AIDS PATIENT CARE and STDs
Volume 34, Number 9, 2020
© Mary Ann Liebert, Inc.
DOI: 10.1089/apc.2020.0062

Stages of Adoption of "Treatment as Prevention" Among HIV-Negative Men Who Have Sex with Men Who Engage in Exchange Sex

Étienne Meunier, PhD,[1] Karolynn Siegel, PhD,[1]
Anne E. Sundelson, MSc,[1] and Eric W. Schrimshaw, PhD[2]

Abstract

Prior research found low acceptability of HIV treatment as prevention (TasP; or *Undetectable = Untransmittable*) among HIV-negative men who have sex with men (MSM). This study reports on qualitative data regarding TasP adoption in a sample of 170 self-reported HIV-negative MSM who had engaged in exchange sex (received money, drugs, or other things in exchange for sex). We classified participants along five stages of TasP adoption: 1–unaware of TasP (11.2%); 2–aware, but perceived ineffective (17.1%); 3–perceived effective, but unwilling to use (35.3%); 4–willing to rely on TasP, but had never done so (24.1%); and 5–had relied on TasP (12.4%). Obstacles to TasP adoption included the following: not believing that it could completely prevent HIV transmission; deeply ingrained fears of HIV/AIDS; concerns about viral load fluctuation; and reluctance to trust a partner's claimed undetectable status. TasP promotion efforts, which can decrease barriers to HIV testing and HIV stigma, will be more effective if tailored to the obstacles specific to each stage of TasP adoption.

Keywords: treatment as prevention (TasP), men who have sex with men (MSM), HIV prevention, exchange sex, precaution adoption process model (PAPM), undetectable equals untransmittable

Introduction

In 2017, the CDC issued the following prevention message regarding treatment as prevention (TasP): "People with HIV who take HIV medicine as prescribed and get and keep an undetectable viral load have effectively no risk of transmitting HIV to their HIV-negative sexual partners."[1] This statement is based on several clinical trials that demonstrated the effectiveness of TasP.[2–4] In these studies, no cases of HIV transmission occurred over tens of thousands of sex acts among serodiscordant couples (both male–female and male–male) in the absence of condoms or pre-exposure prophylaxis (PrEP) when the HIV-positive partner was virally suppressed. TasP is a strategy that could have multiple public health benefits, especially among men who have sex with men (MSM), who accounted for 70% of new HIV infections in the United States in 2018.[5] Because HIV stigma is often rooted in fears of infectiousness,[6–8] TasP has the potential to reduce that stigma by making people living with HIV (PLWH) noninfectious. Because HIV stigma has been shown to be a barrier to HIV testing,[9,10] engagement in HIV care,[8,11] and ART adherence,[12,13] its reduction could have important public health benefits. As such, efforts have been made to promote TasP among health care providers and the public, such as the *Undetectable = Untransmittable* (*U = U*) campaign, which was launched in 2016.[14]

For the public health potential of TasP to be realized, people need to be aware of it, believe in its effectiveness, and be comfortable relying on it. Recent surveys have shown that only a minority of MSM in the United States are still unaware of TasP or *U = U*,[15–17] for example, 8.3% in a recent US-wide sample.[18] Although the perceived effectiveness of TasP seems to be increasing,[10] it is consistently lower among HIV-negative/unaware MSM who have not used PrEP compared to those who are HIV positive or use PrEP.[15–22] For instance, Rendina and Parsons found that about four in five HIV-positive MSM in the United States perceived the *U = U* message as accurate compared to ~1 in 2 HIV-negative/unknown MSM.[18] Few HIV-negative MSM seem willing to rely on TasP (only 11% in a 2016 Australian

[1]Department of Sociomedical Sciences, Mailman School of Public Health, Columbia University Irving Medical Center, New York, New York, USA.
[2]Department of Population Health Sciences, College of Medicine, University of Central Florida, Orlando, Florida, USA.

survey),[20] and HIV-negative men who are not using PrEP report significantly fewer sex partners who are HIV-positive undetectable compared to those who are using PrEP or HIV positive.[23]

These findings raise questions regarding why some MSM do not perceive TasP as effective or would not be willing to rely on it. In qualitative studies, individuals in serodiscordant couples mentioned the difficulty of overcoming the fear of HIV as extremely contagious and devastating.[24–26] Others expressed concerns about the reliability of viral load test results[27] and their reluctance to trust that a partner is indeed virally suppressed, especially in the context of casual sex.[25] Qualitative studies so far have mostly looked at people who are living with HIV or in serodiscordant relationships; thus, there are still few data on barriers to TasP adoption among HIV-negative MSM at large.

The precaution adoption process model (PAPM)[28,29] can help understand TasP acceptability. The model seeks to identify the stages involved in the adoption of health-protective behaviors and the factors leading people to move between stages. It examines how people go from being unaware of an issue, to feeling engaged by it, making decisions about acting on it, and maintaining the adopted health-protective behavior. The PAPM invites researchers to look at factors and qualitative differences among people at different stages of adoption to tailor interventions to each stage. Applying the PAPM to TasP asks to understand why people may or may not move from being unaware of TasP to believing in its efficacy, to being willing to rely on it, and to actually using the strategy. This knowledge can help tailor TasP promotion and interventions to individuals at different stages of adoption. The model has been used to interpret survey findings about TasP,[20] although the different stages have not yet been fully defined.

This article provides a qualitative description of the stages of TasP adoption among a sample of HIV-negative/unaware MSM who had sex in exchange for money, drugs, or other things (exchange sex). According to data from the CDC, men who reported selling sex in the previous year (compared to those who did not) were more likely to have undiagnosed HIV infection and to report partners of unknown HIV status.[30] They are also more likely to report higher numbers of recent sex partners[30,31] and condomless anal sex.[30,32] TasP can thus serve as an additional protective strategy (in addition to condoms and PrEP) for a population at high risk of HIV. In addition, because exchange sex can lead to having frequent new sex partners about whom little is known, the acceptability of TasP among MSM engaging in exchange sex can also help understand the strategy's relevance in the more general context of casual sex among MSM. In this study, we sought to understand how participants understood TasP, why they perceived it to be effective or not, why they would rely on it or not, and their experiences with HIV-positive undetectable sex partners.

Methods

Participants

The findings reported here are part of a larger HIV prevention study with HIV-negative/unknown MSM who engaged in exchange sex (received money, drugs, shelter, or other goods in exchange for sex) with partners they found on hookup apps or websites. With the goal of developing HIV prevention interventions relevant to this population, the study examined participants' pathways into exchange sex, how they negotiate with exchange partners, their HIV risk and prevention behaviors, and their receptivity to different forms of interventions.

To be eligible, participants had to (a) have been assigned male sex at birth and currently identify as men, genderqueer, or nonbinary; (b) be 18–45 years old; (c) self-report never having tested positive for HIV; (d) self-identify as black/African American, white/Caucasian, or Hispanic/Latino of any race; (e) report being fluent in English; (f) reside in the areas of Atlanta, GA; Baltimore, MD; Boston, MA; Chicago, IL; Detroit, MI; New York, NY; Philadelphia, PA; or Washington, D.C.; (g) report having received money, drugs, shelter, or other goods in exchange for any kind of sex with at least two different male partners (exchange partners) in the previous 3 months; (h) report anal sex with at least one of their exchange partners from the previous 3 months; and (i) have initially met at least one of their exchange partners from the last 3 months on a hookup/dating app or website. We used quota sampling to ensure an approximately equal distribution of participants across racial/ethnic categories (black non-Hispanic, white non-Hispanic, and Hispanic/Latino), age groups (18–29 and 30–45), and sexual risk-taking (those who consistently used PrEP and/or condoms with their exchange partners in the previous 3 months and those who did not).

