

### RECOMMENDATIONS FOR INTERVENTION CONTENT TO ENHANCE HIV PRE-EXPOSURE PROPHYLAXIS UPTAKE AMONG MEN WHO HAVE SEX WITH MEN RECEIVING CARE AT SEXUALLY TRANSMITTED DISEASE CLINICS

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#### ABSTRACT

##### Background and objective

Pre-exposure prophylaxis (PrEP) uptake has been suboptimal. Sexually transmitted disease (STD) clinics provide important opportunities to scale PrEP uptake.

##### Material and methods

To inform the development of a brief intervention to enhance PrEP uptake in STD clinics, we conducted 32 qualitative interviews to explore barriers and facilitators of PrEP uptake among PrEP eligible, PrEP naïve, and men who have sex with men (MSM) presenting for STD screening services. We also solicited input for intervention components to enhance PrEP uptake at STD clinics.

##### Results

Most participants' self-perceived HIV risks were low despite reporting unprotected anal intercourse. Many were reluctant to take any medications, expressed apprehension about perceived side effects of PrEP, and were unaware of how to obtain PrEP. Participants recommended that interventions focusing on enhancing PrEP uptake in STD clinics should include: culturally tailored educational materials about PrEP, informational graphics indicating PrEP's relative efficacy in reducing HIV transmission risks, and comprehensive PrEP navigation. Most participants did not feel strongly about gender, race or ethnicity of providers; however, nearly all preferred gay-affirming providers. Brief interventions to enhance PrEP uptake among MSM in STD clinics

should include efforts to raise self-awareness of HIV risk, provide information about PrEP's efficacy relative to other interventions, underscore PrEP's relatively few side effects, and provide culturally tailored messaging.

**Keywords:** *intervention; men who have sex with men (MSM); pre-exposure prophylaxis (PrEP); uptake*

## INTRODUCTION

An estimated 37,600 new HIV infections occur annually in the United States (US); 70% of infections are among gay, bisexual, and other men who have sex with men (MSM).<sup>1</sup> Pre-exposure prophylaxis (PrEP) is a biomedical HIV prevention intervention that can significantly reduce HIV acquisition among MSM. PrEP is a once-daily, oral antiretroviral medication (co-formulated tenofovir disoproxil fumarate and emtricitabine, TDF/FTC) approved by the US Food and Drug Administration to reduce HIV transmission among HIV-negative individuals at risk for HIV infection.<sup>2</sup> PrEP has been proven highly effective in reducing HIV acquisition among MSM in clinical trials.<sup>3,4</sup> However, PrEP uptake among populations most at risk of HIV infection, including MSM of color, remains a challenge.

Pre-exposure prophylaxis programs have expanded across the US since PrEP was approved in 2012.<sup>4-6</sup> While over 70,000 people initiated PrEP by 2017,<sup>7</sup> they represent only a small fraction of the 1.23 million individuals, the Centers for Disease Control and Prevention (CDC) estimates, clinically indicated for PrEP.<sup>8</sup> PrEP awareness, uptake, and adherence are lower among younger and Black/African American and Hispanic/Latino MSM than among White MSM.<sup>6</sup> The highest rates of HIV infection in 2016 occurred among Black/African Americans and Hispanic/Latinos (42 and 27%, respectively).<sup>9</sup> However, only 10% of people starting PrEP between 2012 and 2016 were Black/African American, and only 13% were Hispanic/Latino, compared to 73% who were White. Low self-perceived risk is a common barrier to PrEP uptake and other prevention interventions.<sup>10-13</sup> Other reported reasons include concerns about side effects,<sup>14</sup> stigma,<sup>15</sup> the

prohibitively high cost of PrEP,<sup>16</sup> and accessibility of PrEP services.<sup>17,18</sup>

Other studies have examined the barriers and facilitators to PrEP uptake,<sup>15-17</sup> but little is known about how to enhance PrEP uptake, particularly among MSM of color and in sexually transmitted disease (STD) clinics or safety net settings most likely to serve individuals at highest risk for HIV acquisition. Little is also understood about the requisite “wrap-around” services that would enhance PrEP uptake. In this study, we explored barriers to PrEP uptake among a diverse population of HIV-negative MSM at high risk for HIV acquisition. We also solicited their opinions and recommendations about how to design effective, brief interventions to be delivered in busy STD clinic settings that can enhance PrEP uptake.

## METHODS

### *Patient sample and clinical setting*

Participants were approached for participation if they were identified as male, had never used PrEP, and met current CDC recommendations for PrEP use.<sup>18</sup> We used purposive sampling to recruit participants from an urban STD clinic that serves a diverse patient population in Providence, RI. The clinic offers STD screening services, HIV care, and PrEP services. The inclusion criteria for the study were: identifying as a man who has had sex with another man in the last 6 months, being HIV-negative, and not currently taking PrEP. Participants also met CDC recommendations for PrEP, which include having any male sex partners in the last 6 months, not being in a monogamous relationship with an HIV-negative partner, reporting any condomless anal sex in the past 6 months, or reporting

a diagnosed bacterial sexually transmitted infection (STI) in the last 6 months.<sup>19</sup>

Written informed consent approval was obtained from each participant prior to beginning study procedures. The study was approved by The Miriam Hospital Institutional Review Board. The research conforms to the principles of the Declaration of Helsinki.

