

PMTCT CASCADE ASSESSMENT, TANZANIA

2023

INTRODUCTION

We conducted an assessment of the prevention of mother-to-child transmission (PMTCT) cascade in four purposely selected regions in mainland Tanzania: Dar es Salaam, Mwanza, Mbeya, and Dodoma. The assessment sought to address information gaps within the antenatal care (ANC) and PMTCT cascades, evaluating the services provided to HIV-negative and HIV-positive pregnant and breastfeeding women, as well as their infants. Data collection took place between May 2023 and July 2023.

We assessed 15 facilities in selected regions, which encompassed both PEPFAR-supported and non-PEPFAR-supported facilities offering ANC and PMTCT services. The Tanzania Ministry of Health PMTCT Unit led the assessment, with funding from the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) and technical assistance provided by the University of California, San Francisco (UCSF) and the U.S. Centers for Disease Control and Prevention (CDC).

A list of acronyms used throughout the report can be found in Appendix A.

ASSESSMENT AIMS AND OBJECTIVES

The objectives of the assessment were to:

- Assess the ANC and PMTCT cascades to better understand the uptake of HIV-related services among pregnant, delivering, and postpartum women, factors contributing to attrition along the cascade, and HIV outcomes among HIV-exposed infants (HEI).
- Provide insight into how data quality challenges affect the interpretation of PMTCT and early infant diagnosis (EID) program performance.
- Improve future HIV modelling and estimation activities by generating empirical data around PMTCT service uptake throughout the perinatal period.

The full list of assessment questions can be found in Appendix B.

METHODS

This was a mixed methods assessment comprising five assessment components. Sampling methods, the corresponding target populations, and the kind of information collected during each component are described in Table 1.

Table 1: Target population, sampling methods, and data collection methods for each assessment component, Tanzania PMTCT Cascade Assessment, 2023

Assessment Component	Target Population	Sampling method	Data Collection Method	Information Collected
Retrospective cohort	HIV-positive pregnant women and their HIV-exposed infants	Cohort participants were obtained by selecting a sample of HIV-positive pregnant women from the ANC register from among women who had their first ANC visit between December 2020 and November 2021. Six alternating months were selected from the 12-month cohort window and all positive women in selected months were included in the cohort.	Data abstracted from the ANC register, the woman's CTC2 card, the facility CTC2 database, the mother-child cohort register, and the infant's HEI card for each cohort member	- Antenatal care/services received - HIV care and treatment follow-up visits and services received, including antiretroviral therapy (ART) and HIV viral load (HVL) - Infant feeding practices - Infant follow-up services including EID, prophylaxis, and ART - Infant final outcomes
Cross-sectional survey	Women attending a 9-month vaccination visit with their child	All women were eligible for inclusion, regardless of HIV status. Women were continuously recruited until a total of ten women at each facility had been interviewed.	- Quantitative questionnaire administered in one-on-one interview to consenting women - Data collected using a tablet installed with open data kit (ODK) software	- Women: demographics, HIV status, uptake of ANC and post-natal services, and (if applicable) uptake of PMTCT services - Children: date of birth and (if applicable) PMTCT services received including DNA-PCR HIV testing, test results, and final outcome/HIV status

Assessment Component	Target Population	Sampling method	Data Collection Method	Information Collected
Key informant interviews	Individuals knowledgeable about the PMTCT program	Participants were purposively selected to include the Regional RCH Coordinator in each sampled region, at least 2 District RCH Coordinators in each sampled region, and health care providers at a subset of facilities, selected to represent high and low volume, urban and rural, and PEPFAR and non-PEPFAR supported facilities	Interviews conducted using semi-structured qualitative interview guide	Perceptions, opinions, experiences, and recommendations related to implementation of PMTCT services and interventions
Facility assessment	All participating facilities	All participating facilities were included	Quantitative questionnaire administered through interviews with key facility-level informants, including health facility and RCH in-charges	Facility characteristics, including facility type, location, staffing levels, patient load, and facility size
Data triangulation	N/A	All participating facilities were included	Facility registers used to recreate routine ANC reports which were compared to reports entered in DHIS2	- Aggregate count of ANC HIV testing (1st and 2nd test) for all six months included in retrospective cohort - Key variables from monthly ANC report for the two most recent months prior to data collection

SUMMARY OF DATA COLLECTION ACTIVITIES

Table 2 provides a summary of data collection activities and the sample sizes reached for each assessment component, broken down by PEPFAR support and by region.

Table 2: Summary of assessment methods and sample sizes by region, Tanzania PMTCT Cascade Assessment, 2023

Assessment component	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
Facility assessment*	60	41	19	15	15	15	15
Retrospective cohort	2260	1971	289	755	260	623	622
Cross-sectional survey	609	420	189	158	152	149	150
Key informant interviews	60	30	13	12	11	19	18

*The facility assessment sample size represents the number of facilities that were assessed and does not represent individual interviews or clients

Further information on the key informant interviews that were conducted can be found in Appendix C.

CHARACTERISTICS OF FACILITIES INCLUDED IN ASSESSMENT

The characteristics of the facilities that were included in the PMTCT cascade assessment were collected during the Facility Assessment and are described in Table 3 and below.

Table 3: Characteristics and types of facilities assessed, Tanzania PMTCT Cascade Assessment, 2023

	Total	PEPFAR Supported	Non-PEPFAR Supported
Facility location			
Urban	39 (65.0%)	32 (78.0%)	7 (36.8%)
Rural	21 (35.0%)	9 (22.0%)	12 (63.2%)
Type of facility			
Referral Hospital	1 (1.7%)	1 (100%)	0 (0%)
District/DDH Hospital	10 (16.7%)	10 (100%)	0 (0%)
Health Center	17 (28.3%)	14 (82.3%)	3 (17.7%)
Dispensary	32 (53.3%)	16 (50.0%)	16 (50.0%)

The majority of the assessed facilities reported that they provide PMTCT services five days a week (75.0%), attend to both new and returning ANC clients during the same clinic hours (70.0%), and that they serve both HIV-negative and HIV-positive clients during same clinic hours (73.3%) (Table 4). PEPFAR supported facilities had a larger median number of health care workers providing ANC/PMTCT services on any given day compared to non-PEPFAR supported facilities (3 versus 2), a larger median number of new clients on a normal ANC/PMTCT clinic day (12 versus 4), and a larger median number of follow-up clients on a normal ANC/PMTCT clinic day (30 versus 12).

Table 4: Availability of ANC and PMTCT services and staffing and client levels at assessment facilities, Tanzania PMTCT Cascade Assessment, 2023

	Total	PEPFAR Supported	Non-PEPFAR Supported
Median number of days per week that PMTCT services are offered			
1 day per week	10 (16.7%)	6 (14.6%)	4 (21.0%)
2-3 days per week	5 (8.3%)	2 (4.9%)	3 (15.8%)
5 days per week	45 (75.0%)	33 (80.5%)	12 (63.2%)
Organization of new and follow-up ANC visits			
All visits done together	42 (70.0%)	29 (70.7%)	13 (68.4%)
Provided on same days but different hours	6 (10.0%)	5 (12.2%)	1 (5.3%)
Offered on different days of the week	12 (20.0%)	7 (17.1%)	5 (26.3%)
Organization of ANC visits for HIV-positive and HIV-negative women			
All visits done together	44 (73.3%)	30 (73.2%)	14 (73.7%)
Provided on same days but different hours	3 (5.0%)	2 (4.9%)	1 (5.3%)
Offered on different days of the week	13 (21.7%)	9 (21.9%)	4 (21.0%)
Median number of HCWs providing ANC/PMTCT services on any given day (IQR)	3 (2,4)	3 (2,5)	2 (1,4)
Median number of new clients on a normal ANC/PMTCT clinic day (IQR)	8 (3,20)	12 (5,30)	4 (1,10)
Median number of follow-up clients on a normal ANC/PMTCT clinic day (IQR)	20 (10,48)	30 (15,50)	12 (2,25)

The majority of facilities had all of the national data collection and reporting tools related to ANC and PMTCT services, although in some cases not the most recent version. Some tools were completely absent from a small proportion of facilities: 10.0% of facilities had no labor and delivery register (MTUHA 12), 10.0% of facilities had no labor and delivery monthly reporting forms, 5.0% of facilities had no HEI cards, 1.7% of facilities had no CTC2 cards, 21.7% of facilities had no HEID register, and 1.7% of facilities had no HIV Testing Services (HTS) register. The majority (80.0%) of facilities had staff dedicated to tracking women who missed an ANC/PMTCT appointment. More information about the availability of ANC and PMTCT recording and reporting tools can be found in Table 20 in Appendix D.

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF CROSS-SECTIONAL SURVEY PARTICIPANTS

A total of 609 women were recruited for the cross-sectional survey while visiting the clinic for their child's 9-month vaccination. Nearly three-fourths (72.2%) did not have their RCH card with them. The median age for participants was 27 years. The majority had, at a minimum, completed primary education (86.9%). The most commonly reported occupations were housewife (28.9%), petty trading (26.1%), and farmer (23.8%). These data, disaggregated by PEPFAR versus non-PEPFAR supported facility and by region, can be found in Table 21 in Appendix E.

