HIV Testing and Pregnancy Delay among Adolescent Girls and Young Women Enrolled in the DREAMS Initiative in Northern Uganda

Quantitative Report

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ABBREVIATIONS

AGYW	adolescent girls and young women
CI	confidence interval
CYP	couple-years of protection
DHS	Demographic and Health Survey(s)
DREAMS	Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe Women
FP	family planning
HMIS	health management information system
HTS	HIV testing services
ID	identification number
IP	implementing partner
IUD	intrauterine device
MIS	Malaria Indicator Survey
PEPFAR	United States President's Emergency Plan for AIDS Relief
PLACE	Priorities for Local AIDS Control Efforts
PrEP	pre-exposure prophylaxis
UDTS	Uganda DREAMS-OVC Tracking System
USAID	United States Agency for International Development
WRA	women of reproductive age

EXECUTIVE SUMMARY

Background

In 2015, the United States President's Emergency Plan for AIDS Relief (PEFAR) launched a targeted initiative—Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe Women (DREAMS)—to reduce HIV incidence among adolescent girls and young women (AGYW) ages 10 to 24 years in ten sub-Saharan African countries, including Uganda. The program provides HIV testing along with other interventions to address the structural drivers that directly and/or indirectly increase AGYW's HIV risk, depending on beneficiaries' characteristics.

DREAMS' strategy aims to provide combinations of services (known as a "layering" approach") tailored to meet the different needs of five priority subpopulations or "segments" of AGYW:

- High-risk, in-school
- Pregnant
- Married
- Have given birth by age 15
- Involved in transactional sex

DREAMS currently operates in 11 districts in Uganda. In 2018, three years after program launch, the United States Agency for International Development (USAID)/Uganda asked MEASURE Evaluation to conduct secondary analyses of routinely-collected program data to assess the impact of the DREAMS initiative in four districts in Northern Uganda: Gulu, Lira, Omoro, and Oyam. The assessment was to focus on two specific objectives:

Objective 1: Assess the influence of the family planning (FP) component of DREAMS on delay of subsequent pregnancies among beneficiaries who had given birth by age 15, and

Objective 2: Quantify the coverage of HIV testing and retesting.

Analysis

Preliminary examination of the program data in the Uganda DREAMS-OVC Tracking System (UDTS) revealed that critical indicators, most notably the experience of pregnancy after enrollment in DREAMS, were not collected. Therefore, MEASURE Evaluation expanded Objective 1 to include family planning uptake (an important proximate determinant of fertility) by program beneficiaries and supplemented the UDTS with two additional data sources—the Uganda Demographic and Health Survey (DHS), and Uganda's health management information system, referred to as DHIS 2. Analytic techniques included descriptive statistics as well as survival/life table analysis.

Analysis of Objective 1 was conducted using DHS, UDTS, and DHIS 2 data. From the DHS, we calculated changes over time prior to the launch of DREAMS in the proportions of AGYW beginning childbearing by age 15 (descriptive statistics), and among AGYW who had a first birth by age 15, median intervals between their first birth and the next pregnancy (survival analysis). These analyses were not specific to DREAMS beneficiaries but rather included the general population. To quantify family planning uptake, we examined the UDTS and DHIS 2; the former to quantify reported services received by DREAMS beneficiaries and the latter to look for possible DREAMS impacts at the district level.

Analysis of Objective 2 was based solely on the UDTS, using descriptive statistics. Because other programs have found synergies between family planning and HIV services, we expanded Objective 2 to compare HIV retesting among beneficiaries who were reported to have received family planning services with those who were not reported to have received family planning.

Key Findings

Pregnancy Delay among AGYW with a Birth by Age 15

Because the DREAMS tracker database did not have information on incident pregnancies, we were not able to quantify this outcome from the program's service statistics.

- Longitudinal analysis of DHS data showed that three-quarters of AGYW with a birth before their sixteenth birthday had incurred another pregnancy before their twentieth birthday.
- The time to the next pregnancy steadily increased between 2001 and 2016, from a median of 20 months in 2001 to a median of 24 months in 2016, before the implementation of DREAMS.
- On the basis of these findings, we estimate that it will take several more years before we could expect to detect an impact by DREAMS on pregnancy delay. Even so, given the time trend of an increasing interval from birth to the next pregnancy and the small contribution of DREAMS at the national level, it will be difficult to detect an effect on pregnancy delay attributable to the DREAMS initiative in any national survey such as the DHS.

Family Planning

The DREAMS tracker FP data set provided only limited evidence of family planning uptake. Many beneficiaries recorded in the FP data base did not have a specific contraceptive method associated with their entries; in these cases, we assumed she received FP counseling.

- Fewer than ten percent of all DREAMS beneficiaries had any record in the FP data set and 4% were recorded as having received a specific FP method.
- Beneficiaries who had had a birth by age 15 were somewhat more likely to be recorded in the FP data set than beneficiaries who had not had an early birth (11% vs 9%). Only 6% of beneficiaries who had an early birth were recorded as receiving a contraceptive method, compared to 4% for those who did not have an early birth.[1]

Because DHIS 2 did not reliably capture family planning uptake prior to 2015, it is not possible to compare district-level service delivery prior to and after DREAMS implementation. However, one could hypothesize that if DREAMS had a major impact on FP, year-to-year totals of FP distributed should be increasing. Annual volumes of family planning services delivered over the period 2015 to 2017 failed to show time trends that would be consistent with a major impact of DREAMS. Because DREAMS beneficiaries account for only 15 percent of the total female population ages 15 to 49 in the study districts, it should be noted that any true DREAMS program effect would be attenuated in the analysis of DHIS 2.

- There was no way to identify clients who had had a birth by age 15 in the DHIS 2 data.
- The number of new implant users ages 10 to 19 and ages 20 to 24 increased over time in all districts, but the rate of increase was comparable to new users ages 25 and higher.
- There was no discernible trend in the data on IUDs, injectables, and oral contraceptives dispensed over time for all women (ages 10 to 49). Although there may be variations among the age groups, we were unable to disaggregate the data on FP methods dispensed by age.
- Consistent with the DREAMS tracker database, injectables were the most commonly used FP method (excluding male condoms).

[1] We do not present p-values for comparisons between groups. With large sample sizes such as that found with the UDTS, small differences are often statistically significant even though they may not be programmatically meaningful.

HIV Testing and Retesting

Virtually all DREAMS beneficiaries received an HIV test at the time of enrollment; however, the rates of retesting were low.

- Only 36 percent of beneficiaries tested at enrollment were tested again (received at least one more test after enrollment); among those who did receive a follow-up test, the median time to first retest was eight months.
- Only 15 percent of beneficiaries received a second retest (3 tests in total including enrollment), and 2 percent received a third retest (4 tests in total including enrollment).
- Omoro and Oyam showed higher rates of HIV retesting (46% for each) compared with Lira (33%) and Gulu (21%).
- Beneficiaries who were married or pregnant at the time of enrollment showed higher HIV retesting rates (41% and 42%, respectively), versus beneficiaries who were in school (18%) or who had given birth by age 15 (35%).
- AGYW engaged in transactional sex are known to be at especially high risk for HIV infection. Nevertheless, this segment showed the lowest rates of HIV testing at enrollment (88% versus 94% combined across the remaining beneficiaries) and the lowest rates of retesting for HIV (18% versus 36%).

Family Planning and HIV Retesting

The final analysis examined the extent to which beneficiaries who retested for HIV also received family planning services and vice-versa.

- Only a small percentage (8%) of DREAMS beneficiaries were recorded as having both been retested for HIV and receiving any FP service.
- Of the DREAMS beneficiaries with a record in the FP data set, more than three-quarters of them also received at least one retest for HIV, compared with fewer than one-third of those not recorded in the FP data set (82% versus 31%).

Limitations

At the time of this assessment, DREAMS/Uganda had been operating for only three years, was continually enrolling new beneficiaries, and had experienced multiple changes in the implementing partners (IPs). These various implementing partners sometimes gave existing beneficiaries new identification numbers (IDs) and/or used different ID formats for new beneficiaries, which might have truncated some records and/or led to the same beneficiary being counted twice. Since beneficiaries could be referred to other facilities for family planning services outside of the DREAMS program, it is likely that some program family planning records are incomplete. Finally, the Uganda DREAMS program does not collect information on pregnancies experienced by beneficiaries after they enroll in the program.

For these reasons, we triangulated the UDTS with other data sets. This presented its own challenges. The national health management information system does not (and arguably should not be asked to) identify DREAMS beneficiaries who receive family planning methods at public health facilities; and it is unrealistic to expect that DREAMS beneficiaries will reliably report back to program implementers when they receive family planning outside the program.

Finally, the program does not have a control group of comparable AGYW who were not offered program interventions. Any attempt to create a control group in these districts would be difficult since AGYW who are living in the area and not enrolled in DREAMS may be influenced by spillover effects or may be systematically different in unknown ways from those who did enroll.

Conclusions

After extensive analysis of the three most relevant data sets (UDTS, DHS, DHIS 2), we failed to find substantive empirical evidence of impact of the DREAMS FP intervention on pregnancy delay or contraceptive uptake among beneficiaries who had a birth before the age of 15. Even if the program reliably tracked new pregnancies after enrollment (which it currently does not), it is probably still too early to demonstrate an impact on pregnancy delay in this population. While most beneficiaries received an HIV test at enrollment, only a third received one retest, and very few had more than one. More troubling, the reported coverage of HIV testing and retesting services was especially low among beneficiaries who engaged in transactional sex, who are a key risk group for HIV infection. There was encouraging evidence for the integration of HIV and FP services in that more than 80 percent of the subset of DREAMS beneficiaries reported to have received FP counselling and/or FP services also had at least one repeat HIV test. USAID/Uganda and DREAMS IPs may want to study this finding in greater depth to see if and how FP interventions may improve HIV retesting rates.