### **Data collection**

We conducted semi-structured, individual, in-depth interviews with HIV-negative, PrEP-naïve MSM who presented for HIV and STD screening services at an urban STD clinic in Providence, RI. Interviews were conducted by trained interviewers in a private room. Interviews lasted for approximately 45 min, were digitally recorded, and were professionally transcribed. We asked participants about their knowledge, opinions, and experience with PrEP, and identified barriers to PrEP uptake. We also solicited their normative recommendations about the essential components of a brief intervention to enhance PrEP uptake in STD clinics. Each participant received a \$50 gift card.

These interviews assessed structural, social, individual, and clinical factors that may influence PrEP uptake among MSM who are indicated for PrEP but not currently taking it. Interview guides were informed by existing literature and the team's experience providing clinical services to this population. Interview guides contained questions about PrEP knowledge, including knowledge about PrEP relative to other HIV prevention interventions, attitudes about PrEP, and what factors might negatively or positively influence their PrEP use. To assess participants' HIV acquisition risk, we asked participants to complete the HIV Incidence Risk Index for MSM (HIRI-MSM),<sup>20</sup> which assesses risk by age group and sexual behaviors (i.e., condomless anal sex with one or more male partners). We solicited participant input about content for a brief intervention designed to promote PrEP uptake among MSM presenting to STD clinics. We also asked for their

perspectives on how best to present information about HIV risk and PrEP. Participants were also asked about their preferences for the race, ethnicity, and sexual orientation of health care providers or interventionists delivering any potential PrEP uptake intervention.

### **Data analysis**

We used the grounded theory approach in this study. We interviewed participants until we reached saturation, when no new data were emerging.<sup>21–23</sup> An inductive approach using a coding scheme to identify themes and categories guided data analysis. Three study team members first analyzed the interview transcripts to identify recurrent themes, then developed a preliminary coding scheme. They independently developed and applied a final coding scheme, using NVivo 11 Software<sup>24</sup> to ensure consistency. Discrepancies were discussed and resolved among the research team.

## **RESULTS**

A total of 32 participants were enrolled, from 20 to 49 years of age, with a median age of 27 years. Twenty-eight participants (88%) had either private health insurance (through an employer or purchased themselves) or state-funded insurance (i.e., Medicaid). The demographic characteristics of the study sample are summarized in Table 1. The HIRI-MSM scores ranged from 8 to 33, with a median of 21.

### **Barriers to prep uptake**

We grouped themes by structural, social, individual, and clinical factors that influenced barriers and opportunities to enhance PrEP uptake. Structural factors shape HIV risk via institutions, the environment, access to services and policy. Social factors affect HIV risk through interactions with others.<sup>25–28</sup> Individual factors are usually related to a person's decision-making, attitudes, or perspectives. Clinical factors include clinical issues

**TABLE 1** Study Participant Demographic Characteristics by Race and Ethnicity.

Characteristic	Total (n = 32)	Hispanic/Latino (n = 6)	Non-Hispanic White (n = 20)	Non-Hispanic Black (n = 6)
Age, mean (range)	27 (20–49)	23 (20–31)	27 (20–49)	26 (20–32)
Insurance				
None	4 (12.5%)	0 (0%)	2 (10%)	2 (33%)
Private	24 (75%)	4 (66.7%)	17 (85%)	3 (50%)
Medicaid	4 (12.5%)	2 (33.3%)	1 (5%)	1 (17%)
Sexual orientation				
Gay	19 (59.3%)	1 (16.7%)	14 (70%)	3 (50%)
Bisexual	9 (28.1%)	1 (16.7%)	5 (17.5%)	1 (17%)
Other <sup>†</sup>	4 (12.5%)	4 (66.7%)	1 (5%)	2 (33%)

<sup>†</sup>Participant identified as either asexual or pansexual.

that may impact a patient’s experiences. Barriers included structural factors such as insufficient health care coverage and cost of medications; social factors such as stigma and fear of disclosure of one’s sexual identify; individual factors such as the inaccurate self-perceived risk of acquiring HIV; and clinical factors (i.e., documented and perceived side effects) that may influence PrEP uptake (Table 2).

*Structural barriers*

Even among participants who were interested in taking PrEP, many identified insufficient health insurance coverage and expressed perceptions that high out-of-pocket costs precluded them from starting PrEP. While most were insured, many were unsure whether their insurance would cover PrEP costs.