RETROSPECTIVE COHORT OVERVIEW

CHARACTERISTICS OF RETROSPECTIVE COHORT MEMBERS

A total of 2,260 HIV+ pregnant and breastfeeding women were included in the retrospective cohort, with a median age of 30 years. The majority of retrospective cohort members (87.2%) received services at PEPFAR-supported facilities, with Dar es Salaam having the largest proportion of participants (33.4%) of any of the regions. Seven in ten retrospective cohort members (71.4%) were known to be HIV-positive at ANC enrollment while 28.6% were newly diagnosed HIV positive at their first ANC visit.

Table 5: Age and HIV status at enrollment of retrospective cohort members, by region, Tanzania PMTCT Cascade Assessment, 2023

	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
Number of HIV+ women abstracted from ANC register	2260 (100%)	1971 (87.2%)	289 (12.8%)	755 (33.4%)	260 (11.5%)	623 (27.6%)	622 (27.5%)
Age							
15-19	81 (3.6%)	65 (3.3%)	16 (5.5%)	12 (1.6%)	8 (3.1%)	36 (5.8%)	25 (4.0%)
20-24	415 (18.4%)	351 (17.8%)	64 (22.2%)	105 (14.0%)	54 (20.8%)	119 (19.1%)	137 (22.0%)
25-29	622 (27.5%)	552 (28.0%)	70 (24.2%)	196 (25.9%)	75 (28.8%)	167 (26.8%)	184 (29.6%)
30-34	594 (26.3%)	519 (26.3%)	75 (25.9%)	219 (29.0%)	62 (23.8%)	156 (25.0%)	157 (25.3%)
35+	548 (24.2%)	484 (24.6%)	64 (22.2%)	223 (29.5%)	61 (23.5%)	145 (23.3%)	119 (19.1%)
HIV status at ANC enrollment							
Known HIV-positive	1614 (71.4%)	1440 (73.1%)	174 (60.2%)	563 (74.6%)	152 (58.5%)	458 (73.5%)	441 (70.9%)
Newly diagnosed HIV-positive	646 (28.6%)	531 (26.9%)	115 (39.8%)	192 (25.4%)	108 (41.5%)	165 (26.5%)	181 (29.1%)

Information on routine ANC services received by women in the retrospective cohort, as extracted from the ANC register, can be found in Table 22 in Appendix E.

AVAILABILITY OF RECORDS OF RETROSPECTIVE COHORT ACROSS DATA SOURCES

Overall, 71.7% of HIV-positive women registered at ANC had a record in the MC cohort register at the same facility. A similar proportion (71.8%) had a CTC2 card at the same facility. This was notably different between PEPFAR and non-PEPFAR supported facilities. At PEPFAR-supported facilities, 74.2% of women could be located in the MC cohort register and had a CTC2 card compared to 55.0% at non-PEPFAR supported facilities.

Only half (54.4%) of HIV-positive women registered at ANC had a HEI card available for their baby at the same facility. The proportion was higher at PEPFAR-supported facilities (57.3%) compared to non-PEPFAR supported facilities

(34.6%). The proportion was also higher among women who had a CTC2 card at the same facility (75.6% overall; 77.0% at PEPFAR-supported facilities versus 62.9% at non-PEPFAR supported facilities).

Table 6 presents these findings as well as a breakdown by region.

Table 6: Proportion of HIV-positive women in the retrospective cohort successfully tracked in the MC cohort register, CTC2 card, CTC2 database, and those whose infant had a HEI card, Tanzania PMTCT Cascade Assessment, 2023

	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
Matching women from ANC6 to MC cohort register [N=2,260]							
Was documented in MC cohort register	1621 (71.7%)	1462 (74.2%)	159 (55.0%)	579 (76.7%)	145 (55.8%)	499 (80.1%)	398 (64.0%)
Was not documented in MC cohort register	639 (28.3%)	509 (25.8%)	130 (45.0%)	176 (23.3%)	115 (44.2%)	124 (19.9%)	224 (36.0%)
Matching women from ANC6 to CTC2 card [N=2,260]							
CTC2 card was available	1622 (71.8%)	1463 (74.2%)	159 (55.0%)	545 (72.3%)	171 (65.8%)	471 (75.6%)	435 (69.9%)
CTC2 card was not available	638 (28.2%)	508 (25.8%)	130 (45.0%)	210 (27.8%)	89 (34.2%)	152 (24.4%)	187 (30.1%)
Matching women from ANC6 to CTC2 database [N=2,260]							
Had record in CTC2 database							
Did not have record in CTC2 database							
Matching women from ANC6 to HEI card [N=2,260]							
HEI card was available	1230 (54.4%)	1130 (57.3%)	100 (34.6%)	437 (57.9%)	120 (46.2%)	376 (60.4%)	297 (47.8%)
HEI card was not available	1030 (45.6%)	841 (42.7%)	189 (65.4%)	318 (42.1%)	140 (53.8%)	247 (39.6%)	325 (52.2%)
Availability of HEI card for women with an available CTC2 card [N=1,622]							
HEI card was available	1226 (75.6%)	1126 (77.0%)	100 (62.9%)	436 (80.0%)	119 (70.0%)	376 (79.8%)	295 (67.8%)
HEI card was not available	396 (24.4%)	337 (23.0%)	59 (37.1%)	109 (20.0%)	52 (30.0%)	95 (20.2%)	140 (32.2%)

HIV TESTING AMONG PREGNANT WOMEN AND MATERNAL RETESTING

UPTAKE OF HIV TESTING

National guidelines require that pregnant women be tested for HIV during pregnancy (both at their first ANC visit and between weeks 32 and 36 of pregnancy) as well as throughout the postpartum period if they are breastfeeding. A higher proportion of women interviewed in the cross-sectional survey reported being tested for HIV during their first ANC visit (referred to as ANC1) than during their third trimester or the postpartum period (Figure 1).

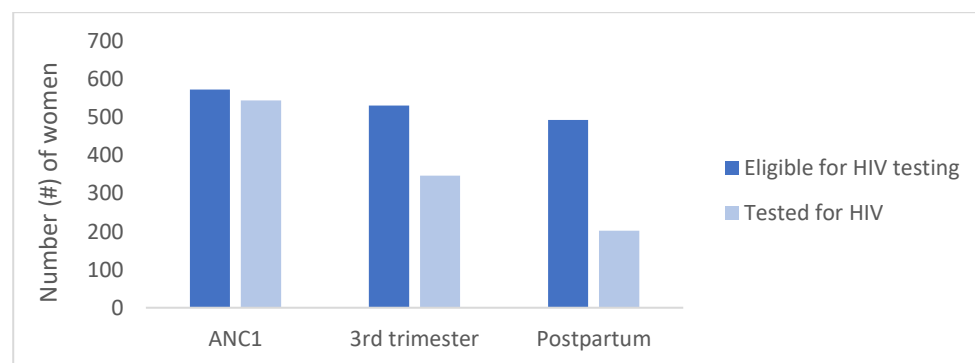


Figure 1: Number of women eligible for and tested during ANC1, pregnancy, and postpartum, Tanzania PMTCT Cascade Assessment, 2023 (Data source: Cross-sectional survey)

Among 609 women interviewed in the cross-sectional survey, 574 (94.3%) were eligible for HIV testing during their first ANC visit. Of these women, 545 (95.0%) were tested and 10 (1.8%) reported a positive HIV test result (Figure 2). Among those tested for HIV during their first ANC visit, 532 (97.6%) reported an HIV-negative result, making them eligible for HIV retesting. Out of these eligible women, 347 (65.2%) were retested during pregnancy. In the postpartum period, 494 women returned for a visit and were eligible for maternal retesting. However, only 203 (41.1%) were tested. The retesting positivity rate during pregnancy and the postpartum period was below 1% (0.3% and 0.5%, respectively).

