

# “A Good Habit”: Telehealth PrEP Users Find Benefit in Quarterly Monitoring Requirements

Journal of the International Association of Providers of AIDS Care  
Volume 19: 1-9  
© The Author(s) 2020  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/2325958220919269  
journals.sagepub.com/home/jia



Kimberly A. Koester, PhD<sup>1</sup> , Shana D. Hughes, PhD, MPH<sup>1</sup>, and Robert M. Grant, MD, MPH<sup>1</sup>

## Abstract

In the United States, uptake of daily oral pre-exposure prophylaxis (PrEP) to prevent HIV continues to grow albeit at a slower than desired pace. Innovations in PrEP delivery systems may partially address structural challenges related to PrEP uptake and PrEP persistence, such as difficulty in attending clinic visits or completing laboratory testing. To study PrEP services offered by a telehealth company called Nurx, we conducted 31 in-depth interviews with prospective or current patients. We hypothesized that patients would find the quarterly laboratory monitoring requirements to be onerous especially in light of receiving all other aspects of PrEP care through a telehealth delivery system. However, interviewees characterized navigating laboratory systems as relatively easy and complying with the quarterly monitoring as a supplementary benefit of PrEP use. Our research illustrates that quarterly monitoring requirements are meaningful to some telehealth PrEP users and may facilitate persistent engagement in receipt of PrEP care.

## Keywords

PrEP, telehealth PrEP, laboratory monitoring, implementation science, qualitative methods

Date received: 27 September 2019; revised: 29 January 2020; accepted: 16 March 2020.

### What Do We Already Know about This Topic?

Patient perspectives on laboratory monitoring requirements as a barrier or facilitator to sustained use of HIV pre-exposure prophylaxis (PrEP) is understudied quantitatively and to our knowledge, no qualitative studies have examined this topic.

### How Does Your Research Contribute to the Field?

Our research makes an important contribution to the field of PrEP implementation research in that it builds our understanding of the role played by an integral component of PrEP services—laboratory monitoring requirements.

### What Are Your Research’s Implications Toward theory, Practice, or Policy?

Our research concludes with recommendations that may influence clinician practice and health system policies regarding PrEP.

## Introduction

HIV pre-exposure prophylaxis (PrEP) with tenofovir disoproxil fumarate (TDF)/emtricitabine (FTC) is a highly effective HIV prevention strategy when used as directed.<sup>1-3</sup> The US Food and Drug Administration approved use of TDF/FTC for HIV PrEP in 2012. Accessing PrEP through traditional sources such as a primary care setting or sexual health clinic requires routine clinic visits and laboratory testing. The extent to which otherwise healthy individuals are willing and able to comply with the frequent in person visits and testing that PrEP use demands remain an important and understudied phenomenon.

Since its approval in 2012, uptake of PrEP has grown albeit at a slower than desired pace.<sup>4,5</sup> With increased rates of PrEP implementation, the phenomenon of PrEP discontinuation is now an emerging issue.<sup>6</sup> Distinguishing instances of

<sup>1</sup> Department of Medicine, University of California, San Francisco, CA, USA

### Corresponding Author:

Kimberly A. Koester, University of California, San Francisco, CA, USA.  
Email: kimberly.koester@ucsf.edu



appropriate discontinuation (ie, when an individual replaces PrEP with alternate HIV prevention method[s]), from inappropriate discontinuation when an individual discontinues use, but continues to have an ongoing indication for PrEP is challenging<sup>7</sup> and therefore difficult to accurately measure. Recent research on reasons for discontinuation (regardless of whether ongoing PrEP is indicated) include cost, loss of insurance, stigma, change in risk perception, and concern about long-term side effects.<sup>8-10</sup> In addition, required quarterly follow-up clinic visits and laboratory testing have been considered a potential barrier to longer term persistence in PrEP care.<sup>11-15</sup> Indeed, a recent study conducted in San Francisco, a location with robust PrEP care, found that the most common reason for discontinuation was difficulty attending clinic visits or completing laboratory tests.<sup>16</sup>

Technological innovations in PrEP delivery systems may help address structural and social challenges related to PrEP uptake and continuity, such as fear of discrimination on the basis of one's sexual identity, difficulty attending clinic visits, or completing laboratory testing. A recent review of advances in telehealth and PrEP care in the United States outlined 5 unique provider-to-patient delivery models.<sup>17</sup> One such telehealth service is Nurx, which launched PrEP services in California in 2016, and has since expanded to numerous states across the United States. Pre-exposure prophylaxis delivered through Nurx and likely any other telehealth PrEP services includes a traditional element of PrEP care: patients must physically present to a laboratory prior to initiating PrEP, and quarterly follow-up laboratory results are required for prescription renewal.

Limited preliminary data signal the possibility for effective capitalization on technology-based service delivery models. However, both in-depth and longitudinal research are needed to understand whether and how telehealth plays a role in supporting PrEP initiation and continuation. To understand how laboratory monitoring requirements influenced the use or non-use of Nurx services, we conducted qualitative interviews with individuals who sought out their PrEP services. In this analysis, we present data on the acceptability of laboratory monitoring for current and would-be telehealth PrEP users.