*I think PrEP is amazing. I just don’t take it because I don’t have health insurance.*

*Out of pocket for me, for one month, is basically the cost of the drug – \$1,500 is just not something doable for me. I can take preventive measures to avoid being on it. But I kind of stopped there.*

Another participant remarked:

*Cost is a huge thing, especially now. I’m transitioning from a job where I was not*

**TABLE 2** Barriers Impacting PrEP Use.

	Identified Themes
Structural barriers	<ul style="list-style-type: none"> <li>• Health insurance (lack of insurance or under-insurance)</li> <li>• Copayments and deductibles for PrEP medication</li> </ul>
Social barriers	<ul style="list-style-type: none"> <li>• Fear of disclosure</li> </ul>
Individual barriers	<ul style="list-style-type: none"> <li>• Low self-perceived HIV risk</li> <li>• Reluctance to take a daily medication</li> <li>• Otherwise good physical health status</li> </ul>
Clinical barriers	<ul style="list-style-type: none"> <li>• Perceived side effects associated with PrEP</li> <li>• Lack of easily interpretable educational materials that document PrEP’s efficacy relative to other interventions.</li> </ul>

PrEP: Pre-exposure prophylaxis.

*making much money. I didn’t have health insurance – and, now, I am going to have health insurance, and I’m just not sure what that covers or what a cost of medication would be.*

*And then, depending on what I can do with insurance or discount card, ... my factor is going to be: what will that cost look like?*

Participants were also concerned about unexpected costs at the pharmacy point of sale. One participant, still covered under his parent's insurance, was unclear whether his insurance plan covered PrEP. He noted his concerns about out-of-pocket costs:

*There's a lot of social stigma about not being able to afford things, so you know if I went to a pharmacy thinking that I was about to receive something and then be told it's a price I can't afford, that's something I would also want to avoid.*

#### Social barriers

Some participants under the age of 26 and covered under their parents' health insurance were concerned that their parents would learn about their PrEP care through the explanation of benefits (EOBs) documents sent to their homes. This fear of disclosure about their sexual orientation and PrEP use to their parents precluded several participants from starting PrEP. Two participants explained:

*My parents would be like, well, why do you need PrEP? Why are you hooking up with such random people? It would definitely throw them back a little bit.*

*I really don't care about what people think, but I'm also a very private person. And in terms of something like this, even though my family is really open ... I'm more private. It's not like keeping a secret or anything like that. But it's my business, so let me handle it.*

#### Individual barriers

Prior to completing the HIRI-MSM, participants were asked to reflect and rate their self-perceived HIV acquisition risks. Many participants underrated their HIV acquisition risks, which were often incongruent with their scores on the

HIRI-MSM. Underrating their acquisition risks was a key factor influencing men's decisions not to initiate PrEP. Two participants' comments illustrated this phenomenon:

*I'd say my risk is low to medium. I mean, I'm playing a really risky role, but I'm not as bad as I could be.*

*I think that it's easy to believe that, because I am not super sexually active or not often sexually active or with a high number of people, that I would want to believe my risk is lower. However, knowing that the partners that I have been sexually active with have also been sexually active with other people ... I think that I'm at a much higher risk than I might believe on my own.*

Participants were asked to complete the HIRI-MSM to quantify their risk of acquiring HIV; most participants scored >10, the recommended threshold for PrEP initiation. Some participants were not surprised by their scores. Two participants conveyed:

*It makes sense ... I actually think it's like, lower than what I would've expected, honestly.*

*I would not say I'm surprised. I mean, any type of unprotected sex or multiple sexual partners obviously, would make someone a candidate for something like that so....*

Some participants also noted reluctance to take medication every day, particularly when they were otherwise young and healthy. This often influenced men's decisions not to start PrEP:

*I think the only reason why I haven't explored it more personally was because I try to reduce the amount of, you know, foreign chemicals in my body as much as possible. So I eat very clean, I try not*

*to take medications for things that can be cured naturally. And that really was the main driver for me not taking it. I have been interested in it and I have looked into it before, but never pursued actually taking it.*

*I guess I have never taken a medication, other than like allergy medication. I've never been on a prescribed medication before, so I think just getting on one kind of makes me nervous. I don't know what the effects could be.*

**Clinical barriers**

Clinical factors influenced some participants' willingness to consider PrEP. Many participants had incomplete or inaccurate information about PrEP's true side effects, and noted perceived side effects as the main reason they hadn't started PrEP:

*I'm not sure what kind of side effects PrEP might have. Because I know a lot of drugs do have major side effects, which can be like permanent side effects. Because I have taken some medications for anxiety and ADD and stuff, and I know there were side effects, but then some were worse than others. It can be scary to think about.*

For many participants, presenting educational materials about PrEP's limited side effects and efficacy prompted them to consider starting PrEP:

*Well, after the diagnosis today, this is the first time I've ever had an STD, so I think I am definitely more interested now than I was before, just because I am a paranoid person when it comes to stuff like this and if there are ways to prevent HIV, and you know, in general, then I think it's definitely something that I should look more into.*

*Reinforcing that [PrEP] has been a drug that's been used for a while, and how effective it is, is probably helpful. It might*

*put someone who is kind of in my position, where they're like "Oh, I don't really need it," in a place where they think, "well, it might be nice."*

**Normative suggestions for brief interventions to increase PrEP uptake in STD clinics**

Participants offered important feedback about how to overcome barriers to PrEP uptake. Their suggestions included offering support to help patients obtain PrEP, tailoring the content and delivery of PrEP educational information to subpopulations of MSM, and providing culturally competent care for LGBTQ patients. They also commented on the preferred demographic characteristics of their PrEP providers. Table 3 presents these findings.

