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## HIV Pre-exposure Prophylaxis Engagement among Adolescent Men who Have Sex with Men: The Role of Parent-Adolescent Communication about Sex

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### Abstract

**Background:** Adolescent men who have sex with men (AMSM) are severely affected by the HIV epidemic in the United States. Pre-exposure prophylaxis (PrEP) has proven extremely effective in preventing new HIV infections among adult men who have sex with men, but no research has examined PrEP awareness among AMSM. Furthermore, initial research investigating PrEP adherence among AMSM has found low adherence to the medication regimen. Effective parent-adolescent communication about sex is associated with safer sexual health behaviors among AMSM, and parent-adolescent communication is one potential avenue to increase PrEP engagement among AMSM.

**Setting:** Participants included 636 AMSM in the United States who completed a cross-sectional online survey in 2015.

**Methods:** Self-reported data on PrEP awareness, attitudes about PrEP, and perceived behavioral control for PrEP usage as well as frequency and quality of parent-adolescent communication about HIV were collected from AMSM. Regression models predicting PrEP awareness, attitudes, and perceived behavioral control from communication constructs were estimated, adjusting for demographic covariates.

**Results:** Sixteen percent of AMSM were aware of PrEP. AMSM who reported more frequent communication about HIV with their parents were more likely to report being aware of PrEP. Among AMSM aware of PrEP, higher quality parent-adolescent communication about HIV was associated with higher perceived behavioral control for PrEP usage.

**Conclusions:** Despite high HIV incidence among AMSM in the United States, PrEP awareness is low in this population. Effective parent-adolescent communication about HIV and sexual health could increase AMSM engagement with PrEP and enhance PrEP adherence within future trials among AMSM.

### Keywords

HIV prevention; adolescent men who have sex with men; pre-exposure prophylaxis; parent-adolescent communication about sex.

## Introduction

In the United States (US), adolescent men who have sex with men (AMSM) remain extremely vulnerable to HIV infection.<sup>1,2</sup> Youth aged 13–24 accounted for 22% of all new HIV diagnoses in 2015 in the US, and young men who have sex with men (MSM) accounted for 81% of new infections within this age group.<sup>3</sup> While young adult MSM have been prioritized within HIV prevention science, AMSM ages 18 and younger remain alarmingly absent from current empirical research designed to ease the burden of the HIV epidemic.<sup>2</sup>

Among adult MSM, pre-exposure prophylaxis (PrEP) has proven extremely effective in preventing new HIV infections.<sup>4,5</sup> The World Health Organization recently recommended that all people at risk for HIV infection, including MSM, be offered PrEP given the high-quality evidence for its effectiveness.<sup>6</sup> However, only one in four young MSM ages 18–24 in the US are even aware of PrEP,<sup>7,8</sup> and no known research has examined PrEP awareness among AMSM under age 18. Furthermore, initial findings suggest that the promising results of PrEP trials among adult MSM might not generalize to younger MSM. Specifically, a recent demonstration project revealed that one month after initiating PrEP, only 54% of AMSM ages 15–17 had blood drug levels consistent with taking 4 or more pills per week, and that number was similarly low (56%) for MSM ages 18–22.<sup>9,10</sup> Moreover, adherence declined further still in both groups in subsequent months of follow-up.<sup>9,10</sup>

Improving PrEP awareness and adherence among AMSM will require attention to their unique social and developmental context.<sup>2,10</sup> Unlike adults who make medical decisions independently, parents are often gatekeepers to medical care for adolescents, and adolescents are more likely to have their medical needs met if their parents are involved in their care<sup>11</sup> and if they are strongly connected to their parents.<sup>12</sup> Moreover, research with other daily medical regimens indicates adolescents have higher adherence when they communicate effectively with their parents.<sup>13</sup> Parental behaviors have been linked with both increased and decreased risk for HIV-related sexual risk behaviors among AMSM. While parental rejection of sexual orientation is associated with higher risk for HIV-related sexual risk behaviors,<sup>14</sup> recent evidence indicates parents can also exert a positive influence on the sexual health of AMSM by communicating about sexual topics and monitoring effectively.<sup>15–17</sup> In particular, parent-adolescent communication about condoms is associated with greater condom use among AMSM. Furthermore, when parents communicate more about condoms, their sons report more positive attitudes toward condoms and greater perceived behavioral control for using them.<sup>16</sup>

Thus, one promising avenue to improving PrEP awareness and adherence among AMSM might be to better integrate parents into the PrEP care continuum.<sup>17,18</sup> However, doing so first requires research to explicate the ways in which parents impact their son's engagement with PrEP. The current study examined PrEP awareness within a large sample of AMSM in the US. We examined whether the frequency and quality of parent-adolescent communication about HIV predicted three outcomes relevant to AMSM engagement with PrEP: PrEP awareness, attitudes toward PrEP, and perceived behavioral control for taking PrEP.

