Adolescent Human Immunodeficiency Virus Care Providers' Attitudes Toward the Use of Oral Pre-Exposure Prophylaxis in Youth

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Abstract

Oral pre-exposure prophylaxis (PrEP) for human immunodeficiency virus (HIV) prevention is currently indicated for use in adults in the United States and may soon be indicated for minor adolescents. However, implementation of PrEP use among minors may present unique barriers. We conducted 15 individual, semi-structured interviews among US clinicians caring for HIV-infected and at-risk youth. The theory-driven interview guide assessed demographics, perceived role of oral PrEP in HIV prevention among adolescents, perceived barriers to and facilitating factors for use of PrEP in adolescents, and clinician-reported likelihood of prescribing PrEP. Transcripts were analyzed using framework analysis. Overall, clinicians viewed PrEP as a time-limited intervention that is one part of a comprehensive approach to HIV prevention among adolescents. Perceived barriers to prescribing to minors included concerns about: confidentiality, legality of minors consenting to PrEP without parental involvement, ability of minors to understand the risks/benefits of PrEP, the possible impact of PrEP on bone accrual, off-label use of PrEP medication in minors, and the high costs associated with PrEP use. Clinician-reported facilitating factors for prescribing PrEP to youth included educating communities and other clinicians about PrEP, ensuring adequate financial resources and infrastructure for delivering PrEP, developing formal guidance on effective behavioral interventions that should be delivered with PrEP, and gaining personal experience with prescribing PrEP. Clinicians indicated greater comfort with prescribing PrEP to adults versus minors. For PrEP to become more widely available to youth at risk for HIV infection, barriers that are unique to PrEP use in minors must be addressed.

Introduction

IN THE UNITED STATES, the estimated annual number of new human immunodeficiency virus (HIV) infections has remained static since the mid-1990s.¹ The recent breakthrough in biomedical HIV prevention, oral pre-exposure prophylaxis (PrEP), allows for a novel approach to reducing the number of new infections. Oral PrEP is the use of oral anti-retroviral medications by HIV-uninfected people to prevent HIV acquisition. Studies have shown that PrEP decreased the risk of HIV acquisition by 44–75% among heterosexuals,^{2,3} men who have sex with men (MSM),⁴ and

injection drug users,⁵ suggesting that this method may play an important role in reducing new infections. In July 2012, the US Food and Drug Administration (FDA) approved the use of combined tenofovir-emtricitabine for PrEP in adults.⁶ More recently, the US Centers for Disease Control and Prevention published clinical guidelines for the use of PrEP in adults.⁷

Adolescents and young adults are also a prime target group for PrEP. American youth are impacted by HIV, with 21% of HIV infections in 2013 diagnosed in youth aged 13–24 years and increasing rates of HIV infections in young MSM.⁸ Therefore, youth who are at risk for HIV infection could

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benefit from access to PrEP. MSM are considered by clinicians to be potential candidates for PrEP,⁹ and studies have demonstrated that PrEP is an acceptable intervention to young MSM.^{10,11} However, for PrEP to be an effective intervention, healthcare providers must be willing to prescribe this medication to youth. Potential providers of PrEP to adults have described a variety of concerns related to PrEP, including concerns about adherence,^{12–16} development of viral resistance with incomplete adherence,^{12,14–20} high cost and insufficient coverage by insurance,^{12,14,16,19,20} medication toxicity,^{12,14,17,18} and side effects,^{16,17,19} efficacy outside of a clinical trial setting,^{13,14,17,20} and risk compensation.^{12,13,16–20} In addition to these concerns, the provision of PrEP to youth may present unique challenges related to the ability of minor adolescents to access PrEP without parental consent.²¹ Clinicians may also be wary of the possible legal consequences of prescribing PrEP off-label to adolescents,^{22,23} which could negatively impact clinician willingness to recommend or prescribe this method to youth.