**TABLE 3.** Normative Recommendations to Increase PrEP Uptake Among MSM in STD Clinics.

	<b>Themes</b>
Structural recommendations	<ul style="list-style-type: none"> <li>• Provide PrEP navigation services to help patients with costs associated with copayments and deductibles</li> <li>• Provide PrEP navigation services to help patients enroll in patient assistance programs</li> </ul>
Individual recommendations	<ul style="list-style-type: none"> <li>• Enhance PrEP knowledge with infographics that illustrate PrEP's efficacy relative to other HIV prevention interventions</li> <li>• Increase the accuracy of patients' self-perceived HIV risks with a brief risk assessment tool</li> </ul>
Service delivery recommendations	<ul style="list-style-type: none"> <li>• Provide culturally tailored education to participants</li> <li>• Train PrEP and other step-down providers to provide culturally congruent care for LGBTQ populations</li> </ul>

*PrEP: Pre-exposure prophylaxis; MSM: men who have sex with men; STD: sexually transmitted disease.*

### **Structural recommendations**

When asked how to best overcome the challenges of high copayments and deductibles, participants suggested having a navigator to help accurately forecast potential out-of-pocket costs, navigate patient assistance and copayment programs, and assist with associated paperwork. Two participants commented:

*I think it's helpful just to go through and have more of a personalized risk assessment. I think for my specific circumstances, the most helpful thing would be someone who'd be able to help navigate insurance stuff and figure this out with my providers, which I feel like is a large part of the medical system in general. I need a patient advocate.*

*It's nicer to just have a personal conversation with someone. I think it's pretty good. It's easier than feeling that you're navigating whole process and decision by yourself.*

### **Recommendations for overcoming individual barriers**

Most participants had incomplete knowledge about PrEP's efficacy, including its efficacy compared to other HIV prevention interventions, as well as the importance of daily medication adherence. They recommended developing a graphical illustration to help raise awareness about PrEP's efficacy relative to other HIV prevention interventions such as condom use, treatment as prevention, male circumcision, and changing sexual positions from receptive to insertive anal sex. One participant noted:

*Those statistics about condoms and circumcision was jarring! I think that's a good thing to bring up: PrEP is significantly better at reducing your HIV risk than a condom!*

Figure 1 presents the graphical representation of the effectiveness of different HIV prevention approaches used in our intervention.<sup>29–34</sup>

In addition to including graphical representations of PrEP's efficacy in educational materials, participants appreciated the HIRI, a brief measure to help understand their own HIV acquisition risks. Participants also suggested that clinics routinely use and discuss the HIRI-MSM HIV-risk scale with patients.

Participants suggested providing information about PrEP's limited side effects. After suggesting this combination of interventions, one participant commented:

*I feel good. I feel encouraged about taking it. I'd say it makes me more encouraged to take it and more willing to take it than I would have been before. Not that I was unwilling to take it before – I just didn't know as much, but now that I know more, I'm more drawn to trying it out.*

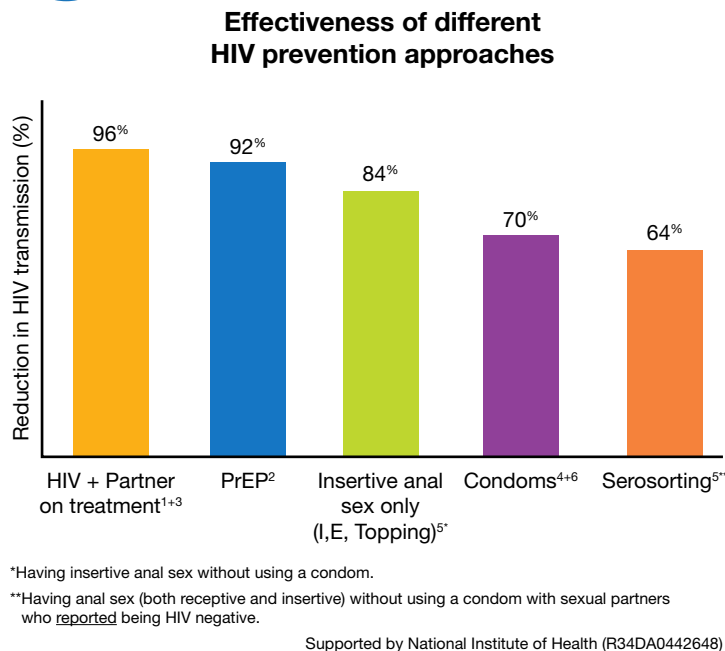
Another participant with similar suggestions suggested:

*I think you should go through a participant's risk and then have a personal conversation with someone about their prevention options. It's easier than sort of feeling that you're navigating this whole process and decision by yourself.*