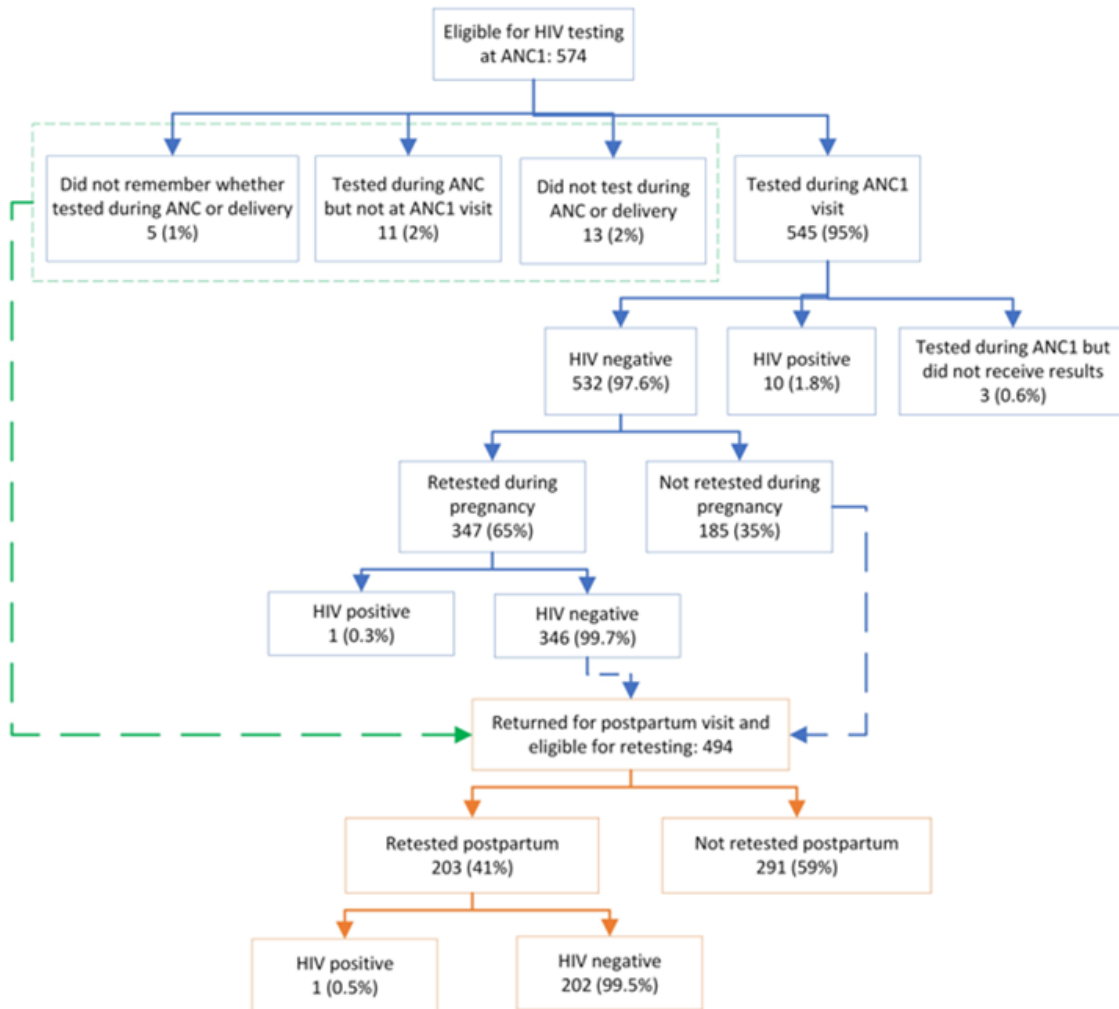


Figure 2: HIV testing at ANC1 and maternal retesting, Tanzania PMTCT Cascade Assessment, 2023 (Data source: Cross-sectional survey)

Qualitative findings attributed the successful uptake of HIV testing at the first ANC visit to effective communication with pregnant women, availability of test kits, prioritization of HIV testing during the first ANC visit, and maintaining detailed MTUHA records.

“All mothers are tested for HIV during their first ANC booking. Normally we make sure all women who start ANC clinic are counselled and educated about the importance of HIV testing.” PMTCT provider

In addition to factors that contribute to the success of ANC1 testing, PMTCT providers also discussed barriers to implementing maternal retesting, which were described at all levels of the health care system (Figure 3).

Client	Provider	Facility	Health system
• Relocation of women during pregnancy • Distance from mothers' homes to facilities	• Heavy workload • Lack of commitment • Burnout • Lack of training	• Lack of privacy for testing • Limited space for testing	• Frequent stock-outs of test kits • Data collection tools for maternal re-testing difficult to complete

Figure 3: Barriers to implementing maternal retesting at each level of the health care system, Tanzania PMTCT Cascade Assessment, 2023 (Data source: Key informant interviews)

“.....There is a shortage of providers compared to the number of pregnant women attending RCH clinics. Sometimes pregnant women are requested to test in a PMTCT room which is inappropriate. Also, there is a shortage of HIV test kits – sometimes we face stockouts and have to borrow from nearby facilities. Our facility does not have a private room for HIV testing, all testing is performed at a vaccination desk which is an open space. We do not have enough rooms.” PMTC provider

LINKAGE TO PMTCT AND ART SERVICES

We extracted data for 646 newly diagnosed HIV-positive pregnant women from the ANC register as part of the retrospective cohort. Of these, 501 (77.5%) had a CTC2 card available at the same facility. Among those who had a CTC2 card available within the facility where they were diagnosed, 94.4% had documentation of being initiated on ART within seven days of diagnosis. Documentation of initiation on ART within seven days of diagnosis was similar at PEPFAR-supported (94.9%) and non-PEPFAR supported (91.9%) facilities (Table 7).

Table 7: Proportion of newly identified HIV positive women in the retrospective cohort who had a CTC2 card available and were initiated on ART within 7 days at the same facility where they were diagnosed, Tanzania PMTCT Cascade Assessment, 2023

	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
Newly identified HIV-positive pregnant women	646	531	115	192	108	165	181
CTC2 card available within same facility among new positives [N=646]	501 (77.5%)	415 (78.2%)	86 (74.8%)	143 (74.5%)	79 (73.2%)	139 (84.2%)	140 (77.4%)
New positives initiated on ART within 7 days of diagnosis [N=501]	473 (94.4%)	394 (94.9%)	79 (91.9%)	136 (95.1%)	70 (88.6%)	134 (96.4%)	133 (95.0%)

Data source: CTC2 card

“Most women refuse to start ART because of stigma from their partners and family. Sometimes they even miss their drug refill or avoid being followed to their homes for sample collection. They normally opt to receive services away from their residential areas. Also, spouses do not support their partners in receiving PMTCT services. Some women have lost their marriages, and they are afraid to inform their spouse due to stigma.” **Health care provider**

RETENTION ON ART

We calculated retention on antiretroviral therapy (ART) at 3, 6, 12, and 18-months after ANC1 among women in the retrospective cohort. The CTC2 card was the data source, which limited the analysis to women who had a CTC2 card at the facility where they registered for ANC. Mothers who passed away, transferred out of the facility, were lost to follow-up (LTFU) (defined as more than 28 days elapsing since the last scheduled visit with no evidence of attendance, collection of medication, or transfer out), or opted out of treatment were considered as not retained. Follow-up of women ceased when they experienced an abortion, stillbirth, or discontinued breastfeeding (i.e., they were excluded from the denominator for the subsequent follow-up period). Women who did not have any of these outcomes documented were included in the analysis until the final documented visit on their CTC2 card.

Overall, retention on ART decreased over time, declining to 66.7% at the eighteen-month mark (Table 8). Retention was higher at PEPFAR-supported facilities than non-PEPFAR-supported facilities at all time points and varied across regions. Retention was poorest in Dodoma at all time points.

Table 8: Retention on ART of retrospective cohort members (N=1622), Tanzania PMTCT Cascade Assessment, 2023

Months since ANC1	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
3 months [N=1603]	1500 (93.6%)	1372 (94.4%)	137 (89.0%)	517 (95.4%)	149 (88.2%)	449 (96.0%)	394 (91.8%)
6 months [N=1520]	1358 (89.3%)	1238 (89.9%)	123 (83.1%)	472 (92.9%)	132 (80.9%)	410 (91.3%)	347 (85.7%)
9 months [N=1520]	1304 (85.8%)	1192 (86.6%)	115 (77.7%)	454 (89.4%)	128 (78.5%)	402 (89.5%)	323 (79.8%)
12 months [N=1520]	1263 (83.1%)	1156 (83.9%)	107 (72.3%)	438 (86.2%)	118 (72.4%)	391 (87.1%)	316 (78.0%)
18 months [N=1520]	1014 (66.7%)	930 (67.5%)	87 (58.8%)	328 (64.6%)	92 (56.4%)	350 (78.0%)	247 (61.0%)

Data source: CTC2 card

INTERRUPTION TO TREATMENT (ITT)

We analyzed interruptions to treatment (ITT) among retrospective cohort members. Data were abstracted from the CTC2 card. We defined an interruption to treatment as missing clinic visits for 28 consecutive days after the last scheduled appointment date. In this assessment, each mother was followed from the time she reported for ANC1 until

the time her baby stopped breastfeeding or until an event signifying the end of the follow-up period occurred for that specific participant. These events included the death of the mother, abortion, stillbirth, transfer out, and complete loss to follow-up with no re-engagement. Consequently, this approach resulted in varying follow-up periods for each participant.

Among the 1622 mothers in the retrospective cohort who had an available CTC2 card, 12 had no documentation of any visit after ANC1 and were consequently excluded from this analysis, leaving 1610 women. Of these 1610 women, 739 (45.9%) had no ITTs throughout the follow-up period, 499 (31%) had one ITT, and 372 (23.1%) had more than one ITT during the follow-up period. The proportion of clients with ITTs was slightly higher in PEPFAR-supported facilities compared to non-PEPFAR supported facilities (54.3% versus 51.3%, respectively). ITTs also varied by region with Dodoma and Mbeya having higher proportions of clients with at least one ITT (63.3% and 60.7%, respectively) compared to Mwanza and Dar es Salaam (50.1% and 49.1%, respectively).

Table 9: Interruption to treatment among retrospective cohort members (N=1610), Tanzania PMTCT Cascade Assessment, 2023

Experiences of interruption to treatment (ITT)	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
Never	739 (45.9%)	664 (45.6%)	75 (48.7%)	276 (50.9%)	66 (38.8%)	184 (39.5%)	213 (49.5%)
Once	499 (31.0%)	454 (31.2%)	45 (29.2%)	176 (32.5%)	40 (23.5%)	150 (32.1%)	133 (30.9%)
More than once	372 (23.1%)	338 (23.1%)	34 (22.1%)	90 (16.6%)	64 (39.8%)	134 (28.6%)	84 (19.5%)

Data source: CTC2 Card

Key informants qualitatively reported that the distance to healthcare facilities and costs associated with transportation are among the main barriers for retaining pregnant women in treatment.

