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## Interest in HIV pre-exposure prophylaxis (PrEP) among adolescents and their caregivers in Malawi

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### Abstract

Over a third of new HIV infections occur in adolescents aged 10–19 globally. Pre-exposure prophylaxis (PrEP) could be a powerful tool for prevention. Understanding more about the drivers of PrEP interest could inform implementation strategies among this age group. Moreover, family dynamics may play a uniquely critical role for this younger age group, thus it is important to gauge whether caregivers would support their children's use of PrEP. We surveyed 2,089 adolescents (aged 10–16) and their caregivers in Malawi during 2017–2018. Data were collected on PrEP interest, factors that may facilitate PrEP use, and preferences for PrEP modality. We used multivariate logistic regression to estimate the association between the above characteristics and PrEP interest. We find that young adolescents are engaging in behaviors that would put them at substantial risk of acquiring HIV, would likely benefit from PrEP, are largely (82%) interested in using such, would prefer to get an injection over taking a daily pill, and are considerably discouraged by the prospect of side effects. Endorsement by caregivers was even greater (87%). Our findings demonstrate initial support for adolescent PrEP, and suggest parents may be a surprising advocate.

### Keywords

HIV; pre-exposure prophylaxis; adolescent; Malawi

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**Data statement:** The data are not publicly available. We anticipate making de-identified data available in the future.

## Introduction

A quarter million adolescents aged 10–19 acquire HIV annually (United Nations Children’s Fund, 2018). Oral, daily pre-exposure prophylaxis (PrEP) could be a powerful tool for prevention: it has proven efficacy and can be taken discretely. Adolescent girls and young women (AGYW) with concurrent or HIV-positive partners, who are orphaned, or who perceive high HIV risk may be among the most vulnerable, and thus should be considered when designing a strategy for PrEP delivery (Pilgrim, Mathur, Gottert, Rutenberg, & Pulerwitz, 2016). Numerous demonstration projects are underway with adolescents in Africa (Cowan et al., 2016), and the DREAMS (Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe) initiative has begun delivering PrEP to adolescent girls in nine countries (Saul et al., 2018).

Despite rapidly expanding interest and implementation, few studies have explored PrEP acceptability, preferences or barriers among AGYW (Bekker, Gill, & Wallace, 2015; Koechlin et al., 2017). One exception is a qualitative study in South Africa that found adolescent girls (age 14–17) reported strong interest in PrEP (Mack et al., 2014). Whether that interest translates into PrEP uptake may depend on their HIV risk perception (Corneli, Wang, et al., 2014; Khawcharoenporn, Kendrick, & Smith, 2012; Liu et al., 2014). Such motivation could be critical: both the FEM-PrEP and VOICE trials (which recruited women 18+ in multiple African countries) failed to produce evidence of PrEP effectiveness because of low adherence (Marrazzo et al., 2015; Van Damme et al., 2012); the latter was in part attributed to low perceptions of risk (Corneli, McKenna, et al., 2014; Corneli, Wang, et al., 2014). Neither study included young adolescents.

Partnership dynamics may also influence interest. Early findings suggest that women (ages 18–35) who experience intimate partner violence (IPV) are more interested in using PrEP (Willie, Stockman, Overstreet, & Kershaw, 2018), though generally findings are mixed (Garfinkel, Alexander, McDonald-Mosley, Willie, & Decker, 2017). Moreover, IPV victims routinely underestimate their risk (Price et al., 2018; Witte & Kendra, 2010), which could reduce motivation to use PrEP. As adolescents establish their first romantic relationships, it is unclear how emerging IPV may influence the uptake of new prevention technologies like PrEP.

Finally, family dynamics may play a uniquely critical role for this age group. Adolescent girls, though on the cusp of adulthood, are largely still minors who reside in their childhood homes. Regardless of whether parental consent is legally required for PrEP access, parental support is likely to influence an adolescent’s decision. Such support may also be critical for optimal adherence, as it has been with anti-retroviral treatment among HIV-positive adolescents (Cluver et al., 2016; Gross et al., 2015).

