Implementing family-focused HIV care and treatment: the first 2 years' experience of the mother-to-child transmission-plus program in Abidjan, Côte d'Ivoire.

Besigin Tonwe-Gold, Didier Ekouevi, Clarisse Amani-Bosse, Siaka Toure, Mamadou Koné, Renaud Becquet, Valériane Leroy, Patricia Toro, François Dabis, Wafaa El Sadr, et al.

Implementing family-focused HIV care and treatment: the first 2 years' experience of the mother-to-child transmission-plus program in Abidjan, Côte d'Ivoire

Tonwe-Gold Besigin [1 2 3 *], Ekouevi Didier Koumavi [1 2 3], Amani-Bosse Clarisse [2], Toure Siaka [2], Koné Mamadou [2], Becquet Renaud [1 3], Leroy Valériane [1 3], Toro Patricia [4], Dabis François [1 3], El Sadr Wafaa M. [4], Abrams Elaine J. [4]

[1] *ISPED, Institut de Santé Publique, d'Epidémiologie et de Développement Université Victor Segalen - Bordeaux II, 146 rue Léo Signat 33076 Bordeaux Cedex,FR*

[2] *ACONDA, MTCT-Plus programme MTCT-Plus programme, Abidjan,CI*

[3] *Centre épidémiologie et biostatistique INSERM : U897, Université Victor Segalen - Bordeaux II, FR*

[4] *ICAP, International Center for AIDS Care and Treatment Programs Columbia University, Columbia University Mailman School of Public Health,, New York,US*

* Correspondence should be adressed to: Besigin Tonwe-Gold <tonwe@aviso.ci>

Abstract

Summary

Objectives

To describe a family-focused approach to HIV care and treatment and report on the first two years' experience of implementing the MTCT-Plus program in Abidjan, Côte d'Ivoire.

Program implementation

New effective models of care are being sought to provide successful strategies to deliver safe, efficient and appropriate HIV care and treatment in resource limited settings. The MTCT-Plus Initiative aims to engage pregnant and postpartum women identified as HIV-infected to initiate comprehensive HIV care and treatment for the woman and her family.

Main outcomes

Between August 2003 and August 2005, 605 HIV-infected pregnant or post-partum women and 582 HIV-exposed infants were enrolled. Amongst 568 male partners reported alive by enrolled women, 300 (52%) were aware of their wife's HIV status and 169 (30 %) have been tested for HIV. Amongst these partners, 88 (53%) were found to be HIV-infected and 69 (78%) were enrolled into the program. Overall only 10% of the women were enrolled together with their infected partner. On the other hand, a success of the program was also to involve a significant number of seronegative men (half of those who came for VCT) in the care of their families. Amongst 1,624 children <15 years reported alive by their mothers (excluding the last newborn infants of the most recent pregnancy systematically screened for HIV), only 146 (10.8%) were brought in for HIV testing, of whom 18 (12.3%) were found to be HIV-infected.

Lessons learned and challenges

The family-focused model of HIV care pays attention to the needs of families and household members. The program was successful in enrolling HIV women, their partners and infants in continuous follow-up. However engaging partners and family members of newly enrolled women into care involves numerous challenges outlined in the cascade of necessary events that must take place to achieve this goal. This involves the difficult issue of disclosure of HIV status by women to their partners and family members. Further efforts are required to understand barriers for families accessing HIV services as strategies to improve partner involvement and provide access to care for other children in the households are needed in this West African urban setting.

MESH Keywords Adolescent ; Adult ; Child ; Child, Preschool ; Cote d'Ivoire ; epidemiology ; Counseling ; Family ; Female ; HIV Infections ; epidemiology ; prevention & control ; transmission ; HIV Seroprevalence ; Humans ; Infant ; Infant, Newborn ; Middle Aged ; Patient Acceptance of Health Care ; Pregnancy ; Program Evaluation ; Sexual Partners ; Young Adult

Author Keywords Africa ; antiretroviral ; care ; counseling ; family approach ; HIV ; mother and partners

Introduction

Effective models of care are being sought to provide successful strategies to deliver a large-scale safe, efficient and appropriate HIV care and treatment in resource-limited settings. Owing to the new global dynamic with substantial increase in international funding and lower antiretroviral (ARV) drugs prices, antiretroviral treatment (ART) has recently expanded throughout sub-Saharan Africa. Gaps in knowledge regarding the best approach to deliver effective HIV care still exist and urgently need to be addressed. Most knowledge on

ART programs comes from industrialized countries [1, 2] while data from treatment programs in sub-Saharan Africa are slowly being gathered [3–6]. In particular, there are few data examining the application and benefits of a family-focused element to HIV treatment in developing countries.

