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TECHNICAL REPORT

Operationalizing the WHO 2010 Guidelines on the Prevention of Mother-to-Child Transmission (PMTCT) of HIV and Infant Feeding in Three Health Care Facilities in Tanzania

MAY 2014

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DISCLAIMER

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TABLE OF CONTENTS

List of Tables and Figures	i
Abbreviations.....	ii
EXECUTIVE SUMMARY	iii
I. INTRODUCTION.....	1
II. BASELINE ASSESSMENT.....	2
A. Methods	2
B. Results.....	3
III. DEVELOPMENT OF THE PROTOTYPE TO APPLY THE 2010 GUIDELINES.....	6
A. Design.....	6
B. Capacity Building.....	7
C. Data Collection.....	7
D. Changes Tested to Facilitate Implementation of the 2010 Guidelines.....	8
IV. RESULTS.....	10
A. ANC Booking.....	10
B. Assessing ART Eligibility.....	10
C. Antiretroviral Prophylaxis Initiation.....	11
D. PMTCT Services in the Postnatal Period.....	11
E. PMTCT Child Follow-up Services	12
F. Medicines, Reagents, and Storage.....	13
V. DISCUSSION	13
A. Persistent Challenges during Implementation of the 2010 Guidelines	13
B. Challenges and Recommendations at the National Level.....	14
C. Challenges and Recommendations at the Regional and District Levels.....	15
D. Challenges and Recommendations at the Facility Level.....	16
E. Challenges and Recommendations at the Community Level.....	17
VI. CONCLUSIONS.....	18
APPENDIX: SUMMARY OF DIFFERENCES BETWEEN THE 2006 AND 2010 PMTCT AND INFANT FEEDING GUIDELINES.....	19

List of Tables and Figures

Table 1: Summary of challenges encountered in implementing the WHO 2010 PMTCT guidelines in three facilities in Njombe Town Council.....	4
Table 2: Summary of changes tested by the prototype facilities	8
Table 3: Persistent challenges during implementation of the 2010 WHO Guidelines	13
Figure 1: Number of pregnant women booking for ANC by gestational age, three facilities in Njombe, Tanzania (Aug. 2011-March 2012).....	10
Figure 2: Percentage of HIV-positive pregnant women attending ANC this month who were ever assessed for ART eligibility by CD4 test, Njombe, Tanzania (Aug. 2011-March 2012)	11

Figure 3: Percentage of HIV-positive pregnant women initiating ARV prophylaxis by gestational age, three facilities in Njombe, Tanzania (Aug. 2011-March 2012)..... 12

Figure 4: Percentage of HIV-exposed infants who received ARVs soon after birth and those discharged with NVP syrup, three facilities in Njombe, Tanzania (Aug. 2011- March 2012)..... 12

Abbreviations

AMO	Assistant Medical Officer
ANC	Antenatal care
ART	Antiretroviral therapy
ARV	Antiretroviral
AZT	Zidovudine
CD4	Human T helper cells expressing CD4 antigen (T helper cell)
CHMT	Council health management team
CTC	HIV care and treatment center
CTX	Co-trimoxazole
DRCHCO	District Reproductive and Child Health Coordinators
EID	Early infant diagnosis
EP	Expert patient
FANC	Focused antenatal care
FP	Family planning
HBC	Home based care
HCI	USAID Health Care Improvement Project
HIV	Human immunodeficiency virus
HMIS	Health management information system
HMT	Health management team
HTC	HIV testing and counseling
IF	Infant feeding
IFC	Infant feeding counseling
M&E	Monitoring and evaluation
MO	Medical Officer
MOHSW	Ministry of Health and Social Welfare
MSD	Medical stores department
MTCT	Mother-to-child transmission
NVP	Nevirapine
OI	Opportunistic infections
PCR	Polymerase chain reaction
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PMTCT	Prevention of mother-to-child transmission of HIV
QI	Quality improvement
RCH	Reproductive and child health
RHMT	Regional health management team
RMO	Regional Medical Officer
SD	Standard Diagnostics
sd-NVP	Single dose-Nevirapine
TB	Tuberculosis
TFNC	Tanzania Food and Nutrition Centre
URC	University Research Co., LLC
USAID	United States Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

In July 2010, the World Health Organization (WHO) released new guidelines on the prevention of mother-to-child transmission (PMTCT) of HIV and infant feeding practices. The new guidelines seek to enhance the effectiveness of PMTCT by optimizing anti-retroviral (ARV) usage and infant feeding practices based on the latest scientific evidence on maximizing HIV-free survival. In August 2011, to align with the new guidance, the Ministry of Health and Social Welfare (MOHSW) in Tanzania adopted and revised their national PMTCT and infant feeding guidelines to reflect the 2010 WHO guidelines.

Successful large-scale implementation of the 2010 guidelines requires adaptation of existing services delivery systems to the updated guidelines. Between July 2011 and March 2012, the USAID Health Care Improvement Project (HCI) supported three health care facilities and the Njombe Town Council Health Management Team in Tanzania to transition to the 2010 guidelines and develop a prototype of how the 2010 guidelines could be successfully operationalized in one district of Tanzania. The goal of the activity was to generate lessons and recommendations that could be used to guide successful scale-up of the updated PMTCT and infant feeding guidelines in other settings.

Prior to testing out the implementation of the guidelines, HCI conducted a baseline assessment in the same three facilities through retrospective data analysis of PMTCT services delivery and interviews with health care workers. The challenges identified in the baseline assessment helped inform the work of facility and council-based improvement teams that sought to identify and address operational challenges and system constraints to implementing the guidelines.

This report presents findings from the baseline assessment and describes the changes in systems and processes of PMTCT care and infant feeding practices and PMTCT program performance following the intervention.

Data collected during implementation of improvement activities from August 2011-March 2012 revealed that late antenatal care (ANC) booking, a low percentage of pregnant women starting ARVs early, stock-outs of Co-trimoxazole syrup and CD4 reagent challenged adherence to the 2010 guidelines, especially due to increased demand for services from surrounding facilities. However, over the intervention period, there was a slight increase in early ANC booking (i.e., pregnant women presenting at less than 14 weeks gestation for ANC) from 12% in August 2011 to 17% in March 2012. In addition, the intervention produced an increase in the percentage of HIV-infected women starting ARV prophylaxis at 14 weeks and at 15-20 weeks from 0% in August 2011 to 22% in March 2012. CD4 testing of HIV-positive pregnant women also increased from 44% to 89% during the same time period.

Results from this prototype demonstrate that implementation of Option A of the WHO 2010 PMTCT and infant feeding guidelines is feasible, but requires support from all levels of the health system for successful implementation. Facility staff demonstrated that they can monitor their monthly data to identify operational challenges and come up with local solutions to improve care. Supply chain management should involve Council Health Management Teams (CHMTs), district level pharmacists, as well as facility staff to ensure that supplies are properly forecasted. In cases where overstocking occurs, CHMTs can support the transfer of supplies to facilities experiencing stock-outs.

At the national level, reporting documents and registers need to be updated to reflect new guidelines, which should aid in improving documentation at the facility level. Updated guidelines, job aids and reporting documents should also be made available in all facilities prior to implementation. CHMTs can provide on-the-training support at their facilities during supportive supervision visits to ensure that all providers are aware of the updates.

While this intervention examined operational challenges and solutions to implementing Option A of the 2010 WHO PMTCT and infant feeding guidelines, its findings are also applicable to Option B and B+. Many other countries, including Tanzania, are now transitioning to PMTCT Option B+. Specifically, it is recommended that countries beginning Option B+ implementation should:

At the National Level:

- Allocate funding for implementing and improving PMTCT services
- Adapt record systems to enable follow-up of pregnant women and their exposed infants across the PMTCT continuum of care

At the Regional and District Levels:

- Improve coordination among all players at the regional and district levels
- Capacitate CHMTs on quality improvement approaches, and strengthen their coaching and mentoring skills
- Strengthen supply chain management and coordination efforts with the Medical Supply Department
- Provide orientation on the new guidelines to all service providers and reinforce new knowledge through on-the-job mentoring and supportive supervision

At the Facility Level:

- Ensure that adequate storage space is available to manage the increased quantity of ARVs required to provide treatment to all HIV-positive pregnant and lactating women
- Build the capacity of facility staff to monitor their own program performance and make changes in their own care processes to adhere to the guidelines

At the Community Level:

- Take steps to increase early booking of pregnant women in ANC through health education at health facilities and strategic community-level promotion on the importance of early booking for ANC

I. INTRODUCTION

In July 2010, the World Health Organization (WHO) released new guidelines on the prevention of mother-to-child transmission (PMTCT) of HIV¹ and infant feeding (IF) practices.² The new guidelines seek to enhance the effectiveness of PMTCT by optimizing anti-retroviral (ARV) usage and infant feeding practices based on the latest scientific evidence on maximizing HIV-free survival. Widespread and effective implementation of the 2010 WHO guidelines is expected to dramatically improve health outcomes for HIV-positive mothers and their infants, bringing developing countries a step closer to eliminating pediatric HIV/AIDS.