As PrEP becomes more accessible across Africa, we need to be ready to implement such effectively within at-risk populations. We thus conducted formative research to better understand PrEP acceptability, preferences and barriers in a sample of over 2,000 young adolescents in Malawi. The aims were to (1) to assess interest in PrEP use; (2) to assess

potential facilitators and barriers to PrEP use; and (3) to gauge preferences for PrEP modality.

## Methods

### Setting:

The high HIV incidence (8%) in Malawi makes it a critical setting for biomedical prevention (NSO, 2017). While PrEP is not yet widely available in Malawi, there are planned and ongoing PrEP trials which include adolescents (PrEP Watch, 2018).

### Sample:

This study is nested within the Malawi Longitudinal Study of Families and Health (Kohler et al., 2015). The present study created a new cohort by sampling children (aged 10–16) of the 2008–2010 respondents. Among those located, only 13 (<1%) declined to participate in the study. Detail on the adolescent cohort selection and data collection is available elsewhere (Kidman, Piccolo, & Kohler, 2019). For each adolescent surveyed (N=2,089), the study also interviewed their primary caregiver (N=1,453). For the current analyses, four adolescents who self-identified as HIV-positive are excluded as they would not be eligible for PrEP.

### Data collection:

Adolescents and caregivers completed face-to-face surveys at their home during 2017–2018. The surveys were conducted by a trained fieldworker who asked questions in their local language.

### Measures:

To gauge interest, all adolescents were initially asked “If there was a pill you could take once a day, every day to prevent getting HIV - would you take the pill?”, and subsequently “Would you still take a pill or injection to prevent HIV if there were side effects, like nausea, stomach pains, or headaches?” While oral PrEP is the only formulation currently available, several long-acting alternatives are currently in development and trials. In anticipation of their roll-out, adolescents were asked about whether they would be willing to get an injection, and whether they would prefer a daily pill to an injection. The latter was assessed through four forced choice preference questions that varied the injection frequency (every 3 or 6 months) and method (by a provider at a health clinic or a self-injection at home). Adolescents were also asked if they had concerns that might stop them from taking PrEP. Due to their late addition, the sample size for analysis (n=1,674) is lower on these questions.

We also collected data on individual, partner and family characteristics hypothesized to influence PrEP use (Mathur, Pilgrim, & Pulerwitz, 2016). We measured HIV risk perception in two manners: first, we measured emotional assessment by asking “How worried are you that you might catch HIV/AIDS?”; response options were not worried at all; worried a little; and worried a lot. Second, we measured probabilistic subjective expectations using an interactive approach that asks adolescents “How likely do you think it is that you will get infected within a 5-year period beginning today?” and records answers by asking

adolescents to place between 0–10 beans on a plate to represent the likelihood of HIV infection ranging from zero to 100% in 10% increments (Delavande & Kohler, 2009, 2015).

Sexual risk was measured through sexual debut; whether a condom was used every time they had sexual intercourse with their most recent partner; concurrent partnerships (two or more sexual partners in the same month); and the HIV status of the most recent partner. We used the Violence Against Women Instrument to measure whether they had ever experienced emotional, sexual and physical IPV (World Health Organization, 2005). We captured parental HIV status (as reported by the adolescent), orphanhood, previous HIV testing, and HIV knowledge (a series of 14 questions assessing their ability to identify HIV transmission methods and recognize that both testing and treatment are available).

Finally, caregiver PrEP interest was measured by asking whether they would want their adolescent to take a daily pill to prevent HIV.

### **Analyses:**

For each gender, we described PrEP interest, preferences and potential determinants using frequencies and means; chi-squared and t-tests were used to test for gender differences. We used multivariate logistic regression to estimate the association between each individual characteristic and PrEP interest. We run separate regressions by gender, and for the subset of respondents who report being sexually-active. Models adjust for adolescent age and for clustering at the caregiver level. Finally, we ran fully-adjusted models that simultaneously included all variables that were significant in the age-adjusted analysis.

## **Results**

### **Willingness to use oral PrEP:**

Over 80% of both genders responded that they would be willing to take a daily pill to prevent HIV. The same proportion would be willing to have an injection every three months. In each case, the proportion rises slightly among those who have sexually debuted. However, only 52% of girls and 48% of boys would still consider using PrEP if there were side effects. Finally, 87% of caregivers indicated that they would want their child to take a daily pill to prevent HIV. There were no statistical differences by either the adolescent's or the caregiver's gender, neither were there differences by age.