### **Nurx Telehealth PrEP Services**

Unlike some telehealth PrEP programs where coordination of a synchronous visit is required (eg, telephone appointments for all follow-up visits [PrEPTECH]),<sup>18</sup> Nurx encounters typically take place online, and there is no pressure to schedule an appointment. Nurx allows either synchronous or asynchronous communication via a secure portal with a chat feature to "speak" with a medical provider.

Individuals interested in receiving PrEP through Nurx submit an online request, complete a medical history questionnaire, upload insurance information, and await a response from a Nurx provider. Nurx providers follow the US Centers for Disease Control and Prevention (CDC) PrEP guidelines<sup>19</sup> and direct prospective patients to an affiliated laboratory nearby. HIV and creatinine testing occur every 3 months; although not required, bacterial sexually transmitted infection

(STI) testing is encouraged every 3 to 6 months. After Nurx reviews laboratory test results, if a patient is approved for PrEP use, a 90-day supply of medication (FTC/TDF) is mailed to the patient, including instructions for renewal.

One significant advantage Nurx has over traditional PrEP delivery models is that systems-level support is an inherent component of the service design. Nurx patients receive automated messages in advance of their prescription renewal date with instructions explaining laboratory testing requirements for continuing with PrEP. A new prescription cycle is kicked off when patients submit a renewal PrEP request; they then complete laboratory testing as in the initial phase and update insurance information as necessary. Once laboratory results are reviewed and approved, another 90-day supply is shipped to the patient.

### **Methods**

We conducted in-depth interviews (IDIs) with men and women who had requested PrEP services through the Nurx platform. Nurx staff facilitated introduction to prospective participants by approaching all PrEP requesters in California, New York, Florida, and Illinois—the states where they were operating at the time of data collection. Ninety-three individuals expressed interest and were directed to the research team. We applied a purposive sampling frame<sup>20</sup> whereby each potential participant's Nurx profile was reviewed prior to enrollment to ensure adequate representation of those who requested and did not initiate PrEP as well as those who requested and did initiate PrEP use.

We intended to interview until patterns were evident and anticipated sampling approximately at least 8 to 12 persons<sup>21,22</sup> in the categories of PrEP requesters and PrEP users. The researchers e-mailed individuals who expressed interest with information about the study and scheduled telephone interviews at a mutually convenient time. We designed the interview guide to explore, among other things, experiences with laboratory testing (interview guide available upon request). The general laboratory questions included: (1) "Tell me about your experiences with lab testing," and (2) "Being on PrEP requires you to do lab testing for HIV, creatinine/kidney functioning, as well as STI screening if you want; what are your thoughts on this type of ongoing monitoring?" Interviews were audio-recorded and lasted 60 to 90 minutes. Following the interview, we verbally collected basic demographic information and presented the participant with a US\$40 Amazon gift card.

All data were transcribed verbatim and entered into Dedoose,<sup>23</sup> a web-based program designed for managing qualitative data. Authors (K.A.K. and S.D.H.) reviewed each interview, writing memos to capture initial impressions and insights. We developed a codebook comprised of deductive and inductive codes.<sup>24</sup> Each transcript was coded by a primary analyst and reviewed by a secondary analyst. For the analysis presented below, authors (K.A.K. and S.D.H.) held a series of analysis sessions to review the text associated with "lab attitudes." During these sessions, text was read aloud, discussed, and summarized. Ultimately, we produced an analytic memo<sup>25</sup> used to develop the findings presented below.

**Table 1.** Participant Demographics.

Demographic	Overall	Requester (n = 10)	Current (n = 21)
<b>Sex</b>			
Female	5	5	0
Male	26	5	21
Transgender	0	0	0
<b>Race/ethnicity</b>			
White (non-Hispanic)	10	3	7
Black (non-Hispanic)	5	2	3
American Indian or Alaskan Native	0	0	0
Asian or Pacific Islander	3	1	2
Hispanic or Latino	9	4	5
Native Hawaiian or other Pacific Islander	0	0	0
More than one race	4	0	4
<b>Age</b>			
18-29	23	9	14
30-39	7	1	6
40-49	0	0	0
50-59	0	0	0
60-64	1	0	1
<b>Insurance</b>			
Uninsured	1	1	0
Medicaid	8	2	6
Parents (unspecified)	5	2	3
Employer based	11	2	9
Kaiser	4	3	1
ACA plan	2	0	2
<b>Duration on PrEP</b>			
Not yet	12	10	2 <sup>a</sup>
Less than 6 months	9	0	9
One year or more	7	0	7
Three years or more	3	0	3

Abbreviations: PrEP, pre-exposure prophylaxis; ACA, Affordable Care Act.

<sup>a</sup>Medications were being shipped at time of interview.

### Ethical Approval and Informed Consent

The University of California, San Francisco Committee on Human Research reviewed and approved all research activities associated with this study (approval #: 16-20521). We obtained verbal informed consent from all participants.