Recruitment

Participants were recruited online between October 2018 and April 2020. Throughout the recruitment period, we posted study advertisements on social networking websites and hookup apps/websites popular among MSM. The advertisements stated that researchers at Columbia University were looking for men willing to talk about how they negotiate encounters with other men they meet on apps and that eligible participants would earn $100 for completing a telephone interview. Those who clicked on the advertisement were redirected to Qualtrics, where they were invited to take a 5-min confidential screening survey. At the end of the questionnaire, participants were immediately notified of their eligibility and, if relevant, invited to provide their contact information. Study staff contacted eligible participants to schedule the study procedures below.

Procedures

First, eligible participants completed an interviewer-administered questionnaire over the phone that elicited information about their sociodemographics, sexual behaviors, and sexual health. At the end of the call, study staff emailed participants a web link to a self-administered questionnaire (SAQ) that included more in-depth items about sexual behaviors and standard measures of mental health and substance use. Once they had completed the SAQ, participants completed an in-depth qualitative telephone interview (average duration: 88 min and standard deviation: 24), during which they were asked about their history of engagement in exchange sex, their recent experiences with exchange partners, and their HIV/STI prevention strategies. After completing the qualitative interview, participants received a code redeemable for $100 on Amazon.com. Of the 209 participants who enrolled in the study, 180 completed all procedures

and were retained in the final sample. The time it took for participants to progress through all three stages of data collection depended on their availability and took on average 1 week.

Interview questions

This article reports on responses to questions about TasP from the qualitative interview. During the interview, participants were asked, ''Have you heard about treatment as prevention or *Undetectable = Untransmittable (U = U)*?'' If they indicated they had not, the interviewer then read them the CDC statement on TasP (quoted in Introduction).[1] Then, all participants were asked what they thought about TasP, if they felt it was safe for them to have condomless sex with an HIV-positive-undetectable partner, and whether they ever had or would have sex with someone who was HIV-positive undetectable. In follow-up questions, interviewers asked participants to expand on their attitude toward TasP and/or their experiences with it.

Analysis

Interview transcripts were coded using ATLAS.ti. In the first cycle of coding, two researchers labeled the transcript sections pertaining to TasP. Then, they independently began classifying participants' attitudes toward TasP. The authors then discussed preliminary findings and chose the PAPM to classify the stages of TasP adoption in the sample. The first author then refined the five-stage classification described in the findings. Two researchers then independently classified each participant into one of the five stages. Classification discrepancies were resolved through discussions among the study team. Through the classification process, coders also identified recurring explanations related to participants' adoption or nonadoption of TasP. Ten participants who did not provide sufficient information to be classified into a stage of the model (e.g., because they chose not to answer or had to cut the interview short) were excluded from this analysis, resulting in an analytic sample of 170.

Results

Table 1 shows participants' characteristics. Median age was 28.5 (range 18–45). There were 28.2% of participants who identified as black/African American, 48.2% as white/Caucasian, and 23.5% as multi-racial or other racial identities. For ethnicity, 35.3% of participants identified as Hispanic/Latino. About 83% had at least some college education. Most participants (85.9%) identified as gay, homosexual, or queer, and the majority (75.9%) was single.

We adapted the stages of the PAPM to classify participants' responses to the questions about TasP. Stage 1 included participants who were not aware of TasP before being told about it in the interview (19; 11.2%). In Stage 2, participants were aware of TasP, but did not perceive the strategy to be entirely effective (29; 17.1%). Participants in Stage 3 had complete and correct knowledge about TasP and understood it to be effective, but were not willing to rely on it (60; 35.3%). Participants in Stage 4 expressed willingness to rely on TasP, but had never done so (41; 24.1%). Finally, Stage 5 included those who had already relied on the strategy (21; 12.4%), which we defined as having had anal sex with an HIV-positive partner without using condoms or PrEP, knowing that the partner's viral suppression would prevent HIV transmission. Participants discussed their attitudes toward TasP in general, that is, in relationship to any type of sex partner (paying or nonpaying). At each stage, there was an approximately even distribution of participants of different ages and racial/ethnic identities.

Table 1. Participant Characteristics ($N = 170$)

	n	%
Age (median/min–max)	28.5	18–45
Hispanic/Latino	60	(35.3)
Racial identity		
Black/African American	48	(28.2)
White/Caucasian	82	(48.2)
Multi-racial/other	40	(23.5)
Education		
High School or less	29	(17.1)
Some college/bachelors	109	(64.1)
Graduate	32	(18.8)
Sexual identity		
Gay/homosexual/queer	146	(85.9)
Bisexual/other	24	(14.1)
Relationship status		
Single	129	(75.9)
In a relationship	41	(24.1)

Stage 1: Unaware

Stage 1 encompassed participants who had never heard about TasP or only had a very vague awareness of the terms, without knowing what they meant. After the interviewer explained what the strategy was, these participants expressed a range of reactions such as indifference, incredulity, or interest, as further described below.

Unfavorable reactions.

Participants who felt indifferent did not think that TasP would change their current sexual practices. They felt that the strategy did not apply to them because of their typical sexual behaviors. Shawn,* for example, felt that using condoms was always preferable with casual or exchange partners and learning about TasP did not change his position: ''That makes it no justification for sleeping with nobody without a condom, though'' (Shawn, 41, black). Carlos also felt like TasP would not change his usual sexual behavior, as he seldom had anal sex: ''I always am trying to avoid actual penetrative sex, so I would do my usual thing and try to avoid it that way'' (Carlos, 22, Latino). Thus, it seems those with little desire to have condomless sex may not think that TasP is relevant to them and are probably unlikely to adopt the strategy.

Other participants who learned about TasP during the interview expressed suspicions about the strategy's effectiveness or an ongoing worry about having sex with HIV-positive partners. Juan, for example, felt that viral suppression could only lower the risk of transmission, without eliminating it completely: ''That just seems sketchy to me. I don't know. I feel like even though it says they're undetectable, I feel like

*Pseudonyms were assigned using a random name generator.

there's probably still some slim chance that they could pass it on to you'' (Juan, 25, Latino). Even among those who did not raise questions about the efficacy of TasP, there were participants who felt like the fear of infectivity would be difficult to shake off. Alan expressed that HIV stigma resulting from the devastation of AIDS early in the epidemic would make it difficult for him to rely on TasP:

> I would feel bad about it. It's such a stigma and I play into that, but it also just scares me. It would take a lot for me to really get past that after hearing everything from the '80s, which I know was a different time, but I don't know. (Alan, 30, white)

Some participants said that learning about TasP would not change their preference for avoiding HIV-positive partners altogether. For example, after hearing an explanation of TasP, Dennis still felt like he would be risking his life by having sex with HIV-positive partners. He said he would need to know more about the research behind the strategy to consider it.

> I honestly wouldn't take the risk of having any sexual contact with them. Even if they tell me, ''Hey my virus is undetected.'' I don't feel secure enough, I don't have the knowledge of that research. I really don't feel like I'm knowledgeable to know enough to put my life under risk or put my health under risk. (Dennis, 23, Latino)

Other participants simply did not feel that TasP was a reason to consider having sex with partners who were HIV positive. For example, Patrick felt that TasP was a positive thing, but, when asked if it would change his opinion about avoiding HIV-positive partners, said, ''I think that [*U* = *U*] is cool. I've seen people that say they're positive, but I wouldn't talk to them.. .. There's just too many guys. Why would I settle for that?'' (Patrick, 24, black Hispanic).