Various models of care have been adopted by programs throughout sub-Saharan Africa to scale up the delivery of ART. In most settings, HIV care programs are centered on the specific needs of the individual adult and child engaged in treatment [7,8]. The family-focused approach is a distinct model of HIV care which was pioneered by the MTCT-Plus Initiative at the International Center for AIDS Care and Treatment Programs (ICAP), Columbia University Mailman School of Public Health [9]. The MTCT-Plus model of care was established to address the long-term care and treatment needs of women identified as HIV-infected in prevention of mother-to-child transmission (PMTCT) programs. In this model, the pregnant or postpartum HIV woman is the pivotal person who serves as the guide steering her family and household members to access to HIV care and treatment services. The approach is distinguished by attention to the needs of both adults and children and to the provision of comprehensive prevention and care services for all family members. Taking the stance that the environment of an individual and therefore the family has a direct impact on the individual's ability to promote his or her own health, family-focused care offers the opportunity to bring women with their partners and children into HIV care together whilst encouraging providers to consider the needs of all family members [10].

We report here the challenges and successes of implementing a family-focused approach to HIV care and treatment at two MTCT-Plus sites in Abidjan, Côte d'Ivoire.

The MTCT-Plus approach of family care

Setting

In 2002, the MTCT-Plus Initiative was one of the first internationally-lead programs to support HIV care and treatment in resource-limited settings and to adopt the family model for delivery of such services. The Initiative funded fourteen demonstration programs in multiple urban, peri-urban and rural sites in eight sub-Saharan African countries and in Thailand [9]. In Abidjan, Cote d'Ivoire, two MTCT-Plus sites were established in two community-based antenatal clinics, in the crowded and poor districts of Yopougon and Abobo.

Patients enrolled in this MTCT-Plus program had access to regular clinical and laboratory assessments, nutritional support, HIV diagnostic testing, family planning services, prophylaxis and management of opportunistic infections and ART initiated according to WHO and local guidelines. The programs also supported community outreach and education. Standardized approaches facilitated procurement of drugs and supplies, training, and data collection [11].

Staffing and training

A multidisciplinary team of health workers was formed at each clinic composed of physicians, nurses, midwives, counselors and outreach workers, pharmacy staff, data entry and monitoring personnel, laboratory technicians as well as peers from persons living with HIV/AIDS (PLWHA). Each multidisciplinary clinic team aimed ultimately to take care of 750 adults and children living with HIV [11]. Training was performed using an MTCT-Plus designed training curriculum focusing on the team as a whole and was instrumental in cementing the relationship between the team members and establishing a culture devoid of rigid hierarchy. The training scheme used a competency-based approach focusing on building individual and team skills to implement the program rather than providing only information updates and general HIV training [11].

Enrollment into the program

Women were recruited from two sources in Abidjan: HIV-infected pregnant women attending routine antenatal visits at six urban clinics as well as postpartum women within 18 months of delivery who were previously enrolled in the PMTCT research protocol ANRS 1201/1202 Ditrame Plus [12,13]. Women were invited to participate in the program if they lived in one of the two urban districts where the MTCT-Plus centers were established.

Each enrolled woman was systematically asked to list her family and household members and was encouraged to bring her partner, children and other household members for HIV testing. The process of identification of family members allowed providers to evaluate family ties, their strengths and needs as well as their concerns and in particular to identify key decision makers within the family. Counseling to encourage partner notification was given to all women who had not yet informed their partners of their HIV status. Disclosure counseling was delivered systematically by counselors and when needed, sessions were scheduled with a psychologist to develop and support individual disclosure plans. Male partners who were tested negative for HIV were not enrolled into the program but were encouraged to provide support to their families by attending visits at the clinic with their families and participating in adherence support sessions for their wives and children as well as taking part in the peer support group.

All infants born to the pregnant women and those most recently born to postpartum women were enrolled in the program and were followed closely until their final HIV status was confirmed.