### **Service delivery recommendations**

Participants suggested that culturally tailored messages about PrEP might enhance PrEP uptake, particularly for MSM of color. One African American participant from the Deep South remarked:

*This is a different region. It's a different beast. I'm African American and I've been here four years, still don't know the lay of*



**FIGURE 1** Effectiveness of different HIV prevention approaches.

*the land or the rules – because Blackness is so ... so much less common here. It's a very White region, whereas my home is not like that. African Americans may need some special outreach.*

Another participant remarked:

*I've only seen one African American guy in HIV education messages. It was a YouTube video with an African American guy who talked about how he found out that he had HIV. I think it was a PrEP commercial actually ... Because he was Black, and the story line was "That could be me. (Laughs) You know what I mean? It was just like, They found out I have HIV, and this is what I'm living with."*

Most participants did not have strong preferences about the gender, sexual orientation, or race of their health care providers. However, participants overwhelmingly noted their strong preferences for knowledgeable, non-judgmental, and gay-affirming providers, noting that these characteristics would impact their PrEP uptake. One participant remarked:

*The biggest point I would make about that is that whoever is providing these sessions should be understanding, sensitive, empathetic. As long as the person is culturally sensitive.*

Another participant commented about the clinic's "safe space" culture:

*I've been going there for a while now and I have a real relationship with the clinic. I feel*



*comfortable and safe talking to the clinic staff about my sexual orientation and my partners.*

A few participants expressed that having a clinical staff of their race, ethnicity, or sexual orientation may be important factors to retain MSM in PrEP care:

*Maybe subconsciously, like someone who is similar to you would probably be more appealing. If they're gay, as well, then I think I would feel more comfortable.*

To identify as many barriers as possible to PrEP uptake, we developed a proposed list for participants to populate that could help a navigator to identify and overcome barriers to PrEP uptake (Figure 2).

**DISCUSSION**

Findings from this study suggest that structural, social, individual, and clinical factors may influence PrEP uptake among at-risk MSM presenting to urban safety-net STD clinics. Structural

<b>PrEPare to Start</b>					
Note: Circle your rating for each question/statement on the right.					
PrEP stands for pre-exposure prophylaxis and is a pill taken once per day, every day to prevent HIV. We are trying to understand our clients' concerns about taking PrEP. What follow are some commonly cited reasons that people may be concerned about taking PrEP.					
Please fill out this form so that we can understand any concerns you might have about taking PrEP. Our staff will then talk to you about any concerns you might have. Your answers will help improve the quality of care that we provide at this clinic.					
Please rate your agreement with whether the following Factors have influenced your decision to take PrEP.	Agree	Agree somewhat			Disagree
I'm not concerned about contracting HIV	1	2	3	4	5
I didn't know about PrEP before I came here	1	2	3	4	5
I knew about PrEP but no one ever offered it to me	1	2	3	4	5
My friends take PrEP	1	2	3	4	5
People might think I'm gay if I take PrEP	1	2	3	4	5
People might think I have HIV if I take PrEP	1	2	3	4	5
People might think I'm promiscuous if I take PrEP	1	2	3	4	5
I am monogamous	1	2	3	4	5
I don't trust doctors or the medical system	1	2	3	4	5
It's hard to find a doctor that prescribes PrEP	1	2	3	4	5
I don't have transportation to doctors appointments.	1	2	3	4	5
costs of co-payments or deductibles influence my ability to pay for PrEP	1	2	3	4	5
I don't have health insurance	1	2	3	4	5
PrEP may have side effects	1	2	3	4	5
PrEP may interact with other medications I take	1	2	3	4	5
PrEP may interact with alcohol	1	2	3	4	5
I don't like taking medications every day	1	2	3	4	5
Other (Please list): _____	1	2	3	4	5
Other (Please list): _____	1	2	3	4	5

**FIGURE 2** A proposed list to help a navigator.

factors affecting PrEP uptake were primarily financial, including prohibitive clinical and pharmaceutical costs for patients who were uninsured or underinsured. Social barriers included fear of disclosure of sexual identity and PrEP use. Individual factors included low perceived HIV-risk and a common unwillingness to take daily medications among otherwise healthy young men. Clinical barriers included perceived side effects and a lack of available educational information at provider locations.

Participants offered numerous normative recommendations to enhance PrEP uptake, particularly among MSM of color. These included hiring PrEP navigators to address insurance and payment barriers, enhancing patient education by providing a graphical representation of PrEP's efficacy relative to other HIV prevention interventions, increasing the accuracy of patients' perceived HIV risk, and training providers and staff to give culturally competent PrEP education and care.

