



Published in final edited form as:

*AIDS Educ Prev.* 2023 July ; 35: 52–66. doi:10.1521/aeap.2023.35.suppA.52.

## Fostering access to PrEP among adolescent girls and young women aged 16 to 24 years at high risk of HIV through the DREAMS initiative in four districts in Zambia

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### Abstract

Adolescent girls and young women (AGYW) in sub-Saharan Africa remain at high risk for HIV, yet limited data exists on implementation of HIV pre-exposure prophylaxis (PrEP) for this group. We examined PrEP uptake among AGYW using a retrospective cohort enrolled in the Determined Resilient Empowered AIDS-free Mentored Safe (DREAMS) initiative in Zambia between October 2020 and March 2022. Eligible AGYW at substantial risk for HIV were consented and voluntarily initiated on PrEP. Multivariable logistic regression was used to examine factors associated with PrEP refills following initiation. Of 4,162 HIV-negative AGYW, 3,233 (77%) were at substantial risk and initiated on PrEP. Overall, 68% of AGYW had at least one refill but this differed significantly by age group and district. DREAMS was successful at reaching AGYW with PrEP

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#### Author's Contributions

Contributors JC, PO, BL, CC, LM, CM, and PP conceived the study. JC, BL, CB, and PO conducted literature searches and data analyses. JC, LM, PO, BL, and CB wrote the initial draft. AM, OC, ChM, CB, MW, RL, KW, JC, LM, ChB, SM, BC, CC, JO, and PP revised the manuscript and provided scientific or technical input. All authors edited and approved the final draft. AO, KT, and PO accessed and verified the source data. All authors had full access to the data in the study and had final responsibility for the decision to submit for publication.

#### Competing Interests

The authors declare that they have no conflicts of interest.

services. More evidence is needed to assess reasons for discontinuation and to improve persistence for those with sustained HIV risk.

### Keywords

DREAMS; PrEP; AGYW; HIV prevention

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### Introduction

Adolescent girls and young women (AGYW) are highly vulnerable to the ongoing risk of acquiring human immunodeficiency virus (HIV) across sub-Saharan Africa (SSA) (Birdthistle et al., 2019; World Health Organization, 2016). In Zambia, AGYW are at substantial risk of HIV infection due to social, cultural, and economic vulnerabilities such as gender inequality, education, sexual violence, and high levels of unemployment, which can lead to behaviors that predispose them to HIV (Butts et al., 2017; Harrison et al., 2015; Mathur et al., 2020). Culturally, it may be difficult for AGYW to make financial and sexual decisions in a relationship, and social stigma may prevent them accessing condoms or other forms of family planning (FP) services (Butts et al., 2017). Among adolescent and young people aged 15 to 24 years old, there is a gender disparity with AGYW (5.7%) being disproportionately affected by HIV compared to adolescent boys and young men (1.8%) (Zambia Statistics Agency, 2018). Among this age group, 9.5% of females reported having sexual intercourse before the age of 15, and face increased risk of HIV acquisition (Zambia Ministry of Health, 2016); adolescents who reported early sexual debut had an HIV prevalence of 11.9% (Zambia Ministry of Health, 2016). Adolescents are a priority population for HIV programming (Cowan & Pettifor, 2009) and it is critical to prioritize HIV prevention interventions for the approximately four million AGYW living in Zambia (US President's Emergency Plan for AIDS Relief (PEPFAR), 2021).

To prevent HIV among AGYW, the Zambian Ministry of Health (MOH) implemented the Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe (DREAMS) initiative in Zambia in 2015 with support from PEPFAR and partners. DREAMS provides comprehensive prevention services and has established safe spaces and communities for AGYW with evidence-based interventions to reduce HIV risk, including pre-exposure prophylaxis (PrEP). Preliminary studies assessing the impact of the DREAMS initiative have reported a correlated decline in HIV incidence among AGYW in other parts of SSA, including Kenya and South Africa (Birdthistle et al., 2021; Chimbindi et al., 2020).

PrEP is highly effective for preventing HIV, especially when taken as prescribed and in combination with other biomedical prevention interventions (Spinner et al., 2016). PrEP was first implemented in Zambia in 2017 and scaled up nationally in 2018 (Claassen et al., 2018; Claassen et al., 2021). However, access to PrEP is often a challenge for AGYW due to limited resources, anxiety, and stigma (Claassen et al., 2021; Skovdal et al., 2022). Barriers such as time, cost, and distance to health facilities often limit AGYWs' access to care (Skovdal et al., 2022). AGYW have expressed concerns about pill size and fear of social stigma if others discover their PrEP use (Skovdal et al., 2022). DREAMS Centers

offer a unique opportunity to provide PrEP to AGYW in a supportive environment (Bekker et al., 2018; Birdthistle et al., 2021; Celum et al., 2019; Claassen et al., 2021; Fonner et al., 2016).