Program components

Patients enrolled in the program received a full array of clinical, supportive and laboratory services [14] including referrals to psychosocial and nutritional support, as well as family planning and tuberculosis services (Table 1). The follow-up schedule was dependant on the stage of HIV disease as determined by clinical assessment and CD4+ cell count and whether the patient received ART. In summary, cotrimoxazole prophylaxis in patients with CD4+ cell count <500/mm^3, weekly follow-up for eight weeks for those starting ART according to WHO criteria (16) and then monthly clinic visits; total blood cell count and CD4+ cell count every six months; management of clinical events at the clinic following standardized algorithms of investigation and treatment; systematic follow-up of participants who did not keep scheduled appointments. All care as well as ART were provided free-of-charge, including transport and consultations. Patients contributed to other costs such as replacement feeding if this was their informed choice, hospitalizations, specific medical investigations and drugs other than those for opportunistic infections (OIs) and vitamins. RNA PCR testing allowed the routine diagnosis of pediatric HIV infection at 4–6 weeks of age [14], with subsequent confirmation according to the breastfeeding pattern after the child reached his or her first birthday. Home visits were provided by peer workers systematically at enrolment for those initiating ART as well as follow up visits if needed in case of non adherence to scheduled visits or in case of social difficulties. A form was filled and transmitted to the clinic's team and the case was discussed during weekly multidisciplinary meetings. Home visits included therefore adherence counselling, psychosocial support and occasionally nutritional support.

ARV first-line regimens for adults were in accordance with WHO 2003 guidelines [15] and were based on a non-nucleoside reverse transcriptase inhibitor (NNRTI)-based regimen with generally nevirapine (NVP) in combination with two nucleoside reverse transcriptase inhibitors (NRTIs): zidovudine (ZDV) and lamivudine (3TC). In children, the first-line regimen was the protease inhibitor (nelfinavir) in association with ZDV and 3TC except for infants <12 months who received a Ritonavir-boosted Lopinavir regimen. Both adults and children had access to other ARV drugs in case of toxicity and to second line ART for clinical or immunological failure. ART was prescribed only in the context of ongoing adherence support.

Monitoring

A comprehensive medical record system was developed to collect individual patient information and to support patient care and follow-up. Program implementation and outcomes were routinely followed including: number of individuals enrolled, percent of eligible individuals receiving ART or OI prophylaxis, program discontinuation (death, loss-to-follow-up and patient redrawal), determination of infant HIV status, and CD4 cell count. The ability of each enrolled woman to bring her other family and household members into care was assessed by the number of family and household members who underwent HIV testing and of the ones found HIV-infected and subsequently enrolled into the program.

An electronic visit scheduling system was utilized to promptly identify individuals who miss visits and to facilitate their tracking. Contact information with carefully drawn plans of the neighborhoods where the patients reside was updated periodically and was used to conduct home visits.

Monitoring of database and statistical analysis

Data was collected every day by physicians, nurses and counsellors at both clinics and keyed in daily by a trained data clerk. All the information was entered in Access software provided by Columbia University. The database was sent monthly to data management centres at Columbia University and we received each month data queries for data cleansing. A total of three forms were used for adults, 3 for infants and 2 other forms for both adults and infants. For statistical analysis, Group comparisons used Student's t-test or non-parametric Mann-Whitney U-test for continuous variables, and Chi-2 test or Fisher's exact test for categorical variables. All the analyses were performed with STATA™ 9.0 (Stata Corporation, College Station, TX, USA).

The Abidjan MTCT-Plus program was approved by the Ministry of Health of Côte d'Ivoire. As a service demonstration program, the MTCT-Plus Initiative was exempted from formal IRB review by the Columbia University Institutional Review Board.

Results

Enrollment of index women

During the first two years of the program, 605 index women were enrolled. Their median age was 28 years (range 16–46) and the median number of household members was 5 (range 1–19). A total of 159 women (26%) lived alone or were widowed. The median parity per woman at enrollment (excluding the current pregnancy birth) was 2, (inter-quartile range [IQR] 1–3). A third of the women were

illiterate (33.6 %). At enrollment, 22 % of women had a CD4+ count <200 cells/mm^3, their median CD4+ count 351/mm^3 (IQR: 219–527), and 24% were WHO stage 3 or 4. Overall, 42.8% of women fulfilled eligibility criteria for ART of whom 94.9% initiated treatment (Table 2).