### Findings

We conducted 31 IDIs between April and July 2017. Median age of participants was 28.5 years; 68% were nonwhite; and the majority were cisgender males (n = 26 cisgender men/5 cisgender women; Table 1). Participants included active and former Nurx PrEP patients, as well as those who requested PrEP services, but did not ultimately initiate PrEP. Participants were insured through employers, public programs, or a parent's plan. Participants addressed both the act of testing (physically presenting at a laboratory) and the meaning or value they attributed to quarterly testing. Data provided by 5 female PrEP requesters were excluded from this analysis. All were assessed as low risk and advised by Nurx providers that PrEP may not be

necessary. Active and former (2 individuals had recently stopped using Nurx) Nurx patients characterized navigating laboratory systems as relatively easy and complying with the quarterly monitoring as a supplementary benefit of PrEP use. The combination of (1) relatively uncomplicated access to laboratories, (2) appreciation for the structure provided by required quarterly testing, and (3) the reassurance laboratory results provided seemed to promote an overall sense of sexual wellness among active Nurx users. Among those who did not initiate PrEP use, only one participant described the required monitoring as an impediment. Note, additional quotes are presented in Table 2 at the end of the Findings section.

### Easy Access to Laboratories Facilitates Compliance with Monitoring

We initially hypothesized that individuals accessing PrEP through an otherwise virtual interface would find the required laboratory testing inconvenient and therefore unappealing. However, participants reported few complaints about presenting for testing, or to drop-off specimens, and instead described why complying with monitoring was not considered burdensome. The commercial laboratory with which Nurx had partnered offered many locations, expansive hours, online appointment scheduling, and drop-in visits. Participants repeatedly highlighted easy access to laboratory facilities as a benefit.

There's so many [labs] around here or there's a fair amount, at least. They have good hours and that was much easier to fit into my schedule than going to a doctor's office. (PT04, 31-year-old, Latino male)

Others spontaneously and favorably compared scheduling or dropping in for a laboratory visit with scheduling health-care appointments. For example, participants typically noted that laboratory visits offered greater flexibility and a shorter time commitment than a medical clinic office visit.

Interviewees often expressed being attracted to Nurx because the service was perceived as compatible with their busy lives and, in some cases, seeking PrEP from Nurx was far more accessible than seeking it out through traditional primary care settings. Two participants specifically explained that their motivation to use Nurx was due to their lack of time to seek health care between the hours of 9 AM and 5 PM. Likewise, even though laboratory monitoring required presenting in person, numerous locations and drop-in structure accommodated individuals with restrictive schedules. Thus, in the broader context of the convenience of virtually and asynchronously interfacing with their Nurx provider, quarterly laboratory visits felt manageable.

I like having to go like that [every 3 months]. For me, it's definitely not a burden at all. Especially if I can do everything else online and all I have to do is just go get the test once every 3 months. (PT32, 31-year-old, African American male)

**Table 2.** Themes and Exemplary Quotes.

Easy access to laboratories facilitates compliance with monitoring	<p>There was one right around the corner from my house. (PT20, 24-year-old, African American male)</p> <p>It's easy. I wait no more than 10 minutes as opposed to going to my PCPs lab. (PT01, 26-year-old, Latino male)</p> <p>I especially appreciated the fact that I didn't have to actually go anywhere except to the lab to get the tests done. (PT14, 26-year-old, Latino male)</p>
Requirements create a helpful structure	<p>Obviously it's like a commitment, but I think it's obviously—it's for the better. It's actually kind of like, one of the—the draws, it's like, having to commit to a regimen almost. Or, like a schedule. (PT25, 27-year-old, White male)</p> <p>I think that's also part of the thing about PrEP that I was like, Great, because I have to get tested every time I renew the prescription . . . I absolutely think of it as a benefit because I wouldn't be doing it otherwise . . . it makes me do it . . . I'm happy about that. (PT10, 28-year-old, White male)</p> <p>Those are the few weeks before your next medication is due, but "Oh S, by the way, you need to go to [lab] because your medication needs to be sent down the next few weeks and we need to have your labs or it can't be processed until your labs come back." So there you go, that's another way of being more effective. Something that wasn't available to me when I had my regular provider. (PT01, 26-year-old, Latino male)</p>
Results of laboratory work provide reassurance and underscore the benefits of the PrEP package.	<p>I knew that, with the lab monitoring, if something were happening [eg, adverse effects] that we would catch it and I could just discontinue the medication and I would be fine. (PT13, 30-year-old, Latino male)</p> <p>It's good to have your blood work taken to see if there are irregularities . . . The more data you have to monitor yourself, the better. Why would you not want to do that? (PT03, 29-year-old, Asian male)</p>
Problems with laboratories are minor annoyances	<p>The only issue that I had is that I guess my name was shortened in their system. So, they couldn't find me initially. But then she just called tech services, and they figured it out right away. It took, like, less than 5 minutes. In the meantime, I had also messaged Nurx. And they got back to me really quickly. And so, that was the only problem I had. Other than that, she had my insurance already. She knew what lab she was supposed to do. I was in and out. (PT14, 26-year-old, Latino male)</p> <p>Initially they had told me they were sending the labs to be done at [an out of network facility] So, I just looked for a lab that was part of my network that was close to where I lived and then I just requested that they fax the lab work to that place instead. They did it and it was very simple. I just scheduled the appointment online, went that day, gave my information and they drew the blood and that was it. (PT13, 30-year-old Latino male)</p> <p>I went and had a set of labs done. They specified the lab, and there was a little hitch there, but they took care of it. I was very pleased. They sent me to a lab that's not the usual lab that I go to, and they sent me a bill for US\$400 for the testing, and I sent a copy of the bill to NuRx. They made it go away so that worked really well. (PT17, 65-year-old, Mixed Race male)</p>