Tanzania is one of the 25 low- and middle-income countries with the largest number of pregnant women living with HIV.³ While the national HIV prevalence is 5.1%,⁴ prevalence varies greatly by region. In 2007, Tanzania launched a national-level PMTCT program, based on the 2006 WHO guidelines. From January to December 2009, 78% of 4,647 health facilities providing reproductive and child health (RCH) services were offering PMTCT services. Regional variations were attributable to financial and human resource constraints. Uptake of ARVs by HIV positive pregnant women was 68% and about 50% of exposed infants received ARV prophylaxis.⁵

In June 2011, Tanzania's Ministry of Health and Social Welfare (MOHSW) adopted Option A of the 2010 WHO PMTCT and Infant Feeding Guidelines. In August 2011, country-wide phasing out of the 2006 WHO PMTCT guidelines and introduction of the 2010 guidelines began.

Successful large-scale implementation of the 2010 guidelines requires adaptation of existing service delivery systems to the updated guidelines. The release of the 2010 guidelines marks the first time ARV prophylaxis is being recommended during the postpartum period through one year of breastfeeding to a child born to an HIV-positive woman on ARV prophylaxis.⁶ HIV-positive women are recommended to exclusively breastfeed for the first six months of life and thereafter continue with complementary feeding and wean the baby at one year of age. This differs from the 2006 guidelines, which advised HIV-positive mothers to breastfeed exclusively for only six months. Under the 2010 guidelines, during the breastfeeding period, HIV-exposed children whose mothers were on ARV prophylaxis during pregnancy are put on daily Nevirapine (NVP) syrup until one week after weaning. The aim was to reduce the risk of HIV transmission during the breastfeeding period. Under the 2006 guidelines, HIV-exposed infants were expected to receive ARV prophylaxis for a maximum of four weeks. The Appendix summarizes the key differences between the 2006 and 2010 guidelines as they were applied in Tanzania.

The differences between the 2006 and 2010 guidelines created the potential for providers and facility staff to encounter operational challenges that may affect the effectiveness of PMTCT programs. As

¹ WHO. 2010. Antiretroviral Drugs for Treating Pregnant Women and Preventing HIV Infection in Infants: Recommendations for a public health approach. 2010 Version. Accessed on 21 Sept 2012. Available at: http://whqlibdoc.who.int/publications/2010/9789241599818_eng.pdf.

² WHO. 2010. Guidelines on HIV and infant feeding. Principles and recommendations for infant feeding in the context of HIV and a summary of evidence. Accessed on 27 Sept 2012. Available at: http://whqlibdoc.who.int/publications/2010/9789241599535_eng.pdf.

³ UNAIDS. Global Report: UNAIDS report of the global AIDS epidemic. 2010. Accessed on 24 Sept 2012. Available at: http://www.unaids.org/documents/20101123_globalreport_em.pdf.

⁴ Tanzania Commission for AIDS (TACAIDS). Tanzania HIV/AIDS and Malaria Indicator Survey 2011-2012. 2013. Accessed on 13 Nov. 2013. Available at: <http://www.measuredhs.com/pubs/pdf/AISI1/AISI1.pdf>

⁵ The United Republic of Tanzania: UNGASS 2010 Progress Reporting Tanzania Mainland. 2010. Accessed on 21 Sept 2012. Available at: http://data.unaids.org/pub/Report/2010/tanzania_2010_country_progress_report_en.pdf.

⁶ WHO. 2010. Antiretroviral Drugs for Treating Pregnant Women and Preventing HIV Infection in Infants: Recommendations for a public health approach. 2010 Version. Accessed on 21 Sept 2012. Available at: http://whqlibdoc.who.int/publications/2010/9789241599818_eng.pdf.

Tanzania began to adopt and scale up services based on the 2010 guidelines, there was a need to study the implementation of the guidelines in order to develop solutions for the challenges that the new guidelines pose for PMTCT programs.

Between July 2011 and March 2012, the USAID Health Care Improvement Project (HCI) collaborated with the Regional Health Management Team of Njombe Region and the Njombe Town Council Health Management Team to develop a prototype for implementing the 2010 WHO guidelines. Njombe was selected by the MOHSW for the intervention because the region has the highest HIV prevalence rate in Tanzania (15%).⁷ Three health facilities representing a “slice” of the local health system in Njombe Town Council were selected through purposive sampling: one district hospital, one health center, and one dispensary. The goal of the intervention was to identify system requirements, common challenges, and solutions that would enable the 2010 guidelines to be fully implemented at the different levels of care.

Prior to testing out the implementation of the guidelines in the sample facilities, HCI conducted a baseline assessment in the same three facilities where six months of data (January to July 2011) were collected retrospectively in order to gain an in-depth understanding of PMTCT service delivery in the context of transitioning from the 2006 to the 2010 guidelines. As part of the improvement intervention, Council and facility staff were oriented to the 2010 guidelines and to quality improvement methods to enable them to identify and address operational setbacks and other transitional challenges in their implementation. Through the intervention, HCI sought to identify changes that could be made in local care processes, recording and inventory systems, and district management that could be shared with other districts and facilities to enable effective implementation of the guidelines at a larger scale.

This report provides details and results of the baseline assessment, implementation, and in-depth follow-up through documentation of progress in systems and processes of care before and after introducing the new guidelines. At the time of writing this report, Tanzania has fully operationalized Option A⁸ of 2010 World Health Organization PMTCT Infant Feeding Guidelines and is now transitioning to Option B+.⁹ Lessons learned and best practices from the Njombe prototype will contribute to the national roll-out of Option B+.

II. BASELINE ASSESSMENT

A. Methods

HCI conducted a baseline assessment in August 2011 at the three facilities – one hospital, one health center, and one dispensary – purposively selected for the development of a prototype of the implementation of the WHO 2010 PMTCT and Infant Feeding Guidelines in Njombe Town Council of Tanzania.

A baseline assessment team was formed consisting of three URC staff, Regional and Njombe Town Council Reproductive and Child Health (RCH) coordinators, and one staff member from the regional PMTCT USAID implementing partner (IP). The team was oriented on data collection tools, after which were pretested in the selected sites in July 2011. Following the pretest, the tools were slightly revised.

⁷ Tanzania Commission for AIDS (TACAIDS). Tanzania HIV/AIDS and Malaria Indicator Survey 2011-2012. 2013. Accessed on 13 Nov. 2013. Available at: <http://www.measuredhs.com/pubs/pdf/AISI1/AISI1.pdf>.

⁸ Option A: Triple ARVs starting as soon as diagnosed, continued for life if CD4 \leq 350. Antepartum: AZT starting as early as 14 weeks gestation Intrapartum: at onset of labour, sdNVP and first dose of AZT/3TC Postpartum: daily AZT/3TC through 7 days postpartum if CD4 > 350. Infant receives Daily NVP from birth through 1 week beyond complete cessation of breastfeeding; or, if not breastfeeding or if mother is on treatment, through age 4–6 weeks.

⁹ Under Option B+, all HIV-infected pregnant, postpartum, and breastfeeding women will be initiated on ARV treatment for life as soon as they are diagnosed, irrespective of their CD4 count and WHO clinical staging. Infant receives: Daily NVP or AZT from birth through age 4–6 weeks regardless of infant feeding method.

The team reconvened in August 2011 to conduct the baseline assessment at the same three sites where pretesting was conducted. Data collection consisted of interviews with Council Health Management Team (CHMT) members, including the District Reproductive and Child Health Coordinator (DRCHCO), District Laboratory Supervisor, and District Pharmacist, and with service providers and clients. Medical record reviews were also conducted at the reproductive and child health (RCH) services, Care and Treatment Centers (CTC), and Labor and Delivery ward.

Three teams, each led by one URC staff member, were formed for the baseline data collection. Each team went to a different facility and visited all of the PMTCT related service areas at their assigned facility. Retrospective data were collected for the six months preceding the assessment from all PMTCT service areas: ANC and the under five clinic in RCH, labor & delivery ward, pediatric ward, pharmacy/medicine store, laboratory, and CTC. At the end of each day, the teams checked all data for correctness and completeness.

Data were entered, cleaned, and analyzed using Excel for indicators pertaining to WHO 2010 PMTCT and infant feeding guidelines. Data were grouped into the following categories: infrastructure; human resource; storage and supplies; financing; service provision; and provider and client perspectives of service provision.

B. Results

The baseline assessment examined aspects of care related to: service delivery; human resources; the health information system; medicines, reagents, storage and supplies; and health system financing to identify strengths and weaknesses of implementing the 2010 PMTCT guidelines.

At the time of baseline assessment, all three facilities felt they suffered from a shortage of staff. Together the three had a total of 91 service providers: 59 health workers at the hospital, 28 at the health center, and four at the dispensary. Forty of these staff (43%) said they had received PMTCT training, but only five (5%) had received a refresher training on the WHO PMTCT 2010 guidelines.

A system for monthly reporting of performance was in place at each facility and at the district (council) and regional levels. However, registers and monthly reporting summary forms were aligned with the 2006 guidelines and had not been replaced or updated to reflect the 2010 guidelines. Review of the registers revealed incomplete and sometimes incorrect documentation. Health workers said they would forget to document or were too busy to document at time of service delivery.