While few studies have explored barriers to PrEP uptake in STD clinics, our results are generally consistent with previous studies that examine barriers and facilitators to PrEP implementation and uptake in other clinical settings.<sup>15–17</sup> Barriers included patients' reluctance to take medication either because of perceived side effects with taking medication<sup>14</sup> or because of the inconvenience of taking daily medication when they were otherwise healthy;<sup>22</sup> low perceived HIV risk;<sup>11–13</sup> and the high and often variable cost of PrEP.<sup>16</sup> Previous research has also indicated that both the perceived and actual cost, particularly for uninsured and underinsured individuals, was an important barrier to PrEP uptake.<sup>23</sup>

Perhaps, most importantly, participants offered numerous actionable solutions to overcome the aforementioned barriers that are highly applicable for busy real-world, high-volume STD clinics. To raise awareness about HIV acquisition risks, participants recommended a subjective HIV risk scoring instrument that could easily be self-administered during the intake process.<sup>24</sup> This tool could easily

be self-administered by patients in busy STD clinics, and then presented to health care providers to shorten intervention time with each client. This might help mitigate inaccurate self-perceived HIV acquisition risks, which are major barriers to PrEP uptake.<sup>25</sup>

While most participants had heard of PrEP, the overwhelming majority had limited knowledge about PrEP and its efficacy relative to other HIV prevention interventions. To address this concern, several participants suggested utilizing a graphical chart during the clinical intake process to help raise awareness about PrEP's efficacy relative to other HIV prevention interventions. We present this tool in Figure 1. Notably, participants' perceived side effects were also incongruent with actual side effects experienced by most patients. Participants' concrete suggestions to provide educational information about PrEP's relative efficacy and relatively few side effects could be delivered by clinical staff (e.g., nurses or nurse practitioners), via pamphlets, or on digital educational screens in the lobby. These low-cost efforts that require minimal human resource investment might enhance PrEP knowledge in busy clinical settings.

The most commonly cited barrier to PrEP uptake was the perceived out-of-pocket costs associated with deductibles and copayments for medications and clinical visits. Many participants did not know about industry and clinic-sponsored patient assistance programs and suggested that a navigator might help participants to overcome those cost barriers as well as navigate industry and clinic-sponsored patient assistance programs. Navigators might also enhance downstream outcomes in the PrEP continuum such as adherence and retention in PrEP care.<sup>26</sup> Additionally, navigators might help patients address concerns about stigma and disclosure with practical solutions. The proposed list for participants to populate that could help a navigator identify and overcome barriers to PrEP uptake is presented in Figure 2. While patient navigation can be costly, patient navigation for Ryan White patients has been associated with

dramatic improvements in program uptake and clinical outcomes. Similar outcomes might be observed for PrEP participants.<sup>27,28,35</sup> Moreover, safety net STD clinics that offer 340B programs may be able to offset navigation costs with 340B revenue.<sup>36</sup>

Another important vehicle for enhancing PrEP uptake in STD clinics is providing gay-affirming, culturally congruent care. Some participants seemed to have a preference for health care providers of their own racial or demographic background, but most participants noted their top priority was to have a gay-affirming, sex-positive provider who delivered care in a non-judgmental setting. Unlike the aforementioned suggestions, this suggestion may require cultural shifts and investment in capacity-building for culturally congruent care in some STD clinics. On the other hand, many STD clinics already have a gay-affirming, sex-positive culture, and may just need periodic training updates for providing culturally congruent PrEP care.

Our study is subject to several limitations, as it was based on a sample of MSM from an STD clinic in the Northeastern US. Thus, results may not be generalizable to other settings or other STD clinics. This study nevertheless offers several important findings for enhancing PrEP uptake in busy STD clinics. We found that complex social, structural, individual, and clinical factors impede PrEP uptake. However, inexpensive educational tools such as administering and reviewing an HIV risk score with patients, providing graphical educational materials about PrEP's relative efficacy in reducing HIV risks, and providing accurate information about PrEP's relatively few side effects might dramatically enhance PrEP uptake and help overcome many of these barriers. Other longer-term investments such as ongoing cultural competence training and patient navigation may also promote PrEP uptake in STD clinics. These findings have important implications for scaling up PrEP in STD clinics across the country. These suggested intervention components might also be easily combined into a "PrEP uptake toolkit" that

could be easily adopted and implemented in similar settings.

## CONCLUSIONS

These findings are consistent with other studies which suggest that increasing PrEP uptake requires interventions that can be delivered in busy, real-world clinical settings. These interventions increase PrEP knowledge,<sup>37</sup> provide targeted and culturally congruent messaging about PrEP,<sup>38</sup> and navigation programs to enhance access to medications.<sup>16–18,39</sup> Taken together, these suggestions from participants about their needs and preferences suggest a way forward for enhancing PrEP interventions that can be done briefly and at relatively low cost in busy, real-world settings.

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## CONFLICT OF INTEREST

The authors declare no competing interests.

