

A Behavior Change Perspective on Integrating PMTCT and Safe Motherhood Programs

A Discussion Paper



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The CHANGE Project
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“The millions of lives already lost have changed the face of villages, towns, cities and nations. It is possible to prevent mother-to-child transmission of HIV now. Proven interventions exist and should be implemented as soon as possible. The obstacles to implementation of this knowledge are numerous... but can be overcome with resources, collaboration, additional research, and policies that prioritize PMTCT. If we can achieve a reduction of transmission to infants, surely we can envision providing treatment to their parents as well, as part of global efforts to prevent and treat HIV infections.”

- Dr. Catherine Wilfert, Scientific Director
Elizabeth Glaser Pediatric AIDS Foundation

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ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Care
ART	Antiretroviral Therapy
ARV	Antiretroviral
BCC	Behavior Change Communication
BCI	Behavior Change Interventions
BF	Breastfeeding
CTA	Call to Action
CTR	Counseling, Testing and Referral
EBEW	Exclusive Breastfeeding/Early Weaning
ECV	External Cephalic Version
EGPAF	Elizabeth Glaser Pediatric AIDS Foundation
HAART	Highly Active Antiretroviral Therapy
HIV	Human Immunodeficiency Virus
IFC	Infant Feeding Counseling
IPP	Infant Postexposure Prophylaxis
MTCT	Mother-to-Child Transmission of HIV Virus
NGO	Non-Governmental Organization
NRTI	Nucleoside Reverse Transcriptase Inhibitor
NNRTI	Non-Nucleoside Reverse Transcriptase Inhibitor
NVP	Nevirapine
OI	Opportunistic Infection
PCR	Polymerase Chain Reaction
PEP	Post-Exposure Prophylaxis
PI	Protease Inhibitor
PLWHA	Persons Living with HIV/AIDS
PMTCT	Preventing Mother-to-Child Transmission
PROM	Premature Rupture of Membranes
PTCT	Parent-to-Child Transmission
RF	Replacement Feeding
ROM	Rupture of Membranes
SM	Safe Motherhood
SNL	Saving Newborn Lives
STI	Sexually Transmitted Infection
TB	Tuberculosis
TBA	Traditional Birth Attendant
TIPS	Trials of Improved Practices
VCT	Voluntary Counseling and Testing
VL	Viral Load
WHO	World Health Organization
UNICEF	United Nations Children's Fund
UNGASS	United Nations General Assembly Special Session
USAID	United States Agency for International Development
ZDV	Zidovudine (also known as AZT)

SUMMARY

HIV/AIDS is a critical development issue in Sub-Saharan Africa, where a disproportionate number of all HIV/AIDS infections occur. HIV prevalence is now as high as 40% among antenatal care attenders in some parts of Africa. At the same time, in many Sub-Saharan African nations, maternal deaths from direct obstetric causes are also extraordinarily high compared to other regions. Almost half of all maternal deaths that occur each year take place in Africa. AIDS-related maternal deaths have increased dramatically and have recently begun to outpace the already alarming number of deaths from obstetric causes. The high prevalence of both obstetric-related maternal mortality and HIV among pregnant women in most African nations clearly indicates the need for programs that simultaneously address both problems.

One disturbing aspect of the HIV/AIDS pandemic is the number of infants who become HIV+ through maternal transmission of the HIV virus that can occur during pregnancy, birth, and during breastfeeding. It is estimated that in 2001 800,000 infants were infected with HIV through mother-to-child transmission, almost 90% of them in Sub-Saharan Africa. At country level, this translates to an estimated 40,000 AIDS-related infant deaths in Uganda, and 56,000 in Kenya each year.

Interventions to prevent mother-to-child transmission of the HIV virus (PMTCT) are now an important part of HIV/AIDS reduction programs worldwide. During the past several years, researchers have learned many valuable lessons about reducing Mother-to-Child Transmission (MTCT) of HIV in resource-poor settings. One of the greatest challenges facing program planners is the need to translate lessons learned from short-term clinical trials to date into effective, actionable, large-scale program interventions.

This discussion paper is intended to encourage dialogue and generate feedback from PMTCT and Safe Motherhood (SM) program planners and implementers who share the responsibility for shaping interventions to prevent mother-to-child transmission of HIV, and to improve maternal and newborn survival through conventional safe motherhood interventions. The paper reviews research results and field experience from a behavior change perspective, to see what can be applied to develop and strengthen the essential behavior change component of PMTCT programs. It briefly discusses some of the operational challenges faced by PMTCT programs documented in the literature, and how a behavior change approach could help to address them.

The paper focuses on those PMTCT program elements related to improved obstetric practice and discusses the potential synergies of integrating PMTCT and SM programs, particularly the behavior change components. **It makes literature-based recommendations for increasing the emphasis on and funding for the improved obstetric practice component of PMTCT programs; and shows how the PMTCT literature supports the need to prioritize operations research to better document the contribution of improved obstetric practice to reduce MTCT during labor, delivery and early postpartum.**

Both PMTCT and SM program planners may not always prioritize behavior change interventions (BCI) among the many program elements they are responsible for. This paper identifies the common behavioral objectives of PMTCT and SM programs - emphasis behaviors - and logical ways to integrate promotion of joint objectives. It suggests a framework and rationale for a set of integrated strategic behavior change interventions to support PMTCT and SM programs. It proposes next steps required for policy makers and planners to begin to develop and implement integrated field programs. Extensive references are provided for readers who want more detail on specific topics.

The review of the literature contained in this paper is an essential first step in developing research-based behavior change interventions. The paper briefly describes the CHANGE Project approach to behavior change, and some innovative methodologies already used by CHANGE and other safe motherhood programs that could be applied to PMTCT behavior change programs as well. It highlights the contribution that innovative behavior change methodologies could make to increasing acceptability and utilization of PMTCT services and treatment regimens; identifies key areas where a strategic multi-level approach to behavior change could enhance current PMTCT program results; and suggests developing a

set of standardized tools that can accelerate scaling-up of strategic, integrated behavior change interventions that support SM, PMTCT and newborn survival programs.

Barriers to Preventing Mother-to-Child HIV Transmission

There are three main mechanisms that are essential for maximally effective reduction of MTCT: 1) reducing maternal viral load with ART, 2) preventing avoidable exposure to maternal virus at birth through improved obstetric practice and 3) reducing exposure to HIV through breastfeeding. **Currently, improved obstetric practice is not receiving equal program emphasis. All three mechanisms should be addressed in PMTCT programs, especially in the behavior change program component.**

Despite impressive achievements in a short timeframe, the current level of success of PMTCT programs in reaching pregnant women and their newborns with ART and other program components demonstrates the need for rapid action to refine and strengthen PMTCT behavior change strategies. Documented barriers, all of which can be addressed with behavior change interventions, include:

- missed opportunities to offer, or low uptake of, VCT during routine ANC
- low levels of acceptance of HIV testing where it is available, by both pregnant women and partners
- failure to return for HIV test results where rapid testing is not available
- inadequate acceptance of ART offered to HIV+ women at ANC
- insufficient use of facility-based delivery where improved obstetric practices can be used, and ART for mother and newborn can be supervised
- poor adherence to “take-home” ART for mother and newborn when given to HIV+ women at ANC
- low coverage of newborns with ART even when delivered in facility
- low uptake of recommended infant feeding behaviors to minimize MTCT

Integrating Behavior Change to Promote PMTCT and SM

Several key interventions to improve both maternal and newborn survival are common among safe motherhood, PMTCT and Saving Newborn Lives (SNL) programs. Many take place around the time of labor, delivery, and early postpartum. One of the most important potential linkages between PMTCT, SM and SNL programs is collaboration to identify, strengthen and integrate overlapping program emphases, and to access the substantial expertise and experience in the safe motherhood community. Vertical PMTCT programs with emphasis solely on PMTCT may miss valuable opportunities to help avert common obstetric and newborn emergencies. This could result in successfully preventing mother-to-child transmission of HIV, only to have the new mother or newborn die from an avoidable obstetric-related cause.

Key points:

- The most significant overlap between behavior change objectives of PMTCT and SM programs occurs in the area of improved obstetric practices.
- Most perinatal transmission of HIV occurs during delivery, so this period should be the target of the most intensive PMTCT program efforts.
- Much more emphasis should be placed on accumulating an evidence base for the contribution of improved obstetric practices to reducing MTCT.
- A suggested point of entry to begin integrating SM/PMTCT behavior change interventions is to focus on reducing delays in obstetric careseeking, in order to reduce prolonged labor and rupture of membranes (ROM) longer than four hours. Both are important contributing factors to MTCT of HIV.

- It is estimated that every year more than a million women infected with HIV deliver babies at home without professional help. One of the most important PMTCT behavior change interventions may be to inform communities and professional and traditional birth attendants that whether a birth takes place at home or in a health facility, there are improvements in childbirth-related behaviors that can help to reduce HIV transmission not only to newborns, but also to birth attendants and others who may be present during and immediately after birth.
- In addition to improving obstetric practices in maternity facilities, a set of simple, realistic obstetric behaviors to reduce MTCT during home births should be a component of all PMTCT programs in settings where home births predominate.
- Timely use of skilled obstetric care and reducing delays in seeking, reaching and receiving skilled childbirth care should be part of behavior change objectives of PMTCT programs.
- Behaviors that potentially reduce prolonged exposure to ruptured membranes should be emphasized to both skilled and traditional birth attendants, families and communities.
- “Nesting” recommended PMTCT behaviors in already established SM programs may help to minimize stigma and “normalize” PMTCT interventions as part of routine maternity care.
- PMTCT program emphasis on ART and infant feeding without addressing obstetric practices may result in deterioration rather than improvement in obstetric practices.

Behavior Change Approach

Behavior change methodologies and approaches that could be more widely utilized in integrated PMTCT/SM programs include:

- Reinforce need for strategic, multi-level, research-based behavior change (BC) interventions.
- Develop and promote a set of EMPHASIS BEHAVIORS that contribute to the common goals of PMTCT, SM, and SNL programs.
- Develop setting-specific approaches that are tailored to the needs of PMTCT/SM programs, for example in areas with low use of facility-based childbirth; high use of facility-based childbirth, “mixed” use of facility birth.
- Add innovative methods such as concept testing, trials of improved practices (TIPS), and positive deviance (doer/non-doer) to research methods used to date.
- Use “generic” PMTCT/SM behavior framework as a broad guide; validate locally and adapt.
- Integrate separate frameworks for stigma, PMTCT, BCC that are now in use to create one comprehensive BCI approach.

Next Steps

There are many steps that must be taken to speed both the integration of PMTCT and safe motherhood programs. Some activities to support this at the global/donor level include:

- Plan a meeting of representatives of key organizations working in PMTCT and SM behavior change to accelerate development of PMTCT BC support materials for country programs.
- Collaboratively outline next steps for implementing comprehensive PMTCT behavior change program components.

- Develop strategies and activities to help PMTCT and SM programs more rapidly integrate program objectives, behavior change objectives, and delivery of integrated services
- Develop plans for operations research to provide needed information on the potential effectiveness of improved obstetric practice in facilities and in communities, even in settings where NVP treatment is not yet offered; and on the effectiveness of various PMTCT BC approaches.
- Develop a “diagnostic” tool to assess local capacity to adapt and implement comprehensive PMTCT behavior change interventions. This BC-specific tool would complement the country assessment tools now being used in several countries.
- Develop a simple, standardized set of qualitative research instruments that all PMTCT programs could use. Results would be comparable and more easily compiled to determine trends.
- Develop and pretest PMTCT BC materials, including a set of facility-based and community-based “PMTCT Counseling Cards” and a Users Guide, that contain simple information on the full set of PMTCT behaviors. The two sets of cards should be appropriate for health facility use by providers, or community health workers in homes and communities, and should contain the basic information required for families to make informed choices about options for the many PMTCT behaviors.

INTRODUCTION

During the past several years, researchers investigating the role and effectiveness of various regimens of antiretroviral therapy (ART) have learned many valuable lessons about reducing Mother-to-Child Transmission (MTCT) of HIV in resource-poor settings. Recently, increased availability of ARVs in developing countries has made it possible to expand the reach of ART from pilot research studies, to begin planning and implementing national programs. One of the greatest challenges facing program planners is the need to translate lessons learned from short-term clinical trials to date into effective, actionable, large-scale program interventions.

Several comprehensive review papers have compiled the results of clinical trials and related field experience, providing detailed program guidance and clinical protocols for many aspects of Preventing Mother-to-Child Transmission (PMTCT) program design and content. Because most ARV-based PMTCT programs were initiated within the past few years, many are still “works-in-progress.” Consequently, some results from these large-scale pilot implementation programs have not yet been formally published. As a result, in addition to available published literature, this review includes unpublished data, abstracts presented at recent technical conferences, and information gathered through personal communication with donors, program planners and program implementers who are collaborating to prevent Mother-to-Child Transmission of HIV.

This paper reviews research results and field experience from a behavior change perspective, to see what can be applied to develop and strengthen the essential behavior change component of national PMTCT programs. It focuses on those PMTCT program elements related to improved obstetric practice and discusses the potential synergies of integration of the behavior change component of PMTCT and Safe Motherhood programs. It is intended to encourage dialogue and generate feedback from program planners and implementers who share the responsibility for shaping behavior change interventions, both to prevent mother-to-child transmission of HIV, and to increase maternal and newborn survival through conventional safe motherhood interventions.

Several assumptions that underlie this discussion paper should be clearly stated. First, it is impossible to break the chain of Mother-to-Child Transmission of HIV without addressing the antecedents -- maintaining HIV negative status among women through primary prevention and preventing unwanted pregnancies among women who are already HIV+. **Although this paper focuses on PMTCT, specifically on improving obstetric practices, it does so within the framework of the World Health Organization’s (WHO) Four-Pronged Approach to Prevention of MTCT** (45, 139, 183, 184).

Second, it is important to recognize a growing consensus away from using the standard term “**Mother-to-Child Transmission**” as it may generate or perpetuate the perception that women should bear the responsibility for and stigma related to HIV+ transmission to their infants. Consequently, there is a move toward broader use of the term “Parent-to-Child Transmission.” Nevertheless, as this paper deals primarily with behaviors related to improved obstetric practices and safer motherhood (which also emphasizes male responsibility despite the term), the term MTCT is used throughout.

Rapid changes in funding and ARV availability have combined to make the goal of long-term treatment of HIV+ pregnant women with highly active antiretroviral treatment (HAART), improving their own health outcome as well as that of their infants, more realistic. PMTCT programs as they are currently designed provide short-term ART to pregnant women primarily to improve newborn outcomes. These can be seen as “bridging the gap”, an interim approach to lay the foundation onto which long-term HAART interventions, such as MTCT-Plus (52), can be built. Although this paper focuses on the behavior change requirements of PMTCT programs as they are currently designed, most of the recommendations will apply to MTCT-Plus programs as well.

I. BACKGROUND

HIV/AIDS remains a critical development issue in most Sub-Saharan African nations (19, 191, 198). As HIV prevalence increases, deaths from AIDS and AIDS-related infections continue to erode hard-won reductions in maternal and child mortality achieved through a decade of maternal and child health and survival programs. In Eastern and Southern Africa, for example, infant mortality is one-third to two-thirds higher than would have been expected in the absence of HIV/AIDS (25, 211).