We also make the following recommendations to improve the quality of data collected for program management and reporting:

1. To improve data quality and facilitate secondary analyses, provide written documentation, including data entry procedures, codebooks, and indicator definitions, for both the UDTS and the DHIS 2.

2. Assess the validity of the HIV-transmission risk classifications assigned by program workers (the "segment" indicator), using skilled caseworkers interviewing newly-enrolled beneficiaries with a standardized risk-assessment interview guide. As appropriate, revise standard procedures and retrain program workers.

3. Define and track program dropouts. How many/what proportion of enrollees drop out of the program? When and why do they drop out (requires a follow-up survey)?

4. Consider adding a new register/data set for "current status." It would be routinely collected for all beneficiaries, by the same IP that filled out the enrollment data form (or replaced that IP).

5. As soon as possible, conduct a data quality audit to provide insight as to whether the low rates of HIV retesting found in the present assessment reflect poor data quality or low program performance.

6. Beginning on a monthly basis, for the UDTS,

   - Check the enrollment data set for duplicate ID numbers, irregular formats, and internal inconsistencies. Flag errors and return to the respective IPs for correction.
   - Match the ID numbers in the enrollment data set with the ancillary service data sets (HTS, FP, etc.). Flag IDs that appear in the service data sets that cannot be found in the enrollment data set and return to the respective IPs for correction.
   - Check the dates of the first HIV test in the HTS data set against the enrollment dates in the enrollment data set. Flag cases where the first HIV test in HTS coincides or precedes the enrollment date and return to the respective IPs for correction.

7. Once every six months, consolidate the data within each service data set in the UDTS and merge the data sets with the enrollment data set. Determine how many beneficiaries are still active in the program (i.e. received any DREAMS service in a stipulated reference period).

8. At least once a year, conduct a "deep dive" into the consolidated UDTS data set. For example, are beneficiaries receiving the layered services indicated by their assigned population segment; is this a service delivery issue or a problem with the way workers made the assignment?

9. Institute routine data quality assessments for UDTS followed by technical assistance and supportive supervision to improve identified priority issues. Monitor change in data quality. MEASURE Evaluation has used this approach successfully in Tanzania.

10. Plan prospective program impact evaluations. Consider adding a comparison group of AGYW who were not offered the opportunity to join DREAMS. Allow enough time to elapse to register impact on priority indicators (e.g., pregnancy delay). Compare outcomes among enrollees who continued with those who dropped out.

INTRODUCTION

In response to the specific social and economic vulnerability of adolescent girls and young women (AGYW), the United States President's Emergency Plan for AIDS Relief (PEFAR) designed a targeted initiative called Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe Women (DREAMS). The goal of this initiative is to reduce HIV incidence among AGYW ages 10 to 24 years. Launched in 2015 and executed by various implementing partners (IPs), DREAMS is being implemented in ten sub-Saharan African countries, including Uganda. It delivers a core package of evidence-informed services to address the structural drivers that directly and/or indirectly increase AGYW's HIV risk, including poverty, gender inequality, sexual violence, and education (PEPFAR, n.d.).

DREAMS operates in 11 districts in Uganda. It has identified five priority subpopulations[2] or "segments" of AGYW for program interventions:

- High-risk in-school
- Pregnant
- Married
- Have given birth by age 15
- Involved in transactional sex

DREAMS employs a "layering" approach (Table 1). All beneficiaries are expected to be provided with HIV testing services (HTS) in combination with other services, depending on their segment. The services include condom promotion and provision; community mobilization and norms change; parenting; social asset building and caregiver program; combined socioeconomic services (financial literacy, entrepreneurial skills, apprenticeship, and savings and lending groups); and services to improve contraceptive mix. The program also offers care for victims of gender-based violence, as appropriate. For AGYW still in school, DREAMS/Uganda offers a minimum package of HIV prevention, violence prevention in school, and referral to the DREAMS safe spaces for other services (DREAMS, n.d.)

Table 1. DREAMS/Uganda layering approach

		Population Segments				
		In-School	Pregnant	Married	Given birth by 15 yrs	AGYW in Transactional Sex
INDIVIDUAL	Primary Individual Interventions	• Social Asset Building • School-based HIV & violence prevention • Sinovuyo- Parenting	• HTS • Condoms • Social Asset building • Combination Socio-economic approaches	• HTS • Condoms • Social asset building • Combination socio-economic approaches	• HTS • Condoms • Combination socio-economic approaches • Social asset building	• HTS • Condoms • Social asset building • Combination socio-economic approaches
	Secondary Individual Interventions	• HTS • Condoms • Contraceptive Mix • Post-violence care • Cash transfers[1]	• Post-violence care • Parenting • Contraceptive mix	• Contraceptive Mix • Post-violence care	• Contraceptive Mix • Post-violence care • Parenting	• PrEP[2] • Contraceptive Mix • Post-violence care
	Range Individual Level Interventions	3-7	4-7	4-6	4-7	4-7

Source: DREAMS Layering Uganda Quarter 3 Report, September 15, 2017

[2] These risk factors are not mutually exclusive; some beneficiaries may have more than one risk factor (e.g., a married young woman who had her first birth at age 14).

Study Objectives

The aim of this study is to assess the impact of the DREAMS initiative with the following objectives:

Objective 1: Assess the influence of the family planning (FP) component of DREAMS on delay of subsequent pregnancies and contraceptive uptake among beneficiaries who had given birth by age 15, and

Objective 2: Quantify the coverage of HIV testing and retesting and compare HIV retesting among beneficiaries who were reported to have received family planning services with those who were not reported to have received family planning.

METHODS

Study Setting

Four districts in Northern Uganda were identified for this study: Gulu, Lira, Omoro, and Oyam (Figure 1).

Figure 1. Map of Uganda showing the location of study districts

Study Design

To accomplish the objectives, MEASURE Evaluation designed a series of four analyses using available data from the Uganda DREAMS Tracking System (UDTS), the Uganda Demographic and Health Surveys (DHS), and the Uganda National Health Management Information System (DHIS) 2.

Analysis 1. Characteristics of AGYW enrolled in the DREAMS program, using data from UDTS

Analysis 2. Trends in pregnancy delay among AGYW with a birth by age 15, using data from the DHS

Analysis 3. FP uptake, using data from the UDTS and DHIS 2

Analysis 4. DREAMS program coverage of HIV testing, using data from the UDTS

The Findings section of this report is divided into four subsections. Each section presents the rationale, methodology, and findings from the individual analyses featured in that section.

Data Sources

Uganda DREAMS Tracking System (UDTS) DREAMS maintains a centralized relational database known as the Uganda DREAMS-OVC Tracking System (UDTS).[3] At the core of this system is the enrollment data set, which has a unique record for each beneficiary enrolled in the program. This record should

[3] https://dreams.mets.or.ug/dhis-web-commons/security/login.action

include a unique DREAMS identification number (ID), identifying information (e.g., name and address), and characteristics of the beneficiary at the time of her enrollment: age; whether her parents are alive; school attendance; whether she has had a child by age 15; whether she was pregnant; marital status;; her HIV risk segment (as determined by the program partner); and whether she was tested for HIV at the time of enrollment. These data are entered only once and are not updated.

Ancillary data sets are maintained in the UDTS for specific DREAMS services. These data sets include HIV testing (HTS), family planning (FP), post violence care, condom distribution, economic strengthening, and partner services. Local IPs are expected to enter the services in the appropriate data sets as they are delivered, creating a new record each time a DREAMS beneficiary receives the service. Therefore, a beneficiary may have multiple records in a service data set if she receives a service more than once; or she may not appear in the data set at all if she never receives a service. The record includes the beneficiary's ID, the date of the service, and other information about the service provided. For example, the HTS data set, which is supposed to record repeat HIV testing after enrollment, records the date of the test, the test result (positive or negative) and whether the beneficiary was referred for follow-up care.

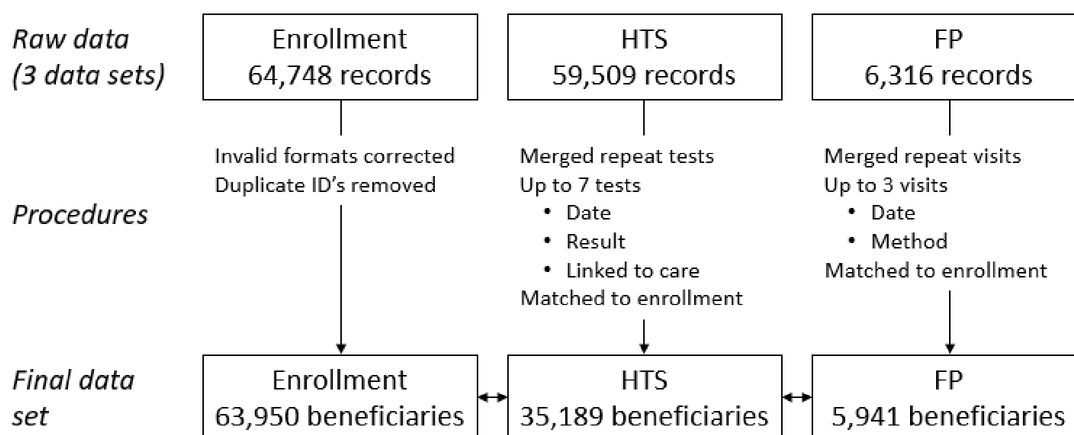
Some services – notably the provision of contraceptives – are not always provided directly by DREAMS, but rather by public health facilities. DREAMS does provide counseling to beneficiaries who seek family planning and will refer them on to a public facility for the method itself. If the beneficiary receives a method at a public facility, she will be recorded in the facility's register (see the description of the national health management information system, the DHIS 2, below), but will not be identified as a DREAMS beneficiary. As will be discussed later, half of the records in the FP data set did not include a contraceptive method. In these cases, we assumed that the beneficiary received counseling.