All antiretrovirals (ARVs) and medicines to treat opportunistic infections were supplied through the CTC and not available at RCH or labor and delivery. In general, the three facilities had not experienced long periods of stock-out of ARVs and HIV test kits but had experienced stock-outs of CD4 reagents for more than a month at the time of the baseline assessment. The assessment also revealed that when CD4 reagents were available, they were only used for CTC patients because providers believed that pregnant women experienced lower immunity during pregnancy and therefore HIV-positive pregnant women did not need to be assessed for ART eligibility using CD4. Cotrimoxazole and Nevirapine syrup were not stocked at RCH; instead, pregnant women and HIV-exposed children were sent to the CTC to collect these medicines, which increased patient wait time.

The hospital RCH and dispensary had no storage facilities for medicine. The storage room at the dispensary was poorly organized and contained items other than medicines. The medicine cupboard for the hospital had been relocated to Njombe District Council when the district was divided into Town and District councils.

The baseline assessment also found that HIV care and treatment were being funded entirely by EngenderHealth, the regional PMTCT implementing partner. Councils had not been allocating funds for HIV care in their budget, except for supervision and capacity building.

Findings from the assessment of the three facilities transitioning from the 2006 to 2010 guidelines are summarized in Table I.

Table 1: Summary of challenges encountered in implementing the WHO 2010 PMTCT guidelines in three facilities in Njombe Town Council

Facility	Challenge
	Infrastructure
Hospital (RCH building)	<ul style="list-style-type: none"> • Inadequate consultation rooms • Some rooms of the RCH building were used as youth friendly services, District Cold Chain services, and for storage • ANC, PMTCT and family planning services delivered separately thus created missed opportunity for integration of services • Both pregnant women and women with HIV-exposed children receive care in the same room designated for PMTCT, creating the potential for stigma against HIV-positive mothers and their exposed children as it identifies their HIV status • Lack of storage space (i.e., during division of Njombe District into Town Council and District Council, the hospital cupboard for ARVs was taken to RCH Njombe District Council) • Vaccination room for under five children inadequately utilized as it had enough space for shared service delivery like early infant diagnosis (EID)
Health center	<ul style="list-style-type: none"> • Inadequate number of examination rooms led to prolonged wait time for ANC clients • Congestion due to lack of waiting room
Dispensary	<ul style="list-style-type: none"> • ANC room had limited audio privacy as the building had no ceiling boards • Disorganized storage room where medicines are mixed with other unrelated items • No delivery or child follow-up services
Component of Care	Challenge
	<ul style="list-style-type: none"> • Service Provision
Human Resources	<ul style="list-style-type: none"> • Inadequate number of staff at all facilities (worse at the dispensary) • Few staff received refresher training on WHO 2010 guidelines • Inadequate providers' knowledge on documenting according to 2010 guidelines in the 2006 version of the PMTCT registers especially during follow-up visits and in situations where an exposed child enrolls late (beyond four weeks) into PMTCT follow-up care • Inadequate ANC providers' knowledge on calculation of NVP syrup dosage for exposed children during follow-up as this was not part of service during child follow-up under the 2006 guidelines • Confusion among staff during transition to 2010 guidelines on whether to initiate NVP for HIV exposed children who were still on EBF during the transition period so that they could benefit from the more efficacious 2010 guideline regime • Inadequate laboratory staff to conduct daily CD4 testing (during assessment CD4 was taken twice a week, 30 samples each time)
Service delivery (Pregnant women)	<ul style="list-style-type: none"> • Few pregnant women got repeat HIV testing after three months hence missed opportunity to identify those who initially tested during the window period, or those with new infection • Late ANC booking beyond 14 weeks of gestation led to late initiation of ARV prophylaxis

Facility	Challenge
	<ul style="list-style-type: none"> • Low enrollment of HIV-positive pregnant women to CTC due to stigma, inadequate knowledge on location of CTC at the facility, fear of pregnant women being LTFU from CTC thus increasing the number of patients who are LTFU from the CTC • Pregnant women not returning for CTC follow-up appointment • Few disclose their HIV status hence cannot bring a treatment supporter before initiation of ART • Pregnant women not complying to three adherence counseling sessions • Pregnant women were not routinely given CD4 tests as an existing practice in the district • Long distances to district hospital (the only site providing CD4 testing) thereby increasing patients' transportation costs • Delayed enrollment to PMTCT mother-baby follow-up program beyond 4 weeks after birth • Inadequate follow-up counseling and testing for women who initially tested negative during pregnancy/ labor or during child follow-up. • Self transfer to other facilities where they may be retested thus using more reagents and contributing to double counting at district level
Service delivery (HIV exposed children)	<ul style="list-style-type: none"> • Mothers' concern about side effects of prolonged use of ARVs for their children who are "not" sick • Mothers confused about 'mixed' feeding after six months which was not allowed for the first six months • Mixed feeding as early as 3 months due to cultural issues, misconception of insufficient milk and pressure from family and community • Lost to follow-up of HIV exposed children, some soon after receiving first PCR results but majority soon after 6 months (some due to self transfers to facilities closer to their homes) • Delayed receipt of PCR results from zonal laboratory; forced mothers/caretakers to make unnecessary extra visits • Sometimes PCR results were lost, misplaced, or not communicated to the mother/ caretaker, or some mothers and caretakers did not return for results • No proper linkage to postnatal and child follow-up resulting in late enrollment to PMTCT child follow-up
Supplies and storage	<ul style="list-style-type: none"> • Inadequate supply for NVP syrup for one month at labor ward • Sometimes NVP syrup come in 240mls with 10 cc syringe which was difficult for the mother to measure and give accurate dose • Lack of storage space (cupboard) at the hospital RCH (see under infrastructure) • Quantity and packaging of NVP syrup (240mls exceeds requirement of a newborn for one month), providers not certain of what to do to avoid causing harm to the children. Some facilities divided one bottle to two or more children depending on dosage • Increased demand for CTX , CD4 reagents Increased demand for ARVs due to raised cut off point for ART use and early initiation of ARV prophylaxis for pregnant women • Periods of stockouts for HIV/ DBS test kits, ARVs, CD4 reagents and medicines for OI hampering continuity of care

Facility	Challenge
	<ul style="list-style-type: none"> • NVP syrup not stored at RCH thus inconveniencing providers' who have to collect the syrup from CTC or labor ward whenever attending an exposed child • Shortage and stockouts of reagents for CD4 testing
Equipment	<ul style="list-style-type: none"> • Only one CD4 machine servicing entire district • Sole CD4 machine could not handle "increased demand" as pregnant women are expected have CD4 test • Irregular servicing and repair during periods of machine breakdown • Limited technicians with knowledge on repairing machine
Information system (Documentation)	<ul style="list-style-type: none"> • Delayed provision of PMTCT registers for 2010 guidelines Use of 2006 PMTCT registers for 2010 guidelines challenging documentation for 2010 guidelines • Inadequate documentation due to inadequate knowledge of PMTCT registers
Male and Community involvement	<ul style="list-style-type: none"> • Inadequate male and community involvement • Low proportion of male partner testing

III. DEVELOPMENT OF THE PROTOYPE TO APPLY THE 2010 GUIDELINES

A. Design

After completing the baseline assessment, in September 2011 HCI, in collaboration with the CHMT, RHMT, the Tanzania Food and Nutrition Centre (TFNC), and EngenderHealth begin to develop the prototype for implementing the 2010 WHO PMTCT and infant feeding guidelines in Njombe Town Council at the same three facilities where the baseline assessment was conducted. The objectives of the prototype were to orient staff of the three facilities on the updated PMTCT and infant feeding guidelines to enable them to identify local solutions to address operational challenges in their implementation and monitoring their own compliance with the updated guidelines. Staff were trained in quality improvement (QI) methods to enable them to examine their own care processes and test changes in those processes to improve compliance with the guidelines. The intervention was designed to coordinate what was being learned in the three facility types to spread best practices among the three facilities and also to generate recommendations for effective implementation of the guidelines at a larger scale.

Njombe Town Council was selected due to limited chance of contamination from other districts of Iringa region where HCI was implementing a PMTCT QI program. The reason for choosing the three facilities – a hospital, health center and dispensary – was to capture a “slice” of the health system so that findings could be applied across the system.

The district hospital included in the assessment serves as the referral facility for general and HIV care as well as a distribution center for ARVs, medicines for opportunistic infections, HIV test kits, and CD4 reagents. This hospital conducts CD4 tests for all public facilities in the district. The health center provides primary level care for the following services: general medical care; antenatal care; labor and delivery services; and HIV care including PMTCT services and home based care. It is also responsible for making requisitions for medicines, reagents and other supplies from Medical Stores Department through the district hospital. The dispensary initially only provided outpatient and RCH-PMTCT services, but during the course of the intervention, facility services were upgraded to conduct deliveries. By the end of the intervention, the dispensary was providing PMTCT services during labor and delivery, postnatal, and child follow-up services.

B. Capacity Building

In September 2011, 29 service providers including members of CHMTs and facility health management teams from the three intervention facilities were given a three-day orientation on QI and the 2010 WHO PMTCT and infant feeding guidelines updates. Following the orientation, in September 2011 QI teams were formed at the three facilities and for the CHMT. The CHMT QI team was oriented on their responsibility of ensuring availability of supplies and providing supportive supervision to the facility QI teams in September 2011. Facility QI teams learned about their role of running the day-to-day implementation of QI activities and collecting data on QI indicators. Specifically, the facility QI teams received training on problem identification, process analysis, developing sets of changes and indicators, redesigning processes, testing suggested changes, and measuring performance outputs to come up with an implementation package for 2010 guidelines.