The University of Maryland Baltimore (UMB) has been implementing DREAMS in Zambia under the Community Impact to Reach Key and Underserved Individuals for Treatment and Support (CIRKUIITS) and Zambia Community HIV Epidemic Control for Key Populations (Z-CHECK) projects in collaboration with the Zambian MOH since 2020. DREAMS Centers under these projects provided PrEP to AGYW as a component of the comprehensive prevention strategy to reach AGYW and reduce their risk of acquiring HIV. We describe the PrEP services provided to AGYW enrolled in the UMB DREAMS program in four districts of Zambia. We evaluate the implementation of PrEP services from HIV testing to PrEP follow-up and examine the factors associated with PrEP initiation and persistence among AGYW.

## Methods

### Study design and setting

We conducted a secondary analysis of data captured on HIV testing and prevention services provided to AGYW enrolled in DREAMS. We examined PrEP uptake among AGYW aged 16 to 24 years using a retrospective cohort enrolled in DREAMS between October 2020 and March 2022 in four districts: Chipata, Mongu, Monze, and Mazabuka. Mongu District is the capital of Western Province, located about 600 km from Lusaka, which has a provincial HIV prevalence of 10.6% (Zambia Statistics Agency, 2018). Monze and Mazabuka districts are in Southern Province, with an HIV prevalence of 12.4% (Zambia Statistics Agency, 2018). Chipata District is in Eastern Province, with an HIV prevalence of 7.4% (Zambia Statistics Agency, 2018).

### DREAMS Intervention

From October 1, 2020 to March 31, 2022, CIRKUIITS and Z-CHECK implemented full DREAMS activities at six DREAMS Centers in Southern and Western Provinces, and provided PrEP services to girls enrolled at four DREAMS Centers in Eastern Province. HIV and PrEP sensitization were offered to AGYW during social asset building sessions, which were delivered as a part of the DREAMS primary intervention. In accordance with Zambian MOH guidelines to reduce unnecessary testing, all persons are screened for HIV risk prior to testing. Per national guidelines, persons aged 16 years and older may provide consent for HIV testing and health services, thus children 15 years old and younger were not included in this study. Eligible AGYW were screened using the national HIV risk assessment tool (Supplemental Material), comprised of a series of questions customized for different age groups (less than 18 years, and 18 years or older). AGYW who screen as high risk for HIV were referred to HIV testing services. Questions focus on health (history of poor health, hospital admission history, STI symptoms), behavior (sexual activity, transactional sex), and socio-behavioral risk factors (gender-based violence experience, orphanhood, family members living with HIV, child marriage). The questions for AGYW over 18 years of age overlap significantly with those below 18 years of age; however, this questionnaire

prioritizes sexual risk behaviors (intercourse without condom, broken condom, number of sexual partners, awareness of HIV status). AGYW who reported two or more of these risk factors were referred for HIV testing. Those who tested HIV-positive were linked to treatment, while those who tested HIV-negative were linked to prevention services, such as PrEP.

### **Zambia DREAMS Approach to PrEP Provision**

PrEP services were provided to AGYW at the DREAMS Centers and nearby health facilities within the DREAMS catchment areas by site coordinators and health care workers trained in PrEP provision and management of AGYW on PrEP. All PrEP initiation is voluntary. All girls initiated on PrEP in Eastern Province were previously screened and found to be at substantial risk for HIV before referral to UMB for PrEP initiation.

DREAMS staff counseled AGYW who tested negative for HIV and linked them to a health care provider for a PrEP eligibility assessment. If eligible, the provider initiated AGYW on a one-month supply of PrEP. Follow-up visits were conducted at one month for HIV retesting, and to check for PrEP adherence and side effects. Follow-up visits then occurred every three months. At each visit, AGYW received adherence and risk reduction counseling, STI screening, repeat HIV tests, and creatinine clearance testing. AGYW were also provided with other prevention services including condoms and contraception as needed. Repeat HIV risk assessments were conducted every three months to inform decisions on whether to continue PrEP.

PrEP eligibility assessment includes STI screening, physical exam, brief medical history, review of current medication use, laboratory testing (urinalysis, hepatitis B surface antigen, and serum creatinine), and assessment of ability and willingness to adhere to daily PrEP. Per national guidelines, PrEP eligibility required confirmation of more than one of the following HIV risk behaviors in the past 6 months: condomless intercourse with >1 partner; sexually active with partner known to be HIV-positive or at substantial risk for HIV; STI history; history of post-exposure prophylaxis use; sharing drug injection equipment; or having an HIV-positive sexual partner not on suppressive ART (Zambia MOH, 2020).