Favorable reactions. Others who were previously unaware of TasP expressed that learning about it might make them feel safer having sex with HIV-positive-undetectable partners. The following participant said that, after confirming the accuracy of the information he had just received, he would feel comfortable relying on TasP:

> I've never even heard of it. I'm no scientist or anything like that, but for me I'd like to know that it actually fully works, the product. But if that was guaranteed for me, yeah, why not? People are people, it doesn't matter what is going on with you. (Frank, 26, white)

Participants who reacted positively to learning about TasP were, in some cases, people who had already been comfortable having sex with HIV-positive partners. For them, learning about TasP made them feel like it would be even safer to have sex with serodiscordant partners. For instance, Todd, who had had sex with condoms with an HIV-positive partner in the past, said he now felt even safer knowing that the person was probably virally suppressed.

> I used a condom. They said they were taking their meds, but I feel much safer now that you told me this information. People who are HIV positive and are undetectable, they can't give the virus off to someone. That's great. And it also makes, basically, HIV just a three-letter word for them. (Todd, 30, black)

Thus, participants who did not already hold stigmatizing or exclusionary attitudes toward PLWH seemed more inclined to view TasP in a positive light after learning about the strategy.

Stage 2: Aware, but perceived ineffective

In Stage 2, participants were aware of TasP, but either did not fully understand it or refused to believe in its effectiveness. None agreed that viral suppression could completely eliminate the risk of HIV transmission. Some would refuse to have sex with anyone they knew to be HIV positive, while others might feel comfortable doing so only under the protection of condoms or PrEP.

Incomplete/incorrect knowledge. Some participants at this stage were unwilling to rely on TasP because they felt they did not know enough about what undetectable meant or how it could make someone untransmittable. Some also felt like they did not know enough about the evidence supporting TasP to feel confident in its effectiveness. For example, Andy considered it risky to have sex with HIV-positive undetectable partners because he did not have enough information about TasP.

> I still think it's risky to have sex with someone that's undetectable, I guess because I don't have information on it. I don't really know too much, I just know that they can't transmit but I think it's still in their body or something? I guess I don't have enough information about it. (Andy, 28, Latino)

As illustrated by the participant above, some participants were unclear about whether people who were undetectable still carried the virus. They were puzzled about how people who are virally suppressed could not transmit HIV and thus still perceived it to be risky to have sex with HIV-positive partners. Even some who had done some research into TasP had reservations about it. One concern was that TasP was a new discovery and that, even if there was evidence showing it to be effective, it could be refuted in the future. For instance, Eric had done some research on the strategy, but did not want to trust it as it was too new.

> I don't really know if I trust it 100%. Done my research, looked it up. It's not my favorite thing. I understand the research and everything behind it, but again I think it's just something that is a new thing. So it's like a little too new to me. (Eric, 26, white)

A common misconception at Stage 2 was that TasP only reduced the risk of HIV transmission. For these participants, the notion that HIV-positive people who are virally suppressed cannot transmit the virus did not register as they believed TasP to be highly, but not completely, effective in preventing transmission. For Carl, that marginal risk was considerable enough that he would only agree to condomless sex with partners who were HIV negative.

> I've heard people can have it and be undetectable. I feel like you could still get it from the person, but the risk is much lower, which I'm like, ''Okay, that's fine.'' But learning more and more about that, it's like I just want to make sure, no matter what, I'm using condoms unless I know for sure the person doesn't have it. [Otherwise,] I wouldn't want to be like a jerk, but I would probably just say, ''No, I don't want to take my chances at all.'' (Carl, 21, white)

Skepticism. Participants mentioned above acknowledged that they did not fully understand TasP or honestly misunderstood the fact that it was completely protective against HIV transmission. There were other participants in Stage 2 who had heard that TasP completely prevented HIV transmission but who simply refused to believe that claim. Like Jeremy, these participants were unwilling to have sex with HIV-positive partners, virally suppressed or not.

> I have [heard about $U = U$], but that doesn't sit well with me. If somebody tells me that they have HIV but they're undetectable, I'll probably pass because it's just certain stuff that I don't believe, and I don't believe that. I don't believe that if you're undetectable you're untransmittable. (Jeremy, 19, Latino)

Participants who did not believe in TasP often pointed to the fact that it was impossible to completely clear the virus from someone with HIV. Some were closed off to trying to understand the claims of $U = U$: ''It's bullshit. Once you have it, you have it. That's it'' (Ed, 28, white). Others were concerned that the virus was only dormant in undetectable people and could become active again at any time. The following participant compared suppressed HIV to landmines that could go off any second:

> I don't believe it. It's still there. You still have it. Even though it's undetectable, it's still there. It's like those old World War II mines people dig up in Europe. No one knows they're there. They never heard about it or seen it, or known it was there. But then they dig it up 1 day and they're like, oh shit, this is going to blow up any second. That's kind of how I see it. It's a landmine. You don't know it's there, but it's still there and it could go off. (Josh, 27, white)

It was easy for such participants to dismiss the claims of TasP as they did not feel like they needed the strategy to protect themselves from HIV. Many felt justified in their choice to avoid HIV-positive partners altogether, ''It's just because I'm cautious about diseases'' (Kevin, 33, white). Some participants who were skeptical of TasP also thought that its promotion was problematic, in that, it could motivate HIV-positive people to engage in risky sexual behavior. The following participant claimed the undetectable people he knew acted as if they did not have HIV and used that as a justification to not use condoms. He thought that was a problem as he did not believe them to be untransmittable.

> I have friends who are HIV positive and undetectable, and they believe they can't transmit HIV, and I don't believe it. I don't believe them at all. And most people I know who are HIV positive don't like to use condoms for whatever reason. I know a lot of them who will say, ''Oh, well, I'm undetectable so I don't need to use a condom.'' And I think that's the problem about $U = U$. The problem that people who are undetectable make it seem as if they don't have HIV at all. (Ethan, 34, black)

Thus, for many participants in that stage, it would be difficult to convince them that TasP is completely effective in preventing HIV transmission, as they felt more comfortable viewing it with a dose of skepticism.

Stage 3: Knowledgeable, but not willing to rely on TasP

In Stage 3, participants fully understood and agreed that TasP was completely effective at preventing HIV transmission; however, they were still unwilling to rely on the strategy. Some of them expressed that they would only feel comfortable having sex with HIV-positive-undetectable men in combination with other HIV prevention methods like condoms or PrEP, while others still would not feel comfortable having sex with anyone HIV positive. For men in this group, barriers to TasP adoption included difficulty trusting whether someone was truly undetectable, worries about viral loads fluctuating, and irrational fears about HIV transmission.

Difficulty trusting viral load status. Participants acknowledged that a challenge with TasP was not being able to know whether someone really was virally suppressed. Especially, in the case of casual or exchange sex, participants might not know whether HIV-positive partners were properly engaged in care and treatment, and might not have access to their test results. Relying on condoms or PrEP would resolve this problem, as expressed by Gary:

> If someone is undetectable, I'm not their doctor, I'm not treating them, so I don't know them. Unless it's somebody I really trusted, I would probably still make sure I was on PrEP before I had any kind of unprotected sex with them. (Gary, 29, Latino)

These participants were unwilling to rely on partners' self-report of being undetectable in the same way that they were unwilling to take claims of being HIV negative at face value. They agreed with $U = U$, but felt like the strategy could not apply to casual or exchange sex. With partners they had met recently, they felt that it was their responsibility to protect themselves using PrEP or condoms, regardless of what claims such partners made regarding their HIV status or viral load.