### **HIV worry and related factors:**

About 9% of the sample reported that they worried a lot about HIV; another 17% worried a little. This is in sharp contrast to their perceived risk: half the sample reported that they thought the likelihood that they would become infected in the next five years was 30% or higher. Overall, one in five reported a previous HIV test. Among sexually-active girls (but not boys) this rose to almost 40%. We also find low consistent condom use (37% of girls and 26% of boys), a substantial burden of IPV (30% and 24% respectively), and about a third with partners who were either HIV+ (2–5%) or of unknown status (28–29%).

**Association between individual, partner and family characteristics and interest in PrEP use:**

Only sexual debut (aOR 3.81,  $p < 0.001$  for girls; aOR 1.71,  $p = 0.013$  for boys; Table 2a) and HIV knowledge (aOR 1.10,  $p = 0.011$  for girls; aOR 1.20,  $p < 0.001$  for boys) were consistently predictive of interest in oral PrEP. For boys only, a higher perceived risk of HIV infection was associated with greater interest (aOR 1.10;  $p = 0.028$ ). Among the sub-sample reporting sexual debut, girls with concurrent partnerships were less willing to use PrEP (aOR 0.23;  $p = 0.05$ ); boys with greater HIV knowledge were more likely to be interested in PrEP (aOR 1.19;  $p = 0.013$ ). All adolescents (eight girls and five boys) who reported an HIV+ sexual partner also reported PrEP interest. Strikingly, perceived HIV risk did not translate into a greater willingness to use oral PrEP, nor did any other HIV-related factor.

Not only was interest considerably lower if there were potential side effects, but there were differences in predictors of interest (Table 3). Most notably, perceived risk emerged as a predictor. Adolescents were more likely to have sustained interest if they worried a lot about contracting HIV (aOR 2.11;  $p = 0.037$  for girls and aOR 2.51;  $p < 0.001$  for boys). Similarly, boys were more likely to remain interested if they perceived a higher likelihood of contracting HIV or reported a past HIV test; the same was true for sexually-active girls.

Sexual debut was negatively associated with PrEP interest even if there were side effects (significant only for boys: aOR 0.62,  $p = 0.006$ ). For sexually-active adolescents, unknown partner HIV status was positively associated with sustained interest (aOR 2.15, but reaching statistical significance for boys only), as was an HIV test (aOR 3.07,  $p = 0.003$  for girls) and condom use for boys (aOR 2.52,  $p = 0.007$ ). We only had data on ten adolescents reporting an HIV+ partner; five were not interested in PrEP if there were side effects.

There were no meaningful differences in the results in fully-adjusted models that simultaneously included all variables that were significant in the above age-adjusted analysis (Table 2b and 3b).

**Preferences for PrEP modality:**

Both genders preferred to get an injection at a health clinic (59–65%) over taking a daily pill. When the alternative was giving themselves an injection at home, approximately half favored an injection over a daily pill (Table 4).

**Potential concerns about PrEP:**

Among those interested in PrEP, 36% said they had concerns that might stop them from taking the pill. The most common were that they might forget to take it (21%), privacy (7%) and that their parents might find out (3%). One quarter said they had concerns that might stop them from getting an injection, including that it might make them sick (6%), privacy (5%), and they may forget to get it (4%). While we did not explicitly ask about pain, the survey included an option to specify additional concerns. Over 10% said that they had a fear of injections/needles or were concerned about the pain associated with such.

## Discussion

We find that young adolescents in Malawi are engaging in behaviors that put them at substantial risk of acquiring HIV, and would likely benefit from PrEP. These behaviors include low rates of consistent condom use and a substantial burden of IPV. Adolescent PrEP interest is high, though we acknowledge that responses to questions on hypothetical use likely overestimate actual uptake, especially since these questions didn't include references to the time/transportation costs of obtaining PrEP, or the costs of medication itself. Moreover, among adolescent sexually-active girls – the target population for PrEP services – we found 40% had been tested for HIV. This suggests that adolescents are accessing HIV services, and provides an entry point for individual PrEP counseling.