For the purpose of this assessment, we used three of the UTDS data sets: enrollment, HTS, and FP. From these three separate data sets, we created a single, consolidated data set that contained all beneficiaries registered in the enrollment data set along with their HIV testing and FP services as follows:

- The three data sets provided by the DREAMS project team included 64,748 records in the enrollment data set, 59,509 records in the HTS data set, and 6,316 records in the FP data set.
- We removed 798 records with duplicate IDs from the enrollment data set and corrected 21 records with IDs that contained illegal characters, such as commas. In the HTS and FP data sets, we combined records for clients who received multiple services into a single longitudinal record for each beneficiary.
- Last, the three data sets were merged to create a combined data set with one record per beneficiary. Each record contained the beneficiary's enrollment information, HTS dates, and HIV test results (if any); FP service dates, the FP method provided, and the IP that provided the service client (if any). Records from the HTS and FP data sets that could not be matched to an ID in the enrollment data set were discarded; 411 records could not be matched. The final consolidated data set had 63,950 unique records.

Figure 2 summarizes the data cleaning and consolidation procedures used to create the final consolidated data set.

Figure 2. Data cleaning and consolidation of UDTS



Limitations of the UDTS

The following data limitations of the UDTS were encountered:

- Pregnancies that occurred following enrollment in DREAMS were not recorded in the data sets we were given. This made it impossible to directly address the first objective.
- There have been multiple changes in the IPs in the course of the implementation of DREAMS. New IPs sometimes gave existing beneficiaries new IDs and/or used different ID formats. This may have been responsible for some of the failures to match FP and/or HIV services with beneficiary IDs in the enrollment data set. We also found multiple typographical errors in the data entry.
- The enrollment data set and service data sets contained IDs with illegal characters (e.g., commas and periods). The enrollment data set also had duplicate IDs, which had to be discarded. The duplication of client IDs and service records may have resulted in mis-reporting services and numbers of clients served.
- MEASURE Evaluation received no written documentation with the UDTS data sets (e.g., a data dictionary describing the indicators and their attributes/code values; data entry and cleaning procedures). We were able to resolve some questions by consulting project staff.
  - The FP data set had records with no contraceptive method noted. Based on conversations with project staff, we assumed that these beneficiaries received FP counseling only and a referral for FP methods.
  - It is unclear whether IPs were expected to record contraceptive methods that DREAMS beneficiaries received at public health facilities in the FP data set, and if so, the extent to which they did.
  - We were told that the HTS data set should record only repeat HIV tests, i.e., tests conducted following enrollment. Including original enrollment tests in the HTS data set could inflate the presumed retesting rate. In fact, for nearly one-third (32%) of the first tests in the HTS data set, the date of the first test coincided with the beneficiary's enrollment date or before enrollment.[4] Therefore, in these cases, we assumed that the first HIV test was, in fact, the enrollment test and substituted the second test (if there was one) as the first repeat test.

[4] We were informed by project staff that some beneficiaries were tested for HIV before formally enrolling in the DREAMS program.

- The enrollment data set has the indicator "segment," which corresponds to the five population segments employed for service layering described in Table 1. We were told by project staff that the segment was assigned by IP staff to flag the characteristic that presented the highest risk for HIV infection. When we compared the assigned segment with the demographic information provided by the client, in nearly ten percent of the records, there was an internal mismatch between the assigned segment and client-reported characteristics (e.g., non-pregnant clients assigned to the "pregnant" segment; beneficiaries with no birth by age 15 assigned to the "birth by age 15 segment"). These mismatches could result in suboptimal targeting of services to client needs.

Demographic and Health Survey

The Demographic and Health Survey (DHS) is a population-based survey conducted approximately every five years.[5] It interviews women ages 15 to 49. Among the extensive topics covered is a complete fertility history, with the date of every live birth. Individual data files are available for surveys conducted by the DHS, and standardized indicators are provided for both the DHS and comparable national surveys, such as the Malaria Indicator Survey (MIS).

Limitations of the DHS

The DHS is recognized for the high quality of its sampling and data collection. However, because of the large number of interviews needed, the surveys provide only high-level estimates. For example, the 2016 Uganda survey sample was designed to provide estimates for the country as a whole, for urban and rural areas separately, and for each of the 15 regions. Lira and Oyam districts were among the eight districts sampled in the Lango region, and Gulu was one of seven districts sampled in the Acholi region. Moreover, due to the small sample sizes for the populations of interest (i.e., women age 15 years at the time of the survey, young women who had had a first birth by age 15), we were able to conduct the analyses only at the national level.

National Health Management Information System – DHIS 2

As noted above, the DREAMS tracker database may not have complete information on the contraceptive methods provided to DREAMS beneficiaries at public health facilities. We therefore used Uganda's DHIS 2, the national health management information system (HMIS), to examine time trends in the delivery of modern contraceptive methods in the districts of interest.

Data for the DHIS 2 are entered from Uganda's HMIS Form 105, which is the health unit outpatient monthly report. The form must be completed and submitted by all health units, meaning that the smallest level of reporting is the health facility. Form 105 collects information on outpatient attendance; referrals and diagnoses totals for the month; maternal and child health services; family planning; HIV/AIDS counseling and testing services; and quantities dispensed and stockout data for essential medicines and health supplies.

The FP portion of the form records clients served, quantities of contraceptives dispensed and numbers of sterilizations performed. Clients are categorized as new users or revisits (e.g. returning for resupply or a check-up). New users are classified by the method they received, their gender, and their age (10-19, 20-24, 25 years and older). Data on quantities dispensed are recorded for all contraceptive methods and brands except implants. Information on the recipients of those methods dispensed (e.g. their age) is not included.

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[5] See https://dhsprogram.com/.

For the purpose of this assessment, MEASURE Evaluation was given permission to download data directly from the DHIS 2 website[6]. We downloaded all FP information contained in the DHIS 2 from January 2015 through December 2017 for the districts of Gulu, Lira, Omoro, and Oyam.

We noticed several issues with the DHIS 2 data (see limitations, below) which led us to question the validity and reliability of the reports of new family planning users. Therefore, we decided to rely on quantities dispensed of emergency contraceptives, female condoms, intrauterine devices (IUDs), injectables, male condoms, oral contraceptives; and numbers of female sterilizations performed. This meant that we could not disaggregate the data by clients' age. Implants were reported for users only and not for units dispensed. We analyzed implant users by clients' age. We also re-calculated annual district totals by adding up the facility reports in each district rather than using the aggregate totals included in the DHIS 2.

Limitations of the DHIS 2

Several data limitations were identified during the analysis:

- We were advised by USAID/Uganda that FP data before 2015 were incomplete. We therefore restricted our analyses to the years 2015 through 2017.
- We encountered problems of external validity with the new user data. For example, some subcounties in Gulu and Omoro recorded more new users for implants than their total population of women ages 20 to 24.
- The aggregated district totals included in the DHIS 2 did not always match the sum of their respective health facilities.
- In Gulu district, one subcounty, Laroo, consistently reported significantly higher figures than all other subcounties in the district, which skewed the results for Gulu district. We therefore replaced Laroo's data with the median of the other counties in Gulu.

Limitations in Study Design

We faced several problems in designing the quantitative analysis, including the following:

- Having a counterfactual (i.e., what happened or could be expected to happen in the absence of the intervention) is critical for impact analysis. DREAMS/Uganda does not have a control group (i.e., comparable adolescent girls and young women [AGYW] who were not offered program interventions). Therefore, we could not directly attribute changes in FP or HIV outcomes to the program interventions.
- DREAMS/Uganda does not collect information on pregnancies experienced by the AGYW after they enroll in the program. We therefore could not measure pregnancy intervals or pregnancy delay using the program's data.
- At the time of this assessment, DREAMS had been operating for only three years and was continually enrolling new beneficiaries. Therefore, even if we had been able to use program data and even if there had been a control group, it might not have been possible to detect a program impact given the short program implementation period.

[6] See https://hmis2.health.go.ug/.

FINDINGS

Findings and specific methodologies for the following four analysis are presented in this section.

Analysis 1. Characteristics of AGYW enrolled in the DREAMS program, using UDTS

Analysis 2. Trends in pregnancy delay among AGYW with a birth by age 15, using data from the DHS

Analysis 3. FP uptake, using data from the UDTS and DHIS 2

Analysis 4. DREAMS program coverage of HIV testing, using data from the UDTS

Analysis 1. Characteristics of DREAMS Enrollees

To provide characteristics of AGYW enrolled in the DREAMS program, we utilized the DREAMS tracker (UDTS) for Gulu, Lira, Omoro, and Oyam districts.