> Even if someone says that they have a zero viral load and they're undetectable, if it's the first time I'm ever meeting them for a hook up, I'm basically just trusting them on their word. It would make me feel better to also have the added protection of a condom. (Aaron, 27, white)

At the extreme, there was also the concern that people could deliberately lie about being undetectable in an attempt to infect others. For example, Fred preferred not to have sex with HIV-positive partners claiming to be undetectable for fear that they could be lying:

> I'm never just going to fully trust a stranger regardless of what they say their status is. … Personally, I choose not to risk leading with people that are positive for solely sexual purposes because of the fact that there are people out there that lie about their medication usage, and their undetectable status and stuff. There are people that purposefully try to infect others. (Fred, 18, black)

The participants above agreed with the fact that people who are truly virally suppressed cannot transmit the virus to their sex partners, but they did not find TasP to be an appropriate prevention strategy as they were unable to trust the validity of someone claiming to be undetectable.

Viral load fluctuation. Another barrier to relying on TasP was the concern that viral load could fluctuate. The participants below were not so concerned with the honesty of a partner claiming to be virally suppressed, but worried that

a previous undetectable test result might not be valid anymore. For instance, Bobby felt comfortable having sex with undetectable partners using condoms, but would need more assurance about the stability of viral loads before foregoing condoms.

> I would just want to know one or two more things about what exactly it entails, because the knowledge gap that I think I have is how much variance is there within detectability. If you're undetectable at one point, is it possible that within 2 months it becomes transmittable again? That would be the big question I would have but if the research says it's not going to transmit under these circumstances, then I would be totally comfortable. I would maybe be comfortable without that assurance but with a condom. (Bobby, 25, white)

These participants understood the science supporting the fact that people who are virally suppressed cannot transmit HIV to their sex partners. However, they felt like they needed more information about how quickly viral loads could fluctuate, how long tests were valid for, and how much adherence was required to maintain viral suppression. Like Matt, some wondered if missing even one daily dose of ART could raise someone's viral load to detectable levels.

> It makes me a little nervous because what if they're not always undetectable? Sometimes it makes me feel like, can that fluctuate up and down, different days? One day you're undetectable, the next day, you might have not taken your medicine, what are you now? I don't know how often you get tested to be undetectable. So, if you get tested once a month, there's no guarantee in that month period, that you're completely undetectable all those moments. (Matt, 27, black)

These participants wanted to support TasP, but needed more information about how adherence could make viral load fluctuate before being willing to rely on it. And even with partners who claim to be fully adherent to their medication, some were still concerned about not being able to really know whether or not that was true. Chris preferred using condoms with undetectable partners as he would not be able to know if they had discontinued treatment.

> If someone's undetectable, then they can't transmit. For all intents and purposes, they're HIV negative as long as they continue using their medication. I've had sex with people who were positive undetectable and I continue my safe sex practices. I would not have sex without condoms with someone who said they were positive undetectable, because I also don't know if that person has stopped taking their medication or something. (Chris, 27, white)

Irrational fears. Among some participants who understood that TasP was fully effective, there were still deeply ingrained concerns about HIV infectiousness that were not rational, but hard to shake off. These participants understood the scientific evidence indicating that they could safely rely on TasP, but felt it was psychologically challenging to do so as they had been conditioned to perceive HIV as a threat for so long. Dan, for example, felt that sex with HIV-positive partners was inherently scary, although he acknowledged that this fear was rooted in stigma.

> I feel like I would still want to use a condom in that case. Open to it, but maybe I'm being a little bit victim of the stigma here, but it still seems just a little bit more inherently scary. But, scientifically, I shouldn't have any concerns, I guess. So, I guess my rational and emotional sides are little in conflict there. (Dan, 23, white)

The difficulty overcoming worries about having sex with HIV-positive people could lead to internal struggles in participants' minds. For example, Charles felt very bad about his preference to not have sex with HIV-positive partners, despite fully understanding that it would be safe to do so.

> What's really upsetting about this is that I know that there's no risk. I know that the risk is so, so, so minimal that it's basically not even there. That's why they're calling it undetectable, and untransferable, or whatever it is. I know there's no risks there, but it's in my mind, and maybe that's stigma that I have. Does that make me a bad person then? Maybe that's something I need to talk to somebody about or talk in my head. (Charles, 33, white)

Even if they knew TasP made it safe, some participants said they simply could not get sexually aroused by people with HIV: ''I'm just very paranoid that I'm going to end up sick. And I don't think sex is worth it. I feel like I'd even have a hard time maintaining an erection because I feel like I would think about it'' (Craig, 33, Latino). Similarly, Rob acknowledged that undetectable partners might be the safest; nevertheless, he could not enjoy having sex with anyone HIV positive as the illness would be a cloud hanging over his head.

> I understand the science of it and that, in many ways, people who are positive but undetectable are some of the safest people to have sex with because there is no possible way for them to transmit HIV to you. Honestly, when people tell me that they're undetectable, even if I find them sexually attractive, even knowing the science and the risk, I don't do it. I've never done it. That's not because I'm afraid of contracting anything at that point; I think I just won't enjoy the experience. I don't even watch pornography with people who I know to be HIV positive. I objectively and rationally know the chances are exceedingly low, but I just don't think I will enjoy the experience because it feels like a cloud sort of hangs overhead. (Rob, 35, white)

These participants understood that their reluctance to have sex with HIV-positive people was a result of being conditioned to think of HIV as a life-threatening disease. As expressed by Douglas, relying on TasP would require rewiring the way he was taught to think about HIV.

> I'm not going to lie, it's still a difficult concept for me to grasp when it comes to me having sex with someone. I'm sort of trying to re-school stigmas, but it's hard. You're told your whole life, ''if someone's HIV positive, don't sleep with them, especially unprotected.'' And then, now with $U = U$ you have to rewire your way of thinking. (Douglas, 24, black)

The participants above had received the message of $U = U$ loud and clear. They understood that having sex with someone undetectable would present no risk of HIV acquisition. However, understanding TasP had not changed their deeply ingrained fears about having sex with HIV-positive people. Although they understood it was irrational, they still did not feel comfortable relying on TasP.

Stage 4: Willingness to rely on TasP

In Stage 4, participants were willing to rely on TasP, but had not yet done so. These participants trusted the evidence

that TasP alone can completely prevent HIV transmission and, although the opportunity had not yet presented itself, would feel safe relying on the strategy.

Trusting science and HIV-positive partners.

Participants mentioned trusting that TasP was effective because health agencies endorsed the strategy. The following participant said it would be no issue for him to rely on TasP because the CDC stated it was effective.

> From what I understand, the research shows that if your viral load is undetectable, that it's no longer contagious. If that's the reality, and I'm pretty sure that that's what the CDC has said, so then, yeah! I guess that makes sense that if it's not transmittable, then there's no issue there. (Rick, 31, white)

Another reason participants were willing to rely on TasP was the notion that people who are virally suppressed might be among the healthiest sex partners due to their required regular visits with health care providers. For example, Terry preferred sex partners who were either on PrEP or undetectable:

> It's guys on PrEP and guys who have HIV positive undetectable are like, to me, the safest bets of people to have sex with because they're pretty on top of testing and their health in general. (Terry, 25, white)

For these participants, potential partners who did not know their HIV status or who had not been tested recently were perceived as riskier than undetectable partners. They also felt that disclosure of HIV-positive and undetectable status would show honesty and trustworthiness. Participants also associated positive qualities with people who were HIV-positive undetectable. When asked how he would feel about having sex with an HIV-positive-undetectable partner, Sam said,

> I would feel safe because at least they're honest and upfront. And actually it means that usually they take care of themselves. I mean they take care of their own health, right? I hate it when people say, ''I don't know.'' ''You don't know your status?'' You should know your status, right? Honesty goes a long way. (Sam, 42, white)

Compared to participants in Stage 3 who brought up issues of trust, some participants in Stage 4 and beyond seemed willing to trust potential partners who said they were undetectable. They felt that people who disclosed being undetectable would have little interest in lying about it. The following participant felt that HIV treatment was accessible in his city of residence (New York), and thus that it would be unlikely for someone to pretend to be undetectable.