To achieve adequate uptake, implementation strategies will need to consider potential facilitators and barriers. We hypothesized that HIV risk perception would influence adolescent's willingness to use PrEP. However, neither perceived likelihood of infection nor HIV worry was related to their general interest. This mirrors findings from a study in the US that found HIV worry was not associated with PrEP acceptability in a sample of young adult woman (Garfinkel et al., 2017). Similarly, perceived risk was associated with PrEP adherence in some but not all of the study sites in the FEM-PrEP trial (Corneli, Wang, et al., 2014). Thus, approaches that rely on risk perception as the key motivation for uptake may not be effective on their own. As Amico and Bekker (2019) have suggested, adolescents may respond more favorably to PrEP messaging about safeguarding their current health than to messaging on risk. This more empowering message may also distance PrEP from high-risk behaviors, and thus reduce the stigma.

Interest was dampened by the potential for side effects, consistent with other studies (Koechlin et al., 2017). There is, however, a dissonance between anticipated side effects and actual occurrence. Most side effects are short-term, are not severe enough to discourage PrEP use in practice, and may be overstated (Fonner et al., 2016; Glidden et al., 2016). In the African FEM-PrEP Trial, women's fear of side effects was a more powerful determinant of non-adherence than was actually experiencing side effects (Corneli et al., 2016). This underscores the importance of primary counselling on expected side effects and their duration, including discussion of effective strategies for minimizing such (Van der Elst et al., 2013).

Examining PrEP interest in the context of side effects also yielded different insights into potential facilitators and barriers. First, HIV risk perception was positively associated with an adolescent's willingness to use PrEP. It may be that those who perceive little HIV risk were more easily deterred by the potential for side effects. Second, we had hypothesized that sexually-active adolescents would be more motivated to adopt PrEP. While we found a large and statistically significant positive association between sexual debut and PrEP interest in the initial models, we found a negative association when asking if they would still be interested in there were side effects. Future qualitative work could explore this conundrum. In the meantime, PrEP campaigns and counselling clearly need to address the issue of side effects head on. At this point, we can merely speculate that the reasons for this reversal are

related to differences in risk attitudes and discount factors among those who have a relatively early onset of sexual activity.

Adolescents may face additional barriers to PrEP related to their age. Importantly, adolescents are still living at home. Their family's opposition to PrEP use may be a difficult barrier to overcome. In many contexts, parental consent may be required for an adolescent to begin PrEP. Even if adolescents were able to access PrEP without parental permission, there is a solid literature demonstrating the importance of caregiver support for anti-retroviral treatment adherence (Cluver et al., 2016; Gross et al., 2015) and of social support for PrEP (Yi et al., 2017). One of the key messages from this study is that the vast majority of caregivers supported PrEP use. As countries grapple with whether to offer PrEP to adolescents, community support is a key issue (Kirby, 2016). Our findings suggest that there may be more support than anticipated, and that parents may be a surprising advocate for PrEP activities.

Anti-retroviral treatment adherence is particularly challenging for adolescents (Nachega et al., 2009), and this is likely to be the case for PrEP as well. We could not find published PrEP adherence data specific to adolescents. There is evidence that oral PrEP adherence is lower in younger (aged <30 years) compared to older women (Yun et al., 2018). A range of PrEP modalities are in development and testing, including long-acting injectable agents (Landovitz, Kofron, & McCauley, 2016). Such methods could improve adherence, though this is still untested. Qualitative research with adolescents in South Africa found no clear preference between pills and injections (Mack et al., 2014). Despite the more infrequent administration, South African adolescents relayed concerns that the injections would be painful. A study in South Africa and Kenya asked young women (aged 18–30) to use one of three placebo prevention options (oral pills, injections, and vaginal rings) (Minnis et al., 2018). Acceptability of injections increased over the course of the study. In our study, adolescents likewise had a preference for injections over daily oral pills. However, many were concerned about pain or feared needles. Messaging surrounding PrEP injections will have to address this. Many girls and young women currently use injectable contraceptives, showing that this concern can be overcome, and pairing contraceptive and PrEP injections may be one strategy to increase adherence (Celum et al., 2019).