To optimize PrEP uptake by adolescents, it is critical to understand clinicians' attitudes about prescribing PrEP. It is especially important to examine the attitudes of clinicians who care for HIV-infected youth: They are likely to be among the first adopters of prescribing PrEP to adolescents due to their experience in prescribing to and monitoring patients who are taking the medications that are used for PrEP, and they may be thought leaders in their community of clinicians with respect to PrEP recommendations. These clinicians may also have contact with individuals who are likely to be among the first candidates for PrEP, such as patients in serodiscordant relationships. However, the attitudes of such clinicians toward the use of PrEP in youth are unknown. An understanding of their attitudes and intentions to prescribe PrEP will be essential in the design of strategies to improve clinician recommendations for PrEP and uptake by adolescents. Thus, the aims of this study were to describe clinicians': (1) beliefs about the role of PrEP in HIV prevention for adolescents; (2) beliefs about barriers to prescribing PrEP, including prescribing specifically to adolescents (defined as patients under 18 years of age); (3) suggestions for mitigating barriers and facilitating prescription of PrEP; and (4) likelihood of prescribing PrEP.

Methods

The data were collected during the qualitative phase of a mixed-methods study that was designed to describe clinician attitudes toward, and practices around, PrEP use in youth. Clinicians (including physicians, nurse practitioners, and physician assistants) who were based at 14 different US locations and provided care to HIV-infected youth were recruited through the National Institutes of Health-funded Adolescent Medicine Trials Network for HIV/AIDS Interventions (ATN), a national (US) research network that includes clinicians who provide clinical care to HIV-infected and at-risk adolescents. A list of clinicians affiliated with the network was obtained from the ATN, and all 50 eligible clinicians received an email inviting them to participate in the interview study. Fifteen clinicians participated in the study. The study received Institutional Review Board approval from the first author's institution with a waiver of the requirement for written informed consent.

An individual semi-structured interview was conducted with each participating clinician, either at the twice-yearly ATN meeting or by phone depending on the preference of the participant. The interview content was guided by the Theory of Planned Behavior and the Diffusion of Innovations Theory.^{24,25} Participants were asked open-ended questions about perceived barriers to providing PrEP. They were also asked about factors that would facilitate prescription of PrEP and their likelihood of prescribing PrEP to different risk groups of patients, including adult (aged 18 years or older) MSM, heterosexual adults, adolescent (under 18 years of age) MSM, and heterosexual adolescents. Interviews lasted on average 1 h; each participant received a \$50 gift card in compensation for their time. Interviews were transcribed by an independent transcriptionist. All transcripts were cleaned by the interviewer (T.L.K.M.) through a review of the original audio recordings, and field notes were added.

A framework analysis approach was used, consisting of five steps: familiarization, identification of thematic frameworks, indexing, charting, and mapping/interpretation.²⁶ The first author conducted these steps, using the data to guide generation of themes after familiarization with the data. The first author conducted the initial indexing and charting of the data into preliminary themes using NVivo (version 10; Doncaster, Australia). Themes and codes were refined iteratively throughout the coding process. The co-authors (G.Z., M.L., and J.A.K.), who were blinded to the identities of the interview participants, reviewed the themes, codes, and coded data for clarity and accuracy of coding.

For the analysis of barriers, data were categorized by similarity of content into categories of barriers, which were derived from the data and refined throughout the data analysis process to decrease the number of categories of barriers while maximizing specificity of the barrier. Categories of barriers were then assigned to the level of barrier (patient-level, provider-level, organizational/systems-level, and community-level) based on the level at which the barrier to prescribing PrEP was operating. For example, "provider-level barriers" were barriers that participants reported would impact their own prescription of PrEP (i.e., concerns about a patient's ability to adhere to PrEP, concerns about risk compensation); "patient-level barriers" were barriers that participants reported would impact a patient's ability to use PrEP (i.e., lack of awareness of PrEP, concerns about maintaining confidentiality). Discrepancies were addressed through discussion until a consensus was achieved. Interpretation of the data was also conducted as a team.

Results

Participant characteristics

Fifteen clinicians were interviewed, including 13 physicians and 2 nurse practitioners. Physician specialties included pediatric infectious diseases ($n=4$), adolescent medicine ($n=5$), general pediatrics ($n=2$), and allergy/immunology ($n=2$). Forty percent of participants were male, 93% were white, and the average age was 47.1 years (SD 8.9). On average, clinicians had worked with youth at risk for HIV for 16 years (range 0–30 years), and clinicians provided care to an average of 9.6 HIV-infected adolescents per week (range 0–50). Forty percent ($n=6$) had ever prescribed PrEP, but none had prescribed PrEP to anyone under the age of 18 years.