Abbreviation: PrEP, pre-exposure prophylaxis.

Notably, participants' encountered few obstacles in complying with laboratory monitoring. One participant recalled having an uneasy feeling when he learned about the frequency of testing—specifically wondering if the medication was safe. Education about the long-standing use of FTC/TDF to treat HIV alleviated his concerns. Occasional reports surfaced of laboratories not receiving orders from Nurx; having to wait to confirm orders; and errors involving patient information, insurance, and costs. However, interviewees portrayed these missteps as annoyances, not serious challenges. In contrast, a subset of interviewees described having encountered serious challenges prior to discovering Nurx that nearly blocked them from accessing PrEP altogether. In at least 4 cases, interviewees reported being denied access to PrEP mainly due to providers' lack of awareness of HIV PrEP medication. In one case, a provider encouraged condom use rather than prophylactic medication. In comparison, laboratory-related issues were portrayed as manageable.

Many participants noted the *minimal* effort required on their part to complete the initial or quarterly monitoring requirements.

Laboratory monitoring was explicitly mentioned as a barrier by one participant, who did not complete the laboratory work and therefore did not receive a PrEP prescription through Nurx. Even in this case, laboratory-related obstacles appear secondary:

I think the only reason why I didn't actually end up taking PrEP was, one, because I had no need for it, or a perceived need, at the time, and, 2, because I'm lazy and didn't want to go to the lab. (PT19, 23-year-old, Asian male)

Participants cited insurance issues (eg, a Health Maintenance Organization Nurx is unable to accept) or a change in perceived HIV risk—not laboratory monitoring—as the main reasons for not using PrEP.

### *Requirements Create a Helpful Structure*

Many participants described the quarterly requirements as creating a beneficial structure for regular HIV and STI screening.

This forcing function was often treated as a welcome motivation for participants to prioritize HIV and STI testing. Numerous participants explained that even with good intentions, it was difficult to prioritize routine testing:

Obviously, the reduction in contracting HIV is the best part of PrEP, but if I had to choose the close second, it would be the required, regular, routine testing. Even though these are really important things they're testing for... It's just so easy to not be in a routine of getting tested... especially when I think people will often fear the results. It's so easy to convince yourself to put it off. The fact that it's tied to getting your supply of PrEP, I think, adds an extra incentive that gets people in what I would call a good habit of getting tested. (PT04, 31-year-old, Latino male)

In many cases, participants aspired to routinely test for HIV and STIs, yet were unsuccessful until faced with the external pressure that came with initiating PrEP use. Testing was not considered a burden; rather it provided PrEP users with a reason to care for their own sexual health.

Because I have to get tested every time I renew the prescription... I absolutely think of it as a benefit because I wouldn't be doing it otherwise... it makes me do it... I'm happy about that. (PT10, 28-year-old, White male)

[Routine screening is] the most positive thing about being on PrEP because it forces you to be very engaged with your own health. Even though it's not required that you're tested for other STIs in most cases, I still choose to be because I'm getting tested for HIV once every 3 months, so why not do a full range testing? I feel really great about it. (PT04, 25-year-old, Asian male)

We often followed questions about attitudes on monitoring with probes about testing patterns prior to initiating PrEP use. Many, but not all, participants spoke of their efforts as missing the mark. Responses such as, "it definitely wasn't every three months" or "very infrequently—once or twice a year tops," were common and implied that interviewees had not been able to test as frequently as they thought was optimal. For participants with an unrealized desire to test regularly, the requirement imposed by PrEP was internalized as supportive, and in one case the structure of testing helped him to overcome test avoidance.

Honestly in my opinion not as often as I should have. Probably like once a year... There [was] definitely a thing of like I'm going to avoid getting tested because waiting and getting the results is scary to me... it definitely had an element of that. But, also the whole thing of making an appointment and go to the doctor and get blood drawn. Like the whole, it's just logistically, like there [were] inconveniences, so I think that [was] somewhat deterring. (PT10, 28-year-old, White male)

Some participants reported having integrated routine testing into their lives prior to initiating PrEP. These men found that complying with the monitoring requirements once they

were on PrEP was a nonissue, describing it as neither remarkable nor burdensome.