“Some mothers don't come on their clinic dates as scheduled due to financial hardship. Also, during the rainy season, when rivers overflow, they are unable to come. In such cases, we sometimes have to provide them with 60 days of drugs for their convenience. For those who are breastfeeding, we advise them to have their child's weight measured at the nearest center and then send us the information.” Healthcare provider

HIV VIRAL LOAD AND VIRAL SUPPRESSION AMONG PREGNANT AND BREASTFEEDING WOMEN

Among retrospective cohort members with an available CTC2 card, 1439 (88.7%) had documentation of at least one HIV viral load (HVL) test and corresponding test results during pregnancy and/or breastfeeding on their CTC2 card. The median number of HVL tests taken among women with at least one HVL test was three (Table 10).

Among women who had documentation of HVL results during pregnancy and/or breastfeeding, 1283 (90.7%) were virally suppressed at <1,000 copies/μL on all tests while 1075 (75.9%) had undetectable viral loads (<50 copies/μL) on all tests (Table 10). However, 101 (7.1%) women had at least one HVL result that was not suppressed (≥1,000

copies/μL) while 31 (2.2%) were unsuppressed on all of their HVL test results. When comparing PEPFAR supported and non-supported facilities as well as across regions, the starkest contrast was in HVL suppression at <50 copies/μL. A higher proportion of women had all HVL results suppressed at <50 copies/μL at PEPFAR-supported facilities compared to non-PEPFAR supported facilities (75.8% versus 66.9%, respectively). Mwanza and Dodoma had the highest levels of viral suppression at <50 copies/μL (87.8% and 77.3%, respectively).

Table 10: HIV viral load suppression among retrospective cohort members with documentation of at least one HVL test and corresponding result during pregnancy and/or breastfeeding, Tanzania PMTCT Cascade Assessment, 2023 [N=1415]

	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
Women for whom all HVL results were suppressed at <50 copies/μL	1075 (75.9%)	1008 (75.8%)	73 (66.9%)	361 (69.3%)	102 (77.3%)	293 (70.4%)	352 (87.8%)
Women for whom all HVL results were suppressed at <1000 copies/μL	1283 (90.7%)	1202 (90.4%)	93 (85.3%)	455 (87.3%)	119 (90.1%)	372 (89.4%)	349 (94.3%)
Women who had <u>at least one</u> HVL result that was <u>not suppressed</u> at ≥1000 copies/μL	101 (7.1%)	104 (7.8%)	13 (11.9%)	56 (10.7%)	8 (6.1%)	34 (8.2%)	19 (5.2%)
Women for whom <u>all</u> HVL results were <u>not suppressed</u> at ≥1000 copies/μL	31 (2.2%)	2 (1.8%)	3 (2.8%)	10 (2.0%)	5 (3.8%)	10 (2.4%)	2 (0.5%)

Data source: CTC2 card

DELIVERY

The majority of the 609 women who participated in the cross-sectional survey (n=583; 95.7%) reported delivering their baby at a health facility. Among those who delivered at a health facility, less than half (n=267; 45.8%) delivered at the same facility where they registered for ANC while 54.2% delivered at a different facility. Among women who delivered at a different facility from where they registered for ANC, the primary reasons for this decision were: wanting to deliver at a facility near their parents or in-laws (n=114; 36.1%), a perception that services at the chosen facility were better than where they attended ANC (n=81; 25.6%), and referral (n=65; 20.6%).

HEI SERVICES

In Tanzania, services provided to HIV-exposed infants are documented in two tools: the HEI card and the MC cohort register. The following analysis of HEI services was done with both data sources individually.

DOCUMENTATION OF HIV-EXPOSED INFANTS

Documentation of live births for retrospective cohort members was similar in the MC cohort register and HEI cards (Table 11).

Table 11: Documentation of live births in the mother-child cohort register and available HEI cards among members of retrospective cohort, Tanzania PMTCT Cascade Assessment, 2023 [N=2260]

	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
Live births documented in MC cohort register	1241	1127	114	438	117	401	285
HEI card available	1230	1130	100	437	120	376	297

ARV PROPHYLAXIS AT BIRTH

Of 1,230 infants with available HEI cards, 1,131 (92.0%) had documentation indicating they received ARV prophylaxis at birth, 17 (1.4%) had documentation stating they were not given ARV prophylaxis at birth, and 82 (6.7%) had no documentation either way. Documentation on the HEI card of infants receiving ARV prophylaxis at birth was higher at PEPFAR-supported facilities than non-PEPFAR supported facilities (93.6% versus 85.0%), with a higher proportion of non-PEPFAR supported facilities having no documentation of whether an infant did or did not receive ARVs at birth compared to PEPFAR-supported facilities (13.0% versus 6.1%, respectively). The highest proportion of HEI who had documentation of receiving ARV prophylaxis at birth was in Dar es Salaam (95.0%) and Mbeya (94.7%). Mwanza had the highest proportion of missing information (14.5%) (Table 12).

Of 1,241 infants with documentation of a live birth in the MC cohort register, similar proportions had documentation indicating they received ARV prophylaxis at birth (91.3%), documentation stating they were not given ARV prophylaxis at birth (2.3%), and missing documentation (6.4%) (Table 12). As seen with the HEI card, a higher proportion of HEI were missing documentation of receiving ARV prophylaxis in non-PEPFAR supported facilities (19.3%) compared to PEPFAR-supported facilities (5.1%). There were also notable differences between the number of HEI with documentation of not receiving ARVs at birth between the two data sources.

Table 12: Documentation of ARV prophylaxis at birth among HEI in the HEI card and the MC cohort register, retrospective cohort, Tanzania PMTCT Cascade Assessment, 2023

ARV prophylaxis at birth	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
HEI card [N=1230]							
Received ARVs	1131 (92.0%)	1046 (93.6%)	85 (85.0%)	415 (95.0%)	110 (91.7%)	356 (94.7%)	250 (84.2%)
Did not receive ARVs	17 (1.4%)	15 (1.3%)	2 (2.0%)	1 (0.2%)	6 (5.0%)	6 (1.6%)	4 (1.3%)
Not documented	82 (6.7%)	69 (6.1%)	13 (13.0%)	21 (4.8%)	4 (3.3%)	14 (3.7%)	43 (14.5%)
MC cohort register [N=1241]							

Received ARVs	1133 (91.3%)	1047 (92.9%)	86 (75.4%)	397 (90.6%)	105 (89.7%)	376 (93.8%)	255 (89.5%)
Did not receive ARVs	29 (2.3%)	23 (2.0%)	6 (5.3%)	12 (2.7%)	3 (2.6%)	8 (2.0%)	6 (2.1%)
Not documented	79 (6.4%)	57 (5.1%)	22 (19.3%)	29 (6.6%)	9 (7.7%)	17 (4.2%)	24 (8.4%)

Data source: HEI card and MC cohort register

Key informants qualitatively gave several reasons as to why some infants do not receive ARV prophylaxis at birth, including stockouts of Nevirapine or Combivir at the facility. One DDRCH-Co, in particular, reported that providers at the health facility face challenges in forecasting and ordering supplies in a timely manner which can lead to stock-outs. Another contributing factor was reported to be mothers who deliver at different facilities from where they enroll in PMTCT, especially when the mother does not disclose her HIV status to healthcare providers during delivery.

“..Some centers lack skills or timely forecasting on ordering high-risk infants’ ARV prophylaxis, resulting in the absence of drugs for high-risk infants....staff shortages and limited understanding of some healthcare providers.” DDRCH-Co

COTRIMOXAZOLE PROPHYLAXIS (CTX)

Overall documentation of receipt of cotrimoxazole prophylaxis (CTX) among HEI differed only slightly between the HEI card and the MC cohort register. Of the 1,230 infants with a HEI card, 1,147 (93.3%) had documentation that they received CTX prophylaxis. Of these, 967 (84.3%) initiated prophylaxis below the age of 2 months, as per Tanzanian guidelines (Table 13). Of the 1,241 infants documented in the MC cohort register, 1,156 (93.2%) had documentation that they received CTX prophylaxis with 1,098 (95.0%) initiated below the age of 2 months.

The completeness of documentation differed between PEPFAR-supported and non-PEPFAR supported facilities. In non-PEPFAR supported sites, 14.0% of HEI had no documentation of CTX initiation in the HEI card compared to only 4.2% of PEPFAR-supported sites. Similarly, in the MC cohort register, 21.1% of HEI at non-PEPFAR supported sites were missing documentation of CTX initiation compared to 5.4% at PEPFAR-supported sites.

There were also notable discrepancies between the two sources regarding the age at which HEI initiated CTX prophylaxis, with higher proportions documented as initiating CTX prophylaxis before two months of age in the MC cohort register (95.0%) than in the HEI card (84.3%).

Table 13: Documentation of CTX prophylaxis among HEI in the HEI card and the MC cohort register, retrospective cohort, Tanzania PMTCT Cascade Assessment, 2023

CTX prophylaxis at birth	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
HEI card [N=1230]							
Received CTX	1147 (93.3%)	1064 (94.2%)	83 (83.0%)	426 (97.5%)	114 (95.0%)	327 (87.0%)	280 (94.3%)

Did not receive CTX	22 (1.8%)	19 (1.7%)	3 (3.0%)	2 (0.5%)	0 (0%)	15 (4.0%)	5 (1.7%)
Not documented	61 (4.9%)	47 (4.2%)	14 (14.0%)	9 (2.1%)	6 (5.0%)	34 (9.0%)	12 (4.0%)
Age during CTX initiation							
<2 months	967 (84.3%)	897 (84.3%)	70 (84.3%)	389 (91.3%)	78 (68.4%)	279 (85.3%)	221 (78.9%)
2-12 months	174 (15.2%)	161 (15.1%)	13 (15.7%)	34 (8.0%)	36 (31.6%)	45 (13.8%)	59 (21.1%)
>12 months	6 (0.5%)	6 (0.6%)	0 (0%)	3 (0.7%)	0 (0%)	3 (0.9%)	0 (0%)
MC cohort register [N=1241]							
Received CTX	1156 (93.2%)	1066 (94.6%)	90 (78.9%)	419 (95.7%)	105 (89.7%)	378 (94.3%)	254 (89.1%)
Not documented	85 (6.8%)	61 (5.4%)	24 (21.1%)	19 (4.3%)	12 (10.3%)	23 (5.7%)	31 (10.9%)
Age during CTX initiation							
<2 months	1098 (95.0%)	1025 (96.1%)	73 (81.1%)	406 (96.9%)	93 (88.6%)	364 (96.3%)	235 (92.5%)
>2 months	58 (5.0%)	41 (3.9%)	17 (18.9%)	13 (3.1%)	12 (11.4%)	14 (3.7%)	19 (7.5%)

Key informants qualitatively reported that the prescription of cotrimoxazole prophylaxis is high. However, the dispensing of CTX is not straightforward as some mothers cannot afford to purchase the prescribed medicine.

“CTX has become a significant issue here; we have been out of cotrimoxazole (CTX) for a long time, almost two years now. We advise mothers to buy Septrine, but there's no way for us to confirm if they actually purchase it.” RCH In-charge

INFANT FEEDING PRACTICES AT BIRTH

Among 1,230 HEI with available HEI cards, 92.5% had documentation of exclusive breastfeeding at birth, in line with WHO recommendations. Fewer than 1% were reported to have received alternative feeding methods. Documentation of feeding practices was lacking for 6.7% of infants.

HEI ADHERENCE TO SCHEDULED VISITS

In this analysis, we identified the number of visits that infants were supposed to complete up to 18 months of age, when they would be eligible to have a final outcome. For those infants who did not reach 18 months of age during the analysis period, we computed the number of expected visits up to the date of data abstraction. The percentage of expected visits attended was calculated by dividing the number of visits documented in the HEI card by the total number of expected visits. Infants were considered to have attended all scheduled visits if the number of visits

documented in the HEI card matched the expected number of visits. Of note, four infants had their basic information documented at the top of the HEI card but lacked information in the visits section. These infants were assigned zero visits.

Overall, HEI attendance at expected clinic appointments was low. Among 1,230 HEI with available HEI cards only 134 (10.9%) attended all expected visits. Nearly three-quarters (74.3%) attended at least half of their required visits but not all (Table 14). Performance varied between PEPFAR-supported and non-PEPFAR supported facilities, with a higher proportion of HEI attending less than half of expected visits at non-PEPFAR supported sites compared to PEPFAR-supported sites (23.0% versus 13.7%, respectively). HEI attendance also varied by region, with one-quarter (25.0%) of HEI attending fewer than half of expected visits in Dodoma, the region with the highest proportion in this category.

Table 14: HEI attendance at scheduled clinic visits, retrospective cohort, Tanzania PMTCT Cascade Assessment, 2023

Percent of expected visits attended	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
0% of visits	4 (0.3%)	3 (0.3%)	1 (1.0%)	0 (0%)	2 (1.7%)	0 (0%)	2 (0.7%)
<50% of visits	178 (14.5%)	155 (13.7%)	23 (23.0%)	51 (11.7%)	30 (25.0%)	49 (13.0%)	48 (16.2%)
≥50% but <100% of visits	914 (74.3%)	847 (74.9%)	67 (67.0%)	318 (72.8%)	85 (70.8%)	281 (74.7%)	230 (77.4%)
All required visits (100%)	134 (10.9%)	125 (11.1%)	9 (9.0%)	68 (15.5%)	3 (2.5%)	46 (12.3%)	17 (5.7%)

Data source: HEI card

Key informants qualitatively reported that geographical distance to health facilities, fear of stigma, and limited resources, including lack of money for transportation and not having access to a phone to receive reminders about upcoming appointments, contribute to mothers not bringing their infants for scheduled visits. They also cited facilities not having phones to use to call mothers to remind them of appointments as a barrier. Notably, early HEI registration (an initiative to register all HEI within seven days of birth) and interventions involving peer support among mothers were cited as enhancing attendance and reducing the risk of children being lost to follow-up.

“.....Lack of resources to follow up the mothers and children for instance. Here we use our own phones, but we aren't even provided with mobile credit.....The lack of motivation needs to be addressed and motivation increased...” PMTCT in-charge

“..... Early HEI registration greatly helps in preventing children from being lost to follow-up. The Ministry should continue to improve services as currently we are in a really good place...” PMTCT in-charge

HIV TESTING AMONG HIV-EXPOSED INFANTS

HIV TESTING AT BIRTH AMONG HIGH-RISK INFANTS

HIV-exposed infants are classified as either high-risk or low-risk based on maternal risk stratification criteria which consider the timing a mother's HIV diagnosis in relation to her pregnancy, her HIV viral load, and her adherence to ART. Tanzanian guidelines recommend HIV testing at birth for infants classified as high-risk. We used data from the

CTC2 cards of women in the retrospective cohort to determine whether their infants should have been classified as high-risk or low-risk and compared that to the information documented on the infant's HEI card.

Among infants of retrospective cohort members who had an available HEI card, only 50 (4.1%) were documented as high-risk, while 865 (70.3%) were documented as low-risk and 315 (25.6%) had no documentation of risk classification. However, considering results from the mothers' HVL tests done during pregnancy and the timing of their HIV diagnosis, we determined that 436 (35.4%) infants met the criteria to be classified as high-risk. Among the 436 infants we identified as high-risk based on the mothers' records, only 6 (1.4%) had documentation of being tested for HIV at birth.

Table 15: Risk classification of HEI and DNA PCR among high-risk infants, Tanzania PMTCT Cascade Assessment, 2023

	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
Infant risk at birth as documented on HEI card							
High-risk	50 (4.1%)	47 (4.2%)	3 (3.0%)	8 (1.8%)	2 (1.7%)	20 (5.3%)	20 (6.7%)
Low-risk	865 (70.3%)	815 (72.1%)	50 (50.0%)	305 (69.8%)	21 (17.5%)	322 (85.6%)	217 (73.1%)
Blank	315 (25.6%)	268 (23.7%)	47 (47.0%)	124 (28.4%)	97 (80.8%)	34 (9.1%)	60 (20.2%)
Infant risk at birth as determined through analysis of mothers' record							
High-risk	436 (35.4%)	374 (33.1%)	62 (62.0%)	157 (35.9%)	60 (50.0%)	125 (33.2%)	94 (31.7%)
Low-risk	794 (64.6%)	756 (66.9%)	38 (38.0%)	280 (64.1%)	60 (50.0%)	251 (66.8%)	203 (68.3%)
DNA PCR among high-risk (determined through analysis) HEI							
At birth	6 (1.4%)	5 (1.3%)	1 (1.6%)	0 (0%)	0 (0%)	4 (3.2%)	2 (2.1%)
Not at birth / not documented	430 (98.6%)	369 (98.7%)	61 (98.4%)	157 (100%)	60 (100%)	121 (96.8%)	92 (97.9%)

Data source: CTC2 card / HEI card

Key informants qualitatively reported a challenge in providers distinguishing between high-risk and low risk infants primarily arising from inadequate documentation. Being unable to classify an infant as high or low risk means providers cannot identify which infants should be tested for HIV at birth.

"..... There are few facilities that have issues in HEI card documentation. Identifying these children in high or low-risk groups is a challenge, especially for those who are relocating from other areas. To address this, it is crucial to ensure there is effective communication between healthcare facilities. Sometimes, it's essential to inquire about their medical history and previous testing when they move to try to determine their risk. ..." **DDRCH-Co**

FIRST HIV TEST AMONG HIV-EXPOSEDS INFANTS

We analyzed documentation of HIV testing among HEI, both in the HEI card and the MC cohort register.

Among 1,230 infants of retrospective cohort members who had an available HEI card, the majority (97.1%) had documentation of at least one DNA PCR test for HIV. Only a small percentage (2.9%) had no documentation of an HIV test. Among those with at least one DNA PCR test, 973 (79.1%) had their first test before 2 months of age, as recommended by Tanzanian guidelines. The majority of the remaining infants (n=189; 15.4%) tested between 2-12 months while 32 (2.6%) tested after 12 months.

Of 1,241 infants with records in the MC cohort register, 1180 (95.1%) had at least one DNA PCR test for HIV, while 61 (4.9%) lacked documentation of being tested. Among those tested, 1030 (83.0%) were tested before 2 months of age, 56 (4.5%) were tested between 2-12 months, 7 (0.6%) were tested after 12 months, and 87 (7.0%) were tested but the age at which the testing was conducted was not documented.