Role of PrEP in HIV prevention for adolescents

Six clinicians described PrEP as a “bridge” to behavior change, to be used during times of high-risk behavior or until youth are capable of making safer decisions with regard to sex: “We’re talking sort of basic pediatrics developmental stuff. We’re waiting for their frontal lobes to engage.... PrEP is not in and of itself the management; it’s the tool that keeps the patient alive long enough [for the behavior to change].” Seven clinicians envisioned PrEP as one part of a comprehensive and customizable approach to HIV prevention: “I’ve often referred to [PrEP] as sort of an arrow in the quiver that would be maybe not the first arrow I go to.” Although most clinicians anticipated using PrEP in a time-limited manner, one clinician described PrEP as being appropriate indefinitely, as long as the patient remained at high risk of acquiring HIV. Two clinicians noted that PrEP could serve as a way to engage patients in medical care and additional services, such as mental health or substance use services. Finally, two clinicians noted that the primary emphasis of HIV prevention should not be on PrEP but should rather be on ensuring that HIV-infected people receive antiretroviral therapy (ART) to reduce the risk of transmission to uninfected partners.

Perceived barriers to prescribing PrEP

Perceived barriers to prescribing PrEP included patient-level, provider-level, organizational- and systems-level, and community-level barriers (Table 1).

Patient-level barriers. A number of barriers to PrEP use in adolescents were identified; however, some barriers were endorsed only by a minority of providers. The most commonly cited patient-level barrier to the provision of PrEP to youth was a general lack of awareness of PrEP among those who might benefit from the medication ($n = 6$): “I think this is really new and I think the biggest challenges that we’re going to face are, number one, I think people still don’t really know what PrEP is.” Patient-level barriers that were specific to prescribing to youth under 18 years of age included barriers related to parents ($n = 4$), such as concerns about maintaining confidentiality with respect to the patient’s sexual identity or risk behaviors and a lack of clarity about whether PrEP falls under protected confidential care that adolescents can access without parental consent: “[PrEP] is a new idea. So, people may challenge it, on an old law, it doesn’t specifically state... that this particular prevention method [is covered by that law].” In contrast, 11 providers believed that PrEP is a part of legally protected confidential reproductive healthcare, and, thus, parental consent would not be required. To minimize barriers related to parents, clinicians suggested that PrEP prescribers encourage minors to involve their parents if possible, proactively troubleshoot with the minor about how to maintain confidentiality related to PrEP use, and respect the adolescent’s decision about parental involvement.

Four providers were concerned that youth may not be able to understand the risks and benefits of PrEP. In contrast, six providers reported that youth would be able to understand the risks and benefits of PrEP, and four participants reported that clinicians would have to make this determination on a case-by-case basis. Three clinicians reported that co-existing mental health or substance abuse disorders would be a barrier

to prescribing PrEP, because these illnesses could interfere with PrEP adherence. However, nine clinicians reported that although mental health and substance abuse disorders would be taken into consideration, the presence of these illnesses would not be a barrier to prescribing PrEP, and three clinicians indicated that such illnesses would be indicators of someone who would benefit from PrEP: “Probably if they have [a] problem with alcohol use or substance use, then I would [prescribe PrEP].”

Provider-level barriers. The most commonly cited provider-level barrier was provider concern about patient adherence to PrEP and PrEP monitoring visits ($n = 11$), including concerns about the development of viral resistance due to incomplete adherence, that patients who have difficulty adhering to behavioral interventions will also have difficulty adhering to PrEP, and that side effects or financial difficulties accessing PrEP may negatively impact patients’ adherence to PrEP. In contrast, two providers reported that concerns about adherence would not impact their prescribing of PrEP: “If they [the patients] really think that they want to take it [PrEP] and I tell them, you have to actually be compliant for this to work because it’s not going to help you if you only do it like 50% of the time.... But I won’t not give it [PrEP] to them because I think they’re going to do that.” Additionally, three clinicians reported that poor adherence to PrEP follow-up visits may be unlikely to occur, because many patients who would be taking PrEP would require frequent follow-up for other medical and psychosocial issues.