I'm fine with it... I feel like because for most gay people... a lot of people are told, you know, you should be getting tested every 3 months anyways for your safety and for the safety of your partners... So, I was already doing, like, tests every 3 to 4 months anyways. So, I'd say it wasn't, like, a huge, big deal. (PT24, 39-year-old, Mixed Race male)

### *Results of Laboratory Work Provide Reassurance and Underscore the Benefits of the PrEP Package*

Although some informants reported deriving a sense of satisfaction from fulfilling the monitoring requirements, the screening was not done for this reason alone—the results of the screening were an essential component of what made the testing meaningful and influenced participants' sense of well-being. Many participants embraced testing as a way to know oneself—whether one was healthy or in need of intervention.

In the most extreme example of the desirability of testing, one participant had negotiated with the Nurx physician for "standing orders" at the laboratory—meaning he could test for HIV and STIs monthly if he wished. Further, not only the frequency but the type of testing offered by Nurx was actually part of the service's appeal.

I was completely amazed that, when I signed up for Nurx and they sent my requisition to [the lab], they were doing a much more advanced screening for these types of STIs and STDs, particularly the HIV panel, which was fourth generation and... much more accurate than the third generation exam. So there was that relief. (PT01, 26-year-old, Latino male)

Although this participant was unique in identifying himself as "into the whole 'quantified self' thing," he was not the only one who suggested that information about his health status was important and empowering. If the goal of using PrEP was to maintain one's HIV-negative status, then testing routinely provided participants with evidence that the medication was working. As another interviewee explained when asked about his feelings when receiving HIV results,

I don't get myself in situations where I'd be worried. It's just nice to know. And if I ever were in a situation where I would be worried, I would go in and get tested, I wouldn't wait for the next regular test. (PT03, 29-year-old Asian male)

In addition, although many interviewees noted they had heard that the side effects of PrEP were minimal, monitoring helped allay any concerns about toxicity and adverse effects. For example, one interviewee noted that routine monitoring would allow any adverse effects to be detected promptly and that he would likely solve the issue by discontinuing PrEP. Another

participant told the story of his roommate, who had been taking a bodybuilding supplement while on PrEP. The required routine testing revealed problematic levels of creatinine, causing the participant to conclude that the more data one had on oneself, the better. More data were frequently understood by this group of interviewees as desirable; for some, this applied not only to PrEP-related biomarkers but also more broadly. A participant in an open relationship with a partner living with HIV explained how testing fit into his perception of health:

I definitely recognize the importance, now more so than I ever have before about my sexual life, of having these services done for me to keep myself healthy. The fact that I have to take 20 minutes out of my day, today, and go have someone take my blood, eh, inconvenient, but I know just how important it is for me. (PT16, 29-year-old, Mixed Race male)

Implicit in the notion that monitoring enhances health was the presumption that those who receive information will act on it, whether that meant a PrEP user would seek treatment for an STI or stop taking FTC/TDF in response to problematic laboratory findings. This presumption applied at multiple levels. Whereas the participant quoted above emphasized keeping himself healthy, another interviewee explicitly stated that frequent monitoring associated with PrEP use leads to a reduction in STIs—a benefit that ripples out into the larger community.

If [PrEP users] are exposed to something, they can get it caught within 3 months, rather than either never or, like, once a year when they actually go in for their checkup, you know? So, I feel like it prevents a lot of other STIs spread, or at least inhibits it somewhat better. (PT24, 39-year-old, Mixed Race male)

Another participant picked up on this notion and connected community-level impact to his personal sexual practice. Specifically, his perception that sex partners would be testing frequently (and treating any diagnosed STIs) if on PrEP enhanced his comfort with, and served as a justification for having, condomless sex.

I kind of want to add that in, too, is another reason why I feel a lot more comfortable not using condoms is because I know people are getting tested for other STDs while they're getting tested for HIV to get their PrEP prescriptions. (PT30, 27-year-old, White male)

As these quotes illustrate, PrEP use and the routine testing that accompany it were envisioned as shared experiences across a collectivity. Benefits of PrEP created spillover effects that accrued at both individual and community levels. This benefit may correlate somewhat with the notion of a community viral load or rather a community of people living with HIV and having an undetectable viral load. Pre-exposure prophylaxis users with sufficient medication adherence and frequent STI screening and treatment may help offset or decrease the community STI burden. Thus, quarterly monitoring was not perceived as onerous. In fact, it was part of a package of

intertwined and interdependent responsibilities and rewards that contribute to a sexually healthy collective.

## Discussion

In this analysis, we focused on participant narratives related to quarterly laboratory testing requirements to assess how these requirements might facilitate or deter PrEP continuation. Our research illustrates that individuals accessing PrEP through a telehealth service characterized navigating laboratory systems as relatively easy. Three intertwined benefits of monitoring included being nudged into complying with recommended HIV and STI testing frequencies for sexually active men who have sex with men (MSM); obtaining reassurance that PrEP was safe, effective, and compatible with general good health; and to some extent, being able to think of oneself as an active participant in enhancing the health of the gay community.