### **Inclusion Criteria, Exposures, and Outcomes**

For this analysis, AGYW enrolled in the DREAMS program with documented HIV-negative status were included; those who tested HIV-positive or had an unknown HIV status were excluded. Primary outcomes of interest are from a modified PrEP cascade including: 1) the proportion of enrolled DREAMS AGYW who tested negative for HIV and screened at substantial risk using the standardized Zambian MOH risk assessment tool; 2) PrEP eligible, the proportion of HIV-negative AGYW who met the criteria for substantial HIV risk and were interested in PrEP; 3) PrEP uptake, defined as the proportion of PrEP eligible AGYW who initiated PrEP; 4) PrEP persistence, defined as the proportion of AGYW initiated on PrEP who attended at least one follow up visit with refill between October 2020 to March 2022. We also performed a descriptive analysis of PrEP discontinuation among AGYW with documented reasons for discontinuation. We disaggregated outcomes data by age groups and districts. Details of HIV risk assessment were not provided from Eastern Province, as UMB

only implements PrEP initiation and not screening in this province. To define outcomes and age groups, we used guidance from the PEPFAR Monitoring, Evaluation, and Reporting (MER) Indicator Reference Sheet version 2.4 (PEPFAR, n.d.). Exposure variables used to assess factors associated with PrEP initiation included self-report of health, behavioral, and socio-behavioral factors on the HIV risk screening tool. Variables used to assess factors associated with PrEP persistence among girls initiated on PrEP included HIV risk behaviors measured by the PrEP eligibility assessment.

### Data Sources and Statistical Analysis

We examined retrospective data for AGYW aged 16 to 24 years old who tested HIV-negative between October 2020 to March 2022 from UMB established client-level District Health Information Software 2 database (District Health Information Software, n.d.). Frequency distributions, proportions, and summary statistics were calculated on outcomes of interest. Pearson chi-square test was used to test for differences in outcomes by categorical variables. Multivariable logistic regression was used to generate adjusted odds ratios (aOR) and 95% confidence intervals (95%CI) to examine factors associated with obtaining at least one PrEP refill following initiation. The analysis of PrEP persistence (Table 2) was truncated to AGYW initiated by February 28<sup>th</sup>, 2022 to allow at least one month for PrEP refill to occur. All analyses were performed using Stata17 SE (STATA Corporation, College Station, TX) and R software-version 4.0.3 (R Core Team, 2021).

### Ethical approval

Ethical approval for this analysis was granted by the institutional review boards (IRB) at the ERES Converge Zambian IRB (Ref Nos. 2021-Jan-010, 2020-Mar-015), the National Health Research Authority (NHRA0008/15/03/2021, NHRA00029/04/2020), and the University of Maryland School of Medicine (HP-00096480, HP-00086064). The study was reviewed in accordance with the US CDC human research protection procedures and determined to be research, but CDC investigators did not interact with human subjects or have access to identifiable data or specimens for research purposes. Informed consent was waived by the IRBs as this study was a retrospective review of deidentified existing aggregate program data.

## Results

### Sample Characteristics

The results described include AGYWs enrolled in DREAMS programs between October 1<sup>st</sup>, 2020 and March 31<sup>st</sup>, 2022 from Southern, Western, and Eastern Provinces in Zambia (Figure 1). During this time, UMB enrolled or received referrals of 26,691 AGYWs aged 16 to 24 years of age into DREAMS, of whom 4,162 were identified at substantial HIV risk and tested HIV-negative. Of the 4,162 AGYW, the median age was 20 years (IQR 18–22), just over half (57%; 2,373/4,162) were young adults between the ages of 20 and 24 years, and most (81%; 3,373/4,162) were single (Table 1).

In Western and Southern Provinces, 3,123 AGYW were identified at substantial HIV risk and tested HIV-negative (Figure 1). HIV risk assessment was conducted in two age groups:

932 (30%) were aged 16–17 years and 2,191 (70%) were aged 18–24 years (Table 1). Among the younger age group, the most reported HIV risk factors were being sexually active (61%), experiencing poor health in the past three months (60%), one or both parents being deceased (31%), and ever being admitted to the hospital (25%). Between the ages of 18 to 24, the most commonly reported HIV risk factors were intercourse without using condoms (85%), unprotected sex since last testing HIV-negative (50%), or reported use of FP (48%) (Table 1).

### PrEP Initiation

Seventy-seven percent (3,223/4,162) of AGYW were initiated on PrEP (Figure 1, Table 1). Characteristics of HIV-negative individuals who initiated PrEP compared to those who did not initiate PrEP differed by age group, marital status, and district (Table 1). A significantly higher proportion of those initiated-on PrEP were young adults aged 20–24 compared to adolescents (65% vs. 35%). The proportion of AGYW that were married was higher in the initiated-on PrEP group compared to the non-initiated, 21% vs. 6%. Among the 3,233 AGYW who initiated PrEP, 1,039 (32%) were in Eastern Province, 1,628 (51%) were in Southern Province, and 556 (17%) were in Western Province. In Eastern Province, all AGYW that were referred for PrEP services were initiated by UMB; screening for PrEP services occurred prior to referral.