As can be seen in Table 2, the beneficiaries enrolled in DREAMS represented approximately one-third of the AGYW population ages 15 to 24 living in their respective districts, and because DREAMS does not serve older women, its representation in the total population of women of reproductive age (WRA) (15 to 49 years) is much lower. This may limit the extent to which uptake of contraceptives by DREAMS beneficiaries can influence FP performance recorded in the DHIS 2.

Table 2. Proportion of 15- to 24-year-old girls in Northern Uganda enrolled in DREAMS

District	DREAMS enrollees ages 15-24[1]	2018 female population ages 15-24[2]	Percentage of female population ages 15-24 enrolled in DREAMS	2018 female population ages 15-49[2]	Percentage of female population ages 15-49 enrolled in DREAMS
Gulu	10,728	37,210	29	78,830	14
Lira	15,359	54,860	28	115,770	13
Omoro	7,456	18,910	39	41,380	18
Oyam	16,941	45,650	37	98,520	17

These numbers do not include girls under the age of 15.

[2] Source: African Centre for Media Excellence. Uganda's District population projections 2015-2020. http://catalog.data.ug/dataset/uganda-s-district-population-projections-2015-2020. Data provided by Uganda Bureau of Statistics.

Table 3 presents the characteristics of DREAMS beneficiaries at time of their enrollment. The majority of the beneficiaries were age 15 or older when they enrolled in the DREAMS program. Approximately one-quarter of enrolled AGYW were married or had given birth by the age of 15. Some differences among the districts can be seen. Notably, a larger proportion of enrollees in Oyam district were pregnant at the time of their enrollment, and a lower proportion of enrollees in Lira were currently in school.

Table 3. Characteristics of DREAMS beneficiaries at the time of enrollment (UDTS)

District	Age and age groups (years)				Other characteristics				
	Median age	10–14 (%)	15–19 (%)	20–24 (%)	Married (%)	Currently pregnant (%)	Birth <15 years (%)	In school (%)	Total (N)
Gulu	18	20	45	35	23	7	20	51	16,284
Lira	18	10	51	39	22	13	29	31	19,171
Omoro	17	12	60	28	22	13	20	49	8,481
Oyam	18	10	56	35	29	23	23	36	20,014
All 4 Districts	18	13	53	34	24	14	23	42	63,950

[2] These characteristics are not mutually exclusive.

Analysis 2. Trends in Pregnancy Delay among AGYW with a Birth by Age 15

The UDTS does not include information on incident pregnancies after a beneficiary is enrolled. We were therefore not able to directly analyze pregnancy delay among DREAMS beneficiaries who had had a birth by age 15.

Analysis 2 Methods

Using data from the Uganda DHS conducted between 2001 and 2016 to examine very early childbearing and pregnancy delays before the widespread implementation of DREAMS, we asked two questions:

Analysis 2.1 How widespread is very early childbearing (i.e., first birth by age 15)?

Analysis 2.2 What was the median time to second pregnancy among AGYW who experienced a very early first birth?

The median time to second pregnancy provides a proxy baseline against which to compare the experience of DREAMS beneficiaries, indicating how long the program must operate before an impact on pregnancy delay could be observed.

Analysis 2.1. Very Early Childbearing

For this analysis, we considered national surveys conducted between 1988 and 2016 and used the DHS utility STATCompiler[7] to extract the indicator "Teenagers who have begun childbearing." This indicator measures the percentage of women ages 15 to 19 at the time of the survey who have either already had a first birth or who were pregnant at the time of the interview. We disaggregated the indicator by respondent's age and restricted the results to 15-year-olds to exclude first births/pregnancies at older ages.

Analysis 2.2. Subsequent Pregnancies among Women with a Very Early First Birth

For this analysis, we obtained women's individual data files from the four DHS conducted between 2001 and 2016. The analysis was limited to women who were between the ages of 15 and 24 at the time of the

[7] See https://www.statcompiler.com/en/.

interview and who had had a very early first birth, defined as first birth before their 16th birthday (the definition used by DREAMS). Data were weighted by the individual weighting factors included in the data sets.

A survival analysis was conducted with the terminal event being having had a subsequent birth or pregnancy by the date of the interview. Women were classified in one of three mutually-exclusive groups:

1. Had a second birth by the date of the interview; or
2. Did not have a second birth, but currently pregnant at the time of the interview; or
3. Had a first birth by age 15 but no recorded second birth and not currently pregnant at the time of the interview.

The analyses were performed using SAS 9.4 (Cary, NC). A "failure" was defined as having had a second birth before the interview or currently pregnant at the time of the DHS interview. A woman was considered to be withdrawn alive/censored if she did not have a subsequent pregnancy by the time of the interview. Intervals for the analyses were calculated in months as shown in Table 4. Each survey was analyzed twice, once for all women and again disaggregated by place of residence at the time of the interview (urban/rural).

Table 4. Calculations of intervals

Group of women	Interval[8]
Had a second birth (failure)	(Date of second birth – 9 months) – Date of first birth
No second birth, currently pregnant (failure)	(Date of interview – Duration of current pregnancy) – Date of first birth
Had a first birth but no second pregnancy (withdrawn alive)	Date of interview – Date of first birth

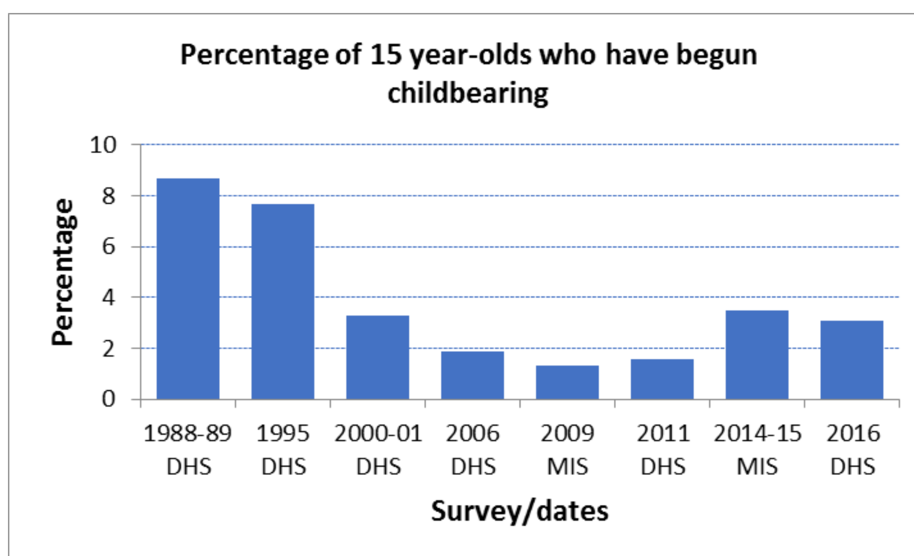
[8] All dates used for the birth interval calculations were done using Century Month Codes.

Analysis 2 Results

Analysis 2.1. Very Early Childbearing

The overall proportion of very early childbearing in Uganda was low. Since 2000, the percentage of 15-year-old girls who had already had a birth or were currently pregnant at the time of the interview has fluctuated between one and four percent, depending on the date and type of survey, as shown in Figure 3.

Figure 3. Percentage of 15-year-old girls who have begun childbearing, 1988-2016 (DHS/Malaria Indicator Survey [MIS])



Source: Analysis performed by the authors using DHS STAT Compiler.

Comparing these results with the proportions of DREAMS enrollees who had experienced a birth by age 15 (23 percent overall, ranging from 20-29 percent by district; Table 3 above) demonstrates that DREAMS has effectively targeted these high-risk AGYW for program enrollment.

Analysis 2.2. Subsequent Pregnancies among Women with a Very Early First Birth

Across all four surveys, 66 percent or more of the women were between the ages of 20 and 24, and about four out of five lived in rural areas. More than 50 percent of the women had had their first birth at the age of 15 (compared with women ages 10 to 14 years). Approximately 85% had already had a second birth or were pregnant at the time of the interview (Table 5), and 75% had a second birth or pregnancy before their 20th birthday (analysis not shown).

Table 5. Respondent's birth status at the time of the interview (DHS)

Characteristics	2001		2006		2011		2016	
	n	%	n	%	n	%	N	%
Already had a second birth	249	80	217	83	235	82	409	78
Currently pregnant, no second birth	15	5	7	3	10	4	23	4
No second birth or pregnancy	49	15	38	14	41	14	92	18
Total	**313**	**100**	**262**	**100**	**286**	**100**	**524**	**100**

The time to next pregnancy steadily increased between 2001 and 2016, from a median of 20 months in 2001 to a median of 24 months in 2016. Table 6 presents the median time to next pregnancy overall, and among women living in rural and urban areas. In every survey, the median time to next pregnancy was significantly shorter among rural women compared with urban women. In 2001, urban women had a median time to next pregnancy of 26 months compared with 20 months for rural women. By 2016, the intervals had increased in both groups; urban women had a median time to next pregnancy of 30 months and rural women had a median time of 24 months. The larger confidence intervals (CI) for the urban strata are a consequence of their smaller sample size.