## Method

### Procedure and Participants

AMSM completed a cross-sectional online survey from February–May 2015. Youth were recruited via advertisements on Facebook targeting adolescent males age 14–18 in the US, who were identified using keywords related to LGBT-relevant topics. Ads were served a total of 76,106 times, and 6822 clicks on the ads were recorded during recruitment. Of those, 3,050 individuals entered the survey and began responding to survey questions. Cases with duplicate IP addresses were checked by hand to examine timestamps and match potential duplicate cases across demographic characteristics, and 176 cases were determined to be duplicates and removed, leaving 2874 unique individuals. Of these, 724 provided enough data to be considered for analysis (i.e., they completed the survey through the question set assessing PrEP). We limited the present analysis to 636 respondents who (a) were ages 14–18, (b) currently male identified, and (c) identified their sexual orientation as gay or bisexual. Complete procedures are described in previously published reports of other data from this study.<sup>15,16</sup> Because of the anonymous nature of the survey and because some AMSM recruited had not disclosed their sexual orientation to their parents, a waiver of parental permission to participate was used. All procedures were approved by the University of Utah Institutional Review Board.

Participant demographic information is described in Table 1. Participants' mean age was 16.60 (SD=1.21). Compared to participants who terminated the survey prior to the PrEP question set, participants who provided sufficient data for this analysis were more likely to identify their race/ethnicity as White, less likely to identify as Black, and reported lower subjective social status.

### Measures

**Communication:** Past research on parent communication about sexual health indicates both communication *frequency* (i.e., how often parents talk) and *quality* (i.e., whether there are perceived as honest and open) are important, distinct domains that predict child outcomes. Building on a measure we created to assess the quality and frequency of parent-adolescent communication about condoms,<sup>16</sup> we created a parallel measure to assess these domains of communication about HIV and sexual health. Four items tapped frequency, assessing youth reports of how often parents spoke about four topics (HIV generally, HIV transmission, HIV testing, and other sexually transmitted diseases). Five items assessed youth perceptions of communication quality, with one each assessing perceived parental openness, knowledgeability, trustworthiness, honesty, and “how much does your parent look out for what’s best for you” during conversations about HIV. Participants responded to all items using 5-point Likert scales. Mean composite scores were separately calculated for frequency and quality measures, and each evidenced high reliability ( $\alpha=0.94$  for each scale). Participants reported separately about each parental figure, and for those reporting on two parents, scores were averaged across the two.

**PrEP Awareness, utilization, attitudes, and self-efficacy:** PrEP awareness was measured with one item: “Pre-exposure prophylaxis, or PrEP, is a way for people who do not

have HIV, but who are at risk for HIV infection, to prevent HIV by taking a pill every day. Are you familiar with PrEP?" Response options included "No," "Yes," and "Don't know." AMSM who were aware of PrEP were coded "1," and AMSM unaware or unsure were coded as "0." Those who indicated awareness of PrEP then completed (a) a single item assessing if they were currently taking PrEP (yes/no), (b) two items assessing their attitudes toward prep (how reliable and how effective they perceived it to be),<sup>19</sup> and (c) one item assessing perceived behavioral control (i.e., how confident they were they could take PrEP every day).<sup>20</sup>

**Demographics:** Age was dichotomized (14–16/17–18). Ethnicity was assessed with one question asking participants to select all ethnicities with which they strongly identified. Three dummy codes were used to compare Black, Latino, and participants reporting another ethnicity to White participants. Sexual orientation was measured with one item assessing self-identified sexual orientation, and this item was dichotomized (gay/homosexual vs. bisexual). Subjective social status (SSS) was measured with a continuous 10-point McArthur Scale of SSS.<sup>21</sup> Sexual activity during the past six months was assessed by asking participants if they had engaged in "any activity where you touch your partner and become sexually aroused." This item was dichotomized (none/any).