In many Sub-Saharan African nations, the rate of maternal deaths from direct obstetric causes is already extraordinarily high compared to other regions. Of the more than 500,000 maternal deaths that occur each year, half occur in Africa (78). HIV prevalence is now as high as 40% among antenatal care attenders in some parts of Africa (204, 210). AIDS-related maternal death rates have increased dramatically and have recently begun to outpace the already disproportionate number of deaths from obstetric causes. The consequences of this almost inconceivable number of maternal and infant deaths from AIDS are devastating to families, communities and national health systems alike.

Among the most tragic aspects of the HIV/AIDS pandemic is the number of infants who become HIV+ through maternal transmission of the HIV virus that can occur during pregnancy, birth, and during breastfeeding. It is estimated that in 2001 800,000 infants were infected with HIV through Mother-to-Child Transmission (26), almost 90% of them in Sub-Saharan Africa. At country level, this translates to an estimated 40,000 AIDS-related infant deaths in Uganda (141), and 56,000 in Kenya **each year** (130).

The high prevalence of both obstetric-related maternal mortality and HIV among pregnant women in most African nations clearly indicates the need for programs to address both problems (11, 12). WHO recommends that MTCT prevention interventions should not stand in isolation, but be integrated whenever possible, strengthening the quality of maternity services as a means to strengthen delivery of PMTCT interventions concurrently. Integrating these interventions should be seen as part of a wider response to HIV/AIDS, which includes expanding access to care and support (207).

Almost all PMTCT programs acknowledge the importance of integrated programs utilizing existing maternal and child health infrastructure as a foundation for PMTCT interventions (11, 12, 66, 81, 156, 198, 210). However, despite widespread consensus on the need to do so, some PMTCT programs have not fully explored potential areas of integration with safe motherhood programs, or actually implemented integrated interventions. Conversely, many safe motherhood programs have not yet integrated PMTCT interventions into their program content.

A closer look at the commonalities between PMTCT and SM program and behavioral objectives, particularly in the area of behavior change, might help to enhance the effectiveness of both types of programs. This intersection of PMTCT and SM program objectives suggests new dimensions for the behavior change components of both programs. It requires a critical rethinking of the design, content, and funding mechanisms for these two primarily vertical programs.

Preventing Mother-To-Child HIV Transmission: The Four-Pronged Approach of WHO

HIV prevention efforts overall now reach fewer than one in five people at risk (45). The challenges involved in preventing mother-to-child HIV transmission are even greater, and progress has not been as rapid as expected. In response to the United Nations General Assembly Special Session (UNGASS) goal of reducing MTCT by 20% by 2010, the World Health Organization (WHO) developed an approach to prevention of Mother-to-Child Transmission of HIV/AIDS that has been adopted as the global model. The original WHO model suggested a three-pronged approach to prevention of Mother-to-Child Transmission of HIV/AIDS -- primary prevention to help all women remain HIV negative; prevention of unwanted pregnancies among women who are already HIV+; and reducing perinatal transmission of HIV among HIV+ pregnant and breastfeeding women. This has recently been expanded to include a fourth prong -- care and support. This paper focuses on the third prong -- preventing mother-to-child HIV transmission. Preventing mother-to-child HIV transmission programs can be divided into interventions during

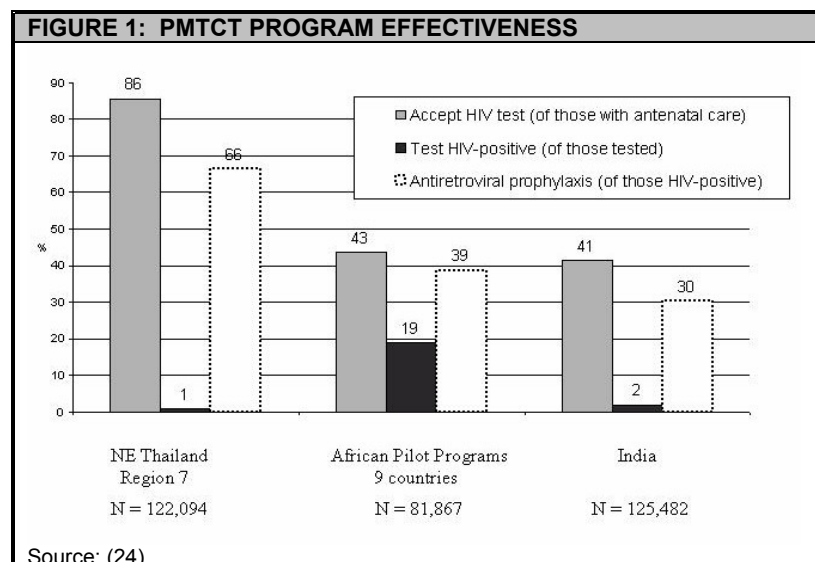
pregnancy; during labor and delivery and early postpartum; and, where breastfeeding is the norm, during at least the first 4-6 months after birth (63).

Barriers to Preventing Mother-to-Child HIV Transmission

There are three main mechanisms – 1) reducing maternal viral load with ART, 2) preventing avoidable exposure to maternal virus at birth through improved obstetric practice and 3) reducing exposure to HIV through breastfeeding - that are essential for maximally effective reduction of MTCT. To meet the UNGASS PMTCT goal, at least 70% of HIV+ women in developing nations would need to be reached with these program elements. Estimates vary but currently far less than 20% of HIV+ women in these countries receive any form of ART, a key element in reducing MTCT. Some sources suggest coverage may be closer to 5%, or even as low as 1% in Sub-Saharan Africa (206, 210).

It is believed that the availability of ARV and other medical treatment (WHO's Prong 4), and access to social and financial support structures, positively influence uptake of VCT and related PMTCT program services (15, 211). Further scientific advances in perinatal prophylaxis, greater reduction of postnatal HIV transmission through breastfeeding, or wider availability of HAART could also more rapidly accelerate current progress in PMTCT (24, 82, 211). However, for programs as they are now structured to move rapidly enough to meet UNGASS goals, ANC utilization would need to be at least 90%, acceptance of VCT 70%, and acceptance of ART (nevirapine) 75% (184). Actual PMTCT program results have been variable, and the results are sometimes difficult to compare due to differences in drug regimens employed and reporting formats.

Figure 1 shows coverage rates for several key PMTCT program services in UNICEF pilot programs in Thailand, Africa and India, and provides a good overview of regional differences in PMTCT program achievement. In Thailand, where HIV prevalence is lower and maternal health care infrastructure is stronger, 86% of ANC attenders participating in UNICEF pilot programs accepted VCT, 1% tested HIV+, and 66% of HIV+ pregnant women received ART. In India, where HIV prevalence at ANC is also relatively low, 41% of ANC attenders accepted VCT, 2% tested HIV+, and 30% of HIV+ pregnant women received ART. In combined data from 9 countries in Africa, 43% of ANC attenders accepted VCT, 19% tested HIV+, and 39% of HIV+ pregnant women received ART.



In another example using combined data from Call to Action (CTA) program participants, among 110,000 total women tested at ANC, 90% were counseled, 80% tested, and among the 17% who tested positive, 58% of women and 30% of their newborns received ARV therapy (26). In a Kenyan program, 73% of women attending ANC were offered VCT, 89% offered VCT accepted, and of the 6% of women who tested HIV+, 64% accepted treatment (49/76) (5). In Botswana, 56% of ANC attenders accepted

counseling, 52% of those counseled were tested, 52% of women who tested HIV+ received ARV therapy, and only 1/3 of those completed the course of therapy (132).

Despite impressive achievements in a short timeframe, the current level of success of PMTCT programs in reaching pregnant women and their newborns with ART and other program components demonstrates the need for rapid action to refine and strengthen PMTCT behavior change strategies. Documented barriers, **all of which can be addressed with behavior change interventions**, include:

- missed opportunities to offer, or low uptake of, VCT during routine ANC
- low levels of acceptance of HIV testing where it is available, by both pregnant women and partners
- failure to return for HIV test results where rapid testing is not available
- inadequate acceptance of ART offered to HIV+ women at ANC
- insufficient use of facility-based delivery where improved obstetric practices can be used, and ART for mother and newborn can be supervised
- poor adherence to “take-home” ART for mother and newborn when given to HIV+ women at ANC
- low coverage of newborns with ART even when delivered in facility
- low uptake of recommended infant feeding behaviors to minimize MTCT

Strengthening Capacity of Maternal Health Services to Prevent MTCT

Recent analysis of data on cost effectiveness from ten pilot PMTCT programs concludes that the costs associated with the third prong of WHO's PMTCT program model, reducing rates of MTCT, are substantially higher than the costs of the preventive components (183). Part of the comparatively high cost of PMTCT can be attributed to the limited efficacy of the most commonly used ARV, nevirapine, which is only 47% effective even under ideal conditions. However, the costs involved in strengthening the health infrastructure so that ART can be more effectively delivered is also a major factor, as are other factors such as low acceptance of voluntary counseling and testing (VCT), and low acceptance of and adherence to ART by women and families.

The need to build PMTCT programs into existing maternal and child (MCH) services in resource-poor countries is widely acknowledged. Antenatal care (ANC) is a logical entry point for introduction of a package of PMTCT services, since many pregnant women already attend ANC regardless of HIV status. A recently released set of practical guidelines for developing community-based PMTCT programs supports this integrated approach, suggesting that PMTCT programs build on a framework of strong and comprehensive MCH services within which all possible opportunities to prevent MTCT are utilized (90). In theory, since many elements of PMTCT programs overlap with existing safe motherhood (SM) and MCH programs, rapid integration should be possible. Improving PMTCT services within a framework of existing MCH services would likely have the “spillover” effect of improving quality of care for all pregnant women and their newborns.

Identifying the specific components of the existing maternal health infrastructure that require strengthening, and strategic planning for improvements to increase effectiveness are therefore key initial steps for integrated PMTCT interventions. Several assessment tools are now in use (95). A 49-country study rated country-specific access to 81 elements of maternal care at district hospital and health center levels (23). Most findings were consistent with well-recognized patterns of maternal health service delivery. With the exception of Egypt and South Africa, all other African countries were categorized as weak, very weak, or extremely weak. Typical urban/rural disparities were evident, with differences of up to one third in access to key services noted between urban and rural women. On average, less than 50% of rural women in study countries delivered with the assistance of a skilled attendant. Availability of many key elements of emergency obstetric care was inadequate, and early postpartum care coverage was very low.

Furthermore, **some maternal health services perceived as routine received even poorer ratings than emergency obstetric care**. Labor was not routinely monitored to detect obstetric complications.

Use of partographs, a relatively “low-tech” and extremely effective tool for detecting prolonged labor that could be an important element in improved obstetric practice for PMTCT, was also found to be low. HIV counseling and testing as part of antenatal care was routinely available in only 30% of facilities (23). Thus, **counseling and testing for HIV, a critical element of PMTCT services, was the least available among ANC services included in the study.**

A PMTCT approach based on improving the current capacity of the existing maternal health infrastructure in many African nations, particularly in remote rural areas where HIV prevalence is often high, will require both the commitment and the resources to substantially improve overall quality of maternal and newborn care in many settings.

Safe Motherhood Program Experience

Several key interventions to improve both maternal and newborn survival are common among safe motherhood, PMTCT and Saving Newborn Lives (SNL) programs. Many take place around the time of labor, delivery, and early postpartum. One of the most important potential linkages between PMTCT, SM and SNL programs is collaboration to identify, strengthen and integrate overlapping program emphases, to access the substantial expertise and experience in the safe motherhood community. Vertical PMTCT programs with emphasis solely on PMTCT may miss valuable opportunities to help avert common obstetric and newborn emergencies. This could result in successfully preventing mother-to-child transmission of HIV, only to have the new mother or newborn die from an avoidable obstetric-related cause. Conversely, some SM programs in areas of high HIV prevalence are missing valuable opportunities to integrate PMTCT into their program activities.

Safe Motherhood programs have almost two decades of experience implementing interventions to improve quality of maternal and newborn care in resource-poor countries. In addition to service improvements, behavior change interventions to promote timely use of maternity services have been a critical element in the success of safe motherhood programs. Several reviews describe and discuss the effectiveness of safe motherhood behavior change interventions (100, 103, 122, 124). Almost all SM program objectives, and the associated behaviors, are complementary to PMTCT program objectives. Key SM program objectives are:

- to increase timely use of skilled birth attendants by all pregnant women,
- to increase timely use of skilled care in obstetric and newborn emergencies,
- to increase timely use of early postpartum care by both mothers and newborns, including a visit to or by a skilled attendant within the first few days following delivery, and
- to improve household and community preparedness for birth, especially readiness for obstetric complications and timely use of focused ANC.

Safe motherhood birth preparedness interventions address well-documented delays (188) in seeking, reaching and receiving skilled care for both normal births and obstetric complications (28, 84, 92, 120, 121, 164, 168) through coordinated activities at household, community and maternity facility level. Improving birth preparedness helps to reduce delay in recognition of obstetric conditions such as premature rupture of membranes, and danger signs such as prolonged labor, both of which also adversely affect MTCT.

Birth preparedness interventions also promote timely use of skilled obstetric care by encouraging all pregnant women to deliver at health facilities and strengthening links between traditional birth attendants (TBAs) and maternity facilities. Increasing facility-based births, in addition to reducing maternal mortality, could also improve receipt of two key PMTCT interventions – ART for mother and newborn and improved obstetric practices. PMTCT programs can benefit from lessons learned by safe motherhood programs that have improved obstetric practices and implemented successful behavior change interventions.

The most significant overlap between behavior change objectives of PMTCT and SM programs occurs in the area of improved obstetric practices. Most perinatal transmission of HIV occurs during delivery, so this period should be the target of the most intensive PMTCT program efforts. A suggested point of entry to begin integrating SM/PMTCT behavior change interventions is to focus on reducing delays in obstetric careseeking, in order to reduce prolonged labor and rupture of membranes (ROM) longer than four hours. Both are important contributing factors to MTCT of HIV.

It is estimated that every year more than a million women infected with HIV deliver babies at home without professional help. One of the most important PMTCT behavior change interventions may be to inform communities and professional and traditional birth attendants that whether a birth takes place at home or in a health facility, there are improvements in childbirth-related behaviors that can help to reduce HIV transmission not only to newborns, but also to birth attendants and others who may be present during and immediately after birth. Timely use of skilled obstetric care and reducing delays in seeking, reaching and receiving skilled childbirth care should be part of behavior change objectives of PMTCT programs. Behaviors that potentially reduce prolonged exposure to ruptured membranes should be emphasized to both skilled and traditional birth attendants, families and communities.

“Nesting” recommended PMTCT behaviors in already established SM programs may help to minimize stigma and “normalize” PMTCT interventions as part of routine maternity care. In addition to improving obstetric practices in maternity facilities, a set of simple, realistic obstetric behaviors to reduce MTCT during home births should be a component of all PMTCT programs in settings where home births predominate.