## REFERENCES

1. *cdc-hiv-surveillance-report-2017-vol-29.pdf* [Internet]. [cited 2018 Apr 19]. Available from: <https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2017-vol-29.pdf>
2. *cdc-hiv-prep-guidelines-2017.pdf* [Internet]. [cited 2019 Oct 10]. Available from: <https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2017.pdf>
3. Shrestha RK, Sansom SL, Purcell DW. Assessing HIV acquisition risks among men who have sex with men in the United States of America. *Rev Panam Salud Publica Pan Am J Public Health*. 2016 Dec;40(6):474–8. PMID: 28718498.
4. Hojilla JC, Vlahov D, Crouch P-C, et al. HIV pre-exposure prophylaxis (PrEP) uptake and retention among men who have sex with men in a

- community-based sexual health clinic. *AIDS Behav.* 2018 Apr 1;22(4):1096–9. <http://dx.doi.org/10.1007/s10461-017-2009-x>
5. Volk JE, Marcus JL, Phengrasamy T, et al. No new HIV infections with increasing use of HIV pre-exposure prophylaxis in a clinical practice setting. *Clin Infect Dis.* 2015 Nov 15;61(10):1601–3. <http://dx.doi.org/10.1093/cid/civ778>
  6. Liu AY, Cohen SE, Vittinghoff E, et al. Pre-exposure prophylaxis for HIV infection integrated with municipal- and community-based sexual health services. *JAMA Intern Med.* 2016 Jan;176(1):75–84. <http://dx.doi.org/10.1001/jamainternmed.2015.4683>
  7. Siegler AJ, Mouhanna F, Giler RM, et al. The prevalence of pre-exposure prophylaxis use and the pre-exposure prophylaxis-to-need ratio in the fourth quarter of 2017, United States. *Ann Epidemiol* [Internet]. 2018 Jun 15. Available from: <http://www.sciencedirect.com/science/article/pii/S1047279718301078>
  8. Vital signs: HIV diagnosis, care, and treatment among persons living with HIV – United States, 2011 [Internet]. [cited 2018 Nov 29]. Available from: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6347a5.htm>
  9. Changes in Truvada® for HIV pre-exposure prophylaxis utilization in the USA: 2012–2016 – Disparities [Internet]. [cited 2019 Apr 30]. Available from: [http://www.natap.org/2017/IAS/IAS\\_72.htm](http://www.natap.org/2017/IAS/IAS_72.htm)
  10. HIVSTD.pdf [Internet]. [cited 2018 Jun 18]. Available from: <http://www.health.ri.gov/publications/surveillance/2016/HIVSTD.pdf>
  11. Chan PA, Glynn TR, Oldenburg CE, et al. Implementation of pre-exposure prophylaxis for HIV prevention among men who have sex with men at a New England sexually transmitted diseases clinic. *Sex Transm Dis.* 2016 Nov;43(11):717–23. <http://dx.doi.org/10.1097/OLQ.0000000000000514>
  12. Corneli AL, Deese J, Wang M, et al. FEM-PrEP: Adherence patterns and factors associated with adherence to a daily oral study product for pre-exposure prophylaxis. *J Acquir Immune Defic Syndr.* 2014 Jul;66(3):324–31. <http://dx.doi.org/10.1097/QAI.0000000000000158>
  13. Goedel WC, Mayer KH, Mimiaga MJ, Duncan DT. Considerable interest in pre-exposure prophylaxis uptake among men who have sex with men recruited from a popular geosocial-networking smartphone application in London. *Glob Public Health.* 2019 Jan 2;14(1):112–21. <http://dx.doi.org/10.1080/17441692.2017.1391859>
  14. Arnold T, Brinkley-Rubinstein L, Chan PA, et al. Social, structural, behavioral and clinical factors influencing retention in pre-exposure prophylaxis (PrEP) care in Mississippi. *PLoS One.* 2017;12(2):e0172354. <http://dx.doi.org/10.1371/journal.pone.0172354>
  15. Franks J, Hirsch-Moverman Y, Loquere AS, et al. Sex, PrEP, and stigma: Experiences with HIV pre-exposure prophylaxis among New York City MSM participating in the HPTN 067/ADAPT study. *AIDS Behav.* 2018 Apr 1;22(4):1139–49. <http://dx.doi.org/10.1007/s10461-017-1964-6>
  16. Pérez-Figueroa RE, Kapadia F, Barton SC, et al. Acceptability of PrEP uptake among racially/ethnically diverse young men who have sex with men: The P18 study. *AIDS Educ Prev Off Publ Int Soc AIDS Educ.* 2015 Apr;27(2):112–25. <http://dx.doi.org/10.1521/aeap.2015.27.2.112>
  17. Golub SA, Gamarel KE, Rendina HJ, et al. From efficacy to effectiveness: Facilitators and barriers to PrEP acceptability and motivations for adherence among MSM and transgender women in New York City. *AIDS Patient Care STDs.* 2013 Apr;27(4):248–54. <http://dx.doi.org/10.1089/apc.2012.0419>
  18. Disparities in PrEP uptake among primary care patients screened for HIV/STIS in SF | CROI Conference [Internet]. 2018 [cited 2018 Aug 1]. Available from: <http://www.croiconference.org/sessions/disparities-prep-uptake-among-primary-care-patients-screened-hivstis-sf>
  19. *cdc-hiv-prep-guidelines-2017.pdf* [Internet]. [cited 2019 May 2]. Available from: <https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2017.pdf>
  20. Smith DK, Pan Y, Rose CE, et al. A brief screening tool to assess the risk of contracting HIV infection among active injection drug users. *J Addict Med.* 2015;9(3):226–32. <http://dx.doi.org/10.1097/ADM.0000000000000123>
  21. “Unsatisfactory saturation”: A critical exploration of the notion of saturated sample sizes in qualitative research—Michelle O’Reilly, Nicola Parker, 2013 [Internet]. [cited 2019 Apr 30]. Available from: <https://journals.sagepub.com/doi/abs/10.1177/1468794112446106>