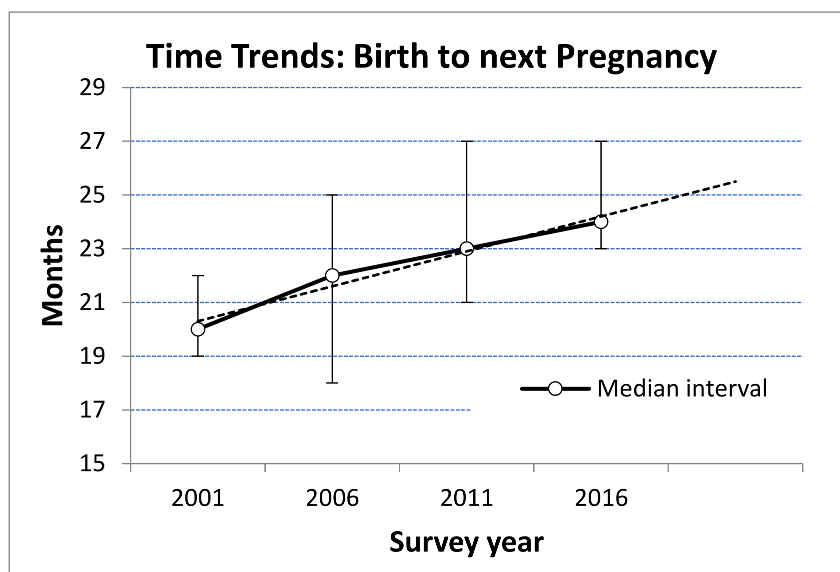
Table 6. Median time in months from birth to next pregnancy, 2001 to 2016 (DHS)

Year	Median (95% CI)[1]		
	National	Rural	Urban
2001*	20 (19-22)	20 (18-22)	26 (19-31)
2006*	22 (18-25)	20 (17-24)	25 (19-51)
2011*	23 (21-27)	21 (19-23)	37 (28-45)
2016*	24 (23-26)	24 (22-25)	30 (24-35)

*Significance level for chi-square test between urban and rural $p<.01$.

Figure 4 graphs the time trend in the median time from birth to next pregnancy from Table 6 (national level). A strong linear trend was clearly seen, with an average increase of 1.3 months between the surveys that were conducted every five years. If this trend continues, we would expect that in 2021, median months from birth to next pregnancy among AGYW with a very early first birth will be upwards of 25 months.

Figure 4. Time trend in birth to next pregnancy (DHS)



Analysis 2 Discussion

The results of these analyses clearly demonstrated that although AGYW who have had a birth before their 16th birthday are a small proportion of the overall population, they are at very high risk for another early pregnancy: three-quarters will become pregnant again before their twentieth birthday. It was also found that AGYW who lived in rural areas had a significantly shorter median time to next pregnancy than those living in urban areas.

Moreover, although the prevalence of very early childbearing has been fairly constant over the past 15 years, the speed at which these high-risk AGYW progressed to their next pregnancy has steadily declined, even in the absence of targeted interventions. Given the retrospective nature of the DHS design, most of the birth events analyzed in the life table analysis occurred many years before the survey date, up to a decade or earlier.

The next DHS will probably take place in 2021. At current (pre-DREAMS) rates, we would expect to see a median pregnancy-to-next-pregnancy interval of at least 25 months, with a CI of plus or minus two months, depending on the sample size.

Analysis 2 Implications for DREAMS/Uganda

DREAMS/Uganda prioritizes AGYW who have had a birth by age 15 to delay a subsequent pregnancy. The analyses of national data clearly demonstrated that, although they make up only a small proportion of the total population, these young women were at extremely high risk of having another pregnancy before their 20th birthday. Even without a program targeted to this high-risk group, their birth-to-next-pregnancy intervals were reliably increasing before the implementation of DREAMS. This trend, coupled with the small overall proportion of AGYW enrolled in DREAMS will make it difficult to detect an effect attributable to DREAMS in the next national survey.

Analysis 3. Family Planning Uptake

FP is a secondary DREAMS intervention for program beneficiaries. Some IPs may offer contraceptive methods for out-of-school AGYW in their "safe spaces", but in Uganda, DREAMS does not offer in-school FP services or counseling. IPs may also refer beneficiaries to public health facilities for contraceptive methods, but it is not clear whether or to what extent the results of those referrals are captured in the UDTS. This makes it possible that the FP data set under-counts actual contraceptives received.

Analysis 3 Methods

Our goal is to examine the overall time trends in the modern FP methods dispensed for patterns (i.e. increased FP uptake) that would be consistent with an impact of the DREAMS intervention. We therefore analyzed data from the Uganda DREAMS tracker database and Uganda's DHIS 2, which captures health service delivery data.

For data from the UDTS, descriptive statistics were generated from the merged data for demographic characteristics related to receiving a FP method. The characteristics were: district; marital status; education status and age categories (10 to 14 years, 15 to 19 years, and 20 to 24 years); whether the client had given birth by age 15; and whether the client was pregnant at the time of enrollment. The FP methods included in the analysis were: injectables, implants, pills, and intrauterine devices (IUDs)[9]. If a beneficiary was included in the FP data set but did not have a FP method associated with her record, it was assumed that she received only FP counseling. We cross-tabulated reporting of observations in the FP data set with having received a FP method to understand the proportion of clients who were included in the FP data set who actually received a FP method.

We extracted data from the DHIS 2 in July 2018 for Gulu, Lira, Omoro, and Oyam districts in Uganda. We extracted the number of units of FP methods dispensed from January 2015 through December 2017 and the number of new implant users during the same period. Implant users were disaggregated by age: 10 to 19 years, 20 to 24 years, and more than 25 years old. Units dispensed for oral contraceptives and injectables were converted to couple-years of protection (CYP).[10] The different brands of contraceptives were grouped in a single category (e.g., oral contraceptive brands included Ovrette, another progestin-only pill, Lo-Feminal, and Microgynon).

Analysis 3 Results

Overall, only nine percent of all DREAMS beneficiaries have a record in the FP data set (indicating that they had received at least FP counseling). Beneficiaries who were pregnant at the time of their enrollment were most likely to have a record in the FP data set; in-school beneficiaries were least likely to have a FP record. Beneficiaries who had given birth by age 15 and married beneficiaries[11] were the most likely to be recorded as having received a FP method at least once, but the overall differences were modest (6% vs. 4% for those who were pregnant at enrollment and 3% for those still in school). Table 7 presents these results.

[9] Condom distribution for prevention of HIV transmission is recorded in its own data set, which was not included in the present analysis. Condoms distributed for FP purposes could be recorded in the FP data set as "other."
[10] One CYP is the estimated number of units needed to protect one couple for one year: four doses of injectable contraceptives and 15 cycles of oral contraceptives (MEASURE Evaluation, n.d.).
[11] Note that these characteristics are not mutually exclusive (i.e., some married beneficiaries had also had a birth by age 15).

Table 7. DREAMS beneficiaries included in the FP data set and DREAMS beneficiaries who received any type of FP method, by demographics at enrollment (UDTS)

Demographics at enrollment		Beneficiary is included in the FP data set		Beneficiary received any type of FP method		N
		n	%	n	%	
Married	Yes	1,753	11	919	6	15,660
	No	4,188	9	1,833	4	48,290
Currently pregnant	Yes	1,318	14	398	4	9,175
	No	4,623	8	2,354	4	54,775
Given birth by age 15	Yes	1,616	11	912	6	15,211
	No	4,325	9	1,840	4	48,739
Currently in school	Yes	1,556	6	608	3	25,661
	No	4,385	12	2,144	6	38,289
Total		5,941	9	2,752	4	63,950

Tables 8 and 9 show contraceptive methods reported in the FP data set by district of residence and age. Injectables were the most popular method, followed by implants; IUDs were the least used method. Contraceptive method mix did not vary appreciably by demographic characteristics at enrollment, and only two percent of beneficiaries who had given birth by age 15 were recorded as having received a long-lasting method (implant or IUD) (analyses not shown). Beneficiaries ages 20-24 were twice as likely to be reported as having received a method as were younger age groups.

Table 8. FP method uptake among AGYW enrolled in DREAMS, by district (UDTS)

Methods	District								Total (N = 63,950)	
	Gulu (N = 16,284)		Lira (N = 19,171)		Omoro (N = 8,481)		Oyam (N = 20,014)			
	n	%	n	%	n	%	n	%	n	%
Injectables	368	2	216	1	263	3	1,078	5	1,925	3
Implants	132	1	31	0	70	1	475	3	708	1
Pills	46	0	5	0	13	0	85	0	149	0
IUDs	25	0	1	0	2	0	9	0	37	0
Any method	571	4	253	1	348	4	1,647	8	2,819[12]	4

Table 9. FP method uptake in AGYW enrolled in DREAMS, by age (UDTS)

Methods	Age groups					
	10-14-year olds (N = 8,016)		15-19- year olds (N = 33,396)		20-24-year olds (N = 22,538)	
	n	%	n	%	n	%
Injectables	180	2	756	2	989	4
Implants	76	1	271	1	361	2
Pills	15	0	63	0	71	0
IUDs	0	0	13	0	24	0
Any method	271	3	1,103	3	1,445	6

The UDTS indicated very low coverage of FP uptake; however, the UDTS may not have complete information on contraceptive methods delivered by public health facilities. To provide a backdrop on trends in FP use among all WRA, we assessed the district-level distribution of modern FP methods in Gulu, Lira, Omoro, and Oyam from 2015 to 2017, as reported in the DHIS 2. Table 10 shows the total contraceptive distribution in these four districts.

[12] In addition, there are 12 records in the FP data set of condoms being distributed.