> If they're undetectable, yes. I wouldn't want to press somebody to give me their paperwork to show me that they are. Also I just feel like we're in New York, people can generally find a way to get the treatment they need here at least. I feel like if you know what undetectable is, unless you're some sort of sociopath that's trying to trick people, you wouldn't really be lying about it. (James, 24, Latino)

Conditions for relying on TasP.

Other participants at this stage had conditions under which they would be willing to rely on TasP. A common one was to have enough knowledge of the person to be able to trust that they were virally suppressed and adherent to treatment. For example, Jimmy said that he would only be willing to have sex without condoms with partners of any HIV status if he knew them well.

> It's something I would have to think about, but that's sort of true of all cases of people I've had sex with without a condom. It's something I really have to know them very well. But, if I knew them very well, I don't see any reason why I wouldn't. (Jimmy, 24, black)

In the context of exchange sex, the need to know a partner well enough to trust that they were indeed virally suppressed and adherent to their medication was what made relying on TasP difficult. Participants often met with first-time exchange partners without knowing much about who they were or whether they were trustworthy. As Derrick explained, he would only be able to rely on TasP with a long-term exchange partner: ''It would have to be a longtime client, not a first-time. … It is about trusting not just what he says, but trusting who he is'' (Derrick, 45, black).

Participants had different perspectives regarding asking for proof of undetectable status to potential sex partners. Some said they would need to see recent test results showing viral suppression before relying on TasP.

> Regardless, sort of condoms are always my policy. If someone was undetectable, and they wanted to have unprotected sex, which has never happened, but I think I'd probably ask for some sort of receipt or proof of their status. (Joe, 19, white)

Others felt that asking for test results might be an unnecessary inconvenience. Kenn, for example, felt that he would not need to ask for proof of undetectable status, but that he would want to know the person enough to trust what they say.

> I don't know if I would want to give them that many hoops to jump through. It should be someone that I would want to feel fairly close to. That feels like it should be a given for sexual partners. It's someone who I have a certain amount of trust and could and would feel comfortable trusting them when they told me that this was in fact the case. (Kenn, 25, white)

Continued relevance of PrEP and STI prevention.

Participants in Stage 4 had not yet relied on TasP either because they had never encountered partners they knew to be HIV-positive undetectable or because they had used other prevention strategies in combination. All participants in this study had a minimum of two exchange sex partners in the previous 3 months, and many of them in Stage 4 were taking daily PrEP to prevent HIV because they had multiple exchange and nonpaying partners. Many participants at this stage had had sex with HIV-positive undetectable partners, while being under the protection of PrEP, thus not relying on TasP. Although they agreed that they did not need PrEP to protect themselves from HIV with undetectable partners, they were still committed to taking it regularly to be safe with other partners. The following participant, who had condomless sex with an undetectable partner, said that the question of whether he would do so without PrEP was moot.

> With knowing that he was being treated and that I was being treated I was really unconcerned there wouldn't be any HIV transmission. If I was not on PrEP, that's hard to answer because I don't see myself ever going off of PrEP. It's a hypothetical question at that point. Ultimately, you can only protect yourself. I'm staying on PrEP. (Billy, 42, white)

At this stage, there were also participants who would only have sex with HIV-positive undetectable men using condoms. However, compared to participants in Stage 3 who would use condoms with undetectable partners because they could not fully rely on TasP, those in Stage 4 did so only to protect themselves from other STIs. These were participants who preferred using condoms with every sex partner, regardless of HIV status. For example, Jerry called it a ''personal preference'': ''If they're like, 'I'm undetectable,' there's still STDs, so it still makes sense to use a condom. It's just a person preference to use a condom'' (Jerry, 21, black). Another participant emphasized the importance of using condoms to protect himself from STIs even though HIV was not transmissible with undetectable partners, especially because he was in a relationship.

> I'd be willing to have sex with undetectable individuals and would be more comfortable using a condom as well, both just in terms of—knowing that HIV isn't transmissible—but other STIs obviously still are. And the agreement with my principal partner of like engaging in unprotected sex outside of our relationship. (Tim, 30, white)

Although participants in Stage 4 felt that TasP was reliable enough for them to feel safe having sex with undetectable partners with no other protection, the strategy did not supplant the need for other prevention strategies. PrEP and/or consistent condom use were still necessary to protect themselves from HIV as they had multiple partners who could be of any HIV status, and condoms were still preferable to protect from STIs.

Stage 5: Relied on TasP

In the final stage were participants who relied on TasP, meaning that they had had anal sex with an HIV-positive partner without condoms or PrEP and knew that the partner's viral suppression protected them from getting HIV.

Positive views about HIV-positive undetectable partners. Some of the participants at this stage even expressed a preference for sex partners who were undetectable. For example, Sean felt that men who were virally suppressed were safer partners than other men.

> More often than not, the guys I hook up with are HIV positive undetectable. So there's a higher degree of safety there because they're more aware of their testing and all those things than your typical gay boy. But again, I do always ask about their sexual history, their safer sex practices, and I'm honest and up front. (Sean, 32, white)

For the following participant, HIV-positive undetectable partners were safer than those who claimed to be HIV negative because HIV was often transmitted by people who had undiagnosed HIV infection.

> I think having sex with someone who is HIV positive, who knows that they are undetectable, is safer than someone who tells me that they're HIV negative, and aren't on PrEP. I think it's much safer, so I have no problems having sex with someone without a condom who is undetectable. I think most HIV infections occur from someone who thinks that they're HIV negative, but have recently been infected with HIV, so their viral load is up the roof, and they're more likely to pass on the virus than someone who's had the virus for, let's say, a year or two, that are on medication, and undetectable. (Adam, 36, Latino)

Participants felt that partners claiming to be undetectable would be unlikely to misrepresent that and could be trusted. Some of them noted that there would be a risk in lying about being virally suppressed, as they could be held accountable for deliberately infecting partners. For example, Larry thought that an HIV-positive partner who was not virally suppressed would be taking legal risk in misrepresenting himself as undetectable.

> I felt fine because he said he was on this and this and that and I was like, ''Okay.'' I also feel you could be sued if you transmit the disease willingly or withhold information that you have HIV. In my head I'm like, ''Oh, well, I don't think they're going to risk that, this lawsuit, if they really aren't undetectable.'' (Larry, 27, black)

Although participants at this stage had been able to rely on TasP, some admitted they had not done so without anxiety. Similar to what participants at other stages expressed, they had lingering fears of HIV infection, despite knowing rationally that they were not taking any risks. The following participant said that his worries relying on TasP would have been alleviated if he could have seen test results or a prescription bottle from his partner. However, he felt like this might have ruined the mood and chose to pursue the encounter without proof of viral suppression.

> I said, ''Okay. Well, cool. If you have viral suppression, I take your word for it. And that's fine. And you can't transmit it to me.'' And there were times when I got kind of worried a little bit sometimes, not for any reason. Like no symptoms or anything, but I just thought to myself, ''What if he… How do I know for sure?'' And I even thought to myself, ''Well, would it be really rude to ask? Do you have your most recent printouts from your labs or something? Or can I see your bottle of medicine so I know that you're picking up the bottle every month?'' But I just thought, ''Well, that's just going to be kind of like a buzz kill.'' (Bruce, 40, Latino)

Gaining confidence in TasP. Even though they knew there was evidence supporting the effectiveness of TasP, relying on the strategy felt like a leap of faith to some participants. The following participant discussed asking God to protect him before receptive anal sex with an undetectable partner, even though he had been educated about TasP in HIV studies.