Eight clinicians reported concerns about risk compensation in the context of PrEP use (e.g., patients participating in riskier sexual behaviors because they feel protected from HIV infection): “I think that there’s always that concern that somebody feels like that’s their pass to have unprotected sex.” In contrast, five clinicians had no concerns about risk compensation among users of PrEP: “I think people generally, if they’re having a lot of unprotected sex before, that’s what’s going to happen now and there’s another reason for that. It’s not going to be that I’ve prescribed them Truvada.” To address this barrier, participants suggested that clinicians provide counseling to patients to minimize possible risk compensation and that new STIs could serve as markers of possible risk compensation. Eight clinicians reported that logistical constraints would negatively impact their own ability to prescribe PrEP, including lack of time and resources to provide PrEP and PrEP monitoring, lack of funding to provide care to HIV-uninfected patients, lack of access to HIV-uninfected patients, and lack of adequate reimbursement for physician services in providing PrEP.

Clinicians raised several further concerns related to prescribing PrEP to youth. Six clinicians reported concerns specifically about prescribing PrEP to patients under the age of 18 years, including concerns about maintaining confidentiality, prescribing a controversial therapy to an adolescent, possible negative publicity around a pediatric provider prescribing PrEP, and possible need to report high-risk, coerced sexual behavior to Child Protective Services. In contrast, nine participants reported that patient age alone would not impact their decisions about prescribing PrEP. Providers also reported concerns about side effects and toxicity related to PrEP, including negative effects on bone density and accrual in adolescents and renal function. To address this

TABLE 1. CLINICIAN-REPORTED BARRIERS TO PRESCRIBING PRE-EXPOSURE PROPHYLAXIS

<i>Level of barrier</i>	<i>Category of barrier</i>	<i>Sub-category of barrier</i>
Patient-level barriers	Lack of awareness of PrEP (<i>n</i> =6)	
	Barriers related to adherence (<i>n</i> =5)	Co-existing mental health or substance abuse may interfere with adherence (<i>n</i> =3) Competing needs (such as for food, housing) may interfere with ability to adhere to PrEP (<i>n</i> =2) Difficulty adhering to a daily medication to prevent a future event (<i>n</i> =1)
	Barriers related to parents (<i>n</i> =4)	Youth may be cut off by parents for using PrEP (<i>n</i> =1) Lack of clarity about legal need to involve parents (<i>n</i> =3)
	Concerns about maintaining confidentiality (<i>n</i> =4)	Fear of disclosure of sexual identity to others (<i>n</i> =3)
	Lack of engagement with healthcare system (<i>n</i> =4)	Fear of disclosure of risk behaviors (<i>n</i> =1)
	Potential inability to understand risks and benefits of PrEP (<i>n</i> =4)	
	Unwilling to take PrEP (<i>n</i> =3)	Unwillingness to take a daily medication (<i>n</i> =2) Unwillingness to take PrEP because of low perceived risk of HIV (<i>n</i> =1)
	Inaccurate perception of one's own risk of behaviorally acquiring HIV (<i>n</i> =2)	
	Lack of awareness that sexual partner has HIV infection (<i>n</i> =2)	HIV-infected partner may not be ready to disclose HIV status to sexual partners (<i>n</i> =1). Lack of relationship safety may prevent HIV-infected partner from disclosing HIV status to sexual partners (<i>n</i> =1)
Provider-level barriers	Concerns about patient adherence to PrEP and monitoring visits (<i>n</i> =11)	Development of resistance due to incomplete adherence (<i>n</i> =5) Patients who have difficulty adhering to behavioral changes will also likely have difficulty adhering to PrEP (<i>n</i> =2) Development of side effects may decrease adherence (<i>n</i> =1) Financial constraints will negatively impact adherence (<i>n</i> =1)
	Concerns about risk compensation in the context of PrEP use (<i>n</i> =8)	Decline in condom use while a patient is using PrEP (<i>n</i> =1)
	Logistical issues impacting ability to prescribe PrEP (<i>n</i> =8)	Lack of time and resources to provide PrEP and required monitoring (<i>n</i> =5) Lack of funding for HIV providers to see HIV-uninfected patients for PrEP (<i>n</i> =3) Lack of access to HIV-uninfected patients (<i>n</i> =1) Lack of reimbursement for PrEP services (<i>n</i> =1)
	Concerns about prescribing to a minor-aged patient (<i>n</i> =6)	Maintaining confidentiality (<i>n</i> =3) PrEP is a controversial therapy (<i>n</i> =1) Negative publicity for pediatric clinician providing PrEP (<i>n</i> =1) Behaviors for which an adolescent would be prescribed PrEP may require intervention from Child Protective Services (e.g., coerced sexual behavior) (<i>n</i> =1).
	Concerns about side effects and toxicity (<i>n</i> =6)	Possible impact of PrEP on bone density in adolescents (<i>n</i> =5) Possible renal side effects (<i>n</i> =4)
	Concerns about patients selling or sharing PrEP (<i>n</i> =5)	Possible use of PrEP as a part of a club drug cocktail (<i>n</i> =2) Patient sharing PrEP with an HIV-infected partner who is not adherent to his/her ART (<i>n</i> =1)