In Western and Southern Provinces, 70% (2,187/3,123) of AGYW were interested in and assessed for PrEP eligibility; this ranged from 60% in Western Province and 80% in Southern Province (Figure 2). While 2,185 (99%) were eligible, 99% (2,184/2,185) were initiated on PrEP (Figure 2). The proportion eligible and initiated was consistent across districts. Among girls aged 16–17 years, those who initiated PrEP (versus did not initiate PrEP) had a significantly higher proportion of AGYW who reported being sexually active (67% vs. 54%,  $p<0.001$ ) and a higher proportion who reported losing a parent/parents (6% vs. 2%) (Table 1). Among the 20–24 year old age group, those who initiated PrEP (versus did not initiate PrEP) had a significantly higher proportion of HIV-negative AGYW who reported knowing their HIV status (74% vs. 63%,  $p<0.001$ ), being tested for HIV in the past 6 months (66% vs 56%,  $p<0.001$ ), and taking FP (50% vs. 40%,  $p=0.001$ ) (Table 1, Table 2). Further, among the older age group, the proportion of AGYW reporting transactional sex was lower in those that initiated PrEP compared to those that did not, 14% to 21%, respectively (Table 1).

### PrEP Persistence

PrEP persistence was 68% (2,086/3,064) overall but differed significantly ( $p<0.001$ ) by district with the highest in Chipata at 99% (952/963) and lowest reported in Monze at 36% (248/686) (Table 2). In the age-adjusted analysis, compared to Chipata, the odds of PrEP persistence was lower in Mongu (aOR 0.08, 95% CI 0.04–0.16), Mazabuka (aOR 0.01, 95% CI 0.01–0.02), and Monze (aOR 0.01, 95% CI 0.00–0.01). The adjusted odds of PrEP persistence was lower among those who reported sex without a condom with more than one partner verses those without such reports (aOR 0.64, 95% CI 0.50–0.82).



Across all provinces, discontinuation of PrEP was documented in 32% (1,035/3,233) of AGYW who had at least one follow-up contact. Of these, 553 (53%) had a reason for discontinuation recorded; <1% documented seroconversions, 59 (11%) indicated they had one consistent sexual partner, 328 (59%) reported that they were no longer involved in unsafe practices, and <1% reported their partner was on ART and virally suppressed. The most common reason for discontinuation provided in free-text format included relocation or transfer-out (34%; 63/188).

## Discussion

We found that DREAMS Centers were highly effective at providing PrEP to AGYW in Zambia, a significantly at-risk population not usually reached with HIV prevention services. Among AGYW aged 16 to 24 years in four districts in Zambia, DREAMS was an effective way to deliver PrEP services to 3,223 AGYW with HIV risk factors, though PrEP initiation and persistence varied by district. We were only able to assess PrEP uptake among girls who were at risk and tested negative for HIV; this excluded a large proportion of AGYW who did not report HIV risk factors. The DREAMS initiative provided an opportunity for close and consistent communication with AGYW, along with a platform to deliver services. Seventy-percent of AGYW who tested HIV-negative were interested in initiating PrEP, and uptake among eligible AGYW was high at over 99%.

To our knowledge, this is the first demonstration of PrEP provision to AGYW in Zambia via DREAMS Centers. Our study is notable for the high uptake of PrEP among AGYW who were interested and assessed for eligibility, which may demonstrate the unmet need for PrEP service delivery via existing mechanisms, as well as highlight the unique role that DREAMS Centers can offer in providing a safe and stigma-free environment for AGYW to access health and HIV prevention services. Our findings of high PrEP uptake among young adults are also consistent with other studies in the region. Prior qualitative evidence suggests that PrEP is viewed as an effective means to protect one's health, and as a result, AGYW initiate PrEP in consideration of their risk exposures (Holmes et al., 2020). Two studies in Kenya showed that participation in the DREAMS program was associated with increased awareness and use of PrEP and condoms (Floyd et al., 2022; Mathur et al., 2022).

Despite high overall uptake, we found that young adults were more likely to initiate PrEP than adolescents; consistent with a PEPFAR summary of PrEP uptake among AGYW that found a larger proportion of girls (64%) who initiated PrEP were in the older 20–24 year age group (Patel et al., 2022). Several studies have shown that early sexual debut can be associated with HIV acquisition (Stöckl et al., 2013), making adolescents a critical group for HIV prevention. We found that adolescents who initiated PrEP were more likely to report being sexually active compared to those who did not initiate. There is little published evidence providing insight into why differences in PrEP initiation between age groups exists; however, further exploration would be beneficial for improving uptake among adolescents.

PrEP persistence at one month was relatively high at 68%, but varied widely by district, with 35% to 92% of AGYW initiated coming for at least one PrEP refill visit. Notably,

Mazabuka and Monze had higher proportions of PrEP eligibility assessment (80% and 69%) with relatively low persistence (46% and 34%, respectively) compared to lower PrEP assessment (60%) and higher persistence (86%) in Mongu. These differences by district may relate to variances in healthcare worker approaches or cultural attitudes, and should be explored further. In DREAMS, AGYW are in close and frequent contact with mentors and connectors, which ideally should facilitate PrEP education and follow-up. Our findings are similar to two Kenya DREAMS programs where they found a 56-day median PrEP persistence with 37% persistence at 3-months (Tapsoba et al., 2021), and a 308-day mean persistence with 59% discontinuation where reasons for PrEP discontinuation included lack of perceived risk, relocation, and age less than 18 (Ohiomoba et al., 2022).