PMTCT Program Experience

Several review documents have analyzed the abundance of information generated by PMTCT program experience and field research. Many of the reviews provide guidance on the clinical aspects of ART (9, 18, 22, 27, 30, 32, 33, 35, 41, 42, 43, 44, 63, 70, 72, 79, 109, 131, 156, 160, 181, 182, 186, 194, 209), on the rationale for and design of comprehensive PMTCT programs, and on the implementation, management and monitoring of PMTCT programs (1, 31, 36, 37, 59, 76, 90, 91, 117, 128, 130, 149, 158, 159, 166, 193, 207). Recently, several mid-program evaluations have been conducted, including an assessment of change in obstetric practices in South Africa (14), of program effectiveness in Ndola, Zambia (155), and of the ten UNICEF pilot programs (196). These evaluations provide valuable lessons learned and suggestions for improved programs.

Commonly encountered barriers documented in the literature include missed opportunities to offer VCT during routine ANC care; low levels of acceptance of HIV testing where it is available; failure to return for HIV test results in settings where rapid testing is not available; inadequate acceptance of ART when it is offered to eligible women, and poor adherence to/uptake of ART by both mothers and newborns; and low acceptance of recommended infant feeding behaviors (184). Although many of these operational barriers can be attributed to structural factors, behavioral factors also play a large role. There is widespread agreement on the importance of behavior change interventions to identify, address and reduce these behavioral constraints.

Components of PMTCT Program Design

There are three main mechanisms that are essential for maximally effective reduction of MTCT: 1) reducing maternal viral load with ART, 2) preventing avoidable exposure to maternal virus at birth through improved obstetric practice and 3) reducing exposure to HIV through breastfeeding. **All three mechanisms should be addressed in PMTCT programs, including the behavior change program component.** Although the introduction of PMTCT services has rekindled interest in lobbying for better quality ANC and delivery care in some settings (154), improved obstetric practice is not receiving equal program emphasis in many PMTCT programs. Some programs utilize a comprehensive MCH-based approach that addresses all three mechanisms of MTCT. Other programs focus on particular PMTCT interventions and identify themselves as “nevirapine-based” (180) or “infant feeding-centered” (155).

“Short-cuts” to Delivery of PMTCT Services

Despite the acknowledged importance of systematically strengthening the maternal and newborn care infrastructure, the challenges involved in strengthening overall service capacity as a foundation for PMTCT services, coupled with low utilization of some maternal services, have prompted some PMTCT programs to take “short-cuts” to deliver PMTCT interventions. Some “short-cuts”, like using rapid HIV testing methods (112, 161), simply streamline part of the conventional VCT process, eliminating the huge barrier of non-return for test results when older HIV testing methods are employed. Other “short-cuts” bypass the conventional PMTCT service delivery mechanisms that rely on VCT to identify HIV+ pregnant women (181, 208), HIV screening during labor (16, 88), or create alternative mechanisms to provide NVP therapy to women and newborns who are not likely to deliver at a health facility where NVP treatment is offered (27, 180, 181). Although these short-cuts that bypass conventional steps in PMTCT service provision do not help to strengthen overall MCH service capacity, they have been shown to be effective alternatives for reaching hard-to-reach HIV+ pregnant women with ART (140, 180, 181). Based on results of operations research, setting-specific, combination approaches that utilize both conventional and alternative PMTCT service delivery mechanisms have been suggested (181).

The specific behaviors to be promoted as part of the behavior change component of PMTCT programs must be modified to reflect the different program emphases and service delivery mechanisms described above. For example, for programs that treat HIV+ pregnant women through conventional channels, increasing acceptance of VCT, improving adherence to ART, and improving infant feeding practices are all critical behaviors. For programs in high HIV prevalence settings that adopt “universal” treatment of all pregnant women with NVP without prior determination of HIV status, the behavioral focus shifts to ART adherence and infant feeding.

II. LOOKING AT PMTCT INTERVENTIONS FROM A BEHAVIOR CHANGE PERSPECTIVE

The concept of behavior-based programming is central to a behavior change approach to reducing Mother-to-Child Transmission of HIV. This places behaviors at the center of the program design process. A behavior change approach is a process for planning and implementing a comprehensive, strategic set of interventions and activities that aims to change behaviors at many levels to achieve a health objective. A behavior change approach identifies priority behaviors for change, uses qualitative research among critical target audiences to define major factors influencing these behaviors and recommends a research-based set of behavior change interventions. A broad range of interventions might be required to change behaviors directly as well as to create a supportive community and policy environment for change. This usually requires expanding the range of “behavior change” activities beyond conventional communication, to link and coordinate communication activities with training, health systems support, product and service improvements and policy changes that may not usually be recognized as essential components of a behavior change strategy.

A comprehensive approach to behavior change to prevent mother-to-child HIV transmission recognizes that behavior change does not result from increasing knowledge alone. Many contextual factors, including the behaviors of a wide family and community network, influence individual behavior change. Creating an “enabling environment” – addressing barriers, resistances and motivators - is essential. The strategic selection and implementation of an appropriate set of behavior change interventions can help to directly improve PMTCT practices and help to create a supportive, “enabling” environment at household, community, health facility and policy levels, within which the recommended behavior changes can best occur.

One of the fundamental principles of the behavior change approach is promoting behavior change in the context of social change. Community engagement, ownership and empowerment are recognized as key to sustained behavior change. At the community level, a behavior change approach focuses on activities that create and sustain an enabling environment for behavior change and social change, building partnerships with communities and developing interventions considering the community’s own assessment of their needs and priorities. Community-centered behavior change interventions promote the empowerment of community partners and encourage collaborative design and implementation of local programs. A community-oriented behavior change approach recognizes people and communities as agents for their own change, placing information within the community for dialogue, debate and collective action and using community-available resources to overcome barriers when feasible. An assets-based approach helps communities identify, strengthen and utilize resources and knowledge that exist within the community itself to support behavior change and improve health outcomes.

Applying a Behavior Change Intervention (BCI) Approach to Preventing Mother-to-Child Transmission of HIV

There are several elements involved in the behavior change approach to PMTCT that are key. Among them are the central concept of behavior-based programming, a standardized format for strategic application of research results to behavior change strategy development, and use of innovative methods such as concept testing, social network analysis, and negotiating behavior change.

Behavior-Based Programming

The concept of behavior-based programming is key. It places behavior change at the center of the PMTCT program design process. As described above, developing a behavioral framework based on a program’s desired health outcomes is the initial step, beginning with clear delineation of the “ideal” behaviors (Figure 2) that would be required of all potential influentials, at all relevant levels of intervention, to achieve the improved outcome. A set of research objectives by category of respondent, based on these ideal behaviors, guides the systematic design of a qualitative research plan and instruments that

contain all the elements, not only to document current behaviors in relation to the “ideals;” but also to explore how current behaviors can be redirected, repatterned or repositioned toward the ideal.

The CHANGE Project is developing a set of qualitative research tools to explore factors influencing PMTCT behaviors. The tools help to organize and analyze information collected about actual behaviors, barriers, motivators, amenability to change, conditions of acceptability and “user characteristics.” Each of these elements is essential to the design of a comprehensive set of research-based PMTCT behavior change interventions.

BCI Strategy Formulation Grid

A standardized format for systematic application of research results to behavior change strategy development has been successfully applied in a wide range of health programs over the past decade (114). One of the most persistent gaps in the design of the behavior change component of programs is that often, even when results from qualitative research that was well-conceived, well-implemented and well-analyzed are available, the results are not systematically carried forward into the strategic design of comprehensive behavior change interventions. The BCI strategy formulation grid suggested for use with the qualitative research instruments to explore factors influencing use of early postpartum care helps to address this gap by providing a simple framework for incorporating research results into BCI strategy design (Appendix I). Other frameworks for PMTCT program strategy design are also in use (55, 56, 192, 195).

Consultative Research: Concept Testing and Negotiated Behavior Change

To date, consultative research may be most widely known through its application to child nutrition (48), but is appropriate to PMTCT as well. Consultative research maximally involves communities and households not only as respondents in the qualitative research, but also in the design, testing and modification of new behaviors to increase acceptability and adoption. For example, in PMTCT research, respondents could be asked for their opinion on the “new” concept of take-home nevirapine for use by mother and newborn at birth. Testing this concept on the ground with the people who must actually agree to try it is critical to assure the potential acceptability of this globally-recognized intervention at the “user interface”.

Negotiating behavior change – talking with women, families and communities to develop realistic, feasible behaviors that come as close to the recommended behaviors as local conditions permit and to determine the specific “conditions of acceptability”- before behaviors, strategies, and interventions have been decided on can increase the likelihood of sustained behavior change.

Localization of Behavior Change Interventions

There is a growing recognition that messages promoting broad behaviors, use of skilled attendance at birth for example, need to be “localized” to have contextual meaning in order to be effective. Too often, “messages” are developed centrally, in countries, regions or even at global level, and may not retain the intended meaning once they reach families and communities who live their lives locally, often within well-defined cultural boundaries. Defining local cultural context and linguistic subtleties can make a generic message locally meaningful and actionable. For example, in some settings, the Western medical interpretation of maternal-fetal blood circulation, a basic concept in mother-to-child HIV transmission, is not shared by women and families (137).

An important initial part of the qualitative research process is developing a lexicon of PMTCT terms. The purpose of this lexicon is more than simple translation of predominantly Western-oriented medical terms and concepts into the local language. A well-researched lexicon also captures the colloquialisms or local “slang” terms. As many traditional cultures have a strong, vital oral tradition, there are also often proverbs, idioms and rhymes that are used to indirectly express concepts that are culturally sensitive. Documenting the precise words, phrases and concepts that communities themselves use allows them to be skillfully

woven into behavior change materials and messages to increase local comprehension. This localization process has been called the “house-to-home” metaphor by UNAIDS.

A Framework for PMTCT Behavior Change

The development of a PMTCT behavioral framework requires: identification of the “ideal” behaviors that will be recommended; a thorough understanding of the actual behaviors in the program area and the factors underlying those practices; documentation of barriers, resistances and motivating factors; development of a set of feasible local behaviors based on the above information; identification of the audiences that will need to be targeted; and a strategic plan to encourage family and community dialogue about PMTCT and create the enabling environment required to support the adoption and maintenance of the recommended behaviors.

A number of separate interventions over a time period of many months -- during pregnancy, birth, postpartum, and during breastfeeding -- are required to prevent MTCT, and each intervention has a particular set of behaviors that should occur. The full set of interventions and behaviors must be promoted in a comprehensive way to effectively reduce MTCT. PMTCT interventions include:

During pregnancy:

- Increase acceptance of VCT/CTR to identify HIV+ women who can benefit from ART
- Reduce maternal viral load through short course ART (when continuous HAART is not available)
- Promote condom use to woman and all partners; and to partners sexual networks to avoid infection/reinfection

During labor and delivery and immediate/early postpartum:

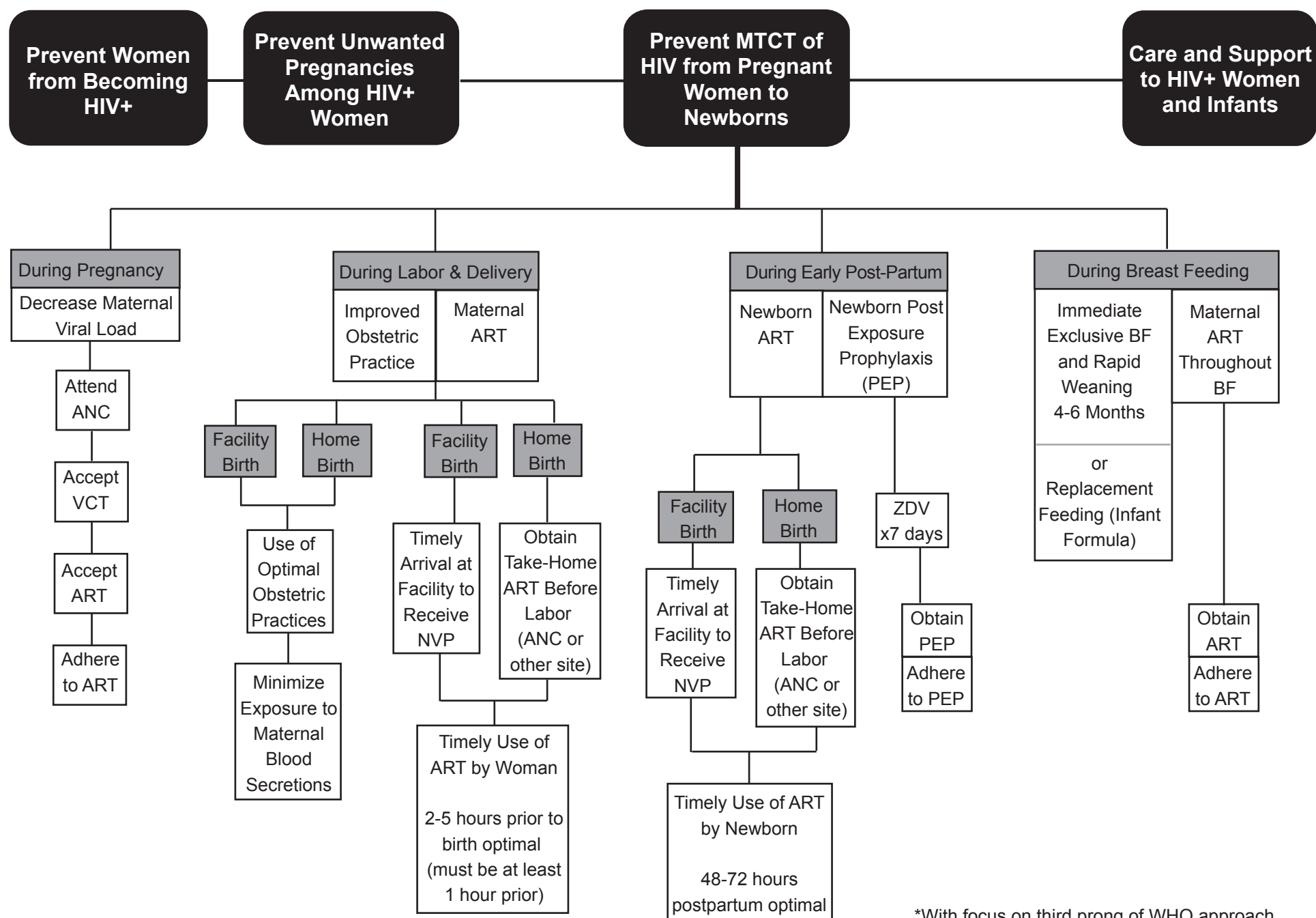
- Modify obstetric practice to reduce newborn exposure to maternal blood and fluids during birth
- Provide maternal/newborn ART (nevirapine or others), 2-5 hours prior to delivery (must be **at least one** hour prior)
- Promote immediate, exclusive breastfeeding (BF)
- In the absence of maternal treatment, provide newborn post-exposure prophylaxis (PEP) with ARVs as soon as possible after birth; but no later than 48-72 hours after birth

During the months after birth:

- Promote exclusive breastfeeding and rapid, early weaning (EBEW) at 4-6 months, or exclusive replacement feeding (RF)
- Promote condom use to woman and all partners; and to partners' sexual networks to avoid infection/reinfection

Each intervention above addresses a particular aspect of perinatal HIV transmission. Each intervention has associated behaviors that involve individual pregnant women and new mothers, family members, and professional and traditional healthcare providers. While each element of the set of interventions/behaviors exerts its own effect on the reduction of MTCT, optimal results occur when the full set of interventions and the associated behaviors are put into practice.