Two hundred and ninety-one index women (48.1%) were pregnant at the time of enrollment. Women enrolled prepartum were somewhat younger (28.0 vs. 29.0 years; p=0.018), had lower parity (1.9 vs. 2.6; p<0.001), had higher CD4+ count (median 429 vs 377 cells/mm3 p=0.012) and lower WHO staging with 15.8% women enrolled antepartum classified WHO stage 3 or 4 compared to 31.8% women enrolled postpartum (p=<0.001). Women enrolled during postpartum period were enrolled in median at 17.1 months (IQR 6.1–25.1) after delivery.

Partner engagement in the program

Of 605 HIV-infected women, 568 (94%) identified living partners. Three hundred (52.8%) of these women disclosed their HIV status to their partners during a median follow-up of 14.3 months (IQR 9.2–18.7). 169 of the 568 identified male partners came forth for HIV testing and whom 88 (52%) were HIV infected.

In women who decided not to disclose their HIV status, 63% cited fear of their partner's reaction (rejection) as the primary reason. Sixty-nine of the 88 (78%) HIV-infected partners were enrolled into the MTCT-Plus program. Of the 19 HIV-infected partners not enrolled, four died prior to enrolment, three never returned after learning their HIV status and 10 were followed at other centers whilst two had appointments for future enrolment.

Figure 1 shows the cascade of effort deployed to engage partners in the process of care, from HIV testing to registration into the program and then to initiation of ART in relation to the number of subjects targeted for the intervention at each stage. The male partners at enrolment were more advanced in their HIV disease with a median CD4 count of 234/mm^3 in comparison to women with a median CD4 count of 351/mm^3 (p <0.001).

Twenty-one adult household members of the index women were HIV-tested through the program: 12 were diagnosed with HIV, including three co-spouses, who were subsequently all enrolled into the program.

Enrollment of children

Of the 291 women enrolled during pregnancy, 270 delivered live born infants who were followed in care. 267 were tested at a median age of 32 days [IQR: 30–37]. HIV final diagnosis at twelve months was known in 222 infants. There were 21 infants lost to follow-up, 14 deaths. Nine of 267 children (3.4% 95% CI; 1.5–6.3%) were diagnosed as HIV-infected at week 4 postpartum and an additional four were diagnosed as infected at 1 year of age [16]. Of the 314 women who were enrolled postpartum, 312 delivered live born infants who were followed in care: 30 children (9.6%) were diagnosed as HIV-infected.

For all 605 women, 1042 children were reported living (excluding babies from the recent pregnancy described above). Out of the 1042 children, 146 were brought to the program for HIV testing and 18 (12.3%) were found to be HIV-infected. The median age at screening was 6.3 years, IQR [4.8–8.5 years]. Fifteen percent of the children living in households of women enrolled in postpartum and 11% of those enrolled in antepartum were brought forward for testing.

Thus during the first two-year period of the program, 57 HIV-infected children were followed in the program. Four children were enrolled at other care centers. The majority of children (n=254) enrolled in this MTCT-Plus program were originally HIV-exposed infants of indeterminate infection status, 71% of whom were breastfed from birth, thus requiring long-term follow-up to ascertain their final HIV status.

Family approach of HIV care

Table 3 summarizes the different family networks followed in our program. The family structure varied primarily in accordance to whether the male partner was aware of the HIV status of their female partners and whether they themselves were HIV tested and their HIV status. Overall, 59% of women had a partner unaware of their own HIV status (not tested in our program) and 10% were followed with their partner in the program. Furthermore, 121 (20%) families had two infected household members identified and 11 (1.8%) had three or more household members with HIV infection (Table 3).

Antiretroviral treatment

Less than 2% of women and 9% of partners were receiving ART before enrolment. During the following two-year period, 251 (41.5%) women accounting for 3182 person-months of follow-up and 41 (65%) partners accounting for 482 person-months of follow-up on ART initiated ART (Table 4). An NNRTI-based regimen was initiated in 98% of the index women and 90% of the partners.

Amongst the infected children (n=57), 43 started ART, 39 with a PI-based regimen at a median age of 23 months [IQR 11.7–31.5].