Table 10. Total contraceptive distribution, 2015 to 2017 (DHIS 2)

District	Year	Emergency contraception	Female condoms (pieces)	IUD (pieces)	Injectables (doses)	Male condoms	Oral pills (cycles)	Female sterilization	Implant 10-19 years new users	Implant 20-24 years new users	Implant 25+ years new users	Total implant new users*
Omoro	2015	51	2,745	251	23,561	41,376	1,047	29	88	208	297	593
	2016	263	1,806	494	54,729	54,979	1,011	31	238	579	728	1,545
	2017	107	2,362	1,501	16,183	89,323	1,120	22	447	882	996	2,325
Gulu	2015	167	5,976	2,255	30,909	106,999	3,413	6	223	458	698	1,379
	2016	387	5,908	1,674	86,883	193,260	11,754	11	828	1,622	1,771	4,221
	2017	822	8,490	2,582	32,799	213,537	8,160	44	1,127	1,761	2,079	4,967
Oyam	2015	193	10,939	601	19,238	109,847	3,999	347	178	524	510	1,212
	2016	81	21,183	1,741	27,350	232,470	11,202	489	426	1,162	1,700	3,288
	2017	439	6,288	4,635	22,575	173,249	2,779	384	603	1,490	1,877	3,970
Lira	2015	107	3,746	653	5,573	58,224	1,532	100	102	357	455	914
	2016	311	19,422	3,728	24,685	277,137	2,188	108	245	820	1,713	2,778
	2017	538	7,561	5,775	23,364	401,508	3,504	112	503	1,817	3,085	5,405

*Total implant new users is calculated by adding the new users from each mutually exclusive age group. It is not sourced from the overall indicator from DHIS 2.

Figures 5 through 8 show district-level time trends for the four contraceptive methods that are most appropriate for younger women: IUDs, injectables, oral contraceptives, and implants.[13] District-level totals from Table 2 were adjusted for the population of women of reproductive age, ages 15 to 49 (WRA); as described earlier, oral contraceptives and injectables were converted to CYP. Although Omoro consistently had the lowest number of units dispensed among the four districts over time, as seen in Table 2, it also has the smallest population of WRA. There were no consistent trends either across methods or across districts.

Figure 5. Time trends for contraceptive methods in Omoro district (DHIS 2)

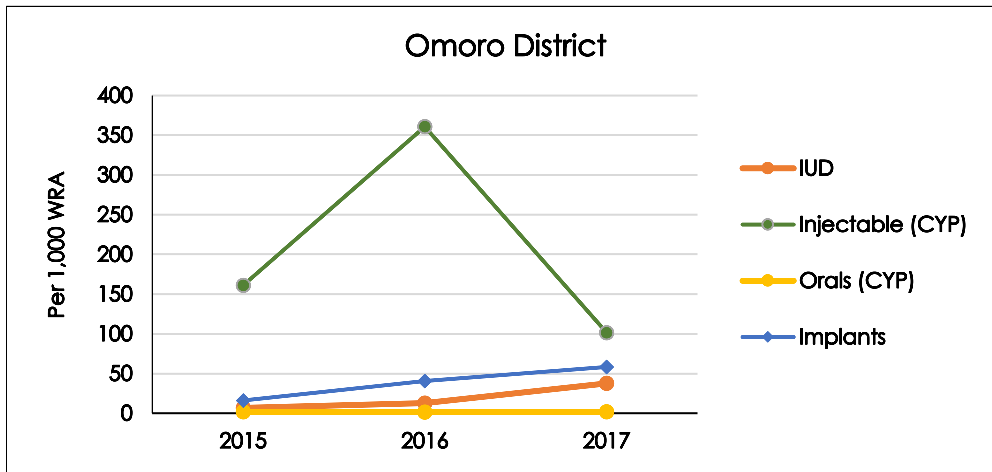
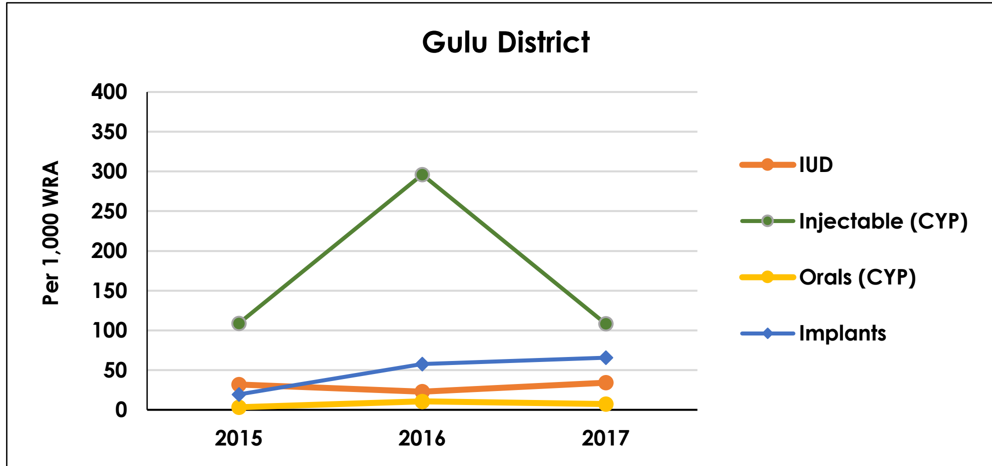


Figure 6. Time trends for contraceptive methods in Gulu district (DHIS 2)



[13] Condoms were not included because they are used for both contraception and prevention of HIV transmission. Emergency contraception is not shown because it is intended for one-time use, to be followed by another FP method.

Figure 7. Time trends for contraceptive methods in Oyam district (DHIS 2)

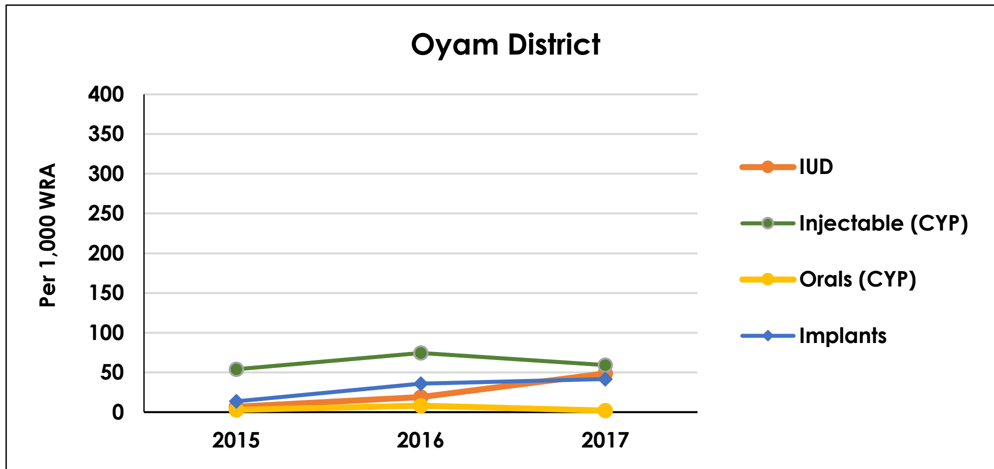


Figure 8. Time trends for contraceptive methods in Lira district (DHIS 2)

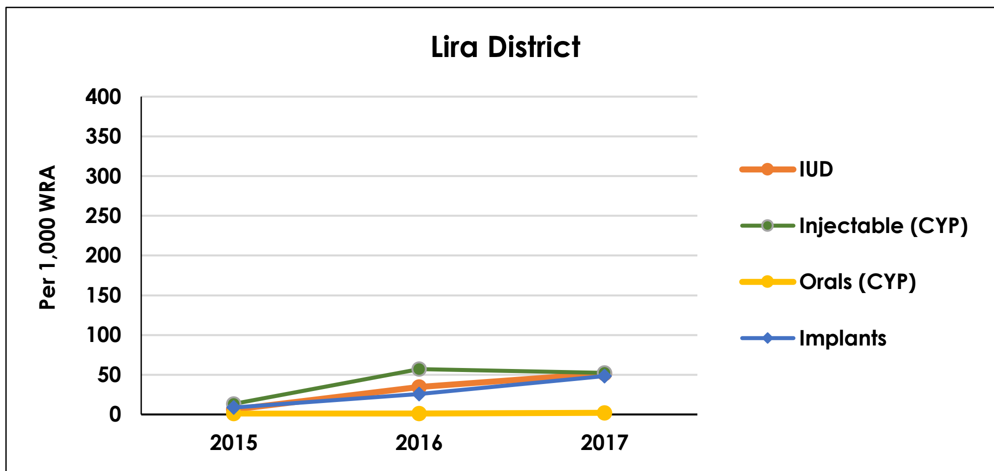
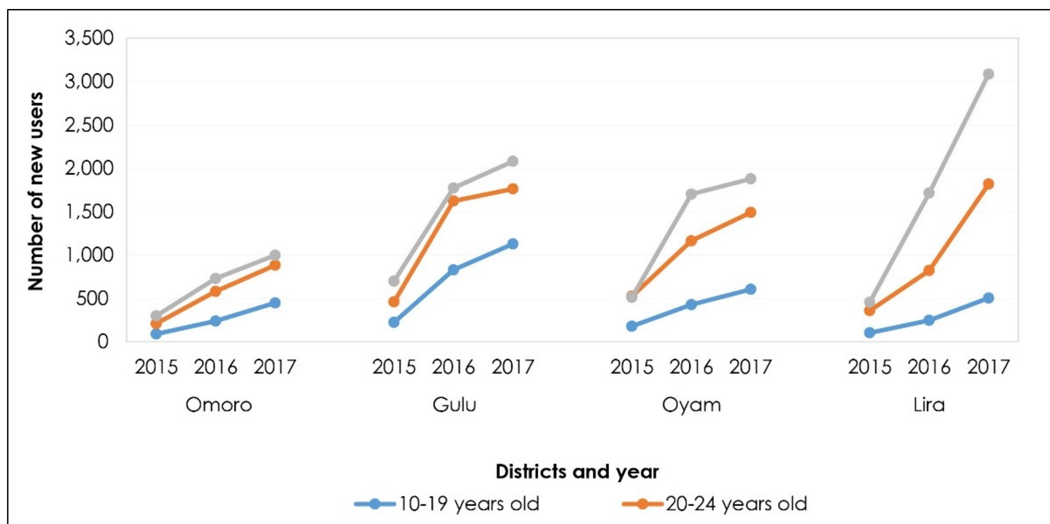


Figure 9 shows an increase in the total number of new users of implants from 2015 to 2017 in all four districts. This trend remained when disaggregated by age, but there were no substantial differences among the age groups.