Figure 2 suggests the components of a generic PMTCT behavioral framework based on this set of interventions. **Some of the recommended PMTCT behaviors represent major changes in common practice for women, families and health care providers (85).**

FIGURE 2: A FRAMEWORK FOR PMTCT BEHAVIOR CHANGE*

*With focus on third prong of WHO approach

Figure 2 lists **only the behaviors associated with Prong Three** of the WHO Four-Prong Approach to PMTCT, and focuses on client behaviors. A recent review paper discusses behavior change and program implications of Prongs One and Two, preventing women from becoming HIV+ and preventing unwanted pregnancy among HIV+ women (157).

PMTCT behaviors overlap significantly with commonly promoted safe motherhood behaviors. Appendices IIA, IIB and IIC list and compare the behaviors by audience (pregnant women, TBAs, professional maternal care providers) for safe motherhood programs and for PMTCT programs; identify the behaviors common to both programs; and list the additional behaviors that should be added to conventional safe motherhood behavior change interventions to integrate PMTCT, and vice versa.

III. DEVELOPING A LOCALLY- APPROPRIATE PMTCT BEHAVIOR CHANGE FRAMEWORK

Figure 2 suggests a generic behavior change framework for Prong Three of PMTCT programs. Each PMTCT program must decide how to adapt this generic framework to the local setting. One of the key factors that PMTCT programs must consider when localizing generic behavior change frameworks is the level of utilization of skilled birth attendants and other components of recommended maternal and newborn care by the population of women they serve. In addition, a realistic appraisal of the local capacity of existing health facilities to deliver each intervention to reduce MTCT is an important initial step. Several guidelines for assessing such capacity have been developed (95, 130).

For example, almost all PMTCT programs include “improved obstetric practice” as one desired outcome of behavior change interventions for their program. But many of the research studies that provided the data on required improvements in obstetric behaviors were conducted either in developed nations or in controlled research settings in Africa, often in urban hospitals in major cities. Therefore, many of the obstetric practices typically listed for “improvement” are hospital or facility-oriented and based on Western medical protocols and procedures. Many are either not practical in rural, resource-poor settings (elective caesarian section for all women, for example) or are obstetric practices that, in reality, are not often practiced as part of daily maternity care in remote rural Africa for a variety of reasons (for example, amniocentesis or chorionic villi sampling, Table 3, page 25). In addition, in many African countries, most women continue to give birth at home and either do not have access to or do not utilize skilled childbirth professionals who can put into practice the recommended improved obstetric behaviors to reduce MTCT.

Understanding the perceptions of women, families and communities in the program area is also important to adapt generic models for PMTCT behavior change programs. A clear understanding of local preferences of each of these groups, the local acceptability of each PMTCT intervention, and their preferred options among the many choices involved with PMTCT interventions and behaviors is essential. This includes information about factors underlying low participation in VCT and low uptake of and adherence to ART, as well as preferred types, sources and providers of PMTCT information and services. Understanding the perceptions of health workers involved in local delivery of PMTCT program services is also essential. Although some PMTCT programs have collected this information, a simple, standardized tool that can be systematically applied by all PMTCT programs to collect these data was not encountered in the literature reviewed to prepare this paper.

BOX 1: INFORMATION NEEDED TO DEVELOP A SETTING-SPECIFIC PMTCT BEHAVIOR CHANGE FRAMEWORK

- level of utilization of professional skilled birth attendants, traditional or family birth attendants, and other components of maternal and newborn care
- realistic appraisal of the local capacity of existing health facilities to deliver each intervention
- knowledge, attitudes, practices, perceptions and preferences about suggested PMTCT behaviors among women, families and communities in the program area
- knowledge, attitudes, practices, perceptions and preferences about suggested PMTCT behaviors among health workers
- assessment of local obstetric practices in facilities and at home

As described earlier, a myriad of behaviors are associated with the technical interventions of comprehensive PMTCT programs, including ANC attendance, acceptance of VCT, improved obstetric practice at home and in health facilities, use of skilled attendance where feasible, participation in and adherence to ART, and immediate exclusive breastfeeding and early weaning or adoption of replacement feeding. This section discusses factors that influence behaviors related to the technical components of

PMTCT programs. Some lessons learned from relevant behavior change experience in safe motherhood programs will be discussed in relation to the specific behavioral challenges that PMTCT presents.

The Overarching Role of Stigma

At the most recent global AIDS conference in Barcelona in July 2002, Nelson Mandela spoke eloquently of the critical importance of knowledge of HIV status as a first step towards receiving HIV/AIDS care and towards survival instead of death. Acknowledging the role of stigma at all levels in delaying progress in AIDS control programs, he urged people worldwide to overcome their fear of stigma and take action to get tested and treated. Perhaps because of such vocal policy-level support for public disclosure, in February 2003, one of South Africa's leading playwrights, Gibson Kente, publicly disclosed his HIV+ status within weeks of learning it himself. He stated "...What is the use of keeping it to yourself? I have HIV...Why not make some use of it" (97). Stigma remains one of the most significant barriers to curbing the global HIV pandemic, and must be addressed in programs. Creating an overall social environment that reduces stigma is an important step to enable people to test and disclose with less fear of discrimination.

A systematic analysis of the different forms and presentations of stigma in each program context is a vital part of programming and planning. One recent review examines the extent and depth of stigma in four countries, discusses the consequences of stigma for PMTCT program effectiveness, and identifies essential elements for programs to tackle directly (175). Several conceptual frameworks have been developed to identify and address HIV/AIDS-related stigma and discrimination (56, 143, 192).

The literature shows that stigma, or fear of stigma, is a factor in almost **every** PMTCT behavior discussed above (56, 73, 137, 167). Fear of disclosure of HIV status to family and community and fear of the stigma attached to being HIV+ are well known factors in low uptake of VCT. In one study in urban Kenya, 100% of respondents believed that VCT offered no privacy or confidentiality (4). Fear of disclosure and stigma has also been mentioned as an underlying factor influencing women's participation in ART (132, 169, 170) and adoption of recommended PMTCT infant feeding behaviors (38, 151).

The behaviors associated with PMTCT have themselves become "markers" that make it difficult to maintain an environment of privacy and confidentiality regarding an HIV+ diagnosis. A pregnant woman whose family sees her taking ARV medications may have no choice but to reveal her HIV status. A woman who abruptly weans her child to avoid MTCT through breastfeeding fears having to justify the deviation in customary practice to relatives and others. Inadvertent disclosure of HIV status, due to visible signs and symptoms or practice of behaviors locally associated with HIV, is more common than deliberate disclosure (137).

Several multi-country studies have provided insights into both overarching themes and variations in local dimensions of HIV/AIDS-related stigma as it applies to PMTCT (85, 137, 175). One report identifies six emerging themes from their research on stigma and PMTCT in Ethiopia, Tanzania and Zambia:

- people are largely unaware that their attitudes and actions are stigmatizing
- language is central to how stigma is expressed
- knowledge and fear interact in unexpected ways that allow stigma to persist
- sex, morality, shame and blame are associated with stigma
- disclosure is simultaneously advocated but acknowledged as difficult and rare
- care and support coexists with stigma

Fear of potential discrimination has been found to be greater than actual discrimination in several settings (60, 137). Understanding and specifically addressing the local dimensions of stigma in program design can improve utilization and acceptance of PMTCT services, such as VCT. For example, in one part of Botswana, there is a widespread belief that the first person tested will be blamed for bringing HIV into the relationship (108). Unwillingness to accept VCT due to this belief could be successfully overcome if correct information is included in clinic and community education.

A study conducted in India, Zambia, Ukraine and Burkina Faso concludes that women, particularly HIV+ women, are repeatedly subjected to the most extensive forms of stigma (175). An extreme manifestation of stigma toward HIV+ women was documented in Cambodia, where a PMTCT program reported that 103/104 HIV+ women were sterilized. The women did not spontaneously request sterilization, but accepted it after receiving post-test counseling (47).

Stigma and Discrimination among Health Workers

HIV/AIDS-related stigma and discrimination is also widespread among health workers. Some stigma among providers is undeniably related to assumptions about the educational, social, economic and class status of HIV+ people. Negative moral judgments about behaviors that led to becoming HIV+ are also widespread. But providers are also vulnerable to fear and concern about their own safety when caring for HIV+ clients, particularly during childbirth. Health workers sometimes fear that HIV acquired through patient contact/occupational exposure would be misinterpreted in the community as due to their own sexual behaviors (137, 202).

In one program in Kenya that investigated health worker attitudes regarding PLWHA during a two-day training workshop, 98% of health workers admitted to feeling at risk of HIV, but all of them attributed this risk to workplace exposure, not their own personal behaviors outside of the workplace (201). This widespread fear of personal exposure to HIV during delivery can significantly affect maternity care.

It has been documented that health workers take extra precautions, such as wearing double-gloves during procedures; that “universal” infection prevention procedures are selectively applied; and that known or suspected HIV+ patients are passed from nurse to nurse for treatment (137). Stigma among health workers can delay or prevent patients from receiving necessary care. HIV+ patients are sometimes refused admission, kept waiting, sent home from maternity facilities to be delivered by TBAs in the community (137), or segregated from other patients. During a labor and delivery assessment undertaken in a rural maternity facility in Kenya for a safe motherhood program, a “no-touch” practice was observed, where any form of touching routine obstetric patients (HIV status unknown to providers) was limited or non-existent (3).

It may be difficult to obtain compliance with the set of improved obstetric practices being recommended to minimize MTCT, without exploring provider fears, correcting misinformation regarding transmission, providing the necessary equipment to improve provider safety while delivering HIV+ women, and addressing stigma and discrimination that influence patient care.

Every category of health worker involved in PMTCT-- including physicians -- can benefit from both skills and attitudinal “upgrades”. Assumptions should not be made that physicians should not be included. For example, in Kenya, a survey of doctors involved in PMTCT programs revealed that doctors need training. 95% of doctors in the study had no counseling skills, despite the fact that they ordered HIV tests for patients at least six times each week (110). Only 0.1% of these doctors had initiated HAART therapy for their patients with AIDS, despite an “elite” client base and an urban location with access to pharmaceuticals. In India, a wide gap between stated physician attitudes toward PLWHA and actual practice was noted (72). This study included assistant professors at the university teaching hospital where much PMTCT research has been conducted. A recent evaluation of PMTCT obstetric practice in South Africa documented gaps in knowledge of some widely accepted treatment protocols even among doctors, who receive much less PMTCT training than other cadres of health workers in that setting (14)

Recommendations in the literature to decrease stigma among health workers include building on expressed intentions not to stigmatize PLWHAs; efforts to create PLWHA-friendly facilities; enabling individuals to participate in the development of and take ownership of non-stigmatizing principles, values and norms, and developing stigma-focused training materials for NGO and community use (98, 175). Expanding the focus of PMTCT to include male partners as well as pregnant women could help to distribute the burden of HIV/AIDS-related stigma more equitably within partnerships (47, 142, 167, 179).

Increasing PMTCT Knowledge and Awareness

Creating widespread community awareness of the full set of behaviors necessary to prevent MTCT is an essential step to improve participation in and adherence to interventions that are part of PMTCT programs. The concept of short course ART at birth to prevent newborn infection is not yet widely understood, nor are drugs for PMTCT, especially in areas where they are not yet a standard part of PMTCT programs. In one such PMTCT program in Ndola, Zambia, a mid-project evaluation demonstrated increased community awareness about mother-to-child HIV transmission during pregnancy from 68% to 72% and MTCT during breastfeeding from 57% to 77%. Despite the critical importance of community awareness and acceptance of obstetric PMTCT interventions, awareness of MTCT during delivery remained low, increasing substantially from 17% to 44% (155).

In many communities, even where PMTCT programs are active, knowledge about mother-to-child transmission is low. Awareness of the mechanisms through which HIV can be transmitted from mother to child is variable at community level. In one study in Uganda, where HIV prevalence among pregnant women remains high, 40% of women knew that MTCT was possible during pregnancy, 58% knew it was possible during delivery, and only 19% knew it could occur during breastfeeding (99). In the same Ugandan study, only 29% of respondents had heard of any drug for PMTCT.

Creating community awareness of the importance of improved obstetric practices to reduce MTCT is also important. Improved obstetric practice cannot be targeted only at health professionals. TBAs, families and communities must be made aware of the obstetric factors contributing to MTCT and how to change practices accordingly.

Risk Perception

Receiving information about PMTCT does not automatically mean that the information is understood or believed. Moral, sexual or other belief systems can override factual information and inhibit processing information into knowledge and action (175). One factor that appears to negatively affect the transformation of information into action is risk perception.

The relationships among HIV knowledge, risk perception, and behaviors in HIV+ women are complex. In a Zambian study, an apparent “disconnect” between HIV risk perception and actual HIV status was documented among recently delivered women. Slightly more than half of women who believed that they were at no or low risk for HIV infection tested HIV+ (179). Among one thousand women in Kwa Zulu Natal, where HIV prevalence at ANC is 38%, self-assessment of personal risk among ANC attenders was inaccurate. 20% of ANC attenders said that their partner had other sexual partners, yet only 15% believed that they were personally at risk of contracting HIV (142).

To address this gap, an AIDS Risk Reduction Model (ARRM) has been described whereby a person gains knowledge about HIV, assigns a level of HIV risk to his/her behaviors, makes a commitment to changing high-risk behaviors, and seeks outside support to maintain the commitment (179).

Strengthening Social Support

Although it is individual women who are most directly involved in adopting recommended PMTCT behaviors, the support of family and community is essential. The support of male partners and elder female family members who often affect practices associated with pregnancy and birth is particularly important. As with safe motherhood, helping women to receive social support and creating an enabling household environment to foster improved PMTCT practices are key objectives. Remembering to take ARVs regularly, arriving on time at a health facility to deliver, and assuring that the newborns of HIV+ mothers get the ART and feeding regimen they require soon after birth can all be facilitated by family members.

Social support has been identified as a principal predictor of coping and adjustment in HIV+ individuals (83). A greater degree of social coherence, measured using a Sense of Coherence Scale, correlated with improved adherence to ART (29). HIV+ women with larger social support networks report better quality of life and self-care practices (67). A conceptual framework for the protective effects of community involvement in HIV/AIDS-related groups has been developed. The framework suggests that interventions based on collective action for social change may be most effective for generating healthy behaviors at community and individual level; and that community involvement reduces risky sexual behavior through effects on peer norms, self-efficacy, positive self-identity (self-affirmation), and alienation. It also proposes burn-out as one negative consequence of community involvement (163).

Peer Support, Community Support and Male Involvement

Several innovative models to increase social support are described in the literature. In Cameroon, PMTCT Support Groups are an integral part of one PMTCT program. These support groups create an opportunity for HIV+ pregnant women diagnosed at ANC to share experiences and link to other support services. The project plans to encourage partners and families of HIV+ women to participate in or start their own support groups (27).

In South Africa, Mothers-to-Mothers-to-Be (M2M2B) is a mentorship program for HIV+ pregnant women. Recently delivered HIV+ mothers return to the ANC facility as mentors to educate, counsel and support HIV+ pregnant women. "Mentor mothers" share from personal experience to encourage adherence with treatment, infant feeding decisionmaking, and to assist with negotiating care and support services. Mentoring resulted in better understanding and greater acceptance of interventions to reduce vertical transmission (13).