The strengths of this paper include its large sample size in an endemic context; focus on adolescents entering a particularly risky period for HIV; and attention to both adolescent and caregiver preferences. The main limitation is the hypothetical nature of the questions. Studies have reported steep drop offs between men reporting a willingness to take PrEP and those who actually use PrEP (Ding et al., 2016; Hoots et al., 2016). Moreover, the sampled population (aged 10–16) is likely younger than potential PrEP users, given that both HIV risk behaviors and HIV incidence rises with age. We note, however, that a substantial proportion of this young sample was sexually-active and may benefit from PrEP.

### **Conclusion:**

A majority of adolescents growing up in a highly-endemic environment expressed willingness to adopt PrEP. Caregivers also look favorably on adolescent PrEP use, and may be important advocates and sources of support. Offering multiple modalities (e.g., pills,

injections) may help adolescents find an approach that works best for them. Accurate education and effective strategies for minimizing side effects may help overcome this significant hurdle.

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Table 1.

Sample characteristics (frequency (%) unless otherwise specified) (n=2,085)

	Girls		Boys	
	Full Sample (n=1,024)	Sexually-Active (n=171)	Full Sample (n=1,061)	Sexually-Active (n=290)
<b>Demographics</b>				
Adolescent's age (mean years)	13.3	14.7	13.2	14.0
<b>PrEP interest</b>				
Adolescent willing to use oral pill	81.4%	93.6%	81.8%	87.9%
Adolescent willing to have injection <sup>‡</sup>	81.4%	90.7%	82.1%	87.0%
Adolescent willing to use PrEP even with side effects <sup>‡</sup>	51.8%	46.5%	48.3%	39.5%
Caregiver willing to have adolescent use oral pill	85.9%	89.2%	87.3%	89.2%
<b>Risk perception</b>				
Worry about HIV				
Not worried	73.8%	70.1%	73.8%	68.9%
Worried a little	17.0%	21.6%	16.8%	25.1%
Worried a lot	9.2%	8.4%	9.4%	6.0%
Likelihood of future HIV infection				
No likelihood	17.3%	11.7%	17.1%	15.9%
10–20% likelihood	33.4%	23.4%	34.0%	29.3%
30% likelihood	49.3%	64.9%	48.9%	54.8%
<b>Sexual risk</b>				
Sexual debut	16.7% <sup>***</sup>	100%	27.4% <sup>***</sup>	100%
Consistent condom use	Na	37.4% <sup>**</sup>	na	25.5% <sup>**</sup>
Concurrent partners	Na	14.8% <sup>***</sup>	na	32.2% <sup>***</sup>
Partner status				
HIV+	Na	4.7%	na	1.7%
HIV–	Na	67.3%	na	69.3%
Unknown	Na	28.1%	na	29.0%
Intimate partner violence <sup>††</sup>	31.5%	30.1%	24.3%	23.5%
<b>Other HIV-related factors</b>				

	<u>Girls</u>		<u>Boys</u>	
	Full Sample (n=1,024)	Sexually-Active (n=171)	Full Sample (n=1,061)	Sexually-Active (n=290)
HIV-infected parent	4.5%	10.0% **	3.3%	3.2% **
Orphan	14.7%	18.1%	13.4%	12.1%
Ever had an HIV test	19.5%	38.0% ***	19.7%	17.6% ***
HIV knowledge (mean score)	9.7 ***	10.2 *	9.4 ***	9.8 *

\* n=1,674;

\*\*

measured among ever-partnered adolescents; statistically significant gender differences denoted as

\* p<0.05,

\*\* p<0.01,

\*\*\* p<.001

Age-adjusted odds ratios (aOR) between each individual, partner and family characteristics and interest in oral PrEP use (n=2,085)