Retention of individuals in the program for those on ART was very high during the first two years of the program with 2.5% of index women lost-to -follow-up, 5.5% of partners and none of the infected children. Retention was also high for those not eligible for ART with 98% of index women and exposed children and 100% of male partners still in follow-up at the time of the analysis. During the 2-year follow-up period, there were 10 deaths amongst the 605 index women, five among the 69 male partners and 17 among the 582 children (2 of whom were HIV-infected) (Table 4).

Lessons learned: challenges and successes

The MTCT-Plus Initiative supported a unique model of care centered on engaging not only individuals, but also family members, in HIV care and treatment. It also emphasized the key role of HIV-infected women in opening the door to their family/household members in accessing HIV care and treatment. While the program has had substantial success and unique contributions, however, in our setting, there were also specific challenges faced. Women are often in vulnerable social situations and therefore face multiple barriers in trying to include their families in care. We found that 26% of women enrolled into our program in Abidjan were not married and not physically living with their current partner, and were not therefore in a formal "husband and wife" partnership.

In our cohort of 605 women, 53% of the 568 who had a living partner indicated that they had disclosed their HIV status to their male partner. The reasons for non disclosure have been cited time and time again in several studies with fear of accusations of infidelity, abandonment, discrimination and violence as primary reasons for not disclosing. Medley et al [17] in her meta-analysis reported that rates and barriers to disclosure amongst women varied from 16.7% to 86% and that women attending free-standing VCT clinics were more likely to disclose their HIV status to their sexual partners than women who were tested in the context of their antenatal care. Furthermore, between 3.5% and 14.6% of women reported experiencing a violent reaction from a partner following disclosure. Surprisingly, the disclosure rate in our program still averaged what has been reported elsewhere, despite unrestricted access to care including ART, an unprecedented situation in Abidjan in 2003–2005. Research surrounding the issue of disclosure in the new context of unrestricted access to ART still needs to be done.

Involvement of partners in the program (i.e. partners having come forward for VCT) was 30% with only 12% of the male partners registered, i.e. actually enrolled due to HIV diagnosis. Bringing men into reproductive health services is known to be very taxing, and finding ways to reach them is complicated [18]. It has been shown that decision making regarding child bearing even though a dual commitment by both partners, is still seen as the woman's responsibility [18]. The fact that the MTCT-Plus program at our sites was implemented primarily at maternal and child heath facilities (generally believed to be health structures designed for women), might have prevented a larger number of men from choosing to access the services provided. Taking into account the high number of serodiscordant couples, we would still have expected approximately 300 HIV-infected partners (48% of partners of the index women) to be enrolled. However, for those male partners who actually did come for testing, even though more than half were seronegative, the program was successful in continuing to involve them in the care of their families (Table 3). These partners were, for a great majority, an invaluable source of support for their wives and children enrolled as they attended clinic visits with their families and participated in adherence sessions when needed; This suggests that involvement and support of men is important in delivering comprehensive care to their families.

Regarding involvement of children into the program, more than 728 infants and children gained access to VCT services and were screened for HIV infection during this period. This can be interpreted in two ways. On one hand, we succeeded in providing to 582 neonates systematic enrollment in the program, close follow-up during the first year of life and availability of early infant diagnostic testing as pediatric diagnosis. On the other hand, only 146 other children were tested in the program and out of the children reported alive by enrolled women, more than 1200 have still yet to be screened despite intensive counseling at the sites. The challenges in accessing these children are still very important even though intensive counseling was provided by the staff at our sites. One major difficulty believed to hinder access was the possibility that many of the children lived away from the mother's household with other relatives in distant communities. Data regarding this hypothesis is now being collected for future assessment including more formative qualitative data on the barriers mothers perceive for testing their children. Universal screening of infants and children at immunization and sick baby clinics could overcome this barrier through "opt-out" and provider initiated testing on a routine basis and this could lead to improved access and care for HIV-exposed and infected children [19,20].

One of the keys of the success of a family-focused program relies on the availability of comprehensive set of services that reflect the needs of every individual within the family and the family unit as a whole. Care in this model requires committed staff with a high provider -to patient ratio to take into account the needs of the family as a whole. Most importantly we acknowledge that a successful family care program as initiated by the MTCT-Plus Initiative [7] clearly requires a paradigm shift in how providers view their patients as well as the way they view the delivery of health care and prevention services [21]. Family care extends the responsibilities of the provider to include screening, assessment, and referral of parents or children for physical, emotional, or social problems or health risk behaviors that can adversely affect the health and emotional or social well-being of any of the individual members of a family.