Most participants opted into Nurx PrEP services specifically because of the convenience and flexibility associated with telehealth.<sup>26</sup> Our sample is unique in that participants coupled asynchronous virtual clinic visits with in-person laboratory visits. Understanding this backdrop is important to interpreting participant narratives on laboratory monitoring experiences. Participants often contrasted their difficulties seeking general health care against the ease they experienced fulfilling PrEP-related laboratory work. Laboratories were described as accessible, convenient, and, in general, more patient-centered than brick-and-mortar clinic settings. The average health-care facility cannot compete with a stand-alone laboratory system offering state-of-the-art online scheduling systems and plentiful, convenient locations. From the vantage point of some Nurx PrEP users, a face-to-face primary care visit was perceived as overly burdensome, in contrast to their perceptions about a quarterly laboratory visit. The additional effort required to make and keep an appointment for a quarterly, face-to-face primary care visit might have left a different impression and potentially have affected PrEP continuation.

In addition to reducing new HIV infections, widespread uptake of PrEP may also produce added sexual health benefits at the population level. Assuming laboratory monitoring guidelines associated with PrEP are followed, modeling indicates that PrEP users test for STIs more frequently than they would otherwise.<sup>27</sup> Our research bears this out. One study modeled a scenario among MSM on PrEP in the United States in which STI incidence decreased, even accounting for risk compensation, as long as regular STI screening occurred.<sup>27</sup> However, underlying the model is a presumption that PrEP providers will strictly follow the monitoring guidelines. Another study reported that this was not the case among PrEP prescribers working in health department-funded community health clinics. Importantly, compliance with the CDC guidelines was better among clinics that had rolled out a panel management initiative focused on PrEP monitoring.<sup>16</sup> This research illustrates the independent as well as interdependent roles played by PrEP prescribers and PrEP users. Each party may be more successful in fulfilling their duties as prescriber or user when systems-level support (ie,

**Table 3.** Key Recommendations to Encourage Laboratory Monitoring Compliance.

1. Explain the purpose of the frequency of monitoring to counteract concerns about the safety of the medication.
2. Assess how patients feel about quarterly monitoring, rather than assuming it will be a burden.
3. Proactively message patients about the subsidiary benefits/“perk” of quarterly testing, particularly for those who opt into the STI screening.
4. Encourage patients to persevere through the “start-up syndrome” of all aspects of becoming a PrEP user including not only the possibility of experiencing short-term, physical side effects, and the necessity of building a routine around daily pill taking but also encourage the development of a routine around laboratory testing, that is, finding a laboratory and adjusting to the facility’s structure.
5. Advise patients that laboratory monitoring requirements may not be easily fulfilled and can limit ongoing access to PrEP. Discuss potential strategies to overcome laboratory testing barriers such as home testing and/or alternative HIV prevention methods ahead of time.

Abbreviation: PrEP, pre-exposure prophylaxis; STI, sexually transmitted infection.

structured reminders) is present. Nurx services are intentionally designed to offer these supports to both parties.

Researchers are beginning to consider whether reducing the number of health-care tasks patients must navigate to secure PrEP would benefit the patient (ie, reducing the required clinic visits and/or laboratory monitoring from 4 times per year to 2).<sup>28,29</sup> However, our findings illustrate that, in the context of receiving PrEP through a telehealth service, some PrEP users see monitoring as a secondary benefit and as another method of preventing STIs. Careful consideration should precede any decision to reduce the frequency of required laboratories while on PrEP—particularly since at least some men are making decisions about sexual practices based on the notion that PrEP users are being tested 4 times per year.

In situations when required follow-up presents an obstacle, we suggest deeper investigation into the specific issue(s) presenting the challenge. As our data suggest, the problem may be more about difficulty attending primary care visits than frequency of required lab work. In such cases, reducing the number of required laboratory visits from 4 to 2 per year would not ease the burden. However, this reduction in frequency might reduce the value of PrEP for some users. Rigorously identifying precisely where challenges arise will be essential to develop adaptations to PrEP care that can optimize the patient experience.

Numerous structural components must be in place for effective uptake and continued use of PrEP to prevent HIV. These components include access to a payer source, a prescriber, a laboratory, and a pharmacy. In addition, other factors are at play: trust in the medical establishment, ability to submit to routine blood draws, and willingness to adhere to a daily pill. Disruptions may occur anywhere along the PrEP continuum of care. We developed a list of practical recommendations for

providers (Table 3) intended to limit these disruptions. For example, patients may benefit from an explicit justification about testing frequency and to reassure patients that FTC/TDF is a safe medication.<sup>30-32</sup>

Our study has several limitations. First, the qualitative design permits us to describe these findings as transferable but not generalizable.<sup>33,34</sup> Our sample was recruited from a very particular setting and the type of PrEP users attracted to Nurx. Thus, our sample might share characteristics or circumstances that would make presenting to a laboratory less of a burden for them than for other types of PrEP users. At the time this research was designed, to our knowledge, Nurx was one of the first PrEP telehealth services in operation.