Our findings of high PrEP uptake but varying persistence are consistent with other PrEP studies in Zambia. We previously reported on the national scale up of PrEP: from 2017–2019, Zambia initiated 26,953 clients on PrEP, of whom 31% were from key and priority populations. Initial program data showed low PrEP persistence at 25% and 11%, at 6 and 12 months, respectively (Claassen et al., 2021). Another study demonstrated PrEP service provision among women aged 18 to 45 years attending FP clinics, where uptake was low (1%) (Kasaro et al., 2021). While our DREAMS population is highly supported, strategies associated with increasing persistence among those eligible, should be examined.

Provision of PrEP to DREAMS participants is an opportune platform to reach AGYW at high risk of HIV acquisition with tailored interventions. Our risk assessment analyses suggests that AGYW who reported being sexually active or being on FP may be more likely to uptake PrEP. These women may be more likely to engage in interventions; however, more outreach may be needed to address those who report risks such as transactional or unprotected sex (Heck et al., 2022). Recent research has shown that interventions that foster access to PrEP are context specific, and the DREAMS initiative may provide a unique platform to address underlying population risks (Claassen et al., 2021; Irungu et al., 2021; Jackson-Gibson et al., 2021). Only 70% of AGYW initiated on PrEP reported being sexually active in this study. AGYW may be initiating PrEP based on a self-perceived anticipated risk, as they expect to be engaging in sexual activities. Perhaps more likely, the AGYW may not have been willing to disclose their sexual activity initially due to social desirability bias, but were more forthcoming once a sustained relationship was established through the DREAMS program. Further study is needed on the relationship between sexual activity and PrEP persistence, as well as how the DREAMS program can improve perception of risk among AGYW.

Our study has some notable strengths; it adds to the limited existing data regarding the PrEP eligibility, uptake, and persistence of PrEP among AYGW in SSA. To our knowledge this is the first use of client-level PrEP AGYW data which facilitates assessment of HIV behavioral risk to test status, PrEP initiation and follow-up, and allows for detailed description of implementation of PrEP service delivery in the DREAMS setting. Further, through enrollment in the DREAMS program, we are able to examine existing risk factor data that may not be otherwise available through a purely health facility-based program.



The primary limitation of our study is the observational nature of our study data. Unmeasured bias could be introduced through confounders and our sample is not randomized. In addition, not all girls were tested for HIV, only those that had risk factors, which could have introduced bias into our sample. Social desirability may have played a role among AGYW who did not disclose risk factors and thus were not tested. While guidelines specify that a one-month supply of PrEP should be dispensed, many AGYW were given a smaller supply at initiation due to supply chain constraints, necessitating an earlier follow-up visit, which may have impacted PrEP persistence. Due to constraints of data availability, we were not able to quantitatively characterize these issues. Improved data collection would allow for reporting of the full PrEP cascade, as adherence assessment is needed to understand true PrEP failures. Further, limited data were available about the reasons for PrEP discontinuation, constraining our ability to evaluate factors associated with stopping PrEP. Further longitudinal research on the amount of PrEP dispensed, number and timing of follow-up visits, adherence to PrEP, and reasons for continuing or discontinuing PrEP would help expand the evidence base on AGYW. Furthermore, not all HIV-negative girls were assessed for PrEP and thus, AGYW who may have benefitted from PrEP could have been missed. We are unable to quantify the magnitude of this gap, pointing to an opportunity to strengthen the program. Finally, while we monitor for HIV seroconversion, currently available data do not allow us to examine overall HIV incidence in this population or examine potential risk factors associated with acquisition.

We found that the DREAMS initiative was successful at reaching AGYW at high risk who tested negative for HIV with PrEP services in Zambia. A high proportion of AGYW at risk of HIV elected to initiate PrEP with a little over two-thirds persisted on PrEP for at least one follow-up visit. Further studies are needed to understand reasons for initiation and discontinuation and improve persistence for AGYW with sustained risk. Given the high level of interest for PrEP among AGYW who were at substantial risk of HIV, developing tools to improve PrEP use would be beneficial for this population. As new biomedical HIV prevention modalities become available, a range of choices will be available to AGYW which will empower them to protect themselves from HIV. Lessons learned from oral PrEP programs for AGYW will be important in successful future scale-up of all PrEP modalities to reach this critical group.

## Acknowledgements

We gratefully acknowledge the DREAMS facility staff, connectors, mentors, and office staff who made this work possible, as well as DREAMS AGYW served through their efforts.

## Funding

The CIRKUIITS and Z-CHECK projects and this publication have been supported by the President's Emergency Plan for AIDS Relief (PEPFAR) through the Centers for Disease Control and Prevention (CDC) under the terms of NU2GGH002123-01-02 and U2GGH001913. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the funding agencies.