Another objective of this family-oriented model of care was to reduce barriers to adherence to care and treatment. It is difficult to make a direct comparison between various models of care in our settings but the low rate of cumulative loss to follow-up in the MTCT-Plus Initiative programs (2.5% in index women and 5.5% in partners) after a median duration of 13 months on ART is a clear indication that this model of care achieved high rates of retention in care in comparison to other models and experiences found in the literature [4,6]. However the high retention may be attributed to a number of other factors including a strong peer support program, attention to psychosocial issues by a multidisciplinary team and relatively robust funding particularly for staffing. Therefore, operational research studies are needed to compare different approaches to address this issue.

Involving family members in care is an evolving field and it is important to monitor how such programs will impact on communication within the family and influence decisions regarding care of the family beyond the first two years of follow-up. We found that family structure can be complex and economic constraints are enormous, both factors which contribute to hindering access to care of family members. Furthermore far from the traditional nuclear family definition, there is a need for flexibility in defining a family in various settings around the world and programs oriented towards families should not choose to operate from the position of a rigid definition.

The challenges faced in implementing a family-focused program in the context of poor urban slums with multiple unfavorable social and political concerns were numerous. Limitations in the extent of success were mostly due to disclosure issues as non disclosure rates to partners is still estimated to be very high even in the context of ART access. Also barriers regarding accessing children for testing outside the prenatal context need to be urgently addressed in order to improve the family approach strategy. However the success of utilizing the pregnant woman as entry point to HIV care and services for the family has now been documented across the world. Other MTCT-Plus sites throughout the developing world have now also demonstrated the feasibility of establishing this model of care and of successfully enrolling and following large numbers of HIV-infected adults and children in their services in various settings [22]. Most importantly, remarkable retention in the program was achieved through a multidisciplinary and comprehensive approach. It is of utmost importance that all models of care become evidence-based as ART and HIV care roll-out progress rapidly in resource-poor settings.

Ackowledgements:

Funding sources: The Abidjan MTCT-Plus care and treatment program is supported by the MTCT-Plus Initiative through the International Center for AIDS Care and Treatment Programs (ICAP) at the Columbia University Mailman School of Public Health, New York. The MTCT –Plus Initiative is funded by several private US foundations (www.mtctplus.org).

The ANRS 1201/1202 Ditrame Plus project on which the MTCT-Plus Abidjan program was built, was funded by the Agence Nationale de Recherches sur le Sida et les Hépatites Virales (Paris, France), with additional support from the Charity Sidaction (Paris, France). Renaud Becquet was funded by the French charity SIDACTION. Didier Koumavi EKOUEVI received a grant from the European Developing Clinical Trial Partnership (senior fellowship).

The authors thank the Secretariat of the MTCT-Plus Initiative at Columbia University especially Miriam Rabkin, Chloe Toesdale and David Hoos who all contributed to make the Côte d'Ivoire program a success, as well as Ida Viho and Kouadio Bertin, from the ACONDA-VS Côte d'Ivoire team, the CeDReS laboratory team, the ANRS Ditrame Plus study clinic team, as well as all patients enrolled in this program.

The MTCT-Plus Program in Abidjan, Côte d'Ivoire is supported by the MTCT-Plus Initiative at the International Center for AIDS Care and Treatment Programs, Columbia University Mailman School of Public Health, New York.

Footnotes:

This study is dedicated to the memory of Pierrette Kassi who was a truly loved and respected mid-wife who passed away on the 20th December 2004 at the site whilst attending her patients.

All authors declare that the answer to the questions on your competing interest form are all "No" and therefore have nothing to declare.