The need for increased emphasis on the development of models for program interventions to increase the participation of men in all aspects of PMTCT programs and services has been voiced by many (6, 87, 107, 142, 144, 168, 179). In Kenya, interventions at two sites to increase awareness of and support for PMTCT services include inviting men to the clinic for VCT; community PMTCT education aimed at men; and support groups for women. This resulted in an increase in spousal communication about PMTCT, increases in uptake of VCT among male partners of PMTCT clients (from 13% to 24%, and from 6% to 9%), and increases in disclosure of results by both partners. Although the proportion of women who disclosed VCT results to partners remained steady at approximately two-thirds, there was a tenfold increase in the volume of clients attending for VCT (153).

Improving Motivation, Participation and Performance of PMTCT Health Workers

The impact of health worker attitudes and motivation on the effectiveness of program interventions to reduce MTCT has been demonstrated. It has been shown that already-overburdened health workers in both resource-rich and resource-poor settings often have inadequate time or insufficient skills to carry out all of the extra tasks related to PMTCT programs (14, 196). This results in gaps in PMTCT counseling, testing, and treatment inconsistencies. Provider burn-out is common because performance expectations of PMTCT programs often do not factor in preexisting, sometimes conflicting, duties and responsibilities.

Improving skills and quality of care delivered by health workers are the cornerstone of the technical component of any maternal health program. But even programs that have devoted considerable resources to skills training have found deficiencies in provider performance (74, 123, 125). Interventions specifically designed to address non-technical aspects of provider performance have helped to improve job satisfaction and motivation of maternal health care providers. In safe motherhood programs, activities to "bridge the gap" between clients and providers have resulted in changes in the content and delivery mechanisms of maternal health services that in turn increased utilization and client satisfaction (125). This is likely to be true in PMTCT programs as well.

Even health workers themselves often do not have adequate, accurate information about mechanisms of transmission of HIV and risks of contracting the virus. Indeed, some programs have documented negative changes in provider behavior when they were made aware of the HIV status of clients and have designed

activities to reduce stigma expressed by health workers toward HIV+ clients and people living with HIV/AIDS (PLWHA) (166). Some PMTCT programs have developed self-assessment checklists to help create a client-friendly environment and implemented participatory sensitization workshops for providers to explore and address stigma and other factors contributing to poor quality of care in PMTCT programs. These activities have assisted health workers to identify institutional weaknesses and take action to improve conditions.

Some stigma among providers is related to assumptions about the educational, social, economic and class status of HIV+ people. Negative moral judgments about behaviors that led to becoming HIV+ are also widespread. But providers are also vulnerable to fear and concern about their own safety when caring for HIV+ clients, particularly during childbirth. It may be difficult to obtain compliance with the set of improved obstetric practices being recommended to minimize MTCT, without exploring provider fears, correcting misinformation regarding transmission, providing the necessary equipment to improve provider safety while delivering HIV+ women, and addressing stigma and discrimination that influence patient care.

A wide range of tools to improve PMTCT provider and program performance have been developed and tested, and these should be consulted when developing comprehensive behavior change interventions for PMTCT programs (36, 37, 113, 133, 141, 156, 187, 190). WHO has developed clinical guidelines to improve care and support in the context of PMTCT. These guidelines have been field tested in five countries (42, 113). In South Africa, protocols for PMTCT programs cover not only technical aspects, but operational aspects as well, including flowcharts for VCT, labor and delivery practices, and postpartum NVP therapy for newborns (13).

BOX 2: KEY ACTIVITIES TO DEVELOP A LOCAL PMTCT BEHAVIOR CHANGE STRATEGY

- Review PMTCT behavior framework to assure that program covers all components
- Localize improved obstetric practices; review global recommendations for ideal practices to assess local OB practices and preferences among providers at facility and home
- Interview providers and women/families to get perspectives on ideal behaviors and identify barriers, constraints, motivators
- Negotiate with women, families and communities to identify feasible local practices for each PMTCT behavior
- "Concept test" new PMTCT behaviors and PMTCT program elements before implementing them

Adherence to ART

Before ART and highly active antiretroviral therapy (HAART) were available in resource-poor settings, behavior change interventions focused primarily on increasing general awareness of and knowledge about HIV/AIDS, promoting key behaviors related to primary prevention (abstinence, reducing the number of sexual partners, condom use), promoting increased use of VCT, decreasing stigma, and changing social norms that impeded efforts to reduce the spread of HIV. In the past few years, as ARVs have become increasingly available and information about experience with programs to deliver them more accessible, recognition of the need for behavior change interventions to address documented behavioral challenges associated with ART has increased.

One of the greatest behavioral challenges facing PMTCT programs is lack of timely adherence to the ART regimens required to effectively reduce mother-to-child HIV transmission. Understanding the factors that influence ART adherence is a critical step to increase program effectiveness. Several comprehensive reviews of the ART adherence literature have been produced, most focusing on ART adherence in the U.S. and other developed countries (2, 62, 203, 171, 172, 174).

The effects of poor ART adherence differ according to treatment regimen. Only about half of patients starting HAART (in the U.S.) achieve complete virologic suppression, in part due to the difficulty of adhering to treatment regimens (53). More than seven days without therapy leads to significant viral rebound in most patients (105). Lack of adherence is the primary cause of inadequate virologic response to ART, especially in the first 24 weeks of HAART therapy (9). Even small breaks in medication schedules can quickly result in diminished effectiveness of treatment in individual patients, as well as the emergence of resistant strains of the HIV virus over time (see Table 1).

TABLE 1: CORRELATION BETWEEN ADHERENCE AND VIROLOGIC RESPONSE TO HAART	
Adherence to HAART*	Viral Load <400 c/ml (copies of HIV virus per milliliter of blood)**
Greater than 95% adherence	78%
90% to 95% adherence	45%
80% to 90% adherence	33%
70% to 80% adherence	29%
Less than 70% adherence	18%
* Number of doses taken/ number prescribed	
** Viral load < 400 c/ml is desirable	
Source: (6)	

Factors affecting ART adherence include difficulty tolerating drug side effects, difficulty integrating treatment schedule into activities of daily life, and fear of revealing HIV status if seen taking medications (61, 71, 134, 199). In Thailand, HIV+ pregnant women said taking ART was a constant daily reminder of their HIV status, and that they feared the medicines would not be effective (94). Quality of provider/client interaction, particularly time spent discussing adherence issues also affects adherence (64, 115). Anticipating these concerns and addressing them in counseling may help to increase adherence.

Measuring ART Adherence

Specific patterns of ART non-adherence have been documented. In one study, “systemic non-adherence”, consistently not taking correct dose or frequency of medication was found in 34% of patients studied. Intermittent non-adherence, missing more than a single dose of medication during the previous week, was noted in 55% (165). Documenting adherence is challenging in settings where laboratory methods are not available or are impractical. Relying on self-reporting of ART adherence may not adequately reflect actual medication use. Self-reports of ART adherence have been found to overestimate actual use by 20-40% (34). In a study in Zambia providing universal single-dose NVP to all pregnant women attending ANC, 32% of participants did not ingest the single-dose NVP tablet issued to them at ANC, despite reminders and the availability of replacement tablets; adherence assessed by self-report correlated only 75% with laboratory measures (181).

Interventions to Improve Adherence

A review of presentations on adherence at the Barcelona AIDS 2002 meetings concludes that approaches to improving adherence are similar in both developed and developing countries (53). Interventions to improve ART adherence include use of motivational tools, and special strategies for women (178). Clinicians need to have a strategy that enables them to assess patient readiness to start and adhere to ART, and to select a regimen based on likelihood of specific patient adherence (177) that can be tailored to individual client needs (39).

Tools to assist clinicians select, monitor, and evaluate ART adherence, as well as motivational tools have been developed. One tool to improve adherence has six standardized modules that can be tailored to individual needs. The six participatory, interactive sessions include:

- tailoring ART regimen to lifestyle
- managing medication side effects
- interaction with health care providers

- social support and stress management
- removing barriers to adherence, and
- creating a non-judgmental atmosphere/motivational interview techniques (39).

A tool to measure and address non-concordance between patient self-report and clinician assessment of ART adherence is available (54). Although these tools were developed in the U.S., they could be adapted for use in resource-poor settings. Dialogue with clients who adhere to ART (“doers”) and those who do not (“non-doers”) can assist in developing locally-appropriate strategies to optimize adherence.

A number of adherence problems are already evident among PMTCT programs that utilize single-dose therapy as the mainstay of their ART component, despite the comparatively simple therapeutic regimen involved. Additional adherence-related challenges can be anticipated as programs provide longer-term ART for HIV+ pregnant women during pregnancy and breastfeeding, and ultimately lifelong therapy for both women and their HIV+ partners. Adherence to multiple treatment regimens for HIV, and to treatment for potentially life-threatening opportunistic infections commonly associated with HIV/AIDS (such as TB, pneumonia and fungal infections), also presents challenges to both clients and providers.

Nearly three-quarters of people infected with both HIV and TB live in Sub-Saharan Africa. Some approaches to address adherence to therapy for HIV/AIDS and concurrent TB infection have been developed utilizing experience from the Directly Observed Therapy (DOT) approach to tuberculosis control. The DOT approach to HIV/AIDS treatment is being tested in Haiti, South Africa, and several other countries with high dual HIV/TB prevalence (34, 51, 77, 111, 170, 173). The ProTEST Initiative, centered on building TB case detection and management onto VCT programs, is testing the optimal mix of measures needed at district level for dual HIV/TB control (136). This effort -to merge TB control with a focus on detection and treatment with HIV/AIDS efforts that have mostly focused on prevention- combines both approaches and builds on the strength of each. There are many parallels to the integrated SM/PMTCT approach suggested in this paper.

Increasing Use of VCT

In many PMTCT programs where VCT is available, low community acceptance and use of VCT services is a major barrier to identifying, counseling and treating HIV+ pregnant women and their partners (61, 75, 93). In one program in Zambia, community awareness of the availability of VCT increased from 45% to 75% during the firsts two years, but use of VCT remained low at 9% (155).

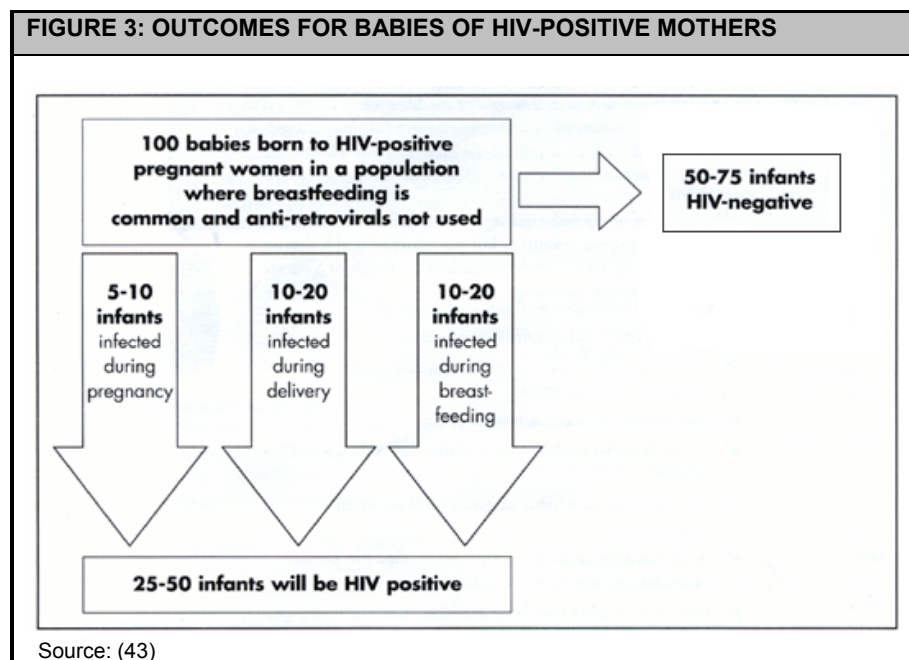
On average, less than 50% of pregnant women accept VCT; increasing acceptance of VCT may be one of the most effective ways to decrease perinatal transmission (211). Many factors have been shown to influence the “demand side” of the decision to seek and accept VCT as part of PMTCT programs, including fear of stigma, fear of more rapid death once knowing one’s HIV status, and unwillingness to participate in an intervention to prevent the baby from getting HIV if no maternal treatment is available (179).

Addressing both supply and demand factors of VCT is essential. Several interventions have been developed to improve the “supply side” of VCT, including manuals to guide VCT counselors (58, 80, 162) and the development of detailed standards for certification and accreditation of VCT sites (50, 185).

Mechanisms to improve and standardize the content and quality of VCT, the cornerstone of most PMTCT programs, have been developed and tested. In Kenya, a national VCT logo will assure clients that facilities displaying the logo met or exceeded national standards for VCT (185). In India, one NGO has developed and disseminated facility-specific guidelines on PMTCT care and management in accordance with national policy, based on actual results of participatory assessment exercises.

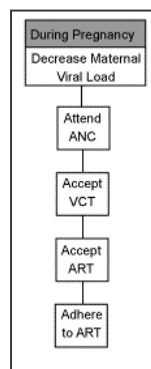
IV. THE RATIONALE FOR RECOMMENDING SPECIFIC BEHAVIORS WITHIN COMPONENTS OF PMTCT PROGRAMS

In order to plan an effective PMTCT behavior change program, it is desirable to have a basic understanding of the timing of and technical rationale for each PMTCT program intervention. In resource-poor settings where breastfeeding is widely practiced, in the absence of any intervention, up to 40% of infants born to HIV positive women will become infected (182). Figure 3 presents a similar breakdown of mother-to-child HIV transmission. Among the 40% of infants who become HIV positive, about 20% are infected during pregnancy, mostly during the last four weeks; 40% during labor and delivery; and up to 40% during breastfeeding (which can last at least a year in some settings) (210). Thus, up to 60% of all mother-to-child HIV transmission occurs during pregnancy and birth. This supports an increase in emphasis on interventions to reduce transmission during pregnancy, labor and delivery.



All of the behaviors associated with WHO's Prong Three aim to reduce exposure to the HIV virus. In PMTCT, **there are three main mechanisms of reducing such exposure -- reducing maternal viral load, preventing avoidable exposure to maternal virus at birth through improved obstetric practice, and reducing exposure through breastfeeding.** These have all been explained in detail in the literature (18, 21, 22, 41, 42, 43, 44, 46, 86, 89, 101, 104, 118, 145, 159), but a short summary follows for behavior change professionals responsible for the design of behavior change (BC) interventions, who may benefit from a brief review. Behavior change interventions that do not promote PMTCT behaviors/options covering all of these time periods -- addressing the three key mechanisms for MTCT -- cannot be considered comprehensive.

Reducing Maternal Viral Load



During pregnancy and throughout breastfeeding, the mainstay of PMTCT is reducing the potential transmission of HIV to the infant by reducing exposure to the virus. Reducing maternal viral load (VL) is one way to help accomplish this, and also has the potential benefit of improving the health of the woman herself. Low maternal viral load confers dramatic protection to the unborn child (see Table 2) (9). To prevent transmission during pregnancy, particularly from the 36th week until delivery when MTCT during pregnancy is known to be highest (9), use of ART to reduce maternal VL is the most effective intervention.