There was a notable disparity in the proportion of infants tested before the age of two months between PEPFAR-supported facilities and non-PEPFAR-supported facilities in both data sources and performance varied across regions. Dodoma had the lowest proportion of HEI tested before 2 months of age, both in the HEI card (56.7%) and the MC cohort register (65.8%). The highest proportions of HEI tested before 2 months of age were in Dar es Salaam at 90.9% in the HEI card and 85.6% in the MC cohort register.

Table 16: Age at first HIV test among HEI, retrospective cohort, Tanzania PMTCT Cascade Assessment, 2023 [N=1241]

	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
HEI card							
<2 months	973 (79.1%)	908 (80.4%)	65 (65.0%)	397 (90.9%)	68 (56.7%)	309 (82.2%)	199 (67.0%)
2-12 months	189 (15.4%)	167 (14.8%)	22 (22%)	26 (5.9%)	44 (36.7%)	53 (14.1%)	66 (22.2%)
>12 months	32 (2.6%)	31 (2.7%)	1 (1%)	9 (2.1%)	3 (2.5%)	5 (1.3%)	15 (5.1%)
Blank	36 (2.9%)	24 (2.1%)	12 (12%)	5 (1.1%)	5 (4.1%)	9 (2.4%)	17 (5.7%)
MC cohort register							
<2 months	1030 (83.0%)	965 (85.6%)	65 (57.0%)	375 (85.6%)	77 (65.8%)	342 (85.3%)	236 (82.8%)
2-12 months	56 (4.5%)	51 (4.5%)	5 (4.4%)	10 (2.3%)	16 (13.6%)	17 (4.2%)	13 (4.6%)
>12 months	7 (0.6%)	5 (0.4%)	2 (1.7%)	3 (0.7%)	0 (0%)	2 (0.5%)	2 (0.7%)
No age documented	87 (7.0%)	64 (5.7%)	23 (20.2%)	35 (8.0%)	12 (10.3%)	27 (6.7%)	13 (4.5%)
Blank	61 (4.9%)	42 (3.7%)	19 (16.7%)	15 (3.4%)	12 (10.3%)	13 (3.2%)	21 (7.4%)

Data source: HEI card and MC cohort register

Key informants qualitatively reported that HEI are not tested due to test kit unavailability, limited capacity of providers to take the required samples, long distances to healthcare facilities for the mothers, mothers moving to new facilities, and transportation costs.

“We do not have enough staff to support DBS collection. Also, we do not understand most of the guidelines on DBS Collection. We were trained to collect DBS; however, we are not very knowledgeable on many issues. for example, I am hearing HEI Card and registers today for the first time. ...” PMTCT-in-charge,

“There is a shortage of providers who are capable of collecting DBS since it is taken at the heel. Most of our providers do not have the capacity to do that. As I said earlier there is a challenge with DBS kit availability and sometimes we fail to collect DBS due to kits not being available. Also, the TAT is so long.” PMTCT-in-charge

HEI FINAL HIV OUTCOMES

We analyzed final outcomes for HEI born to retrospective cohort members who reached at least 18 months of age during the analysis period, or who had stopped breastfeeding at least three months prior to analysis. Infants who tested HIV positive or passed away before reaching 18 months were also included as having a final outcome (Table 17).

Among 1,230 infants with HEI cards, 859 (69.8%) were expected to have a final outcome. Of these, nearly half (n=391; 45.5%) had no documentation of a final outcome, while 463 (37.6%) had an HIV-negative final outcome, 4 (0.5%) died, and 4 (0.5%) were confirmed HIV positive.

Of the 1,241 infants with information in the MC cohort register, 812 (65.4%) were expected to have a final outcome. Among these, 418 (51.5%) had no documentation of a final outcome, while 344 (42.4%) had an HIV-negative final outcome, 10 (1.2%) died, 24 (2.9%) transferred out, 11 (1.4%) were lost to follow-up, and 5 (0.6%) were confirmed HIV positive.

For both data sources, a higher proportion of HEI were missing documentation of a final outcome in non-PEPFAR supported facilities compared to PEPFAR-supported facilities (HEI card: 55.3% versus 44.6%, respectively; MC cohort register: 58.2% versus 50.8%, respectively).

Table 17: Final outcomes among HEI, retrospective cohort, Tanzania PMTCT Cascade Assessment, 2023

	Total	PEPFAR Supported	Non-PEPFAR Supported	Dar es Salaam	Dodoma	Mbeya	Mwanza
HEI card							
HIV-positive	4 (0.5%)	2 (0.3%)	2 (2.6%)	2 (0.7%)	1 (1.3%)	0 (0%)	1 (0.5%)
HIV-negative	460 (53.5%)	428 (54.7%)	32 (42.1%)	189 (62.6%)	33 (43.4%)	124 (43.8%)	114 (57.6%)
Died	4 (0.5%)	4 (0.5%)	0 (0%)	1 (0.3%)	0 (0%)	1 (0.4%)	2 (1.0%)
Blank	391 (45.5%)	349 (44.6%)	42 (55.3%)	110 (36.4%)	42 (55.3%)	158 (55.8%)	81 (40.9%)
MC cohort register							
HIV-positive	5 (0.6%)	4 (0.5%)	1 (1.3%)	0 (0%)	1 (1.5%)	2 (0.7%)	2 (1.1%)
HIV-negative	344 (42.1%)	315 (42.9%)	29 (36.7%)	108 (41.4%)	25 (37.3%)	127 (42.8%)	84 (44.9%)

Died	16 (2.0%)	14 (1.9%)	2 (2.5%)	3 (1.1%)	0 (0%)	8 (2.6%)	5 (2.7%)
Transferred out	24 (2.9%)	24 (3.3%)	0 (0%)	6 (2.3%)	2 (3%)	11 (3.6%)	5 (2.7%)
Lost to follow-up	11 (1.3%)	10 (1.4%)	1 (1.3%)	3 (1.1%)	3 (4.5%)	2 (0.7%)	3 (1.6%)
No final outcome documented	418 (51.1%)	372 (50.8%)	46 (58.2%)	143 (54.8%)	36 (53.7%)	151 (50.2%)	88 (47.0%)

Data source: HEI card and MC cohort register

Qualitative interviews revealed that poor documentation of final outcomes and lack of testing for final outcomes can be attributed to several factors including frequent relocation of mothers, excessive workloads for healthcare staff, disorganized record-keeping systems that hinder retrieval of records during a mothers' visit, the distance to healthcare facilities for women to travel, and the associated transportation costs.

"Challenges in documenting the HEI card and cohort, especially during the confirmatory test, due to file retrieval failures..." DDRCHCo

"Challenge of the confirmatory test at 18 months is due to mothers' mobility. Sometimes there's a shortage of DBS, and they opt to test a younger child rather than the confirmatory one ..." DDRCHCo

MATERNAL INTERRUPTIONS TO TREATMENT AND INFANT FINAL OUTCOMES

Although one of the objectives of this assessment was to compare final outcomes of infants whose mothers had an interruption to treatment against those whose mothers did not have an interruption to treatment, the number of HIV-positive infants was too small to allow for meaningful analysis of this question.

CONCLUSIONS

MATERNAL TESTING AND RETESTING

HIV testing for pregnant women at their first ANC visit was high. Nearly all women who were eligible for HIV testing during their first ANC visit were tested (95.0%). However, only two-thirds (65.2%) of those who were eligible were retested during the third trimester and even fewer (42.1%) were retested during the postpartum period. Positivity among pregnant and breastfeeding women was relatively low, at 1.8%, 0.3%, and 0.5% for those tested at ANC1, in their third trimester, and postpartum, respectively.

Healthcare workers qualitatively reported that heavy workloads, test kit stockouts, and lack of private spaces were barriers to offering maternal retesting, while relocation of women during pregnancy and distances from women's homes to health facilities were challenges that prevented clients from accessing this service. Relocation of women during pregnancy (at least from one facility to another) was supported by data from the cross-sectional survey, where 54.2% of respondents delivered at a different facility from where they registered for ANC.

CARE AND TREATMENT FOR HIV POSITIVE PREGNANT AND BREASTFEEDING WOMEN

Documentation of HIV-positive pregnant and breastfeeding women and their infants across data sources is a challenge. Among women in the retrospective cohort, 71.7% had a record in the MC cohort register and 71.8% had a CTC2 card at the same facility where they were registered for ANC. Among women with a CTC2 card, 75.6% had a corresponding HEI card for their infant.

In the retrospective cohort, 28.6% of women were newly diagnosed during their first ANC visit. Of these, 77.5% had a CTC2 card available at the same facility and, among these, 94.4% had documentation of initiating ART within seven days of diagnosis.

Analysis of the retrospective cohort revealed challenges with retaining pregnant and breastfeeding women on ART. Retention post-ANC1 decreased from 93.8% at three months to 66.7% at eighteen months. In addition, more than half of women in the retrospective cohort experienced an ITT during the follow-up period, with 31.0% having a single interruption and 23.1% having multiple interruptions.

The majority (88.7%) of women in the retrospective cohort had documentation of at least one HIV viral load (HVL) test result during pregnancy and/or breastfeeding, with a median of three tests. Among those with documented HVL results, 90.7% were virally suppressed at <1,000 copies/μL on all tests and 75.9% had undetectable viral loads at <50 copies/μL on all tests.