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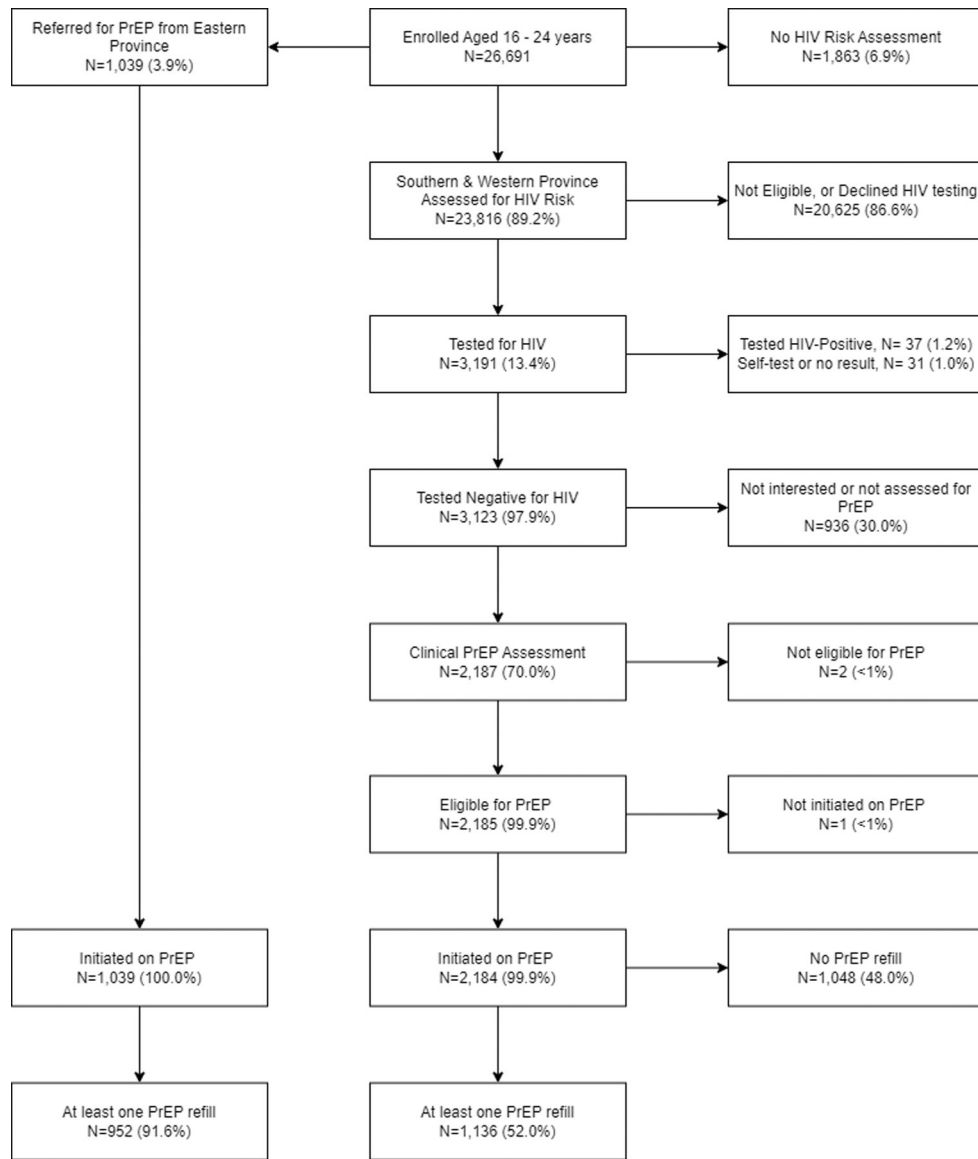
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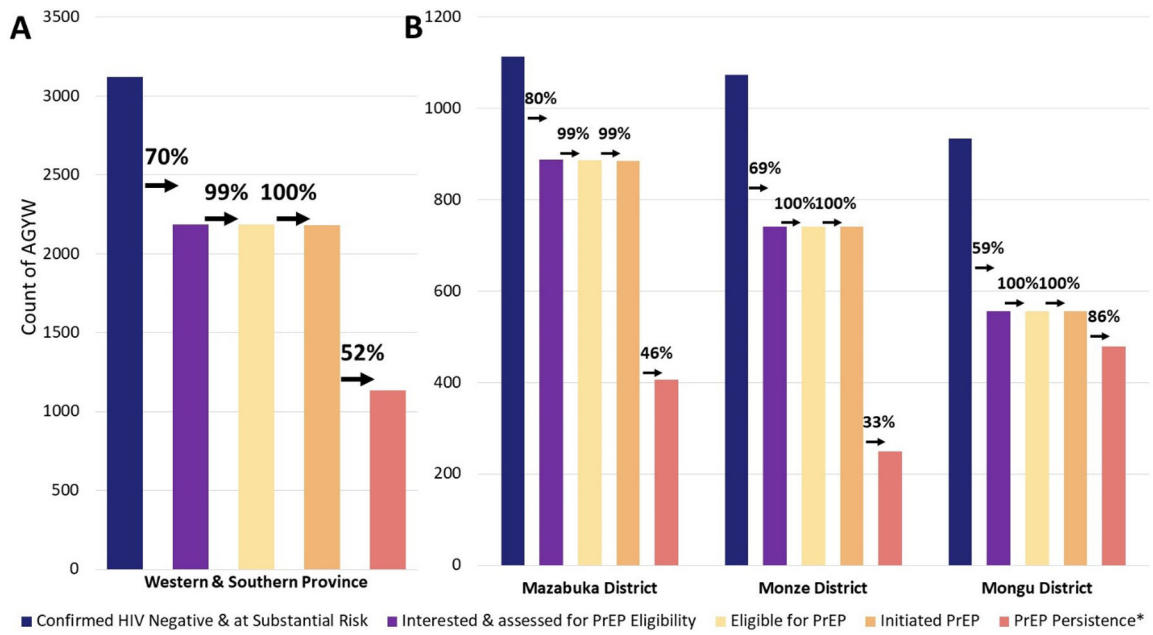
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**Figure 1:** Enrolled DREAMS AGYW, HIV Testing, PrEP Initiation & Refill; Oct 1, 2020 to Mar 31, 2022