(continued)

TABLE 1. (CONTINUED)

Level of barrier	Category of barrier	Sub-category of barrier
Organizational- and systems- level barriers	Concerns about off-label use of medication for PrEP in minors (n = 3)	Confusion among clinicians about HIV tests may lead to a patient not knowing his/her status (n = 1) HIV-infected patients may be in denial about their status and present as HIV uninfected (n = 1)
	Concerns about whether PrEP will be as effective outside of a highly controlled clinical trial setting (n = 2)	
	Concerns about ability to provide sufficiently detailed information for patient to make an informed decision about starting PrEP (n = 2)	
	Concerns about how to ensure that patient is truly HIV uninfected before starting PrEP (n = 2)	
	Concerns about disclosure to parents via insurance benefits statement (n = 2)	
	Availability of more effective HIV prevention methods (n = 1)	
	Personal ethical conflicts (n = 1)	
	Concerns about using PrEP in pregnant patients (n = 1)	
	High cost/lack of medical insurance (n = 15)	
	Structural/organizational barriers (n = 10)	
Community-level barriers	Lack of access to medication (n = 6)	High costs to patient associated with seeing a provider, testing associated with PrEP, and medication (n = 13) Youth concerns about maintaining confidentiality may prevent them from using insurance for PrEP-associated costs (n = 1) High cost of medication may negatively impact the patient's ability to obtain PrEP medication, leading to poor adherence (n = 1) Cost to institution of providing support services for PrEP (i.e., counselors) (n = 1) Negative colleague attitudes toward PrEP may impair patient access to PrEP (i.e., colleagues being uncomfortable prescribing PrEP, perceiving no utility for PrEP because condoms help prevent HIV) (n = 5) Systems limitations on which patients the providers can see (i.e., providers cannot see HIV-uninfected patients, uninsured patients, patients outside of a certain age range) (n = 3) Lack of resources that are necessary to provide PrEP (i.e., lack of clinic space and time, lack of mechanisms to follow monitoring lab tests, lack of sufficient staff) (n = 2) Lack of support from organization to provide PrEP (n = 1) Impaired access to medication due to stigma (n = 1) Lack of access to medication may lead clinicians to "stockpile" medication for patients (n = 1) Pharmacy staff may be unwilling to fill PrEP prescriptions due to personal ethical concerns (n = 1) Potential PrEP candidates are not aware of the availability of PrEP (n = 2)
	Lack of awareness of PrEP among primary care providers (n = 2)	Stigma around HIV infection (n = 2)
	Stigma in the community (n = 3)	Stigma around LGBTQ youth (n = 2)
		Stigma around sex (n = 1)

ART, antiretroviral therapy; HIV, human immunodeficiency virus; LGBTQ, lesbian, gay, bisexual, transgender, questioning youth; PrEP, pre-exposure prophylaxis.

barrier, participants suggested that clinicians consider their concerns about the possible side effects and the possible risk of HIV infection in a risk–benefit analysis before starting PrEP in any particular patient.

Three participants were concerned about the off-label use of medication for PrEP among patients under 18 years of age; nine participants were not concerned about off-label use for reasons including that off-label use of medications is common in pediatrics and lack of a biological reason for restricting PrEP to patients over 18 years of age. One-third of participants voiced concerns about patients selling or sharing PrEP, either as part of a club drug cocktail or with HIV-infected partners who are nonadherent to their ART. Only two clinicians reported that they would need additional training on the use of PrEP before prescribing it.