## Analysis

Associations of parent communication, sexual experience, and demographic characteristics with PrEP awareness were examined using logistic regression, and associations with continuous measures of PrEP attitudes and self-efficacy were examined with ordinary least squares regression. Bivariate (unadjusted) associations were first tested, and variables associated with each outcome at  $p < .10$  were then included in multivariate models among only AMSM who reported they were aware of PrEP. Both parent-adolescent communication variables were included within all adjusted models given their theoretical relevance<sup>16</sup> and focal interest in this study. Analyses were completed with SPSS Version 24.

## Results

Sixteen percent of AMSM ( $n=104$ ) reported they were aware of PrEP. Only 3 AMSM reported currently taking PrEP (0.5%). PrEP awareness did not differ based on demographic characteristics with the exception of sexual orientation: AMSM identifying as gay were more aware of PrEP than participants identifying as bisexual (see Table 1). AMSM who identified as gay, reported higher SSS, and reported more frequent parent HIV communication had higher odds of being aware of PrEP. Within the adjusted logit model, higher frequency of parent HIV communication was associated with higher odds of PrEP awareness ( $B=0.37$ ,  $OR=1.45$ ,  $p=0.005$ ).

Within the sample of 104 AMSM who were aware of PrEP, Table 2 presents the results of unadjusted and adjusted OLS regression models predicting PrEP attitudes and perceived behavioral control from parent communication variables and covariates. With the exception of a significant bivariate association between SSS and PrEP perceived behavioral control, all covariates were nonsignificant in unadjusted models (see Table 2). Within adjusted models, the quality of parent-adolescent communication about HIV was positively associated with

both attitudes about PrEP ( $B=0.21$ ,  $p=.038$ ) and perceived behavioral control for using PrEP ( $B=0.24$ ,  $p=.048$ ).

## Discussion

AMSM in the current sample were more likely to report they were aware of PrEP if they communicated more frequently with their parents about HIV. Furthermore, parents of AMSM who communicated about HIV in a way that was perceived by AMSM as open, honest, knowledgeable, and trustworthy have sons who reported higher perceived behavioral control for PrEP usage and more positive attitudes about PrEP. These results are the first known empirical investigation of how parents can influence PrEP awareness, attitudes, and perceived behavioral control among AMSM, and results indicate parents could play an important role in improving PrEP engagement among AMSM.

Our results point to the potential for parents to assist in improving adolescents' adherence to PrEP, which was disappointingly low in the first published clinical trial with AMSM.<sup>10</sup> Adolescents who perceived their parents to be more informed and trustworthy regarding HIV held more favorable attitudes toward PrEP and felt better prepared to take on the daily regimen of pills. This is consistent with literature across a broad spectrum of health problems that clearly demonstrates how parent engagement improves adolescent adherence to medical regimens and associated health outcomes.<sup>11-13</sup> Although engaging parents in sexual health interventions might not be feasible for every AMSM given parental rejection of sexual orientation within some families,<sup>14</sup> those who are supportive of their sons' sexual health will likely be important allies in PrEP engagement.

As of the date of this assessment, awareness of PrEP among AMSM was low, and it is likely to increase due to recent FDA approval of PrEP for use among adolescents (in May 2018). Research with adults indicates awareness may increase more slowly among certain groups of MSM,<sup>8</sup> and our results indicate bisexual individuals and individuals who perceive low social status may start at a disadvantage among AMSM. We did not see racial/ethnic differences within our data, but this difference may emerge over time, as has been seen among adult men.<sup>8,22,23</sup> Enhanced parent-adolescent communication about HIV is one potential route toward increased awareness of PrEP among AMSM and would require parents to be educated about PrEP, HIV, and how to effectively communicate about sexual health topics with their sons.

One limitation of the present study was the use of only two items to assess attitudes about PrEP and a single item to assess perceived behavioral control. Future investigations should measure psychosocial determinants of PrEP usage among AMSM using a thorough theoretical framework and well-established scales of relevant constructs. Furthermore, data were collected in 2015 prior to recent rapid widespread adoption of PrEP for HIV prevention. While awareness of PrEP among AMSM has likely increased in the past three years, our data also indicate parents could facilitate faster uptake of PrEP among AMSM. Additionally, because the data examined are cross-sectional, we cannot determine temporal precedence of parent-adolescent communication about HIV and AMSM PrEP engagement. Parents of AMSM in the study might have informed their sons about PrEP, and increased

their awareness directly. Alternately, it is also possible that families who maintain an open dialogue about sexual health instill a higher level of sexual health literacy in their sons, which then motivates them to seek additional information on their own. Or more literate sons might elicit more frequent and higher quality conversation from parents. Future longitudinal studies should assess where AMSM obtain information about PrEP and how parents influence their sons' acquisition of knowledge and attitudes toward PrEP and other sexual health innovations. Building theoretically-informed, rigorously tested models of how parents contribute to AMSM's sexual health will lay the foundation for family-engaged interventions to improve outcomes in this uniquely vulnerable population.