**Table 2a.**

	Girls		Boys	
	Full Sample	Sexually-Active	Full Sample	Sexually-Active
<b>Risk perception</b>				
Worry about HIV	ref	ref	ref	ref
Not worried	1.27 (0.81–2.01)	2.87 (0.35–23.22)	1.27 (0.78–206)	0.61 (0.28–1.32)
Worried a little	0.97 (0.56–1.67)	1.29 (0.14–11.63)	0.82 (0.4–1.38)	0.77 (0.16–3.75)
Worried a lot	1.04 (0.95–1.13)	0.93 (0.68–1.28)	<b>1.10 (1.01–1.20)*</b>	0.91 (0.77–1.07)
Likelihood of future HIV infection				
<b>Sexual risk</b>				
Sexual debut	<b>3.81 (2.00–7.26)***</b>	na	<b>1.71 (1.12–2.62)*</b>	na
Consistent condom use	na	0.35 (0.11–1.18)	Na	1.33 (0.58–3.03)
Concurrent partners	na	<b>0.23 (0.05–1.00)*</b>	Na	0.59 (0.26–1.33)
Partner status				
HIV–	ref	ref	ref	ref
HIV+	na	^	na	^
Unknown	na	1.97 (0.41–9.45)	na	1.05 (0.48–2.31)
Intimate partner violence <sup>††</sup>	0.78 (0.35–1.75)	0.76, 0.21–2.78	0.77 (0.39–1.51)	0.64 (0.30, 1.37)
<b>Other HIV-related factors</b>				
HIV-infected parent	1.01 (0.46–2.23)	1.21 (0.14–10.55)	1.16 (0.45–2.98)	1.06 (0.13–8.94)
Orphan	0.92 (0.59–1.44)	2.45 (0.29–20.62)	1.21 (0.73–2.00)	2.42 (0.54–10.76)
Ever had an HIV test	1.29 (0.94–2.00)	2.09 (0.51–8.59)	1.07 (0.71–1.61)	1.27 (0.47–3.47)
HIV knowledge	<b>1.10 (1.02–1.18)*</b>	1.20 (0.96–1.49)	<b>1.20 (1.13–1.29)***</b>	<b>1.19 (1.04–1.37)*</b>

<sup>††</sup> measured among ever-partnered adolescents; statistically significant gender differences denoted as

\* p<0.05,

\*\* p<0.01,

\*\*\* p<.001;

^ not estimated because all 13 adolescents who reported an HIV+ partner also reported PrEP interest

Fully-adjusted odds ratios (aOR) for interest in oral PrEP use (n=2,085) from models that simultaneously include all individual, partner and family characteristics that were statistically significant in the age-adjusted analysis

**Table 2b.**

	Girls		Boys	
	Full Sample	Sexually-Active	Full Sample	Sexually-Active
<b>Risk perception</b>				
Worry about HIV				
Not worried				
Worried a little				
Worried a lot				
Likelihood of future HIV infection			1.10 (1.01–1.20)*	
<b>Sexual risk</b>				
Sexual debut	3.97 (2.08–7.55)***		1.71 (1.11–2.65)*	
Consistent condom use				
Concurrent partners		0.23 (0.05–1.00)*		
Partner status				
HIV–				
HIV+				
Unknown				
Intimate partner violence**				
<b>Other HIV-related factors</b>				
HIV-infected parent				
Orphan				
Ever had an HIV test				
HIV knowledge	1.11 (1.03–1.20)**		1.21 (1.13–1.29)***	1.19 (1.04–1.37)*

\*\*\* measured among ever-partnered adolescents; statistically significant gender differences denoted as

\* p<0.05,

\*\* p<0.01,

\*\*\* p<.001;

not estimated because all 13 adolescents who reported an HIV+ partner also reported PrEP interest

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Age-adjusted odds ratios (aOR) between each individual, partner and family characteristics and interest in oral or injection PrEP even if there were side effects (n=1,674)