Reductions in maternal viral load are most effective when a combination of three drugs is used and the dosage and therapeutic regimen are strictly adhered to. This is known as Highly Active Antiretroviral Therapy, or HAART. In developed countries, VL can be reduced to almost undetectable levels through continual use of HAART. Less effective than HAART, but more available in resource poor settings, are alternative combinations of cheaper, more accessible ARVs, such as zidovudine (ZDV) and lamivudine (3TC) (44, 49, 148, 186, 209).

TABLE 2: CORRELATION BETWEEN MATERNAL VIRAL LOAD AND PERINATAL TRANSMISSION	
Maternal Viral Load c/ml (copies of HIV virus per milliliter of blood)	Perinatal Transmission
>100,000	41%
1,000-10,000	17%
Source: (6)	

Even the less effective lowering of maternal viral load achieved through the use of single drug ART for several months during late pregnancy and/or breastfeeding, can still reduce HIV transmission to the newborn, and improve maternal health in the short term. When even short-term maternal ART during pregnancy is not feasible, single-dose therapy with nevirapine (NVP) can reduce mother-to-child transmission as the newborn passes through the birth canal. This requires a single dose of NVP to the mother within a few hours of delivery, followed by single-dose NVP treatment of the newborn within 48-72 hours after birth.

Maternal/ Newborn Antiretroviral Treatment During Labor and Delivery

The global standard for ARV therapy, even in resource poor settings, is ART for HIV+ women only, following diagnosis made during VCT. However, a variety of “short-cuts” and alternative methods to increase maternal and newborn ART coverage rapidly are being tested. These include universal ART of all pregnant women in high prevalence populations without VCT (181); “take-home” distribution of ARVs to HIV+ women at ANC visits, so that ARVs can still be taken even if women cannot reach health facilities to deliver (181); rapid HIV testing of women who were not tested during pregnancy when they present for facility delivery (153); and community-based TBA distribution or administration of ART (25).

Since lack of participation in VCT is often a factor that limits identification of HIV+ pregnant women who could benefit from ART, some programs have begun to provide short course ART at birth to all pregnant women whether or not they are aware of their HIV status (181). This is one of several “short-cut” program approaches that bypass steps in more standard approaches to PMTCT.

One research study in Zambia tested several mechanisms of ART delivery to prevent MTCT (181). Although more women in the study group who did not know their HIV status accepted ART and agreed to participate in ART, actual use of ART was higher among the women who knew they were HIV+. This may indicate that although distribution and reach of ART is higher, the level of ART adherence necessary to reduce MTCT effectively may not be achieved through “universal “ treatment programs that bypass VCT.

The generic framework for PMTCT behaviors suggested in Figure 2 (page 11) reflects behaviors that correspond with the “gold standard” of ART of only HIV+ women diagnosed through VCT. Adaptations to the framework must be made to reflect any alternative PMTCT interventions or approaches that may be in place - such as those discussed above - due to policy, health worker choices, community preferences, or structural/environmental constraints.

The Critical Importance of Timing of Nevirapine Therapy

Recent research in Zambia demonstrated that **women who delivered within one hour of nevirapine ingestion, women whose viral load was higher, and women who did not breastfeed exclusively were more likely to transmit HIV to their infant during the first six weeks postpartum.** Timing of receipt of maternal NVP, so that pregnant women receive NVP at least an hour before delivering, is therefore critical. **Counseling of women enrolled in NVP programs should emphasize recognition of the signs of onset of labor and focus on the importance of prompt receipt of NVP once labor has begun. This may be particularly important for multiparous women more likely to deliver precipitously (182).**

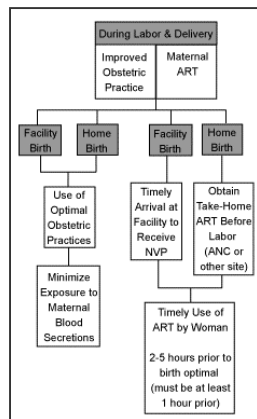
Women and families as well as health providers need to be aware of the importance of timing of receipt of NVP; of the importance of timely self-administration at home births; and of the need for timely use of maternity facilities for facility-based births, so that staff have adequate time to administer NVP.

Some recent studies suggest that even the newborns of mothers who were not able to obtain NVP treatment during birth can benefit from immediate or early postpartum treatment with NVP. This is referred to either as post exposure prophylaxis (PEP) or infant post-exposure prophylaxis (IPP), and is based on the same principles of rapid treatment after exposure to HIV virus that is often provided for health workers.

From a behavior change perspective, reduction of maternal VL requires seeking, obtaining, and adhering to ART, in addition to the behaviors involved in determining HIV status (ANC use and acceptance of ART if HIV+). Although seeking, obtaining and taking treatment with a single dose NVP at birth may seem relatively easy to achieve, in actual practice program success reaching HIV+ women and their newborns with single-dose NVP in resource poor settings has fallen short of goals.

Even if NVP coverage of mothers and newborns at and after birth is high, NVP can only be partially effective in preventing transmission, because the clinical efficacy of NVP is only 47% (18, 45, 183). Also, newborns successfully protected by NVP at birth can soon become infected through transmission of HIV virus through breastmilk, potentially reducing the contribution of NVP. For these reasons, a comprehensive, balanced PMTCT behavior change intervention should emphasize promotion of NVP/ART, but should not rely exclusively on ART. All three mechanisms -- reducing maternal viral load, preventing avoidable exposure to maternal virus at birth through improved obstetric practice, and reducing exposure to HIV through breastfeeding -- are essential for maximally effective MTCT reduction.

Preventing Avoidable Exposure to Maternal Virus at Birth Through Improved Obstetric Practice



Most perinatal transmission of HIV occurs during delivery, so this period should be the target of the most intensive PMTCT program efforts (9). It has been clear since the mid-90's that perhaps as much as 65% of PMTCT occurs during or around the time of delivery (9, 104). There is less published literature documenting the effectiveness of interventions to improve obstetric practice in resource-poor settings, especially during home births, than is available to document effectiveness of other PMTCT interventions, such as improved infant feeding. **Much more emphasis should be placed on accumulating an evidence-base for the contribution of improved obstetric practice to reducing MTCT** (31, 182). Efforts to refine and expand the "improved obstetric practice" component of PMTCT programs are underway.

With or without ART, interventions to reduce exposure to maternal HIV virus during labor, delivery and the immediate postpartum period are critical

components for preventing MTCT. Improved obstetric practices to reduce MTCT can be divided into those more appropriate to facility-based childbirth and those appropriate to home births. Facility-based OB practice improvements are better described in the literature. Table 3 provides a compilation of improved obstetric practices gathered from the literature. This includes both common OB practices that are to be avoided as part of care for HIV+ pregnant women, and beneficial practices that are recommended as part of PMTCT programs.

Although these behaviors are often considered technical skills, best influenced through skills training, it has been shown in safe motherhood programs that skills training alone is not sufficient to change obstetric practices over the long-term (74, 123). Behavior change interventions for childbirth care providers, both skilled professional and traditional, are an integral part of PMTCT behavior change intervention design.

Large-scale national safe motherhood programs have been in place in many African nations for more than a decade, demonstrating slow but steady progress toward increasing skilled birth attendance, improving treatment of obstetric emergencies, and increasing maternal and newborn care during the early postpartum period. Models for obstetric care for women in rural, resource-poor settings have been developed and tested as part of more than a decade of safe motherhood programs. The Safe Motherhood Initiative has also gained experience in behavior change interventions to promote increased use of services.

It is estimated that every year a million women infected with HIV deliver babies without professional help (25). For these reasons, a set of simple, realistic obstetric behaviors that can benefit all pregnant women, as well as reduce MTCT, should be promoted through behavior change interventions at community and household level (see Table 3). Several documents prepared by midwives from the international safe motherhood community have strongly suggested to obstetricians and PMTCT program planners that the contribution of optimum routine maternity care, including home-based maternity care, to reducing MTCT should not be overlooked (3, 75, 90, 102, 135, 157).

Improved obstetric practice interventions to support PMTCT have also been developed and are currently being implemented. One of the most important potential linkages between PMTCT and SM programs is collaboration to identify, strengthen and link with existing safe motherhood interventions and to access the substantial expertise available within the safe motherhood community to implement comprehensive programs to improve facility- and home-based obstetric practice. This component of PMTCT programs is often underfunded, and often interventions to improve obstetric practices are not included (7). Some programs have developed improved obstetric practice guidelines and have started to implement them despite lack of funding for development of this essential PMTCT intervention (90).

The most significant overlap between behavior change objectives of PMTCT and safe motherhood programs occurs in the area of improved obstetric practice, including the early postpartum period. The common behavioral objectives of both programs could be substantially enhanced if resources were combined to develop behavior change interventions (BCIs) that reflected those dual behavioral priorities.

TABLE 3: PMTCT IMPROVED OBSTETRIC PRACTICES			
RECOMMEND		AVOID	
During Pregnancy		During Pregnancy	
		<ul style="list-style-type: none"> ▪ Prematurity ▪ Avoid or reduce invasive procedures <ul style="list-style-type: none"> ▪ Chorionic villi sampling* ▪ Amniocentesis* ▪ Cordocentesis* ▪ External Cephalic Version (ECV) (often practiced by TBAs as well as skilled medical professionals) 	
During Labor and Delivery		During Labor and Delivery	
<ul style="list-style-type: none"> ▪ Provide optimal routine care during all births to minimize OB complications ▪ Use of partograph to monitor and avoid prolonged labor ▪ Provide supportive nursing care – ambulate, feed, rehydrate ▪ Facilitate optimum social support ▪ Avoid unnecessary obstetric procedures while still maintaining “caring” obstetric environment for women ▪ Maintain intact perineum if possible ▪ Maintain universal precautions ▪ Identify and address potential accidental exposure of client or provider to HIV virus ▪ Perform C-section prior to onset of labor when feasible ▪ Use extreme care during late or emergency C-section 		<ul style="list-style-type: none"> ▪ Avoid/reduce artificial rupture of membranes ▪ Avoid unnecessary episiotomy ▪ Avoid repeated vaginal examination ▪ Avoid or reduce unnecessary instrumentation during delivery (forceps, etc.) ▪ Avoid or reduce use of vacuum extraction ▪ Avoid C-section after onset of labor except in emergencies ▪ Avoid/decrease Premature Rupture of Membranes (PROM)/Prolonged Labor (longer than 4 hours) (Rate of transmission increases by 2% each hour after 4 hours) ▪ Prevent/treat intrapartum haemorrhage 	
After Delivery		After Delivery	
Maternal	Newborn	Maternal	Newborn
<ul style="list-style-type: none"> ▪ Careful handling of placenta, cord, lochia, etc. ▪ Prevent/treat cracked nipples and mastitis ▪ Clamp umbilical cord after it stops pulsing to avoid blood spray ▪ Careful disposal of bedclothes and other soiled birth materials 	<ul style="list-style-type: none"> ▪ Careful drying to remove remaining maternal blood and fluids ▪ Gentle removal of vernix ▪ Gentle newborn resuscitation when required ▪ Prompt treatment of newborn thrush 		<ul style="list-style-type: none"> ▪ Avoid invasive procedures ▪ Avoid vigorous suction ▪ Avoid unnecessary newborn procedures while still maintaining “caring” obstetric environment

*these procedures uncommon in developing country settings, yet appear in several national PMTCT protocols developed for resource-poor settings

C-Section

The primary mechanism of preventing intrapartum HIV transmission is avoiding contact with maternal blood and fluids in the birth canal and immediately after birth. The most widely known and most effective way to reduce intrapartum MTCT is elective C-section, performed well before labor has begun (9). As mentioned earlier, however, this obstetric practice is not realistic in many rural resource-poor settings. Infrastructural constraints, utilization rates of rural maternity facilities of less than 25%, and frequent late arrival of those women who do present to facilities to deliver combine to make elective C-section a challenge in settings outside of hospital-based research programs. Higher complication rates have been demonstrated in HIV+ patients receiving C-sections in resource-poor settings (24, 211), a potential disincentive to use of this procedure even on an elective basis in those settings.

Elective C-Sections

The risks of perinatal HIV transmission from performing C-sections after labor has already begun are high and increase as duration of labor increases, especially in the presence of ruptured membranes (ROM) (9). Complications, especially postpartum infections, are five to seven times more common following a C-section performed after labor or ROM compared with vaginal delivery (31). Unfortunately, improving timeliness of arrival at maternity facilities in rural settings has been one of the most challenging aspects of safe motherhood behavior change. In some African studies, many laboring women arrive at health facilities so late that it compromises the timing of or prohibits receipt of even single-dose maternal NVP treatment (193). Therefore “primary prevention” of late C-sections by redoubling efforts to promote timely use of skilled childbirth care, in both SM and PMTCT programs, is essential.

Reducing Unnecessary Instrumentation and Invasive Procedures

Avoiding unnecessary instrumentation and invasive procedures is an essential part of improved obstetric practice. Again, however, if women do not routinely access health facilities for childbirth, obstetric practice guidelines that focus primarily on hospital-based practices can be of only limited effectiveness. One exception is external cephalic version, listed as a potentially invasive/traumatic obstetric practice, which is commonly practiced in some settings by TBAs in the community during late pregnancy, as well as by skilled professionals.

Averting Artificial Rupture of Membranes, Premature Rupture of Membranes, and Prolonged Labor

Even before entering the birth canal, newborn exposure to maternal blood and fluids can take place due to disruption of the fetal protection offered by intact placental membranes. A prolonged state of ruptured membranes resulting from any cause, artificial or natural, increases risk of HIV transmission. It has been demonstrated that four hours is the maximum acceptable duration of rupture of membranes (ROM) in HIV+ pregnant women, after which MTCT increases at a rate of 2% per additional hour of exposure (104). Persistence of ruptured membranes longer than four hours was found to be a much more significant factor in MTCT than other factors, such as intrapartum contamination of the birth canal with maternal blood (104).

This has substantial behavior change implications, and **behaviors that potentially reduce prolonged exposure to ruptured membranes should be emphasized to both skilled and traditional birth attendants, women, families and communities.** As mentioned earlier, use of the partograph in health facilities to identify prolonged labor was one of the weakest elements of maternity care encountered in a 49-country study (23). Community and household delays in seeking skilled care for prolonged labor are one of the most well-documented contributing factors to obstetric-related maternal mortality and disability (121, 164, 188), but should now be recognized as factors in MTCT of HIV as well.

Reducing Unsafe Medical Practices

A recent paper strongly suggests that more HIV transmission in Africa is due to unsafe medical practices than previously believed. A review of studies that linked HIV in African adults to sexual behaviors

accounts for only about one third of HIV infections, suggesting a very large role for unsafe medical practices in Africa's HIV epidemic (10, 68). Transmission to both patients and providers through unsafe medical procedures, including injections, transfusions, and other contact with infected blood may be grossly underestimated.

For example, in rural Africa, during a maternity facility assessment visit for another purpose, laboring women were observed walking barefoot through pooled blood and other body fluids in the delivery room (3). Another study in Africa showed that although sterile gloves were used by 75% of labor and delivery personnel in peri-urban study facilities, only 15% changed gloves between procedures. Despite availability of piped water, health workers were observed handwashing between labor and delivery procedures only 15-26% of the time (155).