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**Table 1:**

Descriptive demographic information, percent in demographic groups aware of PrEP, and unadjusted and adjusted results of logistic regression models predicting PrEP awareness (n = 636).

Dichotomous variables	n (%)	n (%) PrEP aware	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
<b>Age</b>				
14 – 16	258 (40.6)	38 (14.7)	REF	-
17 – 18	378 (59.4)	66 (17.5)	1.23 (0.79 – 1.89)	-
<b>Sexual Orientation</b>				
Gay/Homosexual	452 (71.1)	83 (18.4)	REF	REF
Bisexual	184 (28.9)	21 (11.4) *	0.57 (0.34 – 0.96) *	0.54 (0.32 – 0.92) *
<b>Race/Ethnicity</b>				
White/Caucasion	343 (53.9)	59 (17.2)	REF	-
Black/African American	88 (13.8)	11 (12.5)	0.69 (0.34 – 1.37)	-
Latino/Hispanic	86 (13.5)	13 (15.1)	0.86 (0.45 – 1.65)	-
Other	119 (18.7)	21 (17.6)	1.03 (0.60 – 1.79)	-
<b>Sexually active</b>				
Not Active	261 (41.6)	40 (15.3)	REF	-
Active	367 (58.4)	63 (17.2)	1.15 (0.74 – 1.76)	-
<b>Continuous variables</b>				
	Mean ±SD			
<b>Subjective social status</b>	5.84 ±1.64	-	1.13 (0.99 – 1.29) †	1.12 (0.98 – 1.28)
<b>Frequency HIV communication</b>	0.80 ±0.98	-	1.29 (1.06 – 1.57) *	1.45 (1.12 – 1.89) *
<b>Quality HIV communication</b>	1.90 ±1.20	-	1.03 (0.87 – 1.23)	0.83 (0.66 – 1.05)

Note:

†  $p < 0.10$

\*  $p < 0.05$ ;

PrEP: pre-exposure prophylaxis; OR: odds ratio; REF: reference group.



**Table 2:**

Unadjusted and adjusted results of ordinary least squares regression models predicting PrEP attitudes and perceived behavioral control among AMSM aware of PrEP (n = 104).

Dichotomous variables	PrEP Attitudes		PrEP Perceived Behavioral Control	
	Unadjusted B (SE)	Adjusted B (SE)	Unadjusted B (SE)	Adjusted B (SE)
<b>Age</b>				
14 – 16	REF	-	REF	-
17 – 18	0.27 (0.20)	-	0.37 (0.24)	-
<b>Sexual Orientation</b>				
Gay/Homosexual	REF	-	REF	-
Bisexual	0.01 (0.25)	-	-0.03 (0.30)	-
<b>Race/Ethnicity</b>				
White/Caucasion	REF	-	REF	-
Black/African American	0.41 (0.31)	-	0.35 (0.38)	-
Latino/Hispanic	0.23 (0.31)	-	0.05 (0.37)	-
Other	-0.25 (0.24)	-	0.29 (0.30)	-
<b>Sexually active</b>				
Not Active	REF	-	REF	-
Active	-0.05 (0.20)	-	-0.22 (0.24)	-
Continuous variables				
<b>Subjective social status</b>	0.03 (0.06)	-	0.11 (0.07) †	0.07 (0.07)
<b>Frequency HIV communication</b>	0.03 (0.09)	-0.13 (0.12)	0.03 (0.11)	-0.16 (0.14)
<b>Quality HIV communication</b>	0.13 (0.07) †	0.21 (0.10) *	0.17 (0.09) †	0.24 (0.12) *

Note:

†  $p < 0.10$ ;

\*  $p < 0.05$ ;

PrEP: pre-exposure prophylaxis; B: unstandardized regression coefficient; SE: standard error of unstandardized coefficient; REF: reference group.