Members of the CHMT QI team included the District Reproductive and Child Health Coordinator, District Pharmacist, District Laboratory Technologist, with support from District Medical Officer (DMO) and RHMT members (Regional RCH Coordinator and Regional Laboratory Technologist).

Coaching and mentoring sessions were conducted by HCI, Tanzania Food and Nutrition Centre, Regional Health Management Team, and the Council Health Management Team during 4-6 week intervals from September 2011 through completion of the prototype development in March 2012. CHMTs conducted supervision and provided support to the QI teams in solving problems as they arose. During coaching sessions, data were verified, providers were assisted with problem identification, analyzing the processes of care, developing changes, redesigning processes, and testing the suggested changes through repeated Plan Do Study Act (PDSA) cycles of improving quality of care.

Monthly QI team meetings were held to discuss challenges, successes and progress made by the teams. Three-day coaching and mentoring visits were conducted every three months by the URC team, EngenderHealth, RHMT, and the Njombe Town Council CHMT. After the coaching sessions, the QI teams from the facilities, HMT and CHMT came together for a half-day sharing meeting. At the meeting, each facility team shared experiences from their site, tested changes, challenges, and solutions suggested for teams to test.

C. Data Collection

Teams were trained and supported on conducting process analysis and redesign and testing changes in repeated PDSA cycles during the coaching and mentoring sessions. Teams were oriented in the QI training to the use of the following indicators pertaining to WHO 2010 guidelines to monitor progress of the prototype intervention:

- % of Pregnant women booking before, at and after 14 weeks
- % of HIV-positive pregnant women initiating ARV prophylaxis at 14 weeks
- % HIV-positive pregnant women who received CD4 testing before, at and after 14 weeks
- % HIV-positive pregnant women enrolled to the CTC
- # of days of stock-outs for HIV test kits, CD4 reagents, ARVs and other medicines
- % HIV-positive pregnant women receiving ARV prophylaxis during labor and delivery
- % HIV-exposed children initiating and continuing to take NVP during breastfeeding
- % HIV-exposed babies testing positive by first PCR test at four weeks and six weeks after weaning from breastfeeding
- % HIV-exposed babies who are exclusively breastfed, continue to breastfeed after six months

Data were collected over an eight-month period from August 2011 to March 2012. Facility QI teams were trained on how to collect monthly QI data. During the coaching and mentoring sessions, the coaches checked and verified data collected by the facility QI teams for discrepancies. Coaches also

showed teams how to collect the data with minimal error. Between coaching visits, facility QI teams documented operational changes tested to facilitate adoption guidelines, applying QI principles.

D. Changes Tested to Facilitate Implementation of the 2010 Guidelines

At the beginning of HCI's assessment (August 2011), facility QI teams began the continuous process of identifying gaps (process analysis), redesigning processes of care, and testing several rounds of changes to determine best practices for care. In January 2012, HCI documented the changes the three facilities had made in systems and processes of care to follow the 2010 guidelines. Direct observation and informal interviews were used to gather information from the service providers, CHMTs, and facility management teams. Table 2 provides a summary of changes tested that sites felt led to an improvement in facility performance on the indicators.

Table 2: Summary of changes tested by the prototype facilities

Category/ Service Area	Changes
National	HCI worked with the MOHSW and partners to adopt the WHO 2010 PMTCT guidelines by revising the National PMTCT guidelines, infant feeding training package, job aids and tools. A refresher training package was developed and rolled out by the MOHSW and regional partners
Infrastructure	<p>Hospital:</p> <ul style="list-style-type: none"> • Cupboard recovered from Njombe DC and its use restricted for ARV and ANC related medicines • Plans on the way to recover rooms of the RCH building used by Njombe District council and use rooms for one stop shopping for provision of ANC-PMTCT services <p>Health Center:</p> <ul style="list-style-type: none"> • Construction to expand and secure more rooms for one stop shopping service delivery and waiting area <p>Dispensary:</p> <ul style="list-style-type: none"> • Reorganized rooms and allocated a room with better privacy for ANC • Reorganized storage space for proper storage of medicines and removed unnecessary items • Garnered community support to upgrade the facility for provision of deliveries • Used community funds to purchase a water storage tank, construct placenta pit and renovated postnatal ward (process to assuring continuity of care)
Human Resource	<ul style="list-style-type: none"> • Provided coaching and mentoring for on-the-job training of CHMT members on content of PMTCT registers and data collection • Facilitated peer-to-peer learning of the new guidelines and documentation in registers • Held meeting to share experiences from sites during coaching and mentoring • Task shifting to use non-skilled personnel to escort clients to the CTC
Service Provision RCH -ANC	<ul style="list-style-type: none"> • Strengthened health education sessions to motivate male partner testing • Introduced register to track CD4 testing and enrollment of women to CTC • Redistributed ARVs and Cotrimoxazole (CTX) from facilities with overstock to facilities with low supply as a short term measure for periods of stockouts • Collecting blood samples for CD4 testing from RCH • Escorting HIV-infected pregnant women and presented them to PMTCT focal person at CTC for enrollment • Place orders for CTX directly through pharmacy • Work with CTC and lab staff to prioritize CD4 testing for pregnant women

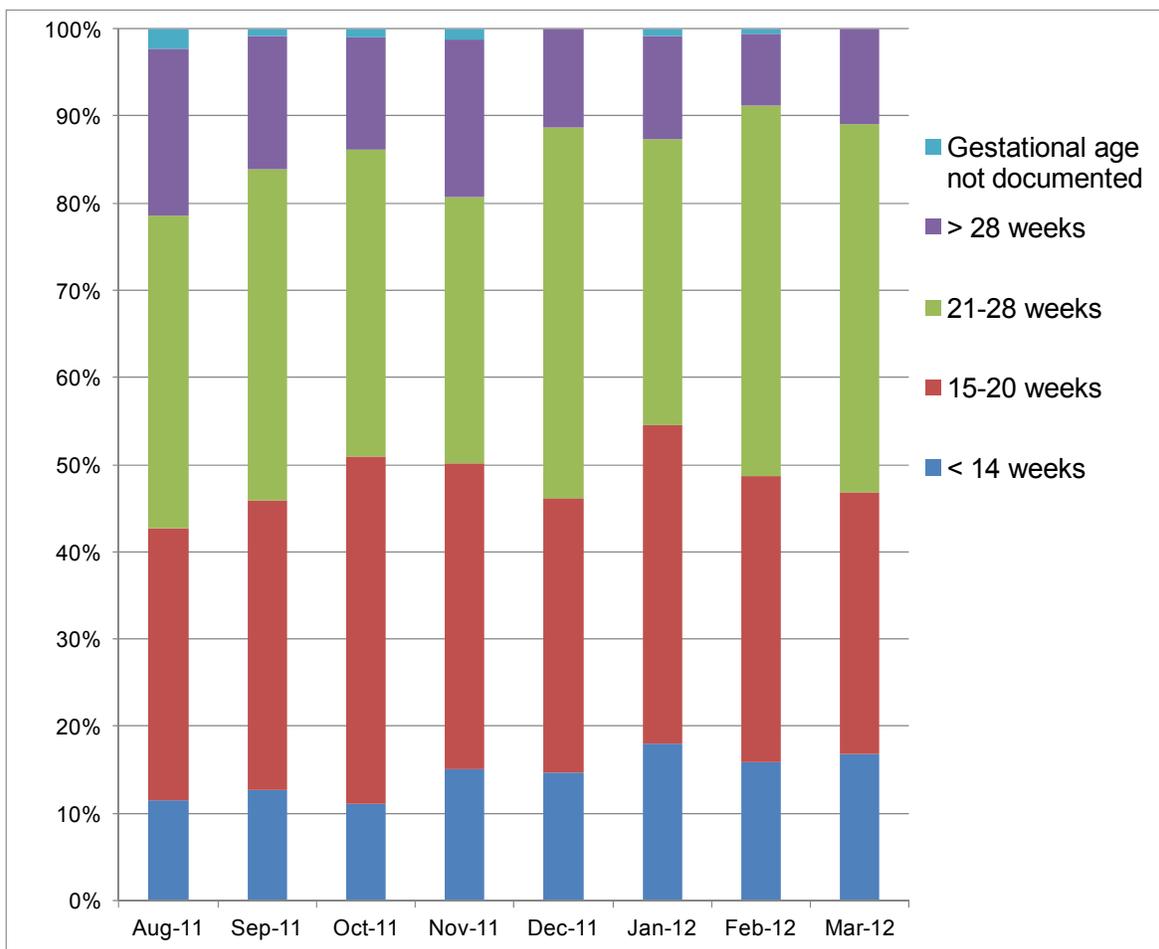
Category/ Service Area	Changes
	<ul style="list-style-type: none"> • Identification of mothers of unknown HIV status for counseling and testing at labor and delivery and at child welfare clinic • Obtained and stored NVP syrup at RCH
Service Provision Labor ward	<ul style="list-style-type: none"> • Give postnatal and child follow-up appointments for mothers and infants at discharge from labor ward • Starting all exposed infants on NVP syrup at birth and providing 1-month supply • Using 1cc easy to measure syringes instead of the 10 cc syringes that regularly come with the 240 cc NVP syrup in order to assist mother in providing correct dosage of NVP syrup to new born infants and educate mothers on how to accurately measure dosage
Service Provision RCH -Infant follow-up	<ul style="list-style-type: none"> • The dispensary initiated mobile clinic to increase capture of children (including HIV exposed) • Stocking NVP syrup at RCH for direct dispensing at time of service delivery and immediate documentation in PMTCT Mother Child Follow-up Register • Introduced separate lines for pregnant women and for mothers with exposed children to shorten the waiting time for mothers with HIV-exposed children who were usually fewer in number than ANC clients • Posted NVP syrup dosage calculations on labor and ANC walls <p>Dispensary:</p> <ul style="list-style-type: none"> • Began taking DBS samples following on-the-job training • Initiated all under five vaccinations after obtaining a refrigerator
Service Provision CTC	<ul style="list-style-type: none"> • Introduced local PMTCT register at CTC to track enrollment and follow up of pregnant women from RCH to CTC for identification of pregnant women coming from the participating facilities • Include ANC number in Pre-ART register to facilitate identification of proportion of HIV pregnant women enrolled to CTC each month • Make follow-up appointments for pregnant women to receive CD4 testing • Introduced a focal person for PMTCT at district hospital CTC
Service Provision Laboratory	<ul style="list-style-type: none"> • Liaise with private organizations (TANWATT) and higher level health facilities (Njombe Town Hospital) to accept patients for CD4 testing • Introduced recording ANC registration number and facility code for identification of pregnant women in the CD4 register. This had simplified data collection for tracking indicator on proportion of HIV positive pregnant women testing for CD4 and use of results for appropriate provision of ARVs • Included ANC number on CD4 test result to facilitate documentation in the PMTCT register • Set aside CD4 reagents for pregnant women in case of stock-out • Five days a week CD 4 testing with samples from pregnant women collected on daily basis
Cross-cutting	<ul style="list-style-type: none"> • Conducted familiarization meeting with community-based organizations in the district to identify means of involving them to facilitate PMTCT service uptake, male partner and community involvement to promote early ANC booking and adherence to ARVs, promote appropriate breastfeeding practice and retention to care • Liaise with local partners and government (EngenderHealth, Town Council, etc.) to purchase CD4 machine, CTX and other supplies to reduce stock-outs