HEI SERVICES AND OUTCOMES

Among 1,230 infants followed in the retrospective cohort who had HEI cards, 92.0% had documentation indicating they received ARV prophylaxis at birth (93.6% at PEPFAR-supported facilities versus 85.0% at non-PEPFAR facilities) and 92.5% were exclusively breastfed at birth. In the MC cohort register, which tracked 1,241 live births, a similar proportion (91.3%) had documentation of receiving ARV prophylaxis (92.9% at PEPFAR-supported facilities versus 75.4% at non-PEPFAR ones).

Of the 1,230 infants with a HEI card, 1,147 (93.3%) had documentation that they received CTX prophylaxis. Of these, 967 (84.3%) initiated prophylaxis below the age of 2 months, as per Tanzanian guidelines. Of the 1,241 infants in the MC cohort register, 1,156 (93.2%) had documentation of CTX prophylaxis with 1,098 (95.0%) initiated below the age of 2 months.

HEI attendance at scheduled clinic appointments was notably low, with only 10.9% of HEI attending all expected clinic visits. The majority (74.3%) attended at least half of their required appointments but not all.

Correctly classifying HEI as high versus low risk was a challenge. Among infants followed in the retrospective cohort who had HEI cards, 4.1% were documented as high-risk, 70.3% as low-risk, and 25.6% lacked risk classification. However, when determining their risk status based on the mother's HIV status and HVL test results, 35.4% met the criteria for high-risk. In addition, only 1.4% of identified high-risk infants had documentation of an HIV test at birth as recommended by national guidelines.

Although we observed challenges with testing of high-risk HEI at birth, most HEI (97.1%) had documentation of at least one DNA PCR test for HIV in their HEI card, and 79.1% had their first test before 2 months. Documentation was slightly poorer in the MC cohort register with 95.1% of HEI having a documented test and 83.0% testing before 2 months.

Documentation of HEI final outcomes was poor. Among those who were expected to have a final outcome in their HEI card, 45.5% of infants had no final outcome. In the MC cohort register, the proportion of infants with no final outcome was 51.5%. And documentation of individual final outcomes was inconsistent between the two data sources with the number of HIV-positive HEI differing between the HEI card and MC cohort register in three of the four regions included in the assessment.

Although one of the objectives of this assessment was to compare final outcomes of infants whose mothers had an interruption to treatment against those whose mothers did not have an interruption to treatment, the number of HIV-positive infants was too small to allow for meaningful analysis of this question. Further research and/or analysis of larger datasets will be required to understand this question.

Key informants cited similar factors as contributing to most of the challenges observed in providing care and treatment to HIV-positive pregnant and breastfeeding women. On the part of clients, they cited mothers relocating during pregnancy and/or breastfeeding, and the distance and transportation costs as barriers that prevent women from accessing services and bringing their infants for clinic visits. On the part of the facility and healthcare workers, key informants cited stock-outs of medications and test kits, excessive staff workloads, and gaps in provider capacity as contributing to services not being provided or well documented.

APPENDICES

Appendix A: Acronyms

Appendix B: PMTCT cascade assessment questions

Appendix C: Key informant data tables

Appendix D: National recording and reporting tool availability data table

Appendix E: Sociodemographic data tables, cross-sectional survey

Appendix F: ANC services received by retrospective cohort members data table

APPENDIX A: ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Clinic
ART	Antiretroviral Therapy
ARV	Antiretroviral
CDC	Centers for Disease Control and Prevention
CTC	Care and Treatment Clinic
CTX	Cotrimoxazole
DBS	Dried Blood Spot
DDH	Designated District Hospital
DHIS	District Health Information Software
DOD	Department of Defense
EID	Early Infant Diagnosis
FO	Final Outcome
HEI	HIV-Exposed Infant
HIV	Human Immunodeficiency Virus
HTS	HIV Testing Services
HVL	HIV Viral Load
IQR	Inter-quartile Range
ITT	Interruption to Treatment
KI	Key Informant
KII	Key Informant Interview
MC	Mother-Child
MoH	Ministry of Health
MTCT	Mother-to-child Transmission
NASHCoP	National AIDS, STI, Hepatitis Control Program
ODK	Open Data Kit
PCR	Polymerase Chain Reaction
PEPFAR	US President's Emergency Plan for AIDS Relief
PMTCT	Prevention of Mother-to-Child Transmission
RCH	Reproductive and Child Health
STI	Sexually Transmitted Infections

TO	Transfer Out
TI	Transfer In
USAID	United States Agency for International Development
UCSF	University of California, San Francisco

APPENDIX B: PMTCT CASCADE ASSESSMENT QUESTIONS

The full list of questions that this assessment aimed to address, the data sources, and the data collection methods used to answer each question are displayed in the below table.

Question	Data source	Data collection methods
1. What proportion of pregnant women are screened for HIV during pregnancy, at delivery, and after delivery as per national guidelines?	- Retrospective cohort - Cross-Sectional	- Data abstraction from ANC and delivery registers - Cross-sectional quantitative interviews
2. What proportion of newly identified HIV-positive pregnant women are linked and adherent to ART services?	Retrospective cohort	Data abstraction and triangulation from ANC register, CTC2 cards, and CTC2 DB
3. What is the extent of attrition and interruptions in treatment along each point in the PMTCT cascade?	Retrospective cohort	Data abstraction and triangulation from ANC register, MC cohort register, CTC2 cards, and CTC2 DB
4. What are the potential risk factors, including demographic characteristics, and programmatic gaps that contribute to attrition and interruptions in treatment (ITT) along the PMTCT cascade?	Retrospective cohort	Data abstraction and triangulation from ANC register, MC cohort register, CTC2 cards, and CTC2 DB
5. To what extent do HIV positive pregnant women who experience ITTs return to care and treatment services and what are the implications for their HIV-exposed infants?	Retrospective cohort	Data abstraction and triangulation from ANC register, MC cohort register, CTC2 cards, and CTC2 DB
6. How complete are infant HIV outcomes resulting from PMTCT services across data sources?	Retrospective cohort	Data abstraction and triangulation from ANC register, MC cohort register, CTC2 cards, and CTC2 DB

7. What are the differences in final outcomes for HEI whose mothers experience ITT and return to treatment versus those whose mothers experience ITT and do not return to treatment?	• Retrospective cohort	• Data abstraction and triangulation from ANC register, MC cohort register, CTC2 cards, and CTC2 DB
8. What are the individual and facility-level factors that contribute to women with a negative first test at ANC not being re-tested for HIV?	• Cross-sectional • Qualitative KIIs	• Cross-sectional quantitative interviews KIIs with facility staff
9. What are the challenges to identify and document infants who are exposed to HIV during seroconversion by breastfeeding mothers?	• Cross-sectional • Qualitative KIIs	• Cross-sectional quantitative interviews KIIs with facility staff
10. To what extent have data quality and data visualization activities made program evaluation easier or harder?	• Qualitative KIIs	• KIIs with facility staff and IP staff
11. What proportion of pregnant and breastfeeding women have valid HVL results documented at all time points throughout the pregnancy and breastfeeding periods as per national guidelines?	• Retrospective cohort	• Data abstraction and triangulation from ANC register, MC cohort register, CTC2 cards, and CTC2 DB
12. What proportion of pregnant and breastfeeding women maintain HIV viral suppression throughout pregnancy and breastfeeding?	• Retrospective cohort	• Data abstraction and triangulation from ANC register, MC cohort register, CTC2 cards, and CTC2 DB
13. What proportion of HIV-exposed infants receive prevention, care, HIV EID test, and treatment services as per national guidelines, including for both low-risk and high-risk infants?	• Retrospective cohort	• Data abstraction and triangulation from ANC register, MC cohort register, CTC2 cards, and CTC2 DB

APPENDIX C: KEY INFORMANT DATA TABLES

Table 18 shows the key informants that were interviewed during this assessment, by region as well as by level of their position (i.e., above site versus facility level).

Table 18: Key informants by region, disaggregated by staff level and, for facility staff, PEPFAR-support, Tanzania PMTCT Cascade Assessment, 2023

	Dar es Salaam	Dodoma	Mbeya	Mwanza	Total
Above-site staff (RRCH-Co, DRCH-Co, IP staff)	4	6	4	3	17
PEPFAR supported facilities	7	3	10	10	30
Non-PEPFAR supported facilities	1	2	5	5	13
TOTAL	12	11	19	18	60

Table 19 shows the breakdown of key informants by position. For KIs coming from the facility, the table shows the breakdown of PEPFAR versus non-PEPFAR supported facilities.

Table 19: Key informants by position and, for facility staff, disaggregated by PEPFAR-support, Tanzania PMTCT Cascade Assessment, 2023

	RRCH-Co	DRCH-Co	IP	RCH provider	Total
Above-site staff (RRCH-Co, DRCH-Co, IP staff)	3	12	2		17
PEPFAR supported facilities				30	30
Non-PEPFAR supported facilities				13	13
TOTAL	3	12	2	43	60

APPENDIX D: NATIONAL RECORDING AND REPORTING TOOL AVAILABILITY DATA TABLE

The following table presents findings related to the availability of national ANC and PMTCT recording and reporting tools at facilities included in the assessment. This information was collected as part of the Facility Assessment.