The author suggests that in addition to promoting safe sex, measures to provide safe blood supply, prevent reuse of unsafe needles, and use of universal precautions for infection prevention are also critical parts of PMTCT and other HIV prevention programs. Use of universal precautions has long been part of safe motherhood/midwifery skills training, but may not be a routine emphasis in PMTCT programs. This provides another example of the potential utility of increasing dialogue about program content among SM and PMTCT program implementers.

Improving Home-Based Obstetric Practice

Use of skilled professional childbirth attendants by all women remains a goal of safe motherhood programs, despite well-known barriers. Increasing use of skilled professional childbirth attendants, facility-based when feasible, should also be a behavioral goal of PMTCT programs. This would allow timely, supervised receipt of ARVs during the intrapartum period, while at the same time allowing opportunity for quality routine childbirth care, and improved obstetric practice administered by skilled providers.

However, partly due to the magnitude of MTCT and the urgency of increasing coverage of PMTCT interventions, and taking into account the childbirth realities in much of rural Africa and South Asia, many programs have begun to focus efforts on improving obstetric practices among traditional birth attendants (TBAs) during home-based childbirth. Challenging global consensus on the diminishing need for and role of TBAs, some PMTCT programs have placed TBAs at the center of efforts to reduce PMTCT in the community (25, 27).

For the most part, this includes reinforcing quality home-based maternity care by TBAs and other family birth attendants and avoidance of home birth practices that could increase MTCT. However, it has also been proposed that in settings such as rural Zambia, where more than 90% of women deliver at home, the role of TBAs in PMTCT be expanded to include such services as HIV testing and counseling, and provision of short courses of ART (25, 27, 200, 210).

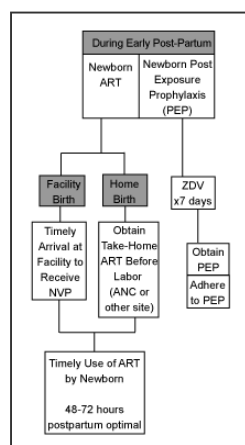
Concerns about this approach have been expressed, many by PMTCT researchers and program implementers (25), and the debate about the role of TBAs in safe motherhood and PMTCT programs continues. There should be no debate, however, that in settings where most women deliver at home, efforts to promote the use of skilled birth attendants, facility-based when feasible, should continue. Nevertheless, training community birth attendants to emphasize the relationship between increased risk of MTCT associated with some common home birth practices should also be undertaken.

Education about the contribution of improved obstetric practices to PMTCT could motivate TBAs and families to encourage pregnant women and their partners to seek VCT; and to take more rapid action at onset of labor to seek timely skilled birth attendance, perhaps even more than conventional safe motherhood behavior change messages have. TBAs, who sometimes perform home births without the availability of even gloves for their own protection against HIV, would surely want access to information about improved behaviors to reduce their own risk of HIV exposure (as well as access to gloves!). More documentation of TBA attitudes toward providing maternity care to HIV+ women would also be useful.

One of the most important PMTCT behavior change interventions may be to inform communities and professional and traditional birth attendants that whether birth takes place at home or in a health facility there are improvements in childbirth-related behaviors and practices that can help to reduce HIV transmission not only to newborns, but also to birth attendants and others who may be present during and after birth (90).

Efforts to reduce delays in seeking and reaching skilled childbirth care, a key behavior recommended by safe motherhood programs, should also be included as part of PMTCT behavior change interventions. In one study in Western Kenya, almost half of laboring women arrived at facilities less than four hours before they delivered – 28% were admitted only 2 hours before delivery and 18% arrived 3-4 hours prior to giving birth (153). This barely allows adequate time for receipt of optimal obstetric care, or initiation of NVP/ART. A better understanding of factors that may contribute to additional delays in obstetric care seeking among pregnant women who know they are HIV+ could be useful to design specific motivational behavior change interventions for this segment of all pregnant women.

Postpartum ART for Newborns (IPP/PEP)



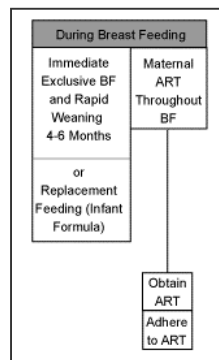
Most PMTCT programs prioritize receipt of single-dose NVP treatment of both mothers and newborns. Despite the best program efforts, many HIV+ pregnant women, whether they deliver in a facility or at home, do not receive single-dose NVP treatment. Thus, there have been programs with the specific objective of providing ART to newborns of HIV+ mothers who did not receive ART. This is referred to either as infant post-exposure prophylaxis (IPP) or post-exposure prophylaxis (PEP). Newborn IPP is most effective when given as soon as possible after birth; 24 hours ideal, within 72 hours acceptable.

Such early postpartum ART of the newborns of mothers who have not taken ARVs may reduce MTCT by up to 50%. In Malawi, a study is being conducted using a one-week course of ZDV to treat the newborns of women who arrived at facilities too late to receive ART themselves.

In several research settings, coverage of ART for newborns of HIV+ women has been substantially lower than maternal ART coverage (27, 176). The reasons why many women are successfully treated with single-dose NVP during birth, yet their newborns do not receive the required single-dose NVP within three days after birth, are still being explored. In many resource-poor settings, women are discharged from the hospital within hours after giving birth, sometimes without adequate counseling on postpartum care (3, 121). Advocating for change in hospital policy so that HIV+ women treated with NVP are not discharged until the newborn has also received NVP treatment might improve the current newborn NVP coverage situation.

Problems with packaging of nevirapine syrup appropriate for pediatric use may contribute to lower NVP coverage of newborns. Originally, the commercial form of NVP syrup was only available in 240 ml. bottles that could not be decanted into smaller containers and expired within two months of opening. As the pediatric dosage of NVP is 0.6 ml, 400 newborns would need to be treated within the two-month timeframe to avoid wastage. Pediatric NVP donated by pharmaceutical companies has been made available in smaller 20 ml. bottles, and additional distribution issues related to donated drugs are being resolved (119). This provides a good example of non-behavioral factors, in this case structural factors, that can be identified and addressed through the use of the comprehensive approach to developing locally-appropriate behavior change interventions discussed earlier.

Reducing Transmission Through Breastfeeding



Using the method for attributing transmission described earlier, among HIV-infected babies, up to 40% of MTCT takes place during breastfeeding (BF), primarily through virus contained in breastmilk itself. The transmission of HIV virus to the infant through breast milk is much less efficient than transmission through maternal blood and other fluids present during birth. However, the period of exposure to breastmilk in patterns of breastfeeding common throughout Africa can be as long as a year or more, allowing a much longer risk of exposure. The presence of cracked nipples or mastitis in breastfeeding mothers can increase the transmission of virus to the baby, and it is important to inform mothers, families and providers of this easily avoided or treated route of transmission.

Although it is widely known that breastfeeding carries a risk of MTCT, it is less well known that the risk of transmission doubles if the mother becomes infected with HIV while she is breastfeeding (151, 159). In Kenya, for example, up to ten percent of all new HIV infections among women occur during breastfeeding (130). It is important to remind all pregnant and breastfeeding women of the need for continued vigilance and safe sexual practice so that they can maintain their negative HIV status.

The most effective way to prevent MTCT related to breastfeeding is to assure that HIV+ women avoid breastfeeding entirely and substitute use of exclusive replacement feeding (RF) with infant formula. However, as with elective C-section, this recommendation is neither safe, feasible nor acceptable to HIV+ women in many resource-poor settings, particularly in Africa. The cultural necessity of breastfeeding and fear of disclosure of HIV status through unexplained deviation from accepted BF practice can be strong barriers to RF. For example, in one South African ARV study, HIV+ women who were given infant formula on discharge from the hospital frequently left the formula at the hospital gate (38). It has been noted that some HIV+ women in South Africa, again due to the stigma of not maintaining culturally-acceptable breastfeeding practices, will give formula at home, but breastfeed in public (142). This type of mixed infant feeding is associated with the highest risk of HIV transmission (211).

Recent research has confirmed that cumulative rates of HIV transmission increase substantially after 14-16 weeks of breastfeeding (17, 151). Among populations where there is considerable resistance to replacement feeding, key interventions include immediate and exclusive breastfeeding, with initiation of rapid early weaning, as early as age four to six months (sometimes known as EBEW). However, vigorous debate continues, suggesting that it is still too early to promote EBEW as an evidence-based intervention (7).

Presentation and analysis of BF-related MTCT research, results of program experience and guidance for this component of PMTCT programs may be more complete than for any other program aspect (38, 116, 150, 151, 152, 155, 159, 189). Clear step-by-step guidance has been elaborated to guide program interventions to prevent MTCT during breastfeeding, including behavior change interventions (150). Recommendations for BF-related behavior change can be taken directly from those complete references.

Some of the behaviors associated with these infant feeding recommendations represent a major change from culturally-condoned, traditional infant feeding and care practices, making the required behavior changes difficult for many HIV+ women (150). This highlights the need to create enabling home and community environments in which recommended behaviors can more easily occur. Family members must therefore be included in behavior change activities to reduce MTCT through breastfeeding.

A strong infant feeding component is an essential part of PMTCT programs (90). A mid-project analysis of a large USAID-funded program in Zambia that emphasizes infant feeding demonstrated effectiveness in improving BF practices (155).

V. A THEMATIC APPROACH TO PROMOTING BEHAVIOR CHANGE TO PREVENT MOTHER-TO-CHILD TRANSMISSION OF HIV

The previous section discussed the rationale behind the technical interventions included in a comprehensive PMTCT program. Throughout this document, the many behaviors recommended throughout pregnancy, birth and breastfeeding to reduce MTCT are listed, and the essential role of supportive families, communities and health workers is discussed. The behavior change component of PMTCT programs should systematically address each behavior and target each audience with current information and new ideas.

In an Egyptian maternal and newborn health program, a thematic behavior change approach that used coordinated mass media, community media, and interpersonal counseling and communication training, and employed a phased timetable for delivery and reinforcement of each specific theme in “waves” has been successful in achieving behavior change objectives (122). A thematic approach of this type begins a behavior change intervention by introducing overarching themes that are usually non-threatening and non-controversial topics. Building on this platform of broad awareness, specific behaviors are suggested and reinforced throughout. This can minimize “message rejection” caused by fear-based approaches (122) that has been observed in some early AIDS campaigns and in safe motherhood BCIs that highlighted obstetric danger-signs (20, 65, 96, 103).

It is possible that adopting this approach and adapting the thematic content to include both key PMTCT and select safe motherhood behavior change objectives could also be successful. Based on a review of available literature, the broad themes for a phased PMTCT behavior change intervention listed in Table 4 emerge. These broad themes need to be more fully developed based on information gained from local research.

TABLE 4: A THEMATIC APPROACH TO INTEGRATED PMTCT/SM BEHAVIOR CHANGE INTERVENTIONS	
GENERAL OBJECTIVES	BROAD THEMATIC CONTENT
THEME I: Everyone planning a pregnancy or expecting a baby should know their HIV status - mother and father.	
<ul style="list-style-type: none"> Promote universal HIV testing/knowledge and disclosure of HIV status Reduce stigma against PLWHAs and especially HIV+ pregnant women. 	Use research-based VCT and stigma reduction strategies and activities.
THEME II: Know ALL of the things that pregnant women and families can do to reduce MTCT	
<ul style="list-style-type: none"> Increase general PMTCT knowledge and awareness among individuals, families, care providers, and communities. 	<p>Introduce comprehensive set of PMTCT concepts:</p> <ul style="list-style-type: none"> Importance of early ANC attendance for VCT to learn HIV status Concept and availability of ART for PMTCT Improved OB practices that can reduce PMTCT (health facility and home) Importance of skilled attendance when feasible, planning for skilled attendance (birth preparedness) Concept and availability of newborn ART, and special infant feeding needs for newborns of HIV+ mothers.
THEME III: All pregnant families and women should prepare for birth	
<ul style="list-style-type: none"> Increase knowledge and practice of basic Safe Motherhood behaviors that complement/support PMTCT behaviors Focus on special counseling and care needs of HIV+ women <p>Reinforce/integrate SM and PMTCT behaviors</p> <ul style="list-style-type: none"> Encourage family and community dialogue about HIV and PMTCT Encourage partner involvement Increase knowledge and intention to adopt specific PMTCT behaviors among pregnant women, families and communities. 	<p>ALL pregnant women should:</p> <ul style="list-style-type: none"> be tested for HIV, use a skilled attendant at birth, seek rapid skilled help for obstetric emergencies and get a check up for new mother and newborn during the first week after birth. In addition to the behaviors above, HIV+ pregnant women should also seek and take ART to be sure maternity care provider knows that both mother and newborn received timely ART if birth took place at home. <p>Overview of PMTCT behaviors and introduce specifics:</p> <ul style="list-style-type: none"> There are things ALL families can do to help reduce HIV transmission to newborns/infants. Families should know ALL of the things they can do during pregnancy, birth, and throughout breastfeeding. Know HIV status- expectant mother and father Birth preparedness and complication readiness with focus on special needs of HIV+ pregnant women Encourage timely use of ANC Support safe obstetric practice at home and timely use of skilled attendant at health facility when feasible Seek and adhere to ART Encourage proper infant feeding Assure early postpartum check for mother and newborn, newborn ART
THEME IV: Know ALL of the things that pregnant women and families can do to reduce MTCT (as above) and SUPPORT women and families to DO THOSE IMPORTANT THINGS.	
<ul style="list-style-type: none"> Increase social support for PMTCT Encourage joint responsibility for HIV, and for preventing PMTCT in families and communities 	(content as above, with targeted messages per segment).
THEME V: Successful PMTCT programs require the participation and support of health workers, and better interaction between health workers and communities.	
<ul style="list-style-type: none"> Increase dialogue between providers and HIV+ pregnant women and their families Increase provider awareness of and response to special care and support needs of HIV+ pregnant women and families Encourage identification and increased use of a mix of locally appropriate improved OB practices (facility-based and home-based) Promote an options-based approach to PMTCT counseling and care Improve PMTCT health care provider motivation, and performance Improve link between TBA and skilled providers Decrease provider-based stigma. 	<ul style="list-style-type: none"> PMTCT can be more effective if providers involve clients. HIV+ pregnant women and families have the right to actively participate in PMTCT decisionmaking and should be provided options and adequate information to make informed choices. Health care providers have the right to work in safe environments, and to request the support they need to make options-based PMTCT counseling and care a reality in their local setting. TBAs have an important role in PMTCT: to facilitate timely maternal and newborn ART and to use improved obstetric practices.

VI. NEXT STEPS

There are many steps that must be taken to speed both the integration of PMTCT and safe motherhood programs. This includes a focus on the development, refinement and dissemination of integrated, global PMTCT/SM behavior change recommendations; and guidelines for local adaptation and implementation that incorporate evidence and experience to date and that utilize innovative but tested BC approaches.