> During the studies, they told you about everything: when you're undetectable, it's like a zero chance of giving to the partner and whatnot. However, whoever's receiving, which in my case, I'm that person most of the times, it's more likely for them to get it and whatnot. Some of the times, I just make a cross on my body, and I just ask God to cover me. (Steve, 28, black)

Participants talked about becoming increasingly comfortable relying on TasP with experience. For example, after having had sex with an undetectable partner, Jon got scared because he got diagnosed with gonorrhea and was worried that might have made TasP ineffective. His partner reassured him and Jon tested HIV negative after the event, making him now feel much more confident relying on TasP.

> I was less educated then than I am now. I was very concerned because, if you get an STD from someone who also has HIV, you're more likely to become HIV positive. But he then,

> thankfully, educated me on what being undetectable really meant and how I was at no risk. So then I just went to the clinic. I got treated for the gonorrhea. I made sure to, obviously, continue to get tested for HIV to make sure that nothing did happen even though it is impossible. And, after that, I've always obviously felt very comfortable about having sex with undetectable people. Because I am educated on how they cannot transmit the virus so there is no danger. (Jon, 23, white)

Consistently testing HIV negative after different encounters with undetectable partners increased participants' endorsement of TasP. Repeated experiences with TasP made participants not only adopters but also proponents of the strategy.

> But I think it's really great. I've had sex with two people who were undetectable without a condom in the past year. Here I am, I have no HIV, so we're fine. I have no problem with it. I buy into it. I know the science. I trust it. I believe in it. I'm a proponent of it, I guess. (Paul, 25, white)

Discussion

Public health scientists see TasP promotion as an important tool in ending the HIV epidemic as it can motivate people to get tested, engage in care, and adhere to treatment.[33,34] Although prior studies have found the acceptability of TasP to be increasing among MSM, it remains lowest among HIV-negative MSM, especially those who do not use PrEP.[15–22] Qualitative research can illuminate the reasons why people may want to adopt TasP or not, but so far, studies have only investigated the issue among PLWH and their HIV-negative partners. This study used the PAPM to analyze qualitative data about TasP acceptability among HIV-negative MSM who engage in exchange sex, who are at high risk of HIV and need every prevention tool at their disposition.[30–32] Although men engaging in exchange sex are a small subset of the MSM population, they provide an interesting perspective on TasP acceptability among people who regularly meet with new sex partners. As such, their barriers to TasP adoption can be informative of how to promote TasP among a broader population of MSM who engage in casual (nonexchange) sex.

Consistent with survey studies,[15–17] only a minority of participants in our study were unaware of TasP (Stage 1), which might be a result of efforts to raise awareness of the strategy such as the $U = U$ campaign.[14] However, people who are aware of TasP do not necessarily have accurate or complete knowledge of it or may not believe in it (Stage 2). Similar to another study,[35] participants in our study who were aware of TasP did not always understand or agree with the science behind the strategy. A common misconception was that TasP only reduced infectivity, without completely eliminating it. Some participants were also unsure whether undetectable meant being free of the virus, while others had a hard time understanding how someone who carried the virus could not transmit it. Even participants at later stages of adoption expressed a need to clarify some facts about TasP. For instance, they were unsure about the variability of HIV viral load, some believing that missing as little as one daily dose of ART could increase viral load. All these doubts or misconceptions led to one conclusion: that TasP was not a foolproof and reliable method to prevent HIV transmission. Thus, promotion efforts seem to have worked at making MSM aware of TasP, but there is still a need to increase actual knowledge about the strategy and how to rely on it.

Because HIV stigma is often based on fears of infectiousness,[6–8] there is great hope that TasP—by rendering HIV-positive people noninfectious—could reduce HIV stigma.[34] However, that stigma and fear still prevented many participants who were aware of TasP from even considering the possibility of having any kind of sexual activity with HIV-positive partners, undetectable or not. Within Stage 2, there were participants who had heard of TasP, but simply refused to believe that viral suppression made HIV untransmittable. In Stage 3, participants fully understood and agreed with the evidence supporting TasP, but were not yet willing to rely on it, in some cases because of deeply rooted fears of infection. Although such participants acknowledged the prejudice in their attitude and felt bad about it, they simply felt unable to have sex with an HIV-positive person without worrying. These findings show that educating people about TasP will not by itself eliminate HIV stigma and fears of infectivity. For decades, HIV/AIDS has been presented as a highly infectious and severe disease, and the fear of it has been deeply ingrained in many people's psyche, especially gay men. TasP promotion will thus require undoing the psychological and emotional barriers that keep some HIV-negative MSM from having sex with HIV-positive partners.

Several surveys have looked at the perceived effectiveness of TasP among MSM,[16,18,20–22] but qualitative data from this study offer more insights into how MSM consider the strategy. All participants from Stage 3 to 5 (72% of the sample) agreed that, theoretically, HIV-positive people who were virally suppressed could not transmit the virus to their sex partners. However, many of them saw practical difficulties with TasP that made it less-than-completely effective in real life. In Stage 3, many participants remained unwilling to rely on TasP because they felt unable to ascertain whether a sex partner was truly virally suppressed at the time of sex. They understood it would be completely safe to have sex without condoms or PrEP with someone who was undetectable, but did not feel that they had a reliable way to know whether someone was indeed undetectable. Such concerns are warranted considering that studies have found that some PLWH, although a minority, self-report being virally suppressed when tests reveal they are not.[36,37] Although the clinical efficacy of TasP has been proven, its application in everyday settings is much more complex as it relies on interpersonal communication and trust. Promoting scientific knowledge about TasP may make people more likely to agree with its efficacy, but not necessarily make them feel safe relying on the strategy. TasP research and promotion will thus need to address the practical struggles with the strategy to develop better guidance on how to safely use TasP.

Indeed, there seems to be a lack of clarity on how to correctly rely on TasP, which prevented some in Stage 3 from being willing to rely on the strategy and was also a concern among those who were willing to (Stage 4) or actually had relied on TasP (Stage 5). Researchers have remarked on the absence of community norms or guidelines for MSM to practice TasP,[21,38] and raised questions about whether TasP would facilitate serodiscussion, decrease the perceived need for serodisclosure, or increase the pressure to have condomless sex with HIV-positive undetectable partners.[20,24,39]

Participants in this study discussed the many challenges of relying on TasP, especially with new partners (exchange partners or nonpaying casual partners). Many said they would not take someone's claim to being undetectable at face value, just as they would not readily believe someone claiming to be HIV negative. Some participants felt they would want to see proof of viral suppression before relying on TasP, but others acknowledged that this could be an awkward request that could also be a turn off. Therefore, just like a lot of education has been done to provide MSM with guidelines or scripts on how to discuss condom use with sex partners, there is a need to provide guidelines on how to use TasP. TasP promotion and education do not end when people have used TasP, as we need to ensure people keep using the strategy correctly over time. An Australian research team proposed a template for serodiscordant couples to reach what they called ''viral load agreements,'' but recognized that there can hardly be a strategy in the context of casual sex.[25] Research should look further into how MSM have relied on TasP with casual or exchange sex partners to provide the tools for more people to be comfortable relying on the strategy.

TasP adoption is also limited by the fact that it is only one strategy among other HIV and STI prevention methods, such as PrEP and condoms. All participants in this study self-reported HIV negative and had met at least two exchange partners in the previous 3 months (and sometimes many more casual nonpaying partners). Many participants in Stage 4 felt like PrEP was the most appropriate strategy for them, rendering TasP somewhat irrelevant. Many also said they would not engage in condomless sex with HIV-positive undetectable partners, simply because they preferred to use condoms with every partner to protect against STIs. Relying on PrEP and/or condoms allowed them to stay in control of their own sexual health, whereas relying on TasP would shift this responsibility to the HIV-positive partner. These participants saw the value of TasP, for example, in the context of a committed serodiscordant relationship, but did not think it was suited for those who had multiple casual/exchange partners. TasP promotion has not presented the strategy as a replacement for PrEP or condoms, but rather as one additional HIV prevention option.[1] However, for people relying on PrEP and condoms, it might be difficult to see TasP as something relevant or important.

Finally, 12% of participants in this study had previously relied on TasP (Stage 5), which we defined as having engaged in anal sex with a partner who was HIV positive and virally suppressed without using PrEP or condoms, knowing that the partner being undetectable would prevent HIV transmission. Some of them described a process of becoming increasingly comfortable relying on the strategy as they kept testing HIV negative after sex with undetectable partners. Some of them also considered HIV-positive undetectable people to be among the safest partners as they had to be engaged in care and thus on top of their testing for viral load or STIs. They also felt that a partner who would disclose being HIV positive and undetectable would likely be an honest and trustworthy person. Future research could focus on the experiences of people who rely on TasP, as their perspective can help understand how acceptability of TasP may lead to positive attitudes toward HIV-positive undetectable people, which can counter HIV stigma.

Rather than looking at TasP acceptability in general, using the PAPM helped define the different stages of TasP adoption. This approach can help tailor interventions for people at different stages in this process. For instance, while people in the earlier stages need better awareness and knowledge of TasP, those in the middle stages need to learn how to feel psychologically or practically safe while having sex with HIV-positive undetectable partners. The stage model could be used in future studies to investigate how TasP adoption differs in different populations, for instance, between MSM of different sociodemographic groups or locations. More detailed knowledge about TasP adoption can help tailor TasP promotion efforts to the specific needs of particular populations.

Some clear benefits of TasP promotion are that it can motivate PLWH to maintain viral suppression and prevent transmitting the virus to their partners, as well as encourage people with undiagnosed HIV to get tested.[33,34] Promoting TasP could also have the added benefit of facilitating serostatus disclosure if it makes HIV-negative people less likely to reject HIV-positive partners. In our study, many participants in the earlier stages of our TasP adoption model expressed being unwilling to even consider sex with anyone HIV positive—regardless of viral load or use of other prevention strategies—whereas those further into the stages were all comfortable with the idea of having sex with PLWH, whether they would rely on TasP or other prevention strategies. Therefore, TasP can make sex with HIV-positive partners less worrisome for HIV-negative people, even if they rely on other HIV prevention strategies.

Similar to the promotion of PrEP, TasP will require the endorsement of health care providers and their willingness to explain the strategy to their clientele.[40] Of course, promotion of TasP should not minimize the importance of PrEP and condoms to prevent HIV and other STIs, especially for people who have multiple sex partners.[34] However, concerns about risk compensation (i.e., that people engage in more risk behaviors after learning about TasP) should not prevent providers from presenting the strategy to their patients as this could only stall TasP adoption, like it arguably has in the case of PrEP.[40]

For HIV-negative men engaged in exchange sex, PrEP and condoms will likely remain the preferred prevention method as they tend to have more sex partners than other MSM[30,31] and may have too little knowledge about exchange partners to be able to trust claims about viral suppression. However, this population should have all the possible tools (including TasP) at their disposal as they are at high risk for HIV. Further, studies have shown that sex workers often act as sexual health educators for their clients,[41,42] and thus, their endorsement of TasP can contribute to increasing TasP acceptability and decreasing HIV stigma.

A limitation of this study is that data were collected from a convenience sample and may not be generalizable to the population. Enrollment was restricted to MSM who self-reported never testing positive for HIV and who had engaged in exchange sex with at least two partners in the previous 3 months (at least one of whom had initially been met through the use of hookup apps/websites). As such, these results cannot be generalized to MSM who do not engage in exchange sex, do not use hookup apps, or were diagnosed HIV positive. However, prior qualitative studies on TasP acceptability had mostly looked at people living with HIV or

their HIV-negative partners;[24–27] thus, this study contributes knowledge on the topic from the perspective of HIV-negative MSM not necessarily in serodiscordant partnerships. Another benefit of looking at TasP adoption in this sample was that all participants had at least two exchange sex partners in the previous 3 months (and many of them had many more exchange and nonpaying partners), allowing us to look at the acceptability of the strategy among people who have multiple sex partners outside of committed relationships. Regarding exchange sex, a minority of participants in the sample identified as sex workers and many only engaged in exchange sex very casually or as the opportunity presented itself; consequently, their perspective on TasP is probably not very different from other MSM who find casual sex partners on hookup apps (and who do not have exchange sex). However, participants who regularly engage in exchange sex might be more likely to opt for HIV prevention strategies that they can control (such as PrEP or condoms), rather than TasP; thus; the proportion of TasP adopters might be higher in samples of MSM not engaging in exchange sex.

Findings may also be limited by a self-selection bias because recruitment was done online. It is possible that MSM who are willing to enroll in a public health study would be more likely to know about TasP and see the strategy in a positive light. Results might also be affected by social desirability bias, that is, participants might have talked about TasP in a manner that they thought would be viewed favorably. For example, among those who never relied on TasP, it may be easy for participants to say that they would be willing to rely on the strategy even if they never intend to. Further, the promotion of TasP is still rather new, and attitudes might be rapidly changing. Although the above limitations prevent us from generalizing on how many MSM might be at different stages of TasP adoption, they do not impede the main aim of this article, which was to define the different stages of adoption and some of the issues present at each stage.

Compliance with Ethical Standards

Ethics approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the Institutional Review Board at Columbia University Irving Medical Center (Protocol AAAR5835).

Consent to participate

Informed consent was obtained from all individual participants included in the study.

Author Disclosure Statement

No competing financial interests exist.

Funding Information

This work was supported by the National Institute on Minority Health and Health Disparities grant #R01MD011587, ‘‘Exchange Sex and HIV Risk Among MSM Online'' (PIs: Siegel/Schrimshaw).