**Figure 2:**  
 PrEP eligibility assessment, initiation and persistence among AGYW in Southern and Western Provinces (A) overall and (B) by district (n=3,123)  
 \*PrEP persistence defined as at least one follow-up refill



**Table 1.**

Characteristics of AGYW at high HIV risk and testing HIV negative Oct 2020-Mar 2022 in Western, Southern & Eastern Province by PrEP Initiation status (N=4,162)

	PrEP Initiation		No PrEP Initiation		P-value	Total	
	N=3,223		N=939			N=4,162	
Age [median (IQR)]	21	(18–23)	18	(17–20)	<0.001	20	18–22
	n	%	n	%		n	%
<b>Age Group</b>					<0.001		
16–19 years	1116	34.6	673	71.7		1789	43.0
20–24 years	2107	65.4	266	28.3		2373	57.0
<b>Marital Status</b>					<0.001		
Single	2,496	77.4	877	93.4		3373	81.0
Married	700	21.4	60	6.4		760	18.3
Divorced	25	0.8	1	0.1		26	0.6
Widowed	2	0.1	1	0.1		3	0.1
<b>Province</b>					<0.001		
Western	556	17.3	379	40.4		935	22.5
Southern	1628	50.5	560	59.6		2188	52.8
Eastern	1039	32.2	-	-		1039	25.0
<b>District</b>					<0.001		
Mongu	556	17.3	379	40.4		935	22.5
Mazabuka	886	27.5	228	24.3		1114	26.8
Monze	742	23.0	332	35.4		1074	25.8
Chipata	1039	32.2	-	-		1039	25.0
<b>HIV Risk Age 16–17*</b>	N=530		N=402			N=932	
Sexually active	354	66.8	217	54.0	<0.001	571	61.3
Poor health in past 3 months	321	60.6	236	58.7	0.825	557	59.8
One or both parents deceased	169	31.9	123	30.6	0.899	292	31.3
Ever admitted to the hospital	130	24.5	106	26.4	0.818	236	25.3
GBV experience	110	20.8	92	22.9	0.691	202	21.7
Transactional sex but not sex worker	81	15.3	64	15.9	0.97	145	15.6
Past or current pregnancy	51	9.6	33	8.2	0.725	84	9.0
Victim of child labor	32	6.0	31	7.7	0.607	63	6.8
HIV positive sibling	23	4.3	30	7.5	0.137	53	5.7
Report of genital discomfort	27	5.1	25	6.2	0.782	52	5.6
Lost parent because of chronic illness or HIV	30	5.7	9	2.2	0.035	39	4.2
Child marriage	18	3.4	12	3.0	0.935	30	3.2
Child of a sex worker	3	0.6	5	1.2	0.519	8	0.9
<b>HIV Risk Age 18–24*</b>	N=1654		N=537			N=2191	
Intercourse without using condoms	1423	86.0	448	83.4	0.504	1871	85.4
Know HIV status	1221	73.8	337	62.8	<0.001	1558	71.1
Tested for HIV in past 6 months	1083	65.5	299	55.7	<0.001	1382	63.1

	PrEP Initiation		No PrEP Initiation		P-value	Total	
Unprotected intercourse since tested HIV negative	847	51.2	250	46.6	0.248	1097	50.1
Taking family planning	834	50.4	217	40.4	0.001	1051	48.0
One or more sexual partner	468	28.3	135	25.1	0.444	603	27.5
One or both parents deceased	419	25.3	133	24.8	0.999	552	25.2
History of hospital admission	256	15.5	94	17.5	0.475	350	16.0
Ever had transactional sexual intercourse	227	13.7	114	21.2	<0.001	341	15.6
Condom broke during intercourse	243	14.7	67	12.5	0.486	310	14.1
Partner, parent or sibling HIV positive	168	10.2	38	7.1	0.129	206	9.4
Ever sexually abused/raped	65	3.9	11	2.0	0.127	76	3.5
Pregnant	52	3.1	17	3.2	0.998	69	3.1

\* HIV Risk Assessment is distinct for individuals less than 18 years of age and those 18 years of age and older. Results are not available for Eastern Province.