Organizational- and systems-level barriers. The most commonly reported organizational- and systems-level barrier to prescribing PrEP to youth was high cost and lack of medical insurance ($n=15$). Thirteen participants noted that the high costs to patients associated with seeing a provider, obtaining PrEP medication, and testing associated with PrEP start and monitoring were barriers to prescribing PrEP: “Unfortunately, Truvada is not free. I cannot remember how much it is, but I think cost and facilitating the actual med[ication] along with the follow-up tests is going to be a barrier, a main barrier.” Participants also reported that youth who were concerned about maintaining confidentiality may not be able to utilize health insurance coverage for PrEP due to fear of inadvertent disclosure of PrEP use to parents via an explanation of benefits statement sent by the insurance company.

Ten participants noted structural- or organizational-level barriers to providing PrEP, including negative colleague attitudes toward PrEP, systems limitations on which patients the providers can see, and lack of resources that are necessary to provide PrEP, including clinic space, clinician time, and sufficient support staff. Aside from barriers associated with cost and lack of insurance, access to the medication in the community was noted to be a barrier by six clinicians: “I’ve not prescribed it generally because you can’t get your hands on the medication as yet.” Clinicians suggested that pharmacy staff may be unwilling to fill prescriptions for PrEP due to ethical objections. Finally, lack of awareness of PrEP among primary care providers was reported as a barrier, because potential PrEP candidates may not be aware of the availability of PrEP: “I don’t know really how it’s reaching the regular pediatrician about that [PrEP]... I think that if we have barriers to do STD testing or HIV testing, what [barriers] will we actually have for a medication?”

Community-level barriers. Fewer community-level barriers were identified. Three clinicians described stigma in the community as a barrier to providing PrEP. Specifically, stigma around HIV infection and sexual minorities, and stigma around sex in general, were cited as barriers to prescribing PrEP in youth: “Because there’s so much stigma and judgment around all the sex stuff, no matter what it is. You know, whether you’re talking about PrEP, whether you’re talking about HIV, whether you’re talking about being gay because your sex is a little bit different because you’re gay.”

Facilitating factors for prescribing PrEP

Participants noted several factors that would facilitate their prescription of PrEP. The most commonly noted facilitating factors were community-related factors, including improving community awareness of PrEP, developing community “buy-in” to the concept of PrEP, and increasing uptake of PrEP in the community. Clinicians suggested that education of the community about PrEP could be provided through celebrity endorsement, education through professional organizations or at venues frequented by people in PrEP target populations, partnerships with churches, and television advertisements.

The second most commonly mentioned facilitating factors were financial factors, including ensuring that potential PrEP users had adequate financial resources (such as health insurance), developing patient assistance programs, and ensuring adequate compensation to healthcare providers for PrEP-related care. One-third of participants reported that implementation of the Affordable Care Act may facilitate PrEP prescription if PrEP is a covered benefit. In addition to educating the community about PrEP, one-third of participants reported that educating primary care providers and pharmacists about PrEP would facilitate prescription of PrEP. Such education could be provided through professional organizations such as the American Academy of Pediatrics or the American Academy of Family Practitioners, through endorsement of PrEP by such organizations, and by including education about PrEP as a part of continuing education requirements for professional licensing.

Participants reported that structural/organizational factors that would facilitate PrEP included adequate infrastructure to provide PrEP (such as space, personnel), access to a patient population that would benefit from PrEP, anonymous clinic sites (e.g., clinic sites that were not identified as affiliated with HIV or HIV prevention), improved availability of the drugs used for PrEP, and development of PrEP-specific visit templates and reminder systems in electronic medical records. Additional facilitating factors for prescription of PrEP included development of formal guidance on effective behavioral interventions that should be delivered with PrEP and gaining personal experience with prescribing PrEP.

Clinician-reported likelihood of prescribing PrEP

Participants differed in their likelihood of prescribing PrEP to hypothetical patients of adult or adolescent age and of differing sexual practices (Table 2). All of the participants described themselves as “likely” or “very likely” to prescribe PrEP to an adult (aged 18 years or older) heterosexual or adult MSM. In contrast, five participants described themselves as “not likely” to prescribe PrEP to an adolescent (younger than 18 years) heterosexual for reasons such as anticipated barriers to the patient accessing PrEP, the clinician’s lack of access to this particular patient population, or the perception that heterosexual patients are at lower risk of sexually acquiring HIV infection. Four participants described themselves as “unlikely” to prescribe PrEP to an adolescent MSM, for reasons including perception that patients will not be sufficiently at risk of HIV to warrant PrEP or provider concerns about adherence to PrEP medication and follow-up visits. Those participants who were likely or very likely to prescribe PrEP to adolescents reported that this likelihood was related to other factors, such as whether the patient could