22. Wang Z, Lau JTF, Fang Y, et al. Prevalence of actual uptake and willingness to use pre-exposure prophylaxis to prevent HIV acquisition among men who have sex with men in Hong Kong, China. *PLoS One* [Internet]. 2018 Feb 12 [cited 2018 Nov 26];13(2). Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5809018/>
23. Bauermeister JA, Meanley S, Pingel E, et al. PrEP awareness and perceived barriers among single young men who have sex with men in the United States. *Curr HIV Res*. 2013 Oct;11(7):520–7. <http://dx.doi.org/10.2174/1570162X12666140129100411>
24. Blumenthal J, Jain S, Mulvihill E, et al. Perceived versus calculated HIV risk: Implications for pre-exposure prophylaxis uptake in a randomized trial of men who have sex with men. *J Acquir Immune Defic Syndr* [Internet]. 2018 Oct 29 [cited 2018 Nov 26]; Publish ahead of print. Available from: <https://insights.ovid.com/crossref?an=00126334-900000000-96526>
25. Yombi JC, Mertes H. Treatment as prevention for HIV infection: Current data, challenges, and global perspectives. *AIDS Rev*. 2019 Jan 30;20(3):1199. <http://dx.doi.org/10.24875/AIDSRev.M18000024>
26. Evolving models and ongoing challenges for HIV pre-exposure prophylaxis implementation in the ... – Europe PMC Article – Europe PMC [Internet]. [cited 2019 Apr 30]. Available from: <https://europepmc.org/articles/pmc5762416>
27. Service delivery and patient outcomes in Ryan White HIV/AIDS program–funded and –nonfunded health care facilities in the United States. | Health disparities | JAMA Internal Medicine | JAMA Network [Internet]. [cited 2019 Apr 30]. Available from: <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2430794>
28. Bradley H, Viall AH, Wortley PM, et al. Ryan White HIV/AIDS program assistance and HIV treatment outcomes. *Clin Infect Dis*. 2016 Jan 1;62(1):90–8. <http://dx.doi.org/10.1093/cid/civ708>
29. Cohen et al., Antiretroviral Therapy for the Prevention of HIV-1 Transmission. *N Engl J Med*. 2016.
30. Grant et al. Preexposure Chemoprophylaxis for HIV Prevention in Men Who Have Sex with Men. *N Engl J Med*. 2010.
31. Rodger et al. Sexual Activity Without Condoms and Risk of HIV Transmission in Serodifferent Couples When the HIV-Positive Partner Is Using Suppressive Antiretroviral Therapy. *JAMA*. 2016.
32. Smith et al. Condom effectiveness for HIV prevention by consistency of use among men who have sex with men in the United States. *J Acquir Immune Defic Syndr*. 1999.
33. Vallabhaneni et al. Seroadaptive practices: association with HIV acquisition among HIV-negative men who have sex with men. *PLoS One*. 2012.
34. WHO I Condoms for HIV prevention [Internet]. WHO. [cited 2017 Dec 6]. Available from <http://www.who.int/hiv/topics/condoms/en>
35. Diepstra KL, Rhodes AG, Bono RS, et al. Comprehensive Ryan White assistance and human immunodeficiency virus clinical outcomes: Retention in care and viral suppression in a Medicaid nonexpansion state. *Clin Infect Dis*. 2017 Aug 15;65(4):619–25. <http://dx.doi.org/10.1093/cid/cix380>
36. Jones EA, Linas BP, Truong V, et al. Budgetary impact analysis of a primary care-based hepatitis C treatment program: Effects of 340B Drug Pricing Program. Smith DK, editor. *PLoS One*. 2019 Mar 14;14(3):e0213745. <http://dx.doi.org/10.1371/journal.pone.0213745>
37. Cahill S, Taylor SW, Elsesser SA, et al. 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 Nov 2;29(11):1351–8. <http://dx.doi.org/10.1080/09540121.2017.1300633>
38. Holloway I, Dougherty R, Gildner J, et al. PrEP uptake, adherence, and discontinuation among California YMSM using geosocial networking applications. *J Acquir Immune Defic Syndr*. 2017 Jan 1;74(1):15–20. <http://dx.doi.org/10.1097/QAI.0000000000001164>
39. Nunn AS, Brinkley-Rubinstein L, Oldenburg CE, et al. Defining the HIV pre-exposure prophylaxis care continuum. *AIDS Lond Engl*. 2017 Mar 13;31(5):731–4. <http://dx.doi.org/10.1097/QAD.0000000000001385>