IV. RESULTS

A. ANC Booking

Out of 1616 women booking at ANC at the three facilities during the prototype development (August 2011-March 2012), less than 15% of pregnant women booked before or at 14 weeks of pregnancy, the recommended gestational age for initiation of ARV prophylaxis. Thirty-four percent (34%) booked at 15-20 weeks; 37.1% booked at 21-28 weeks; 13.6% booked after 28 weeks; and 0.9% booked at an unknown gestational age. Figure 1 shows the proportion of women booking for ANC by gestational age at the three prototype facilities. Among all women booking at ANC, 174 (10.8%) tested positive or booked with a positive HIV status.

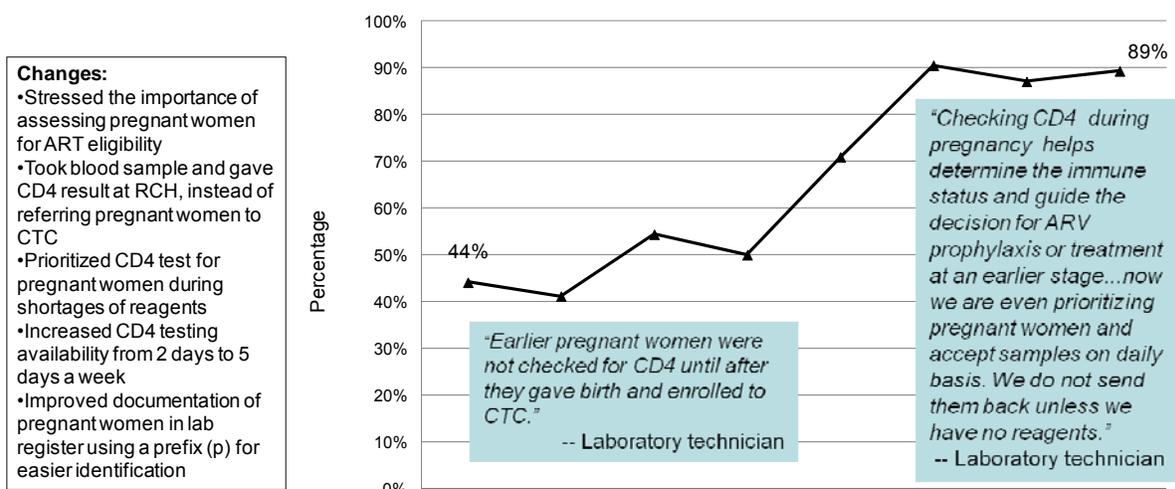
Figure 1: Number of pregnant women booking for ANC by gestational age, three facilities in Njombe, Tanzania (Aug. 2011-March 2012)



B. Assessing ART Eligibility

Assessment of HIV-positive pregnant women for ART eligibility via CD4 test increased from 44% at baseline to 89% at the end of the assessment (Figure 2). Service providers were supported in testing changes to ensure that HIV-positive pregnant women were being assessed for ART eligibility using a CD4 test. Irregular supply of CD4 reagents hampered continuity of performing the test. To improve provision of the test, pregnant women were prioritized to have a CD4 test during periods of low stocks of reagents (see additional changes that led to the improvement listed in Figure 2).

Figure 2: Percentage of HIV-positive pregnant women attending ANC this month who were ever assessed for ART eligibility by CD4 test, Njombe, Tanzania (Aug. 2011-March 2012)



	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12
# HIV+ pregnant women with CD4 test completed	15	21	37	32	44	48	54	67
Total HIV+ women attending ANC/RCH Clinic in the month	34	51	68	64	62	53	62	75
▲ % HIV+ pregnant women with CD4 test completed	44%	41%	54%	50%	71%	91%	87%	89%
Total number of sites reporting	3	3	3	3	3	3	3	3

C. Antiretroviral Prophylaxis Initiation

During January-March 2012, the health center experienced a shortage of CD4 reagents, thus affecting the number of women able to initiate prophylaxis and treatment. At the beginning of the assessment in August 2011, as shown in Figure 3, no HIV-positive pregnant women were initiated on ARVs at 14 weeks of pregnancy as recommended by the 2010 guidelines. A greater proportion of HIV-positive pregnant women were initiated at later gestational ages, consistent with the 2006 WHO guidelines. Eleven out of 18 (61%) HIV-positive women between 21-28 weeks gestational age were initiated on ARVs in August 2011. By the end of the assessment period, there was not much improvement, with only two out of nine HIV positive pregnant women initiated on ARVs at 14 weeks. However, throughout the assessment period, the average proportion of HIV positive pregnant women initiated “early,” between 14-20 weeks, on ARVs was 39% (73/186). Whereas, the average percentage initiated “late” (after 28 weeks gestational age) on ARVs was only one out of nine women (11%).

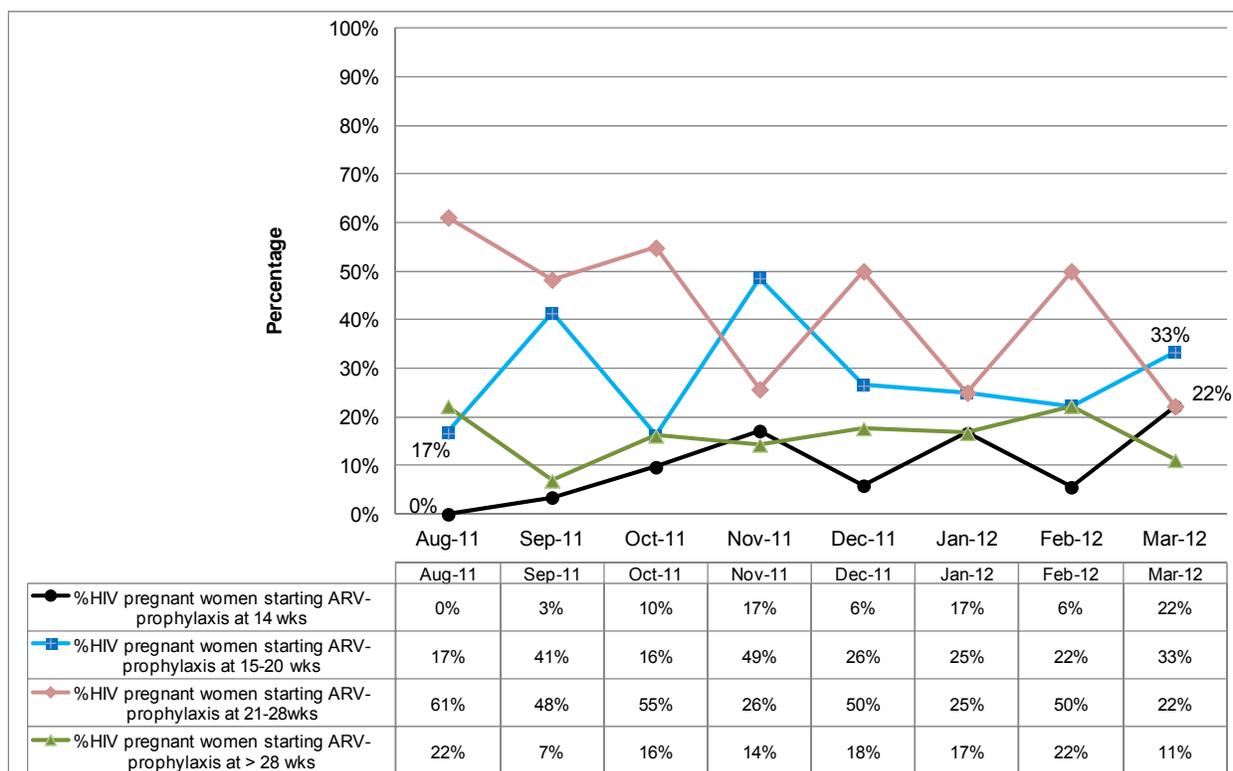
D. PMTCT Services in the Postnatal Period