Future research should compare the findings reported here against those from other PrEP telehealth platforms and users in other locations where laboratory services may be differently configured. Future studies also should examine whether telehealth clinic visits can sufficiently offset the inconvenience of traditional clinic visits and thereby increase motivation to fulfill quarterly laboratory testing requirements.

## Conclusion

To date, no research has assessed whether presenting for laboratory work every 3 months is problematic for telehealth PrEP users. In our study, participants considered the effort involved in adhering to quarterly testing to be worth it. Convenient access to laboratories is an obvious factor that can drive compliance with PrEP monitoring requirements—a structural intervention that led to greater levels of testing among our interviewees. This access also enables PrEP users to more easily derive value from the quarterly lab work. Rather than looking at quarterly testing requirements strictly as a barrier to PrEP persistence, these individuals derived real benefit from regular screening. Our research illustrates that quarterly monitoring requirements are meaningful to telehealth PrEP users and may facilitate persistent engagement in receipt of PrEP care.

## Authors’ Note

Nurx personnel provided relevant and necessary background information of the company, its services, and users. The study design, data collection and analysis as well as the manuscript production were conducted independently by the researchers.

## Acknowledgments

The authors wish to thank the Nurx staff for assisting them with the recruitment activities. The authors also wish to thank their interns, Eve Kelly and Mirabel Levine, for their assistance with data organization and management. Finally, the authors extend their sincere appreciation to all the men and women who participated in their study.


## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was supported by a grant from the National Institutes of Health, University of California San Francisco-Gladstone Institute of Virology & Immunology Center for AIDS Research (P30 AI027763). Publication made possible in part by support from the UCSF Open Access Publishing Fund.

## ORCID iD

Kimberly A. Koester  <https://orcid.org/0000-0003-0023-1127>

## References

- Grant RM, Lama JR, Anderson PL, et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *N Engl J Med*. 2010;363(27):2587–2599.
- Baeten JM, Donnell D, Ndase P, et al. Antiretroviral prophylaxis for HIV prevention in heterosexual men and women. *N Engl J Med*. 2012;367(5):399–410.
- Thigpen MC, Kebaabetswe PM, Paxton LA, et al. Antiretroviral preexposure prophylaxis for heterosexual HIV transmission in Botswana. *N Engl J Med*. 2012;367(5):423–434.
- 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*. 2018;28(12):841–849. doi:10.1016/j.annepidem.2018.06.005.
- PrEPWatch. <https://www.prepwatch.org/>. Accessed January 28, 2020.
- Coy KC, Hazen RJ, Kirkham HS, Delpino A, Siegler AJ. Persistence on HIV preexposure prophylaxis medication over a 2-year period among a national sample of 7148 PrEP users, United States, 2015 to 2017. *J Int AIDS Soc*. 2019;22(2): e25252. doi:10.1002/jia2.25252.
- Nunn AS, Brinkley-Rubinstein L, Oldenburg CE, et al. Defining the HIV pre-exposure prophylaxis care continuum. *AIDS*. 2017; 31(5):731–734. doi:10.1097/QAD.0000000000001385.
- Holloway IW, Dougherty R, Gildner J, et al. Brief report: PrEP uptake, adherence, and discontinuation among California YMSM using geosocial networking applications. *J Acquir Immune Defic Syndr*. 2017;74(1):15–20. doi:10.1097/QAI.0000000000001164.
- 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. doi:10.1371/journal.pone.0172354.
- Whitfield THF, John SA, Rendina HJ, Grov C, Parsons JT. Why I quit pre-exposure prophylaxis (PrEP)? A mixed-method study exploring reasons for PrEP discontinuation and potential reinitiation among gay and bisexual men. *AIDS Behav*. 2018; (0123456789):1–10. doi:10.1007/s10461-018-2045-1.
- Siegler AJ, Mayer KH, Liu AY, et al. Developing and assessing the feasibility of a home-based preexposure prophylaxis monitoring and support program. *Clin Infect Dis*. 2018;ciy529–ciy529. doi:10.1093/cid/ciy529.
- Parsons JT, Rendina HJ, Lassiter JM, et al. Uptake of HIV pre-exposure prophylaxis (PrEP) in a national cohort of gay and bisexual men in the United States: The Motivational PrEP Cascade HHS Public Access. *J Acquir Immune Defic Syndr*. 2017;74(3):285–292. doi:10.1097/QAI.0000000000001251.
- Rusie LK, Orenge C, Burrell D, et al. Preexposure prophylaxis initiation and retention in care over 5 years, 2012–2017: are quarterly visits too much? *Clin Infect Dis*. 2018;67(2):283–287. doi:10.1093/cid/ciy160.
- Golub SA, Gamarel KE, Rendina HJ, Surace A, Lelutiu-Weinberger CL. 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;27(4):248–254. doi:10.1089/apc.2012.0419.
- Parsons JT, Rendina HJ, Whitfield THF, Grov C. Familiarity with and preferences for oral and long-acting injectable HIV pre-exposure prophylaxis (PrEP) in a national sample of gay and bisexual men in the U.S. *AIDS Behav*. 2016;20(7):1390–1399. doi:10.1007/s10461-016-1370-5.
- Spinelli MA, Scott HM, Vittinghoff E, et al. Missed visits associated with future preexposure prophylaxis (PrEP) discontinuation among PrEP users in a municipal primary care health network. *Open Forum Infect Dis*. 2019;6(4). doi:10.1093/ofid/ofz101.
- Touger R, Wood BR. A review of telehealth innovations for HIV pre-exposure prophylaxis (PrEP). *Curr HIV/AIDS Rep*. 2019; 16(1):113–119. doi:10.1007/s11904-019-00430-z.
- Refugio ON, Kimble MM, Silva CL, Lykens JE, Bannister C, Klausner JD. Brief Report: PrEPTECH: A telehealth-based initiation program for HIV pre-exposure prophylaxis in young men of color who have sex with men. A pilot study of feasibility. *J Acquir Immune Defic Syndr*. 2019;80(1):40–45.
- Centers for Disease Control and Prevention: US Public Health Service: Preexposure prophylaxis for the prevention of HIV infection in the United States—2017 Update: a clinical practice guideline. 2018. <https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2017.pdf>. Accessed January 28, 2020.
- Patton M. *Qualitative Evaluation and Research Methods*. Thousand Oaks: Sage; 1990. doi:10.1002/nur.4770140111.
- Guest G, Bunce A, Johnson L. How many interviews are enough? An experiment with data saturation and variability. *Field Methods*. 2006;18(1):59–82. doi:10.1177/1525822X05279903.
- Morse JM. Determining sample size. *Qual Health Res*. 2000; 10(1):3–5. doi:10.1177/104973200129118183.
- Dedoose Version 7.0.23. *Web Application for Managing, Analyzing, and Presenting Qualitative and Mixed Method Research Data*. Los Angeles, CA: Socio Cultural Research Consultants, LLC; 2016. [www.dedoose.com](http://www.dedoose.com). Accessed October 17, 2019.
- Fereday J, Muir-Cochrane E. Demonstrating rigor using thematic analysis: a hybrid approach of inductive and deductive coding and theme development. *Int J Qual Methods*. 2006;5(1):80–92.
- Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multidisciplinary health research. *BMC Med Res Methodol*. 2013; 13(1):117. doi:10.1186/1471-2288-13-117.
- Koester KA, Hughes SD, Gangeskar H, Engesæth E, Hawkins MGR. “For Someone Whose Life Is Very Busy and Unpredictable, This Service Is Like A Dream.” *Reaching Young Men Of Color Who Have Sex With Men Through On-Line PrEP Services*.