Table 20: Availability of ANC/PMTCT recording and reporting tools

	Total	PEPFAR Supported	Non-PEPFAR Supported
ANC register			
Most recent version available	57 (95.0%)	38 (92.7%)	19 (100%)
Older version available	3 (5.0%)	3 (7.3%)	0 (0%)
ANC reporting form			
Most recent version available	56 (93.3%)	38 (92.7%)	18 (94.7%)
Older version available	4 (6.7%)	3 (7.3%)	1 (5.3%)
Labor and delivery register (MTUHA 12)			
Most recent version available	51 (85.0%)	34 (82.9%)	17 (89.5%)
Older version available	3 (5.0%)	3 (7.3%)	0 (0%)
Tool not available	6 (10.0%)	4 (9.8%)	2 (10.5%)
Labor and delivery reporting form			
Most recent version available	51 (85.0%)	34 (82.9%)	17 (89.5%)
Older version available	3 (5.0%)	3 (7.3%)	0 (0%)
Tool not available	6 (10.0%)	4 (9.8%)	2 (10.5%)
Mother-child cohort register			
Most recent version available	59 (98.3%)	40 (97.6%)	19 (100%)
Older version available	1 (1.7%)	1 (2.4%)	0 (0%)
Mother-child cohort reporting form			
Most recent version available	59 (98.3%)	40 (97.6%)	19 (100%)
Older version available	1 (1.7%)	1 (2.4%)	0 (0%)
HEI card			
Most recent version available	56 (93.3%)	39 (95.1%)	17 (89.4%)
Older version available	1 (1.7%)	0 (0%)	1 (5.3%)
Tool not available	3 (5.0%)	2 (4.9%)	1 (5.3%)
CTC2 card			
Most recent version available	58 (96.6%)	41 (100%)	17 (89.4%)
Older version available	1 (1.7%)	0 (0%)	1 (5.3%)
Tool not available	1 (1.7%)	0 (0%)	1 (5.3%)
Facility HEID register			
Most recent version available	47 (78.3%)	34 (82.9%)	13 (68.4%)
Older version available	0 (0%)	0 (0%)	0 (0%)
Tool not available	13 (21.7%)	7 (17.1%)	6 (31.6%)

HTS register			
Most recent version available	58 (96.6%)	40 (97.6%)	18 (94.7%)
Older version available	1 (1.7%)	1 (2.4%)	0 (0%)
Tool not available	1 (1.7%)	0 (0%)	1 (5.3%)

Data source: Facility assessment

APPENDIX E: SOCIODEMOGRAPHIC DATA TABLES, CROSS-SECTIONAL SURVEY

Table 21: Sociodemographic characteristics of participants in cross-sectional survey, Tanzania PMTCT Cascade Assessment, 2023

	Total [N=609]	PEPFAR Supported [N=420]	Non-PEPFAR Supported [N=189]	Dar es Salaam [N=158]	Dodoma [N=152]	Mbeya [N=149]	Mwanza [N=150]
Age group (in years)							
15-19	42 (6.9%)	20 (4.8%)	22 (11.6%)	3 (1.9%)	22 (14.5%)	8 (5.4%)	9 (6.0%)
20-24	179 (29.4%)	119 (28.3%)	60 (31.8%)	48 (30.4%)	46 (30.3%)	38 (25.5%)	47 (31.3%)
25-29	162 (26.6%)	111 (26.4%)	51 (27.0%)	48 (30.4%)	30 (19.7%)	40 (26.8%)	44 (29.3%)
30-34	136 (22.3%)	104 (24.8%)	32 (16.9%)	36 (22.8%)	31 (20.4%)	32 (21.5%)	37 (24.7%)
35+	90 (14.8%)	66 (15.7%)	24 (12.7%)	23 (14.5%)	23 (15.1%)	31 (20.8%)	13 (8.7%)
Highest level of education							
No formal education	42 (6.9%)	20 (4.8%)	22 (11.6%)	2 (1.3%)	18 (11.8%)	13 (8.7%)	9 (6.0%)
Did not complete primary	38 (6.2%)	20 (4.8%)	18 (9.5%)	6 (3.8%)	16 (10.5%)	7 (4.7%)	9 (6.0%)
Completed primary	266 (43.7%)	174 (41.4%)	92 (48.7%)	65 (41.1%)	67 (44.1%)	61 (41.0%)	73 (48.6%)
Did not complete secondary	75 (12.3%)	54 (12.8%)	21 (11.1%)	25 (15.8%)	10 (6.6%)	21 (14.1%)	19 (12.7%)
Completed secondary	145 (23.8%)	119 (28.3%)	26 (13.8%)	43 (27.2%)	26 (17.1%)	37 (24.8%)	39 (26.0%)
Higher than secondary	43 (7.1%)	33 (7.9%)	10 (5.3%)	17 (10.8%)	15 (9.9%)	10 (6.7%)	1 (0.7%)
Occupation							
Farmer	145 (23.8%)	81 (19.3%)	64 (33.8%)	0 (0%)	56 (36.8%)	52 (35.0%)	37 (24.7%)
Housewife	176 (28.9%)	128 (30.5%)	48 (25.4%)	71 (44.9%)	39 (25.7%)	25 (16.8%)	41 (27.3%)
Petty trading	159 (26.1%)	109 (25.9%)	50 (26.5%)	48 (30.4%)	32 (21.1%)	38 (25.5%)	41 (27.3%)
Private business	49 (8.0%)	37 (8.8%)	12 (6.4%)	15 (9.5%)	5 (3.3%)	16 (10.7%)	13 (8.7%)
Self-employed	34 (5.6%)	26 (6.2%)	8 (4.2%)	16 (10.1%)	3 (1.9%)	10 (6.7%)	5 (3.3%)
Employed in formal sector	31 (5.1%)	26 (6.2%)	5 (2.6%)	6 (3.8%)	12 (8.0%)	6 (4.0%)	7 (4.7%)
Unemployed	12 (2.0%)	10 (2.4%)	2 (1.1%)	2 (1.3%)	2 (1.3%)	2 (1.3%)	6 (4.0%)
Other	3 (0.5%)	3 (0.7%)	0 (0%)	0 (0%)	3 (1.9%)	0 (0%)	0 (0%)

Data source: Cross-sectional survey, self-report

APPENDIX F: ANC SERVICES RECEIVED BY RETROSPECTIVE COHORT MEMBERS DATA TABLE

Table 22: Summary of ANC services received by women in the retrospective cohort, Tanzania PMTCT Cascade Assessment, 2023

	Total [N=2260]	PEPFAR Supported [N=1971]	Non- PEPFAR Supported [N=289]	Dar es Salaam [N=755]	Dodoma [N=260]	Mbeya [N=623]	Mwanza [N=622]
Gestational age at first ANC visit							
<13 weeks	802 (35.5%)	701 (35.6%)	101 (35.0%)	284 (37.6%)	66 (25.4%)	264 (42.4%)	188 (30.2%)
13-27 weeks	1321 (58.4%)	1153 (58.5%)	168 (58.1%)	433 (57.4%)	173 (66.5%)	337 (54.1%)	378 (60.8%)
28+ weeks	137 (6.1%)	117 (5.9%)	20 (6.9%)	38 (5.0%)	21 (8.1%)	22 (3.5%)	56 (9.0%)
Number of ANC visits							
1-3	1251 (55.3%)	1053 (53.4%)	198 (68.5%)	399 (52.9%)	220 (64.6%)	384 (61.6%)	248 (39.9%)
4+	1008 (44.6%)	917 (46.5%)	91 (31.5%)	356 (47.1%)	39 (15.0%)	239 (38.4%)	374 (60.1%)
Blank	1 (0.1%)	1 (0.1%)	0 (0%)	0 (0%)	1 (0.4%)	0 (0%)	0 (0%)
ANC service completion							
Received counseling on infant feeding							
Yes	934 (41.3%)	800 (40.6%)	134 (46.4%)	309 (41.0%)	78 (30.0%)	341 (54.7%)	206 (33.1%)
No	76 (3.4%)	73 (3.7%)	3 (1.0%)	4 (0.5%)	17 (6.5%)	12 (2.0%)	43 (6.9%)
Blank	1250 (55.3%)	1098 (55.7%)	152 (52.6%)	442 (58.5%)	165 (64.5%)	270 (43.3%)	373 (60.0%)
Had documented mRDT or BS outcome							
	1947 (86.2%)	1689 (85.7%)	258 (88.3%)	611 (80.9%)	198 (76.2%)	580 (93.1%)	558 (89.7%)
Received LLIN							
Yes	1836 (81.2%)	1608 (81.6%)	228 (78.9%)	595 (78.8%)	195 (75.0%)	484 (77.7%)	562 (90.4%)
No	97 (4.3%)	93 (4.7%)	4 (1.4%)	49 (6.5%)	31 (11.9%)	12 (1.9%)	5 (0.8%)
Blank	327 (14.5%)	270 (13.7%)	57 (19.7%)	111 (14.7%)	34 (13.1%)	127 (20.4%)	55 (8.8%)
Number of IPT doses documented							
None	1342 (59.4%)	1208 (61.3%)	134 (46.4%)	486 (64.4%)	146 (56.1%)	344 (55.2%)	366 (59.0%)
One	357 (15.8%)	290 (14.7%)	67 (23.2%)	123 (16.3%)	71 (27.3%)	98 (15.7%)	65 (10.4%)
Two or more	561 (24.8%)	473 (24.0%)	88 (30.4%)	146 (19.3%)	43 (16.6%)	181 (29.1%)	191 (30.6%)

Data source: ANC6 register