The three facilities performed well on both provision of ARVs to infants soon after birth and discharging infants with NVP syrup when ARV supply stocks were adequate (Figure 4). Almost all (90-100%) of HIV-exposed babies received NVP soon after birth and were discharged with a one-month supply. One cc syringes, which were easier to use by mothers, were secured from the pharmacy to replace the 10 cc syringes that are prepackaged with the 240 ml NVP syrup. Mothers were instructed on drawing the appropriate incremental dosage according to the weight of their baby. Mothers were given a postnatal appointment to guide mothers on timely enrollment for PMTCT child follow-up care.

“I hope that the implementation of the new guidelines will help to reduce transmission of HIV from mother to child because previously HIV-positive pregnant woman were taking ARV prophylaxis for a maximum of twelve weeks before delivering while infants were given NVP syrup for no more than four weeks. But now she is taking ARVs almost throughout the pregnancy (26 weeks) and the infant takes NVP syrup from birth until it reaches a year.”

-- Registered Nurse in labor ward

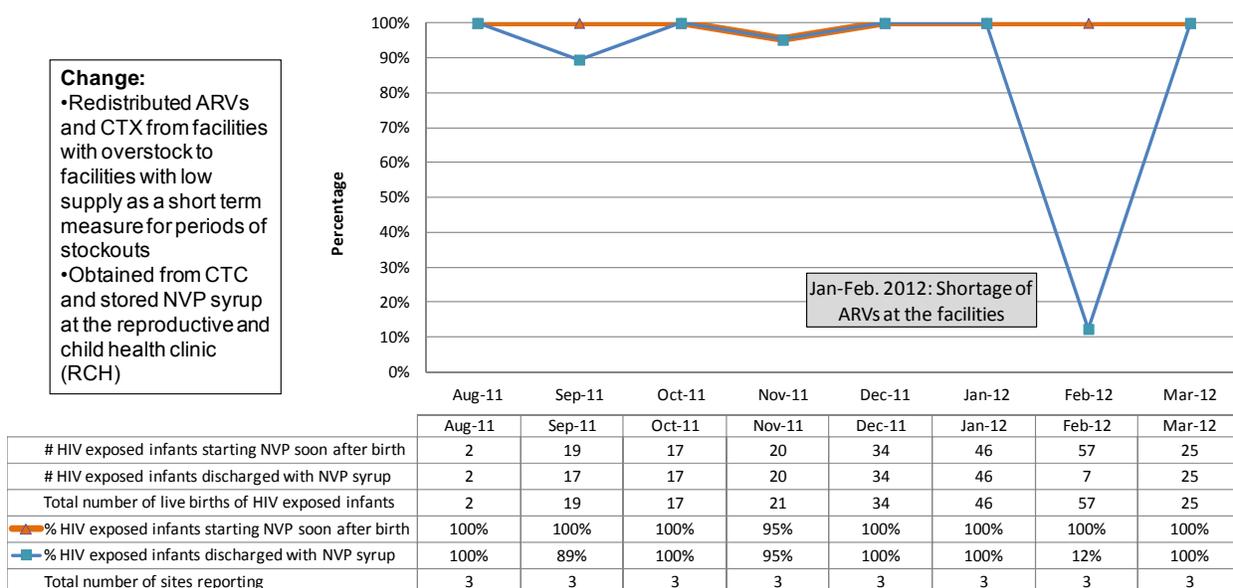
Figure 3: Percentage of HIV-positive pregnant women initiating ARV prophylaxis by gestational age, three facilities in Njombe, Tanzania (Aug. 2011-March 2012)



E. PMTCT Child Follow-up Services

On average 91% of breastfeeding HIV-exposed babies 0-6 months (mother on ARVs) and 0-6 weeks (mother on ART) received Nevirapine monthly. Breastfeeding challenges include mixed feeding before six months, due to beliefs that mothers' milk is not enough or that babies needed water. Mothers also expressed concerns about their babies taking Nevirapine for an entire year and were concerned about the side effects.

Figure 4: Percentage of HIV-exposed infants who received ARVs soon after birth and those discharged with NVP syrup, three facilities in Njombe, Tanzania (Aug. 2011- March 2012)



F. Medicines, Reagents, and Storage

In the course of the assessment HCI conducted, there were long periods of stock-outs of HIV rapid test kits due to recall of faulty Standard Diagnostics (SD) Bioline test kits by the MOHSW and changing of the HIV testing algorithm. Determine was used as initial test and Unigold as confirmatory test which were usually supplied in small amounts for confirmatory purposes. This greatly increased use of Determine, and the supply of Determine was insufficient to test everyone, resulting in periods where testing was not performed.

V. DISCUSSION

A. Persistent Challenges during Implementation of the 2010 Guidelines

The development and testing of the prototype helped to expose how practices and structural factors established under the 2006 guidelines affected PMTCT care during and immediately after the transition to the 2010 guidelines. Several changes under the 2010 guidelines affected PMTCT service delivery. Changes in care processes that were implemented ranged from separating PMTCT service lines to reduce wait times, to building new cabinets to accommodate the increase in demand for ARVs. Separating PMTCT service lines proved to be an effective change for reducing wait time. Specifically, one line was allocated for pregnant women and the other line for women bringing HIV-exposed children for follow-up. This reduced wait time for mothers with HIV-exposed children although it did not reduce stigma as the line indicated that the mothers were HIV-infected. Management was advised to integrate early infant diagnosis (EID) with vaccination services so that children receiving EID would not be singled out.

According to the WHO 2010 guidelines, all HIV-exposed infants are to be initiated on NVP syrup soon after birth. Infants whose mothers are on ART, or opted for replacement feeding, will do so for six weeks, while HIV-exposed breastfeeding babies will continue with NVP syrup until one week after weaning when the exposed child is one year old. During the prototype development, there was a constant supply of NVP syrup except for the month of February. Stock-outs of NVP increase the risk of HIV transmission, especially to exposed children who have begun to mix-feed or those beyond six months on complementary feeding. Table 3 below summarizes some additional challenges.

Table 3: Persistent challenges during implementation of the 2010 WHO Guidelines

Area	Challenges
National	<ul style="list-style-type: none"> • PMTCT registers obtained after several months of implementing the 2010 guidelines • Few service providers received refresher training
Infrastructure and storage facilities	<ul style="list-style-type: none"> • Proper storage conditions (temperature, sunlight). NVP syrup should be stored below 35°C which worked well with cold weather of Njombe • Storage of NVP in hot areas pose a concern, especially when a 240mls bottle which may take several months to be consumed by a small baby is hidden in a hot area by those who did not disclose their status • Room temperatures may be higher after working hours in the facilities when door and windows are closed
Human Resource	<ul style="list-style-type: none"> • Shortage of service providers • No additional refresher training conducted so learning was based on peer support
RCH -ANC	<ul style="list-style-type: none"> • Erratic and inadequate supply of CTX syrup as a result there were many days of stockouts for this item • Limited CD4 testing for pregnant women due to shortage of reagents resulting in difficulty determining eligibility for ART or ARV prophylaxis • Late ANC booking hindering early initiation of ARV prophylaxis (or ART)

Area	Challenges
	<ul style="list-style-type: none"> • Inadequate space for PMTCT services • NVP syrup coming in a 240 ml bottle which exceeds monthly supply for the baby leaving questions for disintegration / impaired potency of the drug and contamination and storage problems. • Dividing the NVP between two or more exposed children as a mechanism to avoid throwing away of the drug raised question of safety and cleanliness of bottles • One time service users who come for Early Infant Diagnosis (EID) or CD4 testing from facilities that do not provide this service, resulting in a false image of lost to follow-up for mothers and children
RCH- HIV exposed Infant follow-up	<ul style="list-style-type: none"> • Compliance to prolonged use of ARV prophylaxis for exposed children. Mothers reported concern about giving medication to infants for an extended period of time when they are not sick or HIV infected (fear of side-effects)
CTC	<ul style="list-style-type: none"> • Delay in starting ART for pregnant women due to requirements of pregnant women completing 3 adherence counseling sessions and attending clinic with a treatment supporter as a pre requisite for initiating ART • Pregnant women not coming back for follow-up due to stigma and not feeling sick
Laboratory	<ul style="list-style-type: none"> • Shortage of reagents for CD4 testing • Shortage of laboratory technicians
Cross-cutting	<ul style="list-style-type: none"> • Poor male involvement • Late ANC booking beyond 14 weeks • Limited providers knowledge on the 2010 guidelines (only 2 providers at each facility received refresher training) • Inadequate documentation during follow-up visit • Delay in availability of appropriate registers for 2010 guidelines forced providers to improvise on locally adapted registers

B. Challenges and Recommendations at the National Level

- **Allocate funding for implementing and improving PMTCT services**

Funding for PMTCT services continued through the regional implementing partner and HCI-supported QI activities for the prototype of the WHO 2010 PMTCT guidelines. The Community Health Fund (CHF) from Idundilanga Ward was used to construct a placenta pit, install a water tank, and renovate rooms for ANC, labor and delivery services in the dispensary. However there were no available funds from Comprehensive Council Health Plans (CCHP) for improving PMTCT services. This left the program fully donor dependent and proved challenging for scaling up QI activities. This exposes a need for a transition plan to enable local ownership and sustainability.