**Table 3a.**

	Girls		Boys	
	Full Sample	Sexually-Active	Full Sample	Sexually-Active
<b>Risk perception</b>				
Worry about HIV	ref	ref	ref	ref
Not worried				
Worried a little	<b>1.53 (1.03–2.27)*</b>	1.38 (0.53, 3.64)	1.39 (0.95, 2.04)	1.40 (0.74, 2.66)
Worried a lot	<b>2.11 (1.30, 3.44)**</b>	1.07 (0.33, 3.48)	<b>2.51 (1.57, 4.02)***</b>	2.64 (0.78, 8.88)
Likelihood of future HIV infection	1.07 (1.00, 1.15)	<b>1.28 (1.06, 1.54)*</b>	<b>1.14 (1.06, 1.23)***</b>	1.19 (1.03, 1.38)
<b>Sexual risk</b>				
Sexual debut	0.71 (0.47, 1.08)	Na	<b>0.62 (0.45, 0.87)**</b>	Na
Consistent condom use	Na	0.93 (0.43, 2.03)	Na	<b>2.52 (1.28, 4.94)**</b>
Concurrent partners	Na	1.39 (0.49, 3.95)	Na	1.25 (0.67, 2.32)
Partner status				
HIV–	ref	ref	ref	ref
HIV+	na	2.39 (0.36–15.90)	na	0.65 (0.06–6.66)
Unknown	na	2.15 (0.98–4.71)	na	<b>2.15 (1.15–4.05)**</b>
Intimate partner violence <sup>††</sup>	0.91 (0.47, 1.78)	1.32 (0.60, 2.92)	0.91 (0.50, 1.66)	0.94 (0.49, 1.80)
<b>Other HIV-related factors</b>				
HIV-infected parent	0.66 (0.31, 1.41)	0.88 (0.22, 3.46)	<b>2.82 (1.08, 7.40)*</b>	1.06 (0.16, 6.95)
Orphan	0.83 (0.57, 1.22)	1.20 (0.52, 2.76)	<b>1.80 (1.19, 2.72)***</b>	1.19 (0.50, 2.83)
Ever had an HIV test	1.34 (0.95, 1.89)	<b>3.07 (1.45, 6.51)**</b>	<b>1.45 (1.03, 2.04)*</b>	1.69 (0.93, 3.44)
HIV knowledge	<b>1.10 (1.03, 1.18)**</b>	0.92 (0.77, 1.10)	<b>1.10 (1.03, 1.17)**</b>	0.96 (0.84, 1.10)

<sup>††</sup> measured among ever-partnered adolescents; statistically significant gender differences denoted as

\* p<0.05,

\*\* p<0.01,



100%  
\*\*\*

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Fully-adjusted odds ratios (aOR) for interest in oral or injection PrEP even if there were side effects (n=1,674) from models that simultaneously include all individual, partner and family characteristics that were statistically significant in the age-adjusted analysis)

**Table 3b.**

	<u>Girls</u>		<u>Boys</u>	
	Full Sample	Sexually-Active	Full Sample	Sexually-Active
<b>Risk perception</b>				
Worry about HIV				
Not worried				
Worried a little	<b>1.57 (1.06–2.34)*</b>			
Worried a lot	<b>2.05 (1.25, 3.35)**</b>		<b>2.33 (1.41, 3.87)***</b>	
Likelihood of future HIV infection		<b>1.31 (1.09, 1.58)**</b>	<b>1.14 (1.05, 1.23)***</b>	
<b>Sexual risk</b>				
Sexual debut			<b>0.60 (0.42, 0.87)**</b>	
Consistent condom use				<b>2.38 (1.20, 4.71)*</b>
Concurrent partners				
Partner status				ref
HIV –				0.87 (0.08, 9.49)
HIV+				<b>2.06 (1.08–3.94)*</b>
Unknown				
Intimate partner violence**				
<b>Other HIV-related factors</b>				
HIV-infected parent				<b>1.62 (1.05, 2.51)*</b>
Orphan				<b>1.51 (1.04, 2.17)*</b>
Ever had an HIV test		<b>3.34 (1.54, 7.23)**</b>		<b>1.10 (1.03, 1.18)**</b>
HIV knowledge	<b>1.10 (1.02, 1.19)**</b>			

**Table 4.**

Adolescent preferences for delivery mode (n=1,674)

	<b>Girls</b>			<b>Boys</b>		
	Pill	Injection	Don't know	Pill	Injection	Don't know
To prevent HIV, would you rather take a pill once a day or...						
...get an injection at a <u>HEALTH CLINIC</u> once every <u>THREE</u> months?	39.3	60.6	<1%	40.6	59.3	<1%
...get an injection at a <u>HEALTH CLINIC</u> once every <u>SIX</u> months?	35.2	64.5	<1%	36.6	63.3	<1%
...give yourself an injection at <u>HOME</u> once every <u>THREE</u> months?	49.6	50.1	<1%	50.1	49.8	<1%
...give yourself an injection at <u>HOME</u> once every <u>SIX</u> months?	46.9	53.0	<1%	46.1	53.8	<1%