Some activities to support this at the global/donor level include:

- Organize a meeting of representatives of key organizations working in PMTCT and SM behavior change to accelerate development of PMTCT BC support materials for country programs.
- Collaborate with key partners to outline next steps for implementing comprehensive PMTCT behavior change program components.
- Develop strategies and activities to help PMTCT and SM programs more rapidly integrate program objectives, behavior change objectives, and delivery of integrated services
- Design operations research to provide needed information on the potential effectiveness of improved obstetric practice in facilities and in communities, even in settings where NVP treatment is not yet offered; and on the effectiveness of various PMTCT BC approaches.
- Develop a “diagnostic” tool to assess local capacity to adapt and implement comprehensive PMTCT behavior change interventions. This BC-specific tool would complement the country assessment tools now being used in several countries.
- Develop a simple, standardized set of qualitative research instruments that all PMTCT programs could use. Results would be comparable and more easily compiled to determine trends.
- Develop and pretest PMTCT BC materials, including a set of facility-based and a set of community-based “PMTCT Counseling Cards” and a Users Guide, that contain simple information on the full set of PMTCT behaviors. The two sets of cards should be appropriate for health facility use by providers, or community health workers in homes and communities, and should contain the basic information required for families to make informed choices among options for the many PMTCT behaviors.

Conclusion

This paper was written to generate feedback and encourage dialogue among researchers and behavior change program planners who are responsible for developing the behavior change component of PMTCT programs. To this audience, the need to rapidly develop and disseminate BCI guidelines for PMTCT programs is obvious. An equally critical audience is the PMTCT technical program planners and implementers, who may not always prioritize behavior change interventions among the many PMTCT program elements they are responsible for. Additionally, **the paper is aimed at safe motherhood program planners working in areas where HIV prevalence is high, since in those areas it is now essential to include PMTCT objectives in safe motherhood program content.**

Despite impressive achievements in a relatively short timeframe, the current level of success of PMTCT programs in reaching pregnant women and their newborns with ARVs demonstrates the need for rapid action to refine and implement experience-based PMTCT behavior change strategies. It indicates the need for dialogue among technical PMTCT programmers, the PMTCT behavior change community, and the safe motherhood program community, both globally and locally.

Delivering the “magic bullet” of nevirapine therapy to reduce PMTCT is not as simple as it once appeared. Some locally appropriate combination of the many PMTCT program components and delivery mechanisms now being tested will provide the right set of behavioral options for each affected community. Determining **which** combination will work best in specific settings can best be decided by behavior change professionals working closely with communities.

As one researcher put it, “there are no simple answers, but PMTCT programs, collaborating partners and local stakeholders must have a common goal” (44). Hopefully, that goal can be attained by increasing knowledge about PMTCT; enhancing community- and household-level support for behaviors to reduce MTCT; motivating participation by the health workers on whom PMTCT programs depend; and improving collaboration between PMTCT and Safe Motherhood program planners and donors.

BOX 3: MULTI-LEVEL ACTIVITIES TO INTEGRATE PMTCT BEHAVIOR CHANGE INTERVENTIONS

1. Influence behaviors at the individual, household and community level:

- increase timely use of ANC
- increase receipt of VCT by both partners
- increase acceptance of ARVs by HIV+ mothers and their families
- increase adherence to ARV treatment schedules
- increase timely use of skilled, facility-based birth where feasible for safer birth and supervised ART
- increase safer home birth practices with focus on reducing prolonged labor/prolonged rupture of membranes
- increase accurate, timely observed compliance with home-administered maternal/newborn ART
- increase use of appropriate infant feeding practices among HIV+ mothers.

2. Strengthen provider capacity to deliver quality, comprehensive PMTCT interventions:

- increase technical knowledge and skills
- increase counseling skills
- increase “caring” behaviors at labor and delivery
- identify and address provider/facility barriers to the implementation of all components of PMTCT programs
- identify and address attitudinal and motivational provider barriers and motivating factors (may include skills training such as infection control to reduce fears of nosocomial HIV transmission)
- increase provider awareness of client perspective and preferences in PMTCT.

3. Promote collaborative design and implementation of integrated PMTCT and SM programs:

- increase awareness of need for collaborative PMTCT/SM programming
- increase coordination among SM/PMTCT program planners and policy makers
- support use of innovative BC methods, including concept testing
- encourage and support research-based intervention design
- identify and exploit common behavior change objectives of SM and PMTCT programs (i.e. facility-based, skilled attendance for births)
- reduce parallel programming.

VII. APPENDICES

APPENDIX I: BEHAVIOR CHANGE INTERVENTION (BCI) STRATEGY WORKSHEET

Theme: _____

Target Group _____

Behavioral Analysis					Behavior Change- Related Interventions and Activities					
Ideal Behaviors	Current Behaviors	Barriers	Motivators	Conditions of Acceptability	Communication	Training (Skills, IPCC, Behavior Change)	Service/ Infrastructure Improvements	Policy/ Standard Improvement	Product Improvement	Other

APPENDIX IIA: COMPARISON OF DESIRED BEHAVIORS FOR SAFE MOTHERHOOD AND PMTCT PROGRAMS*: PREGNANT WOMEN

* rationale /outcomes that are not routine part of SM communication are **bolded**

Safe Motherhood Programs		PMTCT Programs	
Ideal Behavior	Rationale /Desired Outcome	Ideal Behavior	Rationale /Desired Outcome
Audience: Pregnant Women (with family support whenever possible)			
Early and regular use of antenatal care	Allow receipt of focused antenatal care for all women Opportunity to screen for STIs and HIV as part of routine ANC Allows VCT for all women	Early and regular use of antenatal care PLUS Counseled Tested Receive results Agree to ART Receive ART Adhere to ART if more than one dose	Allow receipt of focused antenatal care for all women Opportunity to screen for STIs and HIV as part of routine ANC Allows VCT for all women PLUS Allows early identification of HIV+ women for additional interventions (partner testing, treatment with ARVs and for opportunistic infections)
Safe sex during pregnancy	Avoid exposure to STIs and HIV throughout pregnancy	Safe sex during pregnancy and duration of BF	Avoid exposure to HIV throughout pregnancy PLUS and avoid sexual transmission to partner(s) if already positive Prevent MTCT
Timely use of Skilled Attendant by all women for anticipated normal births Facility-based childbirth whenever possible	Early arrival at facility allows staff to monitor labor, early identification of OB complications and manage, treat or refer	Timely use of Skilled Attendant by all women for anticipated normal births, particularly HIV+ women Facility-based childbirth whenever possible	Early arrival at facility allows staff to monitor labor, early identification of OB complications and manage, treat or refer PLUS Early arrival allows adequate time to give maternal ART, special attention to ROM Allows observed adherence to NVP
Timely use of skilled care for obstetric complications and emergencies	Improve outcome of complications, avoid sequelae	Timely use of skilled care for obstetric complications and emergencies	Reduce time newborn exposed to HIV through PROM Improve outcome of complications, avoid sequelae

Safe Motherhood Programs		PMTCT Programs	
Ideal Behavior	Rationale /Desired Outcome	Ideal Behavior	Rationale /Desired Outcome
Timely use of early postpartum care (1 day, 3 days and 1 week after birth)	Allows check of mother and newborn for OB complications Check compliance with infant feeding - immediate/exclusive BF Detect engorgement/mastitis	Timely use of early postpartum care (1 day, 3 days and 1 week after birth)	Allows check of mother and newborn for complications PLUS Allows check of adherence to maternal ART during labor (at least 1 hour before birth) and newborn ART within 72 hours if woman delivered at home Check compliance with infant feeding- immediate/exclusive BF Detect engorgement/mastitis (sources of MTCT)
Immediate and exclusive breastfeeding for 4-6 months (where infant formula not realistic option)	Optimal infant nutrition, bonding, antibodies, etc.	Immediate and exclusive breastfeeding for 4-6 months (where infant formula not realistic option) PLUS Adhere to infant feeding requirements for HIV+ women to reduce MTCT (rapid, early weaning at 4-6 months)	Optimal infant nutrition, bonding PLUS Important to avoid MTCT through breastmilk
Safe sex postpartum	Avoid exposure throughout breastfeeding Avoid sexual transmission to partner(s) if already positive	Safe sex postpartum	Avoid exposure throughout breastfeeding to prevent MTCT Avoid sexual transmission to partner(s) if already positive

APPENDIX IIB: COMPARISON OF DESIRED BEHAVIORS FOR SAFE MOTHERHOOD AND PMTCT PROGRAMS: SKILLED MATERNITY CARE PROVIDERS

Safe Motherhood Programs		PMTCT Programs	
Ideal Behavior	Desired Outcome	Ideal Behavior	Desired Outcome
Audience: Skilled Maternity Care Providers			
During ANC:		During ANC:	
Counsel ANC attendees	Provide optimal focused ANC for all women	Counsel ANC attendees	Provide optimal focused ANC for all women PLUS special care needs of HIV+ pregnant women
Test and provide results		Test and provide results	
For HIV+ women, advise benefits and types of ART available or refer to appropriate source		For HIV+ women, advise benefits and types of ART available	
Explain benefits of skilled facility-based birth for all women (controlled delivery, hygienic conditions,		Explain benefits of skilled facility-based birth for all women, but especially HIV+ women (controlled delivery, hygienic conditions, availability of supervised ART and f/u) PLUS Dispense ART for home use if home birth preferred by woman/family	
Maintain universal precautions	Protect self from HIV and other infection Protect other patients from infection in hospital/clinic environment	Maintain universal precautions	Protect self from HIV and other infection Protect other patients from HIV and other infection in hospital/clinic environment PLUS Allows opportunity for post exposure prophylaxis (PEP) if required
Encourage obstetric team to maintain same vigilance to protect all staff		Encourage obstetric team to maintain same vigilance to protect all staff	
Identify and rectify obstetric incidents (OI)		Identify and rectify obstetric incidents	
Avoid unnecessary maternal obstetric procedures while still maintaining "caring" obstetric environment for women	Reduce nosocomial (hospital-acquired) infections Reduce maternal morbidities	Avoid unnecessary maternal obstetric procedures while still maintaining "caring" obstetric environment for women	Reduce nosocomial (hospital-acquired) infections Reduce maternal morbidities PLUS Reduce risk of MTCT
Avoid unnecessary newborn procedures while still maintaining "caring" obstetric environment		Avoid unnecessary newborn procedures while still maintaining "caring" obstetric environment	Reduce MTCT
		Explain to woman and family members reason for NVP therapy Administer treatment (NVP) to woman (during labor, at least 1 hour before delivery) and newborn (within 72 hours of birth)	Prevent MTCT

Safe Motherhood Programs		PMTCT Programs	
Ideal Behavior	Desired Outcome	Ideal Behavior	Desired Outcome
Provide timely early postpartum care (1 day, 3 days and 1 week after birth)	<p>Allows check of mother and newborn for OB complications</p> <p>Check compliance with infant feeding - immediate/exclusive BF</p> <p>Detect engorgement/mastitis</p>	Provide timely early postpartum care (1 day, 3 days and 1 week after birth)	<p>Allows check of mother and newborn for complications</p> <p>PLUS</p> <p>Allows check of adherence to maternal ART during labor (at least 1 hour before birth) and newborn ART within 72 hours if woman delivered at home</p> <p>Check compliance with infant feeding- immediate/exclusive BF</p> <p>Detect engorgement/mastitis (sources of MTCT)</p>
Promote immediate and exclusive breastfeeding for 4-6 months (where infant formula not realistic option)	Optimal infant nutrition, bonding, antibodies, etc.	<p>Promote immediate and exclusive breastfeeding for 4-6 months (where infant formula not realistic option)</p> <p>PLUS</p> <p>Adhere to infant feeding requirements for HIV+ women to reduce MTCT (rapid, early weaning at 4-6 months)</p>	<p>Optimal infant nutrition, bonding</p> <p>PLUS</p> <p>Important to avoid MTCT through breastmilk</p>
Promote safe sex postpartum	<p>Avoid exposure throughout breastfeeding</p> <p>Avoid sexual transmission to partner(s) if already positive</p>	Promote safe sex postpartum	<p>Avoid exposure throughout breastfeeding to prevent MTCT</p> <p>Avoid sexual transmission to partner(s) if already positive</p>

APPENDIX IIC: COMPARISON OF DESIRED BEHAVIORS FOR SAFE MOTHERHOOD AND PMTCT PROGRAMS: TBAS AND OTHER BIRTH ATTENDANTS

Safe Motherhood Programs		PMTCT Programs	
Ideal Behavior	Rationale /Desired Outcome	Ideal Behavior	Rationale /Desired Outcome
Audience: TBAS and other family/community birth attendants			
Provide social support and anticipatory guidance during pregnancy, birth and early postpartum to women in the community.	Traditional role /promote healthy behaviors	Provide social support and anticipatory guidance during pregnancy, birth and early postpartum to women in the community PLUS Encourage HIV testing, use of ANC and other services, and acceptance of treatment if HIV+	Traditional role PLUS Reduce MTCT, encourage ARV treatment, use of services
Actively participate as part of the maternal care team during pregnancy, birth, and early postpartum period (first week after birth) along with a skilled provider whenever possible	Maintain traditional function of social support during transition to facility-based, skilled birth attendance	Actively participate as part of the maternal care team during pregnancy, birth, and early postpartum period (first week after birth) along with a skilled provider whenever possible	Maintain traditional function PLUS promote acceptance of treatment, use of skilled attendant and facility birth, and elective c-section to HIV+ women where this is an option
When attending a birth without skilled attendant present, recognize complications during birth and encourage use of skilled EmOC	Reduce avoidable obstetric deaths from complications of labor and delivery through early detection, referral and treatment Early detection and referral of prolonged labor can reduce ruptured uterus	When attending a birth without skilled attendant present, recognize complications during birth and encourage use of skilled EmOC	Reduce avoidable obstetric deaths Early detection and referral of prolonged labor can reduce ruptured uterus PLUS Early recognition of prolonged ROM can reduce MTCT
Maintain universal precautions Avoid unnecessary obstetric procedures Avoid unnecessary newborn procedures	Prevent sepsis	Maintain universal precautions Avoid unnecessary obstetric procedures Avoid unnecessary newborn procedures	Prevent sepsis PLUS Reduce MTCT Reduce MTCT
Encourage immediate and exclusive breastfeeding	Optimal Maternal and newborn nutrition, bonding, antibodies etc	Encourage immediate and exclusive breastfeeding PLUS RAPID weaning at 4 months	Optimal Maternal and newborn nutrition, bonding, antibodies etc PLUS reduce MTCT
Accompany women and families with obstetric complications to the nearest skilled provider, and actively participate in their home-based follow-up care.	Early skilled intervention when complications occur during home births avoids complications progressing to become obstetric emergencies	Accompany women and families with obstetric complications to the nearest skilled provider, and actively participate in their home-based follow-up care.	Early skilled intervention when complications occur during home births avoids complications progressing to become obstetric emergencies PLUS Allows ARV treatment for newborn at facility

Safe Motherhood Programs		PMTCT Programs	
Ideal Behavior	Rationale /Desired Outcome	Ideal Behavior	Rationale /Desired Outcome
Function as a "link care provider"- link women and families to the closest source of skilled obstetric care.	Maintain traditional function of social support during transition to facility-based, skilled birth attendance	Function as a "link care provider"- link women and families to the closest source of skilled obstetric care.	Maintain traditional function of social support during transition to facility-based, skilled birth attendance PLUS Extend social support to include support of behaviors to reduce MTCT
Assist in community dissemination and acceptance of "link behaviors" and "link care providers	Maintain traditional function of social support during transition to facility-based, skilled birth attendance	Assist in community dissemination and acceptance of "link behaviors" and "link care providers	Maintain traditional function of social support during transition to facility-based, skilled birth attendance PLUS Encourage community/family links with HIV/AIDS services and care

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