)	
Coast Guard	49 (11.4%)	40 (11.2%)	9 (12.5%)	
Marine Corps	48 (11.2%)	38 (10.6%)	10 (13.9%)	
Navy	58 (13.5%)	51 (14.3%)	7 (9.7%)	
<i>Region of Station <sup>a</sup>:</i>				<0.001*
Midwest	55 (12.8%)	45 (12.6%)	10 (13.9%)	
Northeast	79 (18.4%)	74 (20.7%)	5 (6.9%)	
South	161 (37.5%)	139 (38.9%)	22 (30.6%)	
West	129 (30.1%)	97 (27.2%)	32 (44.4%)	
Other/OCONUS	5 (1.2%)	2 (0.6%)	3 (4.2%)	
<i>Depression PHQ Screening <sup>b</sup>:</i>				0.40
>=1	269 (62.7%)	227 (63.6%)	42 (58.3%)	
=0	160 (37.3%)	130 (36.4%)	30 (41.7%)	
<i>HIRI-MSM Risk Score <sup>c</sup></i>				0.17
>=10	383 (89.3%)	322 (90.2%)	61 (84.7%)	
<10	46 (10.7%)	35 (9.8%)	11 (15.3%)	
<i># of male sex partners last 6 months:</i>				<0.01**
0-5 partners	303 (70.6%)	242 (67.8%)	61 (84.7%)	
6+ partners	126 (29.4%)	115 (32.2%)	11 (15.3%)	

<b>Table 3.</b> Characteristics of the participant demographics, stratified by PrEP experience.				
<b>Variable</b>	<b>Total Sample (n=429)</b>	<b>PrEP- Experienced (n=357)</b>	<b>No PrEP Experience (n=72)</b>	<b>F/<math>\chi^2</math> (p- value)</b>
<i># CRAS within last 6 months<sup>d</sup></i>				0.61
None	69 (16.1%)	56 (15.7%)	13 (18.1%)	
About once/month or less	249 (58%)	211 (59.1%)	38 (52.8%)	
About once/week or more	111 (25.9%)	90 (25.2%)	21 (29.2%)	
<i># of HIV+ partners last 6 months<sup>e</sup>:</i>				<0.001*
0 partners	268 (62.5%)	205 (57.4%)	63 (87.5%)	
1 or more partners	161 (37.5%)	152 (42.6%)	9 (12.5%)	
<i>Satisfied w/Current level of HIV protection?</i>				<0.01**
Satisfied	356 (83%)	304 (85.2%)	52 (72.2%)	
Unsatisfied	73 (17%)	53 (14.8%)	20 (27.8%)	
<i>Level of comfort discussing sex life w/PCP</i>				0.42
Extremely uncomfortable	37 (8.6%)	31 (8.7%)	6 (8.3%)	
Mostly uncomfortable	121 (28.2%)	95 (26.6%)	26 (36.1%)	
Mostly comfortable	209 (38.7%)	179 (50.1%)	30 (41.7%)	
Extremely comfortable	62 (14.5%)	52 (14.6%)	10 (13.9%)	

**Table 3.** Characteristics of the participant demographics, stratified by PrEP experience.

Variable	Total Sample (n=429)	PrEP-Experienced (n=357)	No PrEP Experience (n=72)	F/ $\chi^2$ (p-value)
<b>Notes:</b>				
a: States within the U.S. Midwest (IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI), Northeast (CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VT), South (AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, WV, AZ, NM, OK, TX), West (AK, CA, CO, HI, ID, MT, NV, OR, UT, WA, WY), Other/OCONUS (overseas, out of country)				
b: Yes/No PHQ2 Version. Scores $\geq 1$ positive screen(41)				
c: 1-47 range. Scores $\geq 10$ defined as high risk for HIV(42)				
d: The number of condomless receptive anal sex (CRAS) within the past 6 months.				
e: The number of sex partners that were HIV-positive in the past 6 months.				
* Significantly different at significance level of 0.001.				
** Significantly different at significance level of 0.01.				
*** Significantly different at significance level of 0.05.				

**Table 4.** Relative importance scores (RIS)<sup>a</sup> of PrEP attributes, stratified by PrEP experience.

PrEP Program Attribute	Total Sample (n=429) (%)	PrEP-Experienced (n=357) (%)	No PrEP Experience (n=72) (%)
Dosing Method	45.2	43.53	53.57
Provider Type	15.8	16.39	13.13
PrEP Visit Location	14.5	15.15	11.44
Lab Evaluation Location	13.4	13.52	12.65
PrEP Dispensing Venue	11.0	11.41	9.21
<i>Total</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>
<b>Notes:</b>			
a: Relative importance scores reflect the influence that each attribute has on a participant's decision-making (standardized to sum 100%).			



**Table 5.** Part-worth utilities (zero-centered values)<sup>a</sup> of PrEP program attributes and level choices, stratified by PrEP experience.

<b>Attributes and Levels</b>	<b>Total Sample (n=429)</b>	<b>PrEP-Experienced (n=357)</b>	<b>No PrEP Experience (n=72)</b>
<i><u>Dosing Method</u></i>			
Daily tablet	21.75	18.85	36.13
PrEP injection	15.58	7.81	54.14
PrEP implant	14.05	8.44	41.82
On-demand regimen	8.99	13.93	-15.51
PrEP rectal douche	-60.37	-49.03	-116.59
<i><u>Provider Type</u></i>			
Military	5.55	6.20	2.33
Civilian	-5.55	-6.20	-2.33
<i><u>PrEP Visit Location</u></i>			
Smartphone	7.69	7.72	7.53
On-Base	2.45	3.10	-0.81
Off-Base	-10.13	-10.82	-6.73
<i><u>Lab Evaluation Location</u></i>			
Provide labs on-base	12.65	12.16	15.09
Provide labs off-base	-9.68	-9.09	-12.60
Home-based mail-in kit	-2.97	-3.07	-2.49
<i><u>PrEP Dispensing Venue</u></i>			
Receive PrEP on-base	12.66	13.15	10.23
Receive PrEP off-base	-8.42	-8.89	-6.11
Receive PrEP by mail	-4.23	-4.26	-4.11
<i>None<sup>b</sup></i>	<i>-54.7</i>	<i>-53.70</i>	<i>-59.63</i>

**Notes:**

*a:* Zero-centered part-worth utility scores imply the positive or negative magnitude of the participant's preference for the level choice in relation to the other level options within the same attribute.



*b*: The “None” parameter represents the positive or negative magnitude in which a respondent is likely to select “None” (not willing to take PrEP in any scenario despite program configuration)

**Table 6.** Description of hypothetical PrEP scenarios with different attributes and levels

PrEP Scenario <sup>a</sup>		PrEP Attributes & Level Options				
		Dosing Method	Provider Type	Visit Location	Lab Evaluation	Dispensing Venue
1	On-Base Military Daily Tablet	Daily Tablet	Military	On-base	On-base	On-base
2	Smartphone Military Daily Tablet	Daily Tablet	Military	Smartphone	On-base	On-base
3	Smartphone Military On-Demand	On-Demand	Military	Smartphone	On-Base	On-Base
4	Smartphone Military Injection	PrEP Injection	Military	Smartphone	On-base	On-base
5	Remote Military Injection	PrEP Injection	Military	Smartphone	Home kit	On-Base
6	Smartphone Military Implant	PrEP Implant	Military	Smartphone	On-base	On-base
7	Off-Base Civilian Daily Tablet	Daily Tablet	Civilian	Off-Base	Off-Base	Off-Base
8	Off-Base Civilian Rectal PrEP	Rectal Douche	Civilian	Off-Base	Off-Base	Off-Base

**Notes:**

*a*: Scenarios descriptions reference Scenarios 1 through 8 in Table 7.

**Table 7.** Participation interest (share of preference) of individual PrEP program scenarios, stratified by PrEP experience.

PrEP Scenario # <sup>b</sup>	Share of Preference % by PrEP experience <sup>a</sup>		
	Total Sample (n=429)	PrEP-Experienced (n=357)	No PrEP Experience (n=72)
1. On-Base Military Daily Tablet	<b>66.4%</b>	65%	73.1%
2. Smartphone Military Daily Tablet	<b>69.6%</b>	68%	78%
3. Smartphone Military On-Demand	<b>67.6%</b>	67.6%	67.4%
4. Smartphone Military Injection	<b>69.6%</b>	67.4%	80.5%
5. Remote Military Injection	<b>67.9%</b>	65.8%	78.3%
6. Smartphone Military Implant	<b>68.5%</b>	66.4%	78.7%
7. Off-Base Civilian Daily Tablet	<b>57.7%</b>	56.5%	63.7%
8. Off-Base Civilian Rectal PrEP	<b>40.5%</b>	42.4%	30.9%

**Notes:**

*a:* Share of preference denotes the percent of respondents that would prefer or have interest to participate in the respective PrEP program scenario with a particular combination of program features based on utilities obtained during the conjoint survey.

*b:* Descriptions of PrEP scenarios 1 through 8 are explained in Table 6.

## Figures

**PrEP Program Possibility or not?**

Here are a few military PrEP programs that you might like. For each one, indicate whether it would be an acceptable possibility for you. If it's not a program you would do, then select "Won't work for me."

(1 of 6)

<u>Dosing Method</u>	PrEP Injection	Daily Oral Tablet	PrEP Implant	Rectal PrEP Douche
<u>Healthcare Provider Type</u>	Military Provider	Civilian Provider	Military Provider	Civilian Provider
<u>Medical Visit Location</u>	Smartphone/Mobile App	Off-Base Medical Visit	On-Base Medical Visit	Off-Base Medical Visit
<u>Dispensing Venue</u>	Pick-Up/Receive PrEP On-Base	Receive PrEP by Mail Delivery	Pick-Up/Receive PrEP On-Base	Pick-Up/Receive PrEP Off-Base
<u>Lab Work Evaluation</u>	Home-Based Mail-In Kit	Do Lab Work Off-Base	Do Lab Work On-Base	Do Lab Work Off-Base
	<input type="radio"/> A possibility <input type="radio"/> Won't work for me	<input type="radio"/> A possibility <input type="radio"/> Won't work for me	<input type="radio"/> A possibility <input type="radio"/> Won't work for me	<input type="radio"/> A possibility <input type="radio"/> Won't work for me

**Figure 1**

Sample conjoint choice task screener item. Note: Attribute level options presented within programs change as choice tasks are made, which results in captured preference data on the most important attributes driving a respondent's selection of a particular program configuration.