Health insurance funds like Community Health Fund and National Health Insurance Fund (CHF, NHIF), and cost sharing could add value if used at the point of collection, similar to the prototype experience where funds were used to upgrade the dispensary. It is useful for governments to have alternative plans to include funding for QI activities in Comprehensive Council Health Plans to support and achieve total country ownership.

- **Adapt record systems to enable follow-up of pregnant women and their exposed infants across the PMTCT continuum of care**

Another challenge of implementing the 2010 guidelines was delayed availability of updated PMTCT registers and monthly reporting forms. HCI advisors provided assistance to facility QI teams in

modifying the 2006 PMTCT registers and monthly reporting forms to enable recording and reporting on services provided according to the 2010 PMTCT and infant feeding guidelines. Documentation improved after registers were updated.

The structure for reporting on PMTCT services implemented under the prototype activity is aligned with the MOHSW's monthly reporting system. Health facilities continued to report data from their PMTCT activities on a monthly basis to the MOHSW through district and regional authorities who provided timely support to QI teams. Use of an electronic database for tracking and monitoring PMTCT performance indicators enabled QI teams to produce graphs on their performance and identify areas in need of improvement.

C. Challenges and Recommendations at the Regional and District Levels

- **Improve coordination among all players at the regional and district levels**

The Regional and District Reproductive and Child Health Services Coordinators (RRCHCO), District Pharmacist and Laboratory Technologist for Njombe Town council participated in every step of the prototype activity. The RRCHCOs worked closely with the CHMT, the dispensary team, and community members to raise the capacity of the dispensary to conduct deliveries, EID, and vaccination services which improved infant/child follow-up. Four additional nurse midwives were transferred to the dispensary to support increased delivery services. The inclusion of regional and district level MOHSW members provided a roadmap towards ownership and sustainability of the changes that improved PMTCT care.

Further attention is needed at the regional and district level to address the use of 10 cc syringes for mothers to give their exposed infants NVP. The 10cc syringe creates the potential for giving the child either more than the recommended dosage, which could result in toxicity. We did not monitor or put any changes in place to improve this but we noted that this is a problem. It may be safer to secure small syringes (1 cc) to facilitate administration of Nevirapine syrup to exposed infants by mothers.

- **Capacitate CHMTs on quality improvement approaches, and strengthen their coaching and mentoring skills**

In their current roles, members of the RHMT and CHMT visit health facilities on a quarterly basis to provide technical and clinical supervision, facilitate capacity development and support QI activities.¹⁰ Therefore, during routine site visits, RHMT and CHMT QI coaches can follow-up on the implementation of the 2010 guidelines while continuing to support facility-level QI activities.

In order to supplement the trainings on the 2010 guidelines, providers were also trained and supported to provide care to a higher volume of patients, forecast and request increased stocks of HIV test kits, ARVs, CTX and CD4 reagents to meet the increased demand under the updated guidelines. The district pharmacist supported service providers with stock management to prevent stockouts. Sharing meetings were also held to address identified gaps in services, operational challenges, and possible solutions. During these meeting sites came together with the CHMT and EngenderHealth to share their challenges and the changes that they made to care processes to address those gaps.

- **Strengthen supply chain management and coordination efforts with the Medical Supply Department**

Inadequate storage space for ARVs was an initial problem at the hospital. The 2010 guidelines increased the number of HIV-positive women qualifying for ARV prophylaxis from 14 weeks gestational age of

¹⁰ United Republic of Tanzania Ministry of Health and Social Welfare and the Prime Minister's Office Regional Administration and Local Government. 2008. Functions of Regional Health Management System: Roles and responsibilities of Regional Health Management Team, Regional Referral Hospital Management Team and the Regional Referral Hospital Board. Accessed on 6 Nov 2012. Available at: <http://www.moh.go.tz/documents/Functions%20of%20Regional%20Health%20Management%20System.doc.pdf>.

pregnancy. Therefore, larger storage facilities and prompt stock management became essential for successful implementation of the 2010 guidelines. The increased demand for ARV prophylaxis led to stock-outs of ARVs at the three facilities. This was made worse with a spillover effect observed as pregnant women from other facilities were referred to the hospital for CD4 testing and ARVs after word spread that the hospital was offering “additional” services, thus also placing a greater strain on the supplies of CD4 reagent.

The three implementing facilities faced irregular supply of Co-trimoxazole syrup and CD4 reagents. During the assessment, HCI discovered that children were given NVP syrup using the sharing technique, where one 240ml bottle was shared among two or three exposed children. This sharing technique masked the true amount of available supply and created unanswered questions such as: potency of NVP syrup after opening and cleanliness of the bottles used to divide the medicine. Stock-outs of other essential supplies also exposed a need to improve supply chain management to abide by the 2010 guidelines. This became apparent when stock-outs of rapid HIV test kits prevented identification of HIV-positive women and delayed enrollment into CTC.

- **Provide orientation on the new guidelines to all service providers and reinforce new knowledge through on-the-job mentoring and supportive supervision**

Less than half (43%) of the staff had received PMTCT training, and only 5% had received a refresher training for the WHO PMTCT 2010 guidelines. Before rolling out implementation of WHO 2010 PMTCT and infant feeding guidelines, in June and July 2011 the MOHSW started rolling out a refresher training for Regional PMTCT trainers so that they could conduct a similar refresher training for service providers in their regions.

In the Njombe Region, two providers were trained from each facility on the updates of the 2010 guidelines by regional trainers who had received the national refresher PMTCT training in July 2011. The providers went back to their facilities and shared the 2010 updates with their peers through on-the-job training with support from the CHMT. Specifically, the PMTCT-trained providers assisted others who have not received the training on proper documentation in registers and on the use of task shifting to have non-skilled personnel escort clients to CTC. This was an important change because skilled providers were able to focus on performing technical activities instead of leaving their duties to escort clients to the CTC.

D. Challenges and Recommendations at the Facility Level

- **Ensure that adequate storage space is available to manage the increased quantity of ARVs required to provide treatment to all HIV-positive pregnant and lactating women**

The 2010 guidelines also affected service delivery of ARVs. Provision of ARV prophylaxis at 14 weeks of gestation, as recommended in the 2010 guidelines, requires pregnant women to book earlier for ANC. Only a small proportion of the pregnant women booked for ANC at 14 weeks gestational age or earlier. Consequently, the facilities had a low proportion of HIV-positive women initiating ARVs at 14 weeks, compared to those pregnant women initiating ARVs with a gestational age above 14 weeks. This highlights the importance of community-based solutions, which are essential to ensuring that women and their children have access to the entire continuum of PMTCT services.¹¹

Additionally, provision of ARVs was limited based on the storage issues and stock-outs at the health facilities. Prior to beginning our assessment, part of the Iringa Region was divided to form the new Njombe Region. Njombe District was divided into Town and District Councils, and Njombe Region was formed with five districts in total. The assessment was conducted in Njombe Town Council District. During the division of equipment, the medicine cabinet went to the District Council, which left the

¹¹Marcos Y, Phelps B, Bachman G. 2012. Community strategies that improve care and retention along the prevention of mother-to-child transmission of HIV cascade: a review. Accessed on 31 Oct. 2012. Available at: <http://www.ijasociety.org/index.php/ijas/article/view/17394/737>.

hospital in Njombe Town Council with no medicine cabinet. During the prototype intervention, the Njombe Town CHMT liaised with the district council to recover the medicine cabinet for the hospital, which was successful. At the facility level, QI teams also worked with facility health management teams to build new cabinets and provide trainings on supply chain management to ensure that facility staff members were able to meet the increased demand for ARVs since more women were qualifying for ARV initiation under the 2010 guidelines. It was found that some facilities, especially low level/rural facilities had more than required amounts of ARV, CTX, and sometimes test kits. The CHMT redistributed supplies and commodities from facilities with overstocking to those that experienced stock-outs.

- **Build the capacity of facility staff to monitor their own program performance and make changes in their own care processes to adhere to the guidelines**

For example, drug supply chains may need to be strengthened ahead of the guideline implementation. At all levels health information management systems need to be ready to track data according to the new guidelines at the start of implementation. District pharmacist and district laboratory technologist, as well as RCH, CTC, labor ward providers' knowledge could be improved through effective on-the-job training, coaching and mentoring. Providers who have been trained at the regional level can bring back their knowledge to share with their colleagues. Training providers in quality improvement methods can further strengthen their capacity to improve care at the facilities. By improving their knowledge and skills to identify gaps, analyze processes, design alternative processes, suggest and test changes; they will be able to monitor their facility performance to determine whether changes have led to improvement.