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**Table 2.**

Characteristics of AGYW Initiated on PrEP Oct 2020-Feb 2022 in Western, Southern & Eastern Province by PrEP persistence (N=3,064) \*

	PrEP Persistent N=2,086 (68.0%)	PrEP Non-persistent N=978 (31.9%)	uOR (95% CI) <sup>†</sup>	P-value	aOR (95% CI) <sup>‡</sup>	P-value	Overall N=3,064
<b>Age Group</b>							
16-19	669 (32.1%)	407 (41.6%)	Ref	<0.001	Ref	0.05	1076 (35.1%)
20-24	1417 (67.9%)	571 (58.4%)	1.51 (1.29-1.77)		1.23 (1.00-1.51)		1988 (64.9%)
<b>District</b>							
Mongu	479 (23.0%)	67 (6.9%)	0.08 (0.04-0.15)		0.08 (0.04-0.16)	<0.001	546 (17.8%)
Chipata	952 (45.6%)	11 (1.1%)	Ref	<0.001	Ref		963 (31.4%)
Mazabuka	407 (19.5%)	462 (47.2%)	0.01 (0.01-0.02)		0.01 (0.01-0.02)	<0.001	869 (28.4%)
Monze	248 (11.9%)	438 (44.8%)	0.01 (0.00-0.01)		0.01 (0.00-0.01)	<0.001	686 (22.4%)
<b>Province</b>							
Western	479 (23.0%)	67 (6.9%)	0.08 (0.04-0.15)		-		546 (17.8%)
Southern	655 (31.4%)	900 (92.0%)	0.01 (0.00-0.01)		-		1555 (50.8%)
Eastern	952 (45.6%)	11 (1.1%)	Ref	<0.001	-		963 (31.4%)
<b>Marital Status</b>							
Single	1557 (74.6%)	827 (84.6%)	Ref	<0.001	Ref		2384 (77.8%)
Married	503 (24.1%)	150 (15.3%)	1.78 (1.46-2.18)		1.18 (0.90-1.54)	0.2	653 (21.3%)
Divorced	24 (1.2%)	1 (0.1%)	12.7 (2.69-228)		4.51 (0.66-89.5)	0.2	25 (0.8%)
Widowed	2 (0.1%)	0 (0%)	-		-	>0.9	2 (0.1%)
<b>Sexually active in past 6 months</b>							
No	569 (27.3%)	354 (36.2%)	Ref	<0.001	Ref	>0.9	923 (30.1%)
Yes	1511 (72.4%)	618 (63.2%)	1.52 (1.29-1.79)		1.01 (0.79-1.29)		2129 (69.5%)
Missing	6 (0.3%)	6 (0.6%)					12 (0.4%)
<b>Current sex partner with one or more HIV risk</b>							
No	1539 (73.8%)	717 (73.3%)	Ref	0.824	Ref	0.11	2256 (73.6%)
Yes	520 (24.9%)	256 (26.2%)	0.95 (0.80-1.13)		1.28 (0.95-1.72)		776 (25.3%)
Missing	27 (1.3%)	5 (0.5%)					32 (1.0%)
<b>Sex without condom with more than one partner</b>							
No	794 (38.1%)	332 (33.9%)	Ref	0.032	Ref	<0.001	1126 (36.7%)

	PrEP Persistent N=2,086 (68.0%)	PrEP Non-persistent N=978 (31.9%)	uOR (95% CI) <sup>1</sup>	P-value	aOR (95% CI) <sup>2</sup>	P-value	Overall N=3,064
Yes	1288 (61.7%)	641 (65.5%)	0.84 (0.72–0.98)		0.64 (0.50–0.82)		1929 (63.0%)
Missing	4 (0.2%)	5 (0.5%)					9 (0.3%)
<b>Took PEP to prevent HIV after accidental exposure</b>							
No	2066 (99.0%)	972 (99.4%)	Ref	0.604	Ref	0.8	3038 (99.2%)
Yes	6 (0.3%)	1 (0.1%)	2.82 (0.48–53.4)		1.50 (0.13–35.7)		7 (0.2%)
Missing	14 (0.7%)	5 (0.5%)					19 (0.6%)
<b>Had STI in the past six months</b>							
No	2020 (96.8%)	970 (99.2%)	Ref	<0.001	Ref	0.6	2990 (97.6%)
Yes	53 (2.5%)	3 (0.3%)	8.48 (3.12–34.9)		1.44 (0.35–7.41)		56 (1.8%)
Missing	13 (0.6%)	5 (0.5%)					18 (0.6%)

\* The analysis of PrEP persistence (Table 2) was truncated to AGYW initiated by February 28<sup>th</sup>, 2022 to allow at least one month for PrEP refill to occur.

<sup>1</sup> uOR: unadjusted odds ratio.

<sup>2</sup> aOR: adjusted odds ratio. STI: sexually transmitted infection, PEP: post-exposure prophylaxis