Figure 9. Implant new users in Omoro, Gulu, Oyam, and Lira districts (DHIS 2)



Analysis 3 Discussion

The results of this analysis demonstrated that an overall small proportion of DREAMS beneficiaries were recorded in the UDTS as having received FP counseling or FP methods. Only six percent of beneficiaries who had given birth by age 15 – USAID/Uganda's highest priority for pregnancy delay – were recorded as having received a FP method, with two percent recorded as having received a long-lasting method. These numbers are too low in and of themselves to be expected to significantly delay pregnancy among this vulnerable group.

Findings from the DHIS 2 failed to demonstrate an increased contraceptive distribution that could be consistent with an impact of the implementation of DREAMS interventions. These findings were not totally unexpected because, by design, DREAMS beneficiaries account for a small fraction of all WRA (15 to 49 years). With the exception of implants, there were no consistent time trends by methods or by districts from 2015 to 2017. We were not able to discern whether these reported trends were due to data quality issues (inverted U-shapes) or represented accurate service delivery for these years. For implants, women above the target DREAMS age group (e.g., 25 years and older) consistently accounted for greater numbers of new users than younger women, and they showed similar or greater rates of increase year-to-year.

Per the DREAMS layering approach to services, increasing the contraceptive mix is classified as a secondary intervention for all segments of the program and is not included as a school-based intervention. Given that an appreciable proportion of DREAMS beneficiaries are still in school and most likely not sexually active, these AGYW might not yet represent a prime market for FP.

Analysis 3 Implications for DREAMS/Uganda

Increasing the use of FP methods is a priority for USAID/Uganda; however, only a very small proportion of DREAMS beneficiaries in Northern Uganda were recorded in UDTS as receiving this service. Moreover, although AGYW who have given birth by age 15 — who are at very high risk for a subsequent pregnancy — showed the highest FP uptake, not even one in fifteen was recorded as having received a contraceptive method. To effectively delay pregnancy among program beneficiaries, FP services need to be implemented more widely, with special attention to those who have had a birth by age 15 and/or are pregnant at the time of enrollment. It is possible that FP services were not being properly recorded in the UDTS. This is something that DREAMS should assess, perhaps with data quality assessments in the field.

Overall, there was no clear trend in the FP service statistics as reported in the DHIS 2. Given that the DREAMS beneficiaries make up a small proportion of the total women of child bearing age in Northern Uganda and the inability to disaggregate FP data by age, the DHIS 2 is not a viable data set to demonstrate the impact of DREAMS.

Analysis 4. DREAMS Program Coverage of HIV Testing

Analysis 4 Methods

HIV testing is a primary DREAMS intervention, with the aim of quarterly HIV repeat testing. We used data from the UDTS to assess the uptake of HIV testing and retesting and FP services among enrolled AGYW.

Descriptive statistics, such as medians and frequencies, were generated from the merged data for demographic characteristics, including: district; marital status; education status; age and age categories (10 to 14 years, 15 to 19 years, and 20 to 24 years); whether the client had given birth by age 15; whether the client was pregnant at the time of enrollment; and programmatic "segment." The "segment" indicator was assigned by program workers to flag the beneficiary's highest risk factor for HIV infection (and thereby help structure the program interventions that would be offered). We created a variable for the HIV retesting index based on reported retests and cross-tabulated it with the demographic characteristics, the segment, and whether a client's information was recorded in the FP data set. We cross-tabulated reporting of observations in the FP data set with HIV testing and retesting to understand the proportion of clients who received both HIV testing and retesting and at least FP counseling, in line with the "layering" strategy of DREAMS. In this section, we only report whether a beneficiary was tested and not the test results because we did not have access to results for HIV tests conducted at the time of enrollment.

Analysis 4 Results

HIV Testing

Regular, repeated HIV testing is a core component of the DREAMS service delivery package. As can be seen in Table 11, HIV retesting rates were low. Only 36 percent of all clients had a first retest, and 15 percent and 2 percent had second and third retests, respectively. Among those who had been retested for HIV, the median interval between the enrollment test and the first retest was eight months.

In general, married beneficiaries were more likely to have been tested and retested for HIV than unmarried beneficiaries. Similarly, as can be seen in Table 12, pregnant beneficiaries were more likely to be have been tested at enrollment than those who were not. Beneficiaries who were in school were less likely to have been tested and retested for HIV than those who were out of school. HIV testing and retesting rates among those who had or had not given birth by age 15 varied.

Table 11. HIV testing and retesting[14] during DREAMS implementation, by district (UDTS)

HIV testing index	District	Total beneficiaries eligible for testing or retesting	Number of beneficiaries who were tested	% of total beneficiaries who were tested among all DREAMS clients	% retested by DREAMS among beneficiaries who tested in the previous round	Median interval between tests, in months
Enrollment	Gulu	16,284	14,585	90	--	--
	Lira	19,171	18,765	98	--	--
	Omoro	8,481	8,054	95	--	--
	Oyam	20,014	18,950	95	--	--
	Total	**63,950**	**60,354**	**95**	**--**	**--**
Retest 1	Gulu	14,585	3,406	21	23	7.8
	Lira	18,765	6,230	33	33	8.9
	Omoro	8,054	3,928	46	49	7.7
	Oyam	18,950	9,183	46	49	8.4
	Total	**60,354**	**22,747**	**36**	**39**	**8.2**
Retest 2	Gulu	3,406	800	5	24	4.0
	Lira	6,230	4,000	21	64	3.3
	Omoro	3,928	1,679	20	43	4.2
	Oyam	9,183	2,485	12	27	3.3
	Total	**22,747**	**8,964**	**15**	**40**	**3.7**
Retest 3	Gulu	800	97	1	12	3.9
	Lira	4,000	652	3	16	3.4
	Omoro	1,679	267	3	16	4.0
	Oyam	2,485	171	1	7	3.1
	Total	**8,964**	**1,187**	**2**	**13**	**3.6**
Retest 4	Gulu	97	9	0	9	2.9
	Lira	652	117	1	18	3.3
	Omoro	267	19	0	7	3.9
	Oyam	171	8	0	5	3.2
	Total	**1,187**	**153**	**0.0**	**13**	**3.3**

As described earlier, program implementers categorized each new enrollee by her highest risk factor for HIV infection[15] (the "segment" indicator). Table 12 presents retesting rates by district and assigned segment. Differences by district and by segment can be seen. Notably, beneficiaries assigned to the transactional sex population segment were the least likely to have been tested for HIV. Beneficiaries assigned to the pregnant segment were the most likely to have been tested for HIV.

[14] Ideally, only people with negative test results would receive a subsequent HIV test. The data sets we received did not include the results of HIV tests conducted at enrollment. In addition, test results recorded in the HTS data set may contain errors. For example, 317 beneficiaries were recorded as having a positive test result in their first retest; nearly half of them were tested again, and of these nearly half (48%) were recorded as having a negative result on the second test. Therefore, we decided not to eliminate beneficiaries from the testing cascade based on test results.
[15] Internal inconsistencies in this assignment are discussed earlier.

Table 12. HIV testing and retesting during program implementation, by district and population segment at enrollment (UDTS)

District	Assigned Segment	HIV tests					
		Enrollment (%)	Retest 1 (%)	Retest 2 (%)	Retest 3 (%)	Retest 4 (%)	N
Gulu	Given birth	94	30	8	1	0	3,418
	In school	87	15	3	0	0	8,557
	Married	93	30	7	1	0	2,564
	Pregnant	98	27	7	1	0	840
	Transactional sex	80	7	0	0	0	905
Lira	Given birth	99	23	13	2	1	6,747
	In school	95	47	33	5	0	6,049
	Married	99	39	25	4	1	3,628
	Pregnant	100	10	6	1	0	2,144
	Transactional sex	100	27	15	7	3	603
Omoro	Given birth	96	49	25	5	0	1,843
	In school	93	39	14	1	0	4,109
	Married	97	60	26	5	0	1,663
	Pregnant	100	50	23	3	0	853
	Transactional sex	*	*	*	*	*	13
Oyam	Given birth	97	51	15	1	0	4,700
	In school	91	37	6	0	0	7,141
	Married	93	41	12	2	0	4,191
	Pregnant	99	61	21	1	0	3,920
	Transactional sex	98	63	5	0	0	62
Total	Given birth	97	35	14	2	0	16,708
	In school	91	33	13	1	0	25,856
	Married	95	41	17	3	1	12,046
	Pregnant	99	42	15	1	0	7,757
	Transactional sex	88	18	7	3	1	1,583
	Total	94	36	15	2	0	63,950

*Too few observations to analyze.