E. Challenges and Recommendations at the Community Level

- **Take steps to increase early booking of pregnant women in ANC through health education at health facilities and strategic community-level promotion on the importance of early booking for ANC**

Community groups should be mobilized to support pregnant women in their communities to book before 14 weeks, bring male partners to ANC for HIV testing, exclusively breastfeed for six months, utilize infant follow-up services, etc. Community support and male involvement may increase early booking for ANC, positively impacting early initiation of ARV prophylaxis, and improve uptake and retention along the entire PMTCT continuum of care. Linking the health facility to the community goes beyond sensitizing women and families in the community about the importance of ANC care, enrolling, and being retained in care. Existing community groups (i.e. women's, agricultural, youth, credit and savings groups, etc.) can be connected with the health facility to spread health messages in the community about RCH and PMTCT health issues. These community groups have the potential for rapid spread of health messages during weddings, funerals, and other community events. They can also help to identify and refer clients in their own households and community to the health facility.

Under the 2006 guidelines, the PMTCT program was quite successful in HIV counseling and testing, but child follow-up was a challenge. Many of the children were lost to follow-up or self transferred to seek care at other health facilities closer to their residence. Inadequate documentation of follow-up visits made it difficult to identify women and exposed infants who were lost to follow-up.

Communities need to be brought on board early for optimal utilization of services and improved PMTCT outcomes. Community based organizations in Njombe town Council were involved during the intervention period to promote access, utilization and retention to care. It was useful to hold familiarization meetings with community organizations' representatives to improve health seeking behaviors. These organizations were skilled in a diverse number of approaches for educating communities such as: building life skills for youths, soliciting men who are reluctant to undergo HIV counseling and testing, giving HIV related talks during wedding and funeral occasions. They were very eager to be trained on the WHO 2010 updates so that they could promote health issues in the community.

VI. CONCLUSIONS

The HCI intervention to develop a prototype of how to transition to the WHO 2010 PMTCT guidelines emphasized the need to conduct a thorough situational analysis of systems and processes of PMTCT care prior to actual implementation. This enables facilities as well as district and national officials to put solutions in place for anticipated implementation challenges. Experiences from the HCI intervention of transitioning to Option A of the WHO 2010 PMTCT and infant feeding guidelines in Njombe Town Council have been used to guide further roll-out of the 2010 guidelines to other HCI sites in Tanzania.

These lessons, highlighted in this report, could also guide implementation of PMTCT Option B or Option B+ in other countries. Results from HCI's intervention demonstrate that the WHO 2010 guidelines can be feasibly implemented, but require support from all levels of the health system for successful implementation. Nationally, reporting documents and registers need to be updated to reflect new guidelines, which should aid in improving documentation at the facility level. Updated guidelines and reporting documents should also be available in all facilities prior to their implementation. At the district level, CHMTs can provide on-the-job training support at facilities during supportive supervision visits to ensure that all providers are aware of the updates. Additionally, facility level staff can monitor their monthly data to identify operational setbacks, and come up with local solutions to improve care.

While this assessment was a pilot study examining operational challenges and solutions to implementing Option A of the 2010 WHO PMTCT and infant feeding guidelines, many other countries, including Tanzania are now transitioning to PMTCT Option B or B+. Findings from this intervention are still applicable to Option B and B+. Specifically, under Option A, more HIV-positive pregnant and breastfeeding women qualified for ARV prophylaxis or treatment due to the change in CD4 count eligibility, placing a greater demand on ARVs and ART. Similarly, Option B+ recommends that all pregnant or breastfeeding women, once confirmed to be HIV-positive, should be placed on treatment. This too, will place a larger demand on ART and requires stronger supply chain management to ensure adequate drug supplies at the facilities.

Supply chain management should involve CHMTs, district level pharmacists, as well as facility staff to ensure that infrastructure (i.e., supply storage areas) is adapted to support increased demand and that supplies are properly forecasted. In cases where overstocking occurs, CHMTs can support the transfer of supplies to facilities experiencing stock-outs according to supply chain management protocols. Initiating a district level approach to improve the quality of services, where CHMT members provide direct quality improvement technical support to facilities to assist them in addressing gaps in services is beneficial. Overall, CHMTs should be integrally involved in the roll-out of best practices and future guideline updates.

APPENDIX: SUMMARY OF DIFFERENCES BETWEEN THE 2006 AND 2010 PMTCT AND INFANT FEEDING GUIDELINES

Category	WHO PMTCT Guidelines	
	2006	2010
CD4 levels cut off point for ART	200 cells/mm ³	≤ 350 cells/mm ³
Gestational age for initiation of ARV Prophylaxis	28 weeks	14 weeks
ART initiation	As soon as feasible	As soon as feasible
ARV prophylaxis during pregnancy	Clinical stage I & 2 or CD4 > 250, AZT 300 mg twice daily from 28 weeks to one week post delivery OR to four weeks if AZT was taken for less than four weeks during pregnancy	Clinical stage I & 2 or CD4 > 350, AZT 300 mg daily from 14 weeks till delivery OR To continue with for four weeks postnatal AZT if this was taken for less than four weeks during pregnancy
ARV prophylaxis during delivery (known HIV status and received AZT during pregnancy)	AZT 600 mg at onset of labour OR AZT 300 mg at onset of labour and every 3 hours until delivery, 3TC 150mg every 12 hours until delivery; and Sd NVP 200 mg at onset of labour; and 3TC 150 mg at onset of labour and every 12 hours till delivery then continue with AZT 300 mg daily for one week if AZT was taken for more than four weeks OR four weeks if AZT was taken for less than four weeks	AZT 300mg + 3TC 150mg every 12hrs till delivery
Postpartum (mother)	AZT 300 mg and 3TC 150 mg twice daily for 7 days	OR If AZT was given for < 4 weeks GA then the woman should receive: SD NVP +AZT 300mg every 12hrs + 3TC 150mg every 12hrs+sdNVP 200mg After delivery the woman should receive AZT 300mg + 3TC 150mg every 12 hours for 7 days (“Tail dose”)post partum
Pregnant women testing HIV positive during labor and delivery	AZT 600 mg at onset of labour OR AZT 300mg at onset of labour and every 3 hours until delivery 12hrly + 3TC 150mg 12hrly+sdNVP 200mg. After delivery, they should continue with AZT 300mg + 3TC 150mg 12hrly for 7 days (Tail dose)	AZT 300mg every 12 hours + 3TC 150mg every 12 hours+sdNVP 200mg. After delivery, they should continue with AZT 300mg + 3TC 150mg every 12 hours for 7 days (“Tail dose”)
Postpartum	AZT 300 mg twice daily for 7 days AND 3TC 150 mg twice daily for 7 days	<i>NO postpartum ARVs</i> if the mother received AZT for four weeks or more

Category	WHO PMTCT Guidelines	
	2006	2010
ART	From 14 weeks to life will continue with same dose during labor and delivery	As soon as determined eligible(CD 4 ≤ 350 or clinical stage 3&4 will continue during labor and for life
Co-trimoxazole prophylaxis	Not given	Mandatory from 14 weeks of pregnancy
TB screening	Not conducted at ANC unless enrolled to CTC	Mandatory at each visit
ARV prophylaxis for HIV-exposed children; Irrespective of infant feeding option, if mother received ARV for 4 or more weeks during pregnancy	Sd NVP 2mg/kg oral suspension immediately after birth AND AZT 4mg/kg twice a day for 7 days Irrespective of infant feeding option, initiated within 72 hours of birth To one week if mother took AZT for more than four weeks or 4 weeks if mother took AZT for less than four weeks	Depend on mothers' use of ARV/ ART and infant feeding option. Mother on ARV and opted to breastfeed baby will receive NVP syrup according to birth weight from birth to one week after weaning: 0-6 weeks Birth weight 2000gm-2499gm 1 ml (10mg) once daily Birth weight ≥ 2500gm 1.5 ml (15mg)once daily 6 weeks -6 months 2 ml (20mg)once daily 6-9 months 3ml (30mg) once daily 9 months to one week after weaning 4 ml (40mg) once daily Mother opted for replacement feeding irrespective of ART/ ARV use, baby will receive NVP syrup from birth to six weeks Mother on ART and opted to breastfeed, baby will receive NVP syrup for six weeks only
ARV prophylaxis for HIV-exposed children: Irrespective of infant feeding option, if mother received ARV for less than 4 weeks during pregnancy or identified during labour and delivery	Sd NVP 2mg/ kg oral suspension immediately after birth	
Feeding practices	Breastfeeding option: mothers will breastfeed exclusively for six months only and wean the baby on available family foods After weaning, the baby can continue with	Mothers opting for breastfeeding shall breastfeed their babies exclusively for six months then continue with breastfeeding till 12 months of age, while providing complementary foods.

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	<p>animal milk if this was available and affordable</p> <p>Replacement Feeding: Mothers opting to were starting this from birth only if animal milk is Affordable, Feasible, Acceptable, Safe and Sustainable</p>	<p>OR may wean earlier between 7-12 months. May give animal milk if this is available and affordable</p> <p>Mothers opting to Replacement Feeding shall start this from birth and not breastfeed their babies at all provided this is Affordable, Feasible, Acceptable, Safe and Sustainable</p>

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