TABLE 2. CLINICIAN-REPORTED LIKELIHOOD OF PRESCRIBING PRE-EXPOSURE PROPHYLAXIS

<i>Description of hypothetical patient</i>	<i>Likelihood of prescribing PrEP</i>	<i>n (%)</i>
Adult (≥18-year-old) heterosexual person	Not likely	0
	Likely	4 (27)
	Very likely	11 (73)
Adult (≥18-year-old) MSM	Not likely	0
	Likely	2 (13)
	Very likely	13 (87)
Adolescent (<18-year-old) heterosexual person	Not likely	5 (33.3)
	Likely	5 (33.3)
	Very likely	5 (33.3)
Adolescent (<18-year-old) MSM	Not likely	4 (27)
	Likely	4 (27)
	Very likely	7 (47)

Percentages may not add up to 100% due to rounding.
MSM, man who has sex with men; PrEP, pre-exposure prophylaxis.

access the medication, met criteria for being at substantial risk of HIV, had capacity to consent to PrEP, or was of older age (e.g., aged 16 years or older).

Discussion

Clinicians providing care to HIV-infected and at-risk youth identified numerous barriers to providing PrEP, particularly to adolescents. Even among this sample of clinicians who had experience with the medications used for PrEP, clinicians generally indicated more comfort with prescribing PrEP to adults as compared with adolescents. This is the first study to focus solely on the PrEP-related attitudes of providers who care for adolescents. The clinicians in our study are likely to be early adopters of PrEP for use in youth; therefore, an understanding of the attitudes of these providers is critical to the successful implementation of PrEP among youth, a target population identified in the updated US National AIDS Strategy for 2020.²⁷ Clinicians in this study supported the incorporation of PrEP into current HIV prevention efforts targeting adolescents, which parallels the views of youth at risk of HIV infection.²⁸ However, for PrEP to have an impact on the HIV epidemic, it must be made available to individuals who are at high risk of acquiring HIV infection. Similar to a prior study of clinician-reported barriers to providing sexual reproductive health counseling to HIV-infected youth,²⁹ clinicians in the current study identified barriers at multiple levels, including at the level of the patient, provider, organization/system, and community. These findings suggest that to facilitate access to PrEP—and thus use of PrEP by at-risk youth—barriers at multiple levels must be addressed.

Although the most commonly mentioned patient-level barrier was lack of awareness of PrEP among potential users, providers were also concerned about barriers related to parents and had concerns about maintaining confidentiality, particularly for minor-aged patients. Participants disagreed as to whether PrEP falls under the umbrella of confidential reproductive healthcare to which adolescents can consent without parental notification or consent. Some participants seemed to be confident that PrEP would be considered a part

of confidential care, whereas other participants voiced a need for clarity with respect to the legal issues around PrEP. Consistent with the views of participants, a review of US laws about adolescent ability to consent to confidential reproductive healthcare concluded that due to variability in state laws, “minors’ access to PrEP without parental consent is unclear.”²¹ Participants also held differing opinions as to whether minor-aged patients would be able to understand the risks and benefits of PrEP and, thus, would be potentially unable to provide true informed consent. However, a study of adolescent decision making about participation in a hypothetical HIV vaccine trial found that, although there was variation in the understanding of risks and benefits across participants, most adolescents were capable of making informed decisions.³⁰ This finding suggests that many adolescents are likely to have the capacity to understand the risks and benefits associated with PrEP. The provision of education about PrEP to communities that are at risk of HIV, as well as primary care providers and other healthcare providers, may also improve awareness of the availability of PrEP, thus increasing the likelihood that those who would benefit from PrEP ask about it and are offered it.