References

1. Centers for Disease Control and Prevention. National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. Evidence of HIV Treatment and Viral Suppression in Preventing the Sexual Transmission of HIV. Atlanta, GA, 2018.
2. Bavinton BR, Pinto AN, Phanuphak N, et al. Viral suppression and HIV transmission in serodiscordant male couples: An international, prospective, observational, cohort study. Lancet HIV 2018;5:e438–e447.
3. Cohen MS, Chen YQ, McCauley M, et al. Prevention of HIV-1 infection with early antiretroviral therapy. N Engl J Med 2011;365:493–505.
4. Rodger AJ, Cambiano V, Bruun T, et al. Risk of HIV transmission through condomless sex in serodifferent gay couples with the HIV-positive partner taking suppressive antiretroviral therapy (PARTNER): Final results of a multicentre, prospective, observational study. Lancet 2019;393: 2428–2438.
5. Centers for Disease Control and Prevention. HIV Surveillance Report, Atlanta, GA, 2018. 2019.
6. Florom-Smith AL, De Santis JP. Exploring the concept of HIV-related stigma. Nurs Forum 2012;47:153–165.
7. Bogart LM, Cowgill BO, Kennedy D, et al. HIV-related stigma among people with HIV and their families: A qualitative analysis. AIDS Behav 2008;12:244–254.
8. Sayles JN, Ryan GW, Silver JS, Sarkisian CA, Cunningham WE. Experiences of social stigma and implications for health care among a diverse population of HIV positive adults. J Urban Health 2007;84:814–828.
9. Golub SA, Gamarel KE. The impact of anticipated HIV stigma on delays in HIV testing behaviors: Findings from a community-based sample of men who have sex with men and transgender women in New York City. AIDS Patient Care STDS 2013;27:621–627.
10. Leblanc NM, Flores DD, Barroso J. Facilitators and barriers to HIV screening: A qualitative meta-synthesis. Qual Health Res 2016;26:294–306.
11. Remien RH, Bauman LJ, Mantell J, et al. Barriers and facilitators to engagement of vulnerable populations in HIV primary care in New York City. J Acquir Immune Defic Syndr 2015;69:S16–S24.
12. Ware NC, Wyatt MA, Tugenberg T. Social relationships, stigma and adherence to antiretroviral therapy for HIV/AIDS. AIDS Care 2006;18:904–910.
13. Remien RH, Hirky AE, Johnson MO, Weinhardt LS, Whittier D, Le GM. Adherence to medication treatment: A qualitative study of facilitators and barriers among a diverse sample of HIV+ Men and Women in Four U.S. Cities. AIDS Behav 2003;7:61–72.
14. U = U | Prevention Access Campaign. U = U | United States | Prevention Access Campaign. n.d. Available at: www.preventionaccess.org (Last Accessed September 27, 2018).
15. Rendina HJ, Parsons JT. Factors associated with perceived accuracy of the Undetectable = Untransmittable slogan among men who have sex with men: Implications for messaging scale-up and implementation. J Intern AIDS Soc 2018;21:e25055.
16. Siegel K, Meunier É. Awareness and Perceived Effectiveness of HIV treatment as prevention among men who have sex with men in New York City. AIDS Behav 2019;23: 1974–1983.
17. Meanley S, Connochie D, Bonett S, Flores DD, Bauermeister JA. Awareness and perceived accuracy of

undetectable = Untransmittable: A cross-sectional analysis with implications for treatment as prevention among young men who have sex with men. Sex Transm Dis 2019;46:733.
18. Rendina HJ, Cienfuegos-Szalay J, Talan A, Jones SS, Jimenez RH. Growing acceptability of undetectable = Untransmittable but widespread misunderstanding of transmission risk: findings from a very large sample of sexual minority men in the United States. J Acquir Immune Defic Syndr 2020;83:215–222.
19. Holt M, Lea T, Schmidt H-M, et al. Increasing belief in the effectiveness of HIV treatment as prevention: results of repeated, national surveys of australian gay and bisexual men, 2013–2015. AIDS Behav 2016;20:1564–1571.
20. Holt M, Draper BL, Pedrana AE, Wilkinson AL, Stoové M. Comfort Relying on HIV Pre-exposure prophylaxis and treatment as prevention for condomless sex: Results of an online survey of australian gay and bisexual men. AIDS Behav 2018;22:3617–3626.
21. Bavinton BR, Holt M, Grulich AE, Brown G, Zablotska IB, Prestage GP. Willingness to act upon beliefs about 'Treatment as Prevention' among Australian Gay and Bisexual Men. PLoS One 2016;11:e0145847.
22. Card KG, Armstrong HL, Lachowsky NJ, et al. Belief in Treatment as Prevention and Its Relationship to HIV Status and Behavioral Risk. J Acquir Immune Defic Syndr 2018; 77:8.
23. Grov C, Jonathan Rendina H, Patel VV, Kelvin E, Anastos K, Parsons JT. Prevalence of and factors associated with the use of HIV serosorting and other biomedical prevention strategies among men who have sex with men in a US nationwide survey. AIDS Behav 2018;22:2743–2755.
24. Persson A. 'The world has changed': Pharmaceutical citizenship and the reimagining of serodiscordant sexuality among couples with mixed HIV status in Australia. Sociol Health Illn 2016;38:380–395.
25. Philpot SP, Prestage G, Ellard J, Grulich AE, Bavinton BR. For the opposites attract study group. How Do Gay Serodiscordant Couples in Sydney, Australia Negotiate Undetectable Viral Load for HIV Prevention? AIDS Behav 2018;22:3981–3990.
26. Young I, Flowers P, McDaid LM. Key factors in the acceptability of treatment as prevention (TasP) in Scotland: A qualitative study with communities affected by HIV. Sex Transm Infect 2015;91:269–274.
27. Newman CE, de Wit J, Persson A, et al. Understanding concerns about treatment-as-prevention among people with HIV who are not using antiretroviral therapy. AIDS Behav 2015;19:821–831.
28. Weinstein ND, Sandman PM, Blalock SJ. The precaution adoption process model. In: Glanz K, Rimer BK, Viswanath K, editors. Health Behavior and Health Education: Theory, Research, and Practice. 4th ed. San Francisco, CA: Jossey-Bass; 2008. pp. 123–147.
29. Weinstein ND. The precaution adoption process. Health Psychol 1988;7:355–386.
30. Nerlander LM, Hess KL, Sionean C, et al. Exchange sex and HIV infection among men who have sex with men: 20 US cities, 2011. AIDS Behav 2017;21:2283–2294.
31. Reilly KH, Neaigus A, Wendel T, Marshall IV DM, Hagan H. Correlates of selling sex among male injection drug users in New York City. Drug Alcohol Depend 2014;144: 78–86.
32. Prestage GP, Jin F, Bavinton B, Hurley M. Sex Workers and Their Clients Among Australian Gay and Bisexual Men. AIDS Behav 2014;18:1293–1301.
33. Eisinger RW, Dieffenbach CW, Fauci AS. HIV viral load and transmissibility of HIV infection: Undetectable equals untransmittable. JAMA 2019;321:451–452.
34. Patel RR, Curoe KA, Chan PA. Undetectable equals untransmittable: A game changer for HIV prevention. Clin Chem 2020;66:406–407.
35. Carter A, Lachowsky N, Rich A, et al. Gay and bisexual men's awareness and knowledge of treatment as prevention: Findings from the Momentum Health Study in Vancouver, Canada. J Int AIDS Soc 2015;18:20039.
36. Mustanski B, Ryan DT, Remble TA, D'Aquila RT, Newcomb ME, Morgan E. Discordance of self-report and laboratory measures of HIV viral load among young men who have sex with men and transgender women in Chicago: Implications for epidemiology, care, and prevention. AIDS Behav 2018;22:2360–2367.
37. Sewell J, Daskalopoulou M, Nakagawa F, et al. Accuracy of self-report of HIV viral load among people with HIV on antiretroviral treatment. HIV Med 2016;18:463–473.
38. Horvath KJ, Smolenski D, Iantaffi A, Grey JA, Rosser BRS. Discussions of viral load in negotiating sexual episodes with primary and casual partners among men who have sex with men. AIDS Care 2012;24:1052–1055.
39. Newcomb ME, Mongrella MC, Weis B, McMillen SJ, Mustanski B. Partner disclosure of PrEP use and undetectable viral load on geosocial networking apps: Frequency of disclosure and decisions about condomless sex. J Acquir Immune Defic Syndr 2016;71:200–206.
40. Golub SA, Myers JE. Next-Wave HIV Pre-Exposure Prophylaxis Implementation for Gay and Bisexual Men. AIDS Patient Care STDS 2019;33:253–261.
41. Browne J, Minichiello V. The Social Meanings behind Male Sex Work: Implications for Sexual Interactions. Br J Sociol 1995;46:598–622.
42. Parsons JT, Koken JA, Bimbi DS. Looking Beyond HIV: Eliciting individual and community needs of male internet escorts. J Homosex 2007;53:219–240.

Address correspondence to:
Étienne Meunier, PhD
Department of Sociomedical Sciences
Mailman School of Public Health
Columbia University Irving Medical Center
722 West 168th Street
New York, NY 10032
USA

E-mail: em3196@cumc.columbia.edu