Family Planning and HIV Testing

Following the DREAMS "layering" strategy for service delivery, we assessed the extent to which HIV testing and retesting covaried with FP services. Virtually all (5912 out of 5941) beneficiaries with a record in the FP data set also received an HIV test at enrollment. Overall, 82 percent of beneficiaries with a record in the FP data set had a first HIV retest, compared with 31 percent of those who did not have a record in the FP data set (analysis not shown). Recorded performance varied widely by district, as can be seen in Table 13. Note that 77 percent of beneficiaries in Gulu district have neither HIV retest nor FP services recorded; even Oyam, the best-performing district in this analysis, shows that half its registered beneficiaries have neither a recorded HIV retest nor an FP service.

Table 13. Coverage of HIV retesting by presence in the FP data set by district (UDTS)

District		Services Recorded				
		None recorded	HIV retest only	FP only	HIV retest + FP	Total
Gulu	Count	12,587	2,845	291	561	16,284
	% within District	77%	18%	2%	3%	100%
Lira	Count	12,877	5,913	64	317	19,171
	% within District	67%	31%	0%	2%	100%
Omoro	Count	4,530	3,412	23	516	8,481
	% within District	54%	40%	0%	6%	100%
Oyam	Count	10,111	5,734	720	3,449	20,014
	% within District	50%	29%	4%	17%	100%
Total	Count	40,105	17,904	1,098	4,843	63,950
	% within District	63%	28%	2%	7%	100%

Within districts, recorded program performance varies widely by subcounty. In Gulu district, Paicho subcounty recorded 81 percent of beneficiaries receiving HIV retesting and/or FP services compared to Bardege division, which recorded only 8 percent of beneficiaries receiving at least one of these two services. Patiko subcounty recorded more than 40 percent of its beneficiaries as receiving both HIV retesting at some FP service. In Oyam district, Aleka subcounty recorded two thirds (67%) of its beneficiaries as receiving both services (analysis not shown). Table 14 presents these findings for the lowest three and highest two performing subcounties in Gulu district.

Table 14. Gulu district: Coverage of HIV retesting by presence in the FP data set for selected subcounties (UDTS)

Gulu District Selected subcounties		Services recorded				
		None recorded	HIV retest only	FP only	HIV retest + FP	Total
Bar-dege Division	Count	5,928	493	2	8	6,431
	% within subcounty	92%	8%	0%	0%	100%
Layibi Division	Count	1,701	186	38	50	1,975
	% within subcounty	86%	9%	2%	3%	100%
Pece Division	Count	2,120	296	7	83	2,506
	% within subcounty	85%	12%	0%	3%	100%
Paicho Subcounty	Count	101	318	72	51	542
	% within subcounty	19%	59%	13%	9%	100%
Patiko Subcounty	Count	69	54	0	95	218
	% within subcounty	32%	25%	0%	43%	100%

Analysis 4 Discussion

The results of this analysis demonstrate that while HIV testing for DREAMS beneficiaries at the time of enrollment was nearly universal, retesting rates were very low. The median waiting period of eight months between the first and second HIV tests was longer than the recommended three months. These findings demonstrate that recorded program performance falls short of the goals outlined in the DREAMS strategy.

Despite potentially being exposed to the highest risk for HIV infection, beneficiaries considered to be engaged in transactional sex were the least likely to test and retest compared with all other population segments. This finding suggests that the HIV testing initiatives implemented by DREAMS IPs may not have adequately reached this population segment, and there may be a need to refocus efforts to improve their use of testing services.

We also found that HIV testing and retesting rates were higher among beneficiaries who also received at least FP counseling compared those with no record in the FP data set. This would be consistent with PEPFAR's strategy to promote the integration of HIV services with other health services to maximize health system effectiveness (United States Global Health Initiative, 2014).

Analysis 4 Implications for DREAMS/Uganda

Regular HIV testing is one of the core interventions of the DREAMS strategy. Nevertheless, retesting rates among program beneficiaries appeared to be very low. Beneficiaries classified by program workers as engaging in transactional sex, the highest risk for HIV infection, were the least likely to test and retest. Beneficiaries recorded as receiving a FP service were the most likely to be retested for HIV. Finally, recorded program performance varied widely by district and subcounty. We recommend that DREAMS conduct data quality audits and in-depth comparisons of high- and low-performing subcounties for lessons learned to inform program planning and implementation.

CONCLUSIONS AND RECOMMENDATIONS

After extensive analysis of the UDTS, DHS, and DHIS 2, we failed to find substantive empirical evidence of impact of the DREAMS initiatives we were asked to assess: pregnancy delay; contraceptive uptake; regular retesting for HIV. Even if the program reliably tracked new pregnancies after enrollment (which it currently does not), it is probably still too early to demonstrate an impact on pregnancy delay among AGYW with a birth by age 15. The national health management information system, which has data quality issues of its own, does not (and should not be asked to) identify DREAMS beneficiaries who receive family planning methods at public health facilities; and it is unrealistic to expect that DREAMS beneficiaries will reliably report back to program implementers when they receive family planning outside the program. Aside from apparent duplication of some of the enrollment HIV tests in the HIV retesting data set, which can be easily corrected by comparing the dates of enrollment and first HIV retest, the HTS data set does not seem to present significant data quality issues. However, the reported coverage of HIV testing and retesting services was especially low among AGYW who engaged in transactional sex, who are a key risk group for HIV infection. There was encouraging evidence for the integration of HIV and FP services in that more than 80 percent of the subset of DREAMS beneficiaries who received FP counselling and services also had a repeat HIV test. USAID/Uganda and DREAMS IPs may want to study this finding in greater depth to see if and how FP interventions may improve HIV retesting rates.

Our conclusions are only as strong as the data we were provided. For this reason, we offer the following recommendations to USAID/Uganda and the DREAMS partners.

1. Provide written documentation, including data entry procedures, codebooks, and indicator definitions, for both the DREAMS tracker (UDTS) and the DHIS 2. This will improve data quality and facilitate secondary analyses, such as those included in this report.
2. Assess the validity of the HIV-transmission risk classifications assigned by program workers (the "segment" indicator), using skilled caseworkers interviewing newly enrolled beneficiaries with a standardized risk-assessment interview guide. The sample should include enrollees from all segments; original classifications would not be shared with the interviewer. The interviewer's independent classifications would then be compared with the original classifications made by program workers. As appropriate, revise standard procedures and retrain program workers.
3. Define and track program dropouts. How many/what proportion of enrollees drop out of the program? When and why do they drop out (requires a follow-up survey)?
4. Consider adding a new register/data set for "current status." It would be routinely collected for all beneficiaries, by the same IP that filled out the enrollment data form (or replaced that IP). The form should record the beneficiary's current status by population segments (currently pregnant, in school, married, engaged in transactional sex). New fields could be date of last birth, date of last HIV test, need for program interventions (HIV retesting, FP, etc.), as well as dropout/not located.
5. As soon as possible, conduct an initial data quality audit (DQA[16]) of the UDTS database in a small, purposive sample of high- and low-performing subcounties, including some that have experienced turn-over in implementing partners. Focus the initial audit on HIV testing and the HTS data set within the UDTS. Include community trace-and-verify (CTV[17]) of active beneficiaries and probe for re-issuance of DREAMS passports and/or assignment of new ID numbers. Assigning new IDs to old beneficiaries will over-report numbers enrolled and under-report regularity of service delivery. The findings of the initial DQA will provide insight as to whether the low rates of HIV retesting found in the present assessment reflect poor data quality (i.e. failure to register tests performed) or low program performance (i.e. failure to retest).

[16] See MEASURE Evaluation tools: https://www.measureevaluation.org/resources/tools/data-quality
[17] https://www.measureevaluation.org/resources/publications/ms-13-63

6. On a monthly basis, check the enrollment data set for duplicate ID numbers and irregular formats (e.g. illegal characters). Check for internal inconsistencies (e.g., non-pregnant enrollees classified as pregnant). Flag all errors and return to the respective IPs for correction. As data quality improves, these checks can be reduced to once a quarter.
7. On a monthly basis, match the ID numbers in the enrollment data set with the ancillary service data sets (HTS, FP, etc.). Flag IDs that appear in the service data sets that cannot be found in the enrollment data set and return to the respective IPs for correction. As data quality improves, these checks can be reduced to once a quarter.
8. On a monthly basis, check the dates of the first HIV test (which should be the date of the first HIV retest) in the HTS data set against the enrollment dates in the enrollment data set. Flag cases where the first HIV test in HTS coincides or precedes the enrollment date and return to the respective IPs for correction. As data quality improves, these checks can be reduced to once a quarter.
   Once every six months, consolidate the data within each service data set and merge the data sets with the enrollment data set, using the procedures employed in this assessment. Determine how many beneficiaries are still active in the program (i.e. received any DREAMS service in a stipulated reference period).
9. At least once a year, conduct a "deep dive" into the consolidated data set. For example, are beneficiaries receiving the layered services indicated by the population segment they were assigned at enrollment? If not, is this likely to be a service delivery issue or a problem with the way workers made the assignment?
10. Institute routine data quality assessments followed by technical assistance and supportive supervision to improve identified priority issues. Monitor change in data quality. MEASURE Evaluation has used this approach successfully in Tanzania.[18]
11. Plan prospective program impact evaluations. Consider adding a comparison group of AGYW who were not offered the opportunity to join DREAMS. Allow enough time to elapse to register impact on priority indicators (e.g., pregnancy delay). Compare outcomes among enrollees who continued with those who dropped out.

[18] See https://www.measureevaluation.org/measure-evaluation-tz/institutionalizing-strong-m-e-procedures

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