Frequently cited provider-level barriers are related to concerns about patient adherence to PrEP medication and visits, a set of findings consistent with results from studies of adult care providers.^{12–14,16–18} Participants were divided as to whether they thought risk compensation (increases in risky sexual behaviors after the initiation of PrEP) would occur. Although concerns about risk compensation have been raised by some adult care providers,^{12,13,16–20} studies to date suggest that the majority of people taking PrEP do not practice risky behaviors.^{31–33} Few participants were concerned about prescribing PrEP for off-label use to a minor-aged patient. Use of medications off-label is a common practice in pediatrics,^{23,34,35} and the American Academy of Pediatrics advised that lack of FDA approval for a particular indication “should not prevent physicians from prescribing an available drug in the best interests of their patients.”³⁶ Concerns were raised about whether PrEP would become a club drug, particularly among adolescents. Diversion of antiretroviral medications through selling or sharing of medications has been described^{37–40} and may lead to emergence of drug-resistant HIV, because people using diverted PrEP medication may be less likely to receive routine testing and, thus, will not be aware of newly acquired HIV infection.⁴¹ To address these provider-level barriers, developmentally appropriate behavioral interventions need to be designed to be administered with PrEP to youth. Such interventions should be evidence based and encourage adherence to medication and monitoring visits and continued safer sexual behaviors, including condom use.

All of the participants reported the following structural barriers to PrEP: the high costs associated with PrEP use and the lack of medical insurance to cover such costs. The costs associated with PrEP include not only the cost of the medication itself (which is estimated to be more than \$1000 per month and is variably covered by insurance programs)⁴² but also the costs associated with baseline and follow-up medical testing and clinic visits.⁷ Youth seeking to keep their use of PrEP confidential may decide not to use their existing health coverage to obtain PrEP due to fear of their parents learning about their use of PrEP through insurance explanation of

benefits statements. Therefore, ensuring that insurance programs expanded through the Affordable Care Act provide coverage for PrEP is essential to expanding uptake of this intervention. Lack of community and primary care provider awareness of PrEP, both of which are commonly cited barriers to PrEP uptake, may be addressed through interventions to raise community awareness of PrEP, such as messages delivered by media,⁴² and development of educational programs about PrEP targeting primary care providers.

Clinicians in this study reported greater likelihood of prescribing PrEP to adults as compared with adolescents, even though all of the participants provide care to youth and have familiarity with the drugs that are used for PrEP. All of the participants reported intention to prescribe PrEP to adult MSM or heterosexuals, whereas fewer participants reported intention to prescribe PrEP to adolescent MSM or heterosexuals. This is the first study, to our knowledge, to specifically assess intention to prescribe PrEP to adolescents. Among adult infectious disease physicians, similar percentages of participants reported willingness to prescribe PrEP to heterosexuals with risk factors (78%) and to MSM with risk factors (73%).¹⁴ In the current study, all clinicians reported intention to prescribe PrEP to adult MSM or heterosexuals, which may be due to increasing clinician comfort with PrEP as further data about efficacy and safety emerge. In studies of the actual clinician prescribing PrEP, more clinicians had prescribed PrEP to MSM (63–78%)^{16,19} than to heterosexual men (31%)¹⁶ and women (28%).¹⁶ Rates of actual prescribing of PrEP, as compared with intention to prescribe, may be lower due to barriers to prescribing PrEP, such as lack of patient uptake or financial barriers. Because intention to perform a behavior predicts the actual behavior,²⁴ clinician intention to prescribe PrEP to adolescents is a critical and potentially modifiable component of the successful dissemination of PrEP. Future studies to determine factors associated with intention to prescribe PrEP to adolescents can inform the development of strategies targeting physicians to maximize prescription of PrEP to adolescents at risk of HIV infection.

Our study is subject to several limitations. Participants may not have had actual experience with prescribing PrEP; however, as our intention was to elicit the full range of attitudes toward PrEP, we included clinicians regardless of actual experience prescribing PrEP. Second, participants were recruited through a single research network. However, because all these providers care for HIV-infected youth, they have experience using the medications used for PrEP and would be expected to be among the earliest adopters of PrEP. Finally, our sample size is relatively small. However, the purpose of this qualitative inquiry was to generate an understanding about the range of attitudes toward the use of PrEP in youth and not to produce generalizable results.

Among this sample of clinicians who provide care to HIV-infected and at-risk youth, numerous patient-, provider-, organizational/systems-, and community-level barriers to the provision of PrEP were identified. For PrEP to become more widely available to youth at risk for HIV infection, these barriers will need to be addressed. Potential strategies could include increasing awareness of PrEP among target populations and primary care providers, clarifying the legal issues related to prescribing PrEP to minor-aged patients, developing interventions to promote adherence to PrEP and

monitoring visits, and ensuring adequate financial resources such as health insurance coverage for PrEP.

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