- Amsterdam, the Netherlands: International AIDS Society Meeting; 2018.
27. Jenness SM, Weiss KM, Goodreau SM, et al. Incidence of gonorrhea and chlamydia following human immunodeficiency virus preexposure prophylaxis among men who have sex with men: a modeling study. *Clin Infect Dis*. 2017;65(5):712–718. doi:10.1093/cid/cix439.
  28. Mugwanya KK, Baeten JM, Wyatt C, et al. Brief report: frequency of monitoring kidney function in HIV-uninfected persons using daily oral tenofovir disoproxil fumarate pre-exposure prophylaxis. *J Acquir Immune Defic Syndr*. 2018;77(2):9. [https://journals.lww.com/jaids/Fulltext/2018/02010/Brief\\_Report\\_\\_Frequency\\_of\\_Monitoring\\_Kidney.12.aspx](https://journals.lww.com/jaids/Fulltext/2018/02010/Brief_Report__Frequency_of_Monitoring_Kidney.12.aspx).
  29. Golub SA, Myers JE. Next-wave HIV pre-exposure prophylaxis implementation for gay and bisexual men. *AIDS Patient Care STDS*. 2019;33(6):253–261. doi:10.1089/apc.2018.0290.
  30. Mugwanya KK, Baeten JM. Safety of oral tenofovir disoproxil fumarate-based pre-exposure prophylaxis for HIV prevention. *Expert Opin Drug Saf*. 2016;15(2):265–273. doi:10.1517/14740338.2016.1128412.
  31. Tetteh RA, Yankey BA, Nartey ET, Lartey M, Leufkens HGM, Dodoo ANO. Pre-exposure prophylaxis for HIV prevention: safety concerns. *Drug Saf*. 2017;40(4):273–283. doi:10.1007/s40264-017-0505-6.
  32. Kojima N, Klausner JD. Is emtricitabine-tenofovir disoproxil fumarate pre-exposure prophylaxis for the prevention of human immunodeficiency virus infection safer than aspirin? *Open Forum Infect Dis*. 2016;3(1):9. doi:10.1093/ofid/ofv221.
  33. Mays N, Pope C. Qualitative research: rigour and qualitative research. *BMJ*. 1995;311(2):109–112.
  34. Kuper A, Lingard L, Levinson W. Critically appraising qualitative research. *BMJ*. 2008;337:a1035. doi:10.1136/bmj.a1035.