References:

- 1. Egger M , May M , Chene G , Phillips AN , Ledergerber B , Dabis F Prognosis of HIV-1-infected patients starting highly active antiretroviral therapy: a collaborative analysis of prospective studies. Lancet. 2002; 13; 360: (9327) 119- 29
- 2. May MT , Sterne JA , Costagliola D , Sabin CA , Phillips AN , Justice AC HIV treatment response and prognosis in Europe and North America in the first decade of highly active antiretroviral therapy: a collaborative analysis. Lancet. 2006; 368: (9534) 451- 8
- 3. Braitstein P , Brinkhof MW , Dabis F , Schechter M , Boulle A , Miotti P Mortality of HIV-1-infected patients in the first year of antiretroviral therapy: comparison between low-income and high-income countries. Lancet. 2006; 367: (9513) 817- 24
- 4. Calmy A , Klement E , Teck R , Berman D , Pecoul B , Ferradini L Simplifying and adapting antiretroviral treatment in resource-poor settings: a necessary step to scaling-up. Aids. 2004; 18: (18) 2353- 60
- 5. Ferradini L , Jeannin A , Pinoges L , Izopet J , Odhiambo D , Mankhambo L , Karungi G , Szumilin E , Balandine S , Fedida G , Carrieri MP , Spire B , Ford N , Tassie JM , Guerin PJ , Brasher C Scaling up of highly active antiretroviral therapy in a rural district of Malawi: an effectiveness assessment. Lancet. 2006; 367: 1335- 1342

- 6. Stringer JS , Zulu I , Levy J , Stringer EM , Mwango A , Chi BH Rapid scale-up of antiretroviral therapy at primary care sites in Zambia: feasibility and early outcomes. Jama. 2006; 296: (7) 782- 93
- 7. Mermin J A family based approach to preventive care and antiretroviral treatment in Africa. 12th conference of Retroviruses and Opportunistic Infections 2005; 22–25 February 2005 Boston, USA
- 8. Arrive E , Kyabayinze DJ , Arrivé E , Marquis B , Tumwesigye N , Kieffer MP , Azondekon A 2006; Cohort profile: The pædiatric antiretroviral treatment programmes in lower-income countries (KIDS-ART-LINC) collaboration. Int J Epidemiol.
- 9. The MTCT Initiative at the Mailman School of Public Health. Columbia University Mailman School of Public Health; New York Accessed date 22 October 2007
- 10. Abram EJ , Myer L , Rosenfield A , El-Sadr WM Prevention of mother-to-child transmission services as a gateway to family-based human immunodeficiency virus care and treatment in resource-limited settings: rationale and international experience. AJOG. 2007; 197: S102- S106
- 11. The Columbia Clinical Manual. Care and treatment of HIV/AIDS in resource limited settings. Accessed date 22 October 2007
- 12. Dabis F , Bequet L , Ekouevi D , Viho I , Sakarovitch C , Becquet R Field efficacy of zidovudine, lamivudine and single-dose nevirapine to prevent peripartum HIV transmission. AIDS. 2005; 19: (3) 309- 18
- 13. Ekouevi DK , Leroy V , Viho A , Bequet L , Horo A , Rouet F Acceptability and uptake of a package to prevent mother-to-child transmission using rapid HIV testing in Abidjan, Cote d'Ivoire. AIDS. 2004; 18: (4) 697- 700
- 14. Rouet F , Ekouevi DK , Chaix ML , Burgard M , Inwoley A , Tony TD Transfer and evaluation of an automated, low-cost real-time reverse transcription-PCR test for diagnosis and monitoring of human immunodeficiency virus type 1 infection in a West African resource-limited setting. J Clin Microbiol. 2005; 43: 2709- 17
- 15. WHO Scaling up antiretroviral therapy in resource-limited settings: treatment guidelines for a public health approach. 2003; Accessed date 22 October 2007
- 16. Tonwe Gold B , Ekouevi DK , Viho I , El-Sadr Wafaa M , Abrams EJ , Dabis F Antiretroviral Treatment and Prevention of Peripartum and Postnatal HIV Transmission in West Africa: Evaluation o a Two-Tiered Approach. PLoS Med. 2007; Aug 21 4: (8) e257- 1362- 73
- 17. Medley A , Garcia-Moreno C , McGill S , Maman S Rates, barriers and outcomes of HIV serostatus disclosure among women in developing countries: implications for prevention of mother-to-child transmission programs. Bull World Health Organ. 2004; 4: 299- 307
- 18. Mbizvo MT , Bassett MT Reproductive health and AIDS prevention in sub-Saharan Africa: the case for increased male participation. Health Policy Plan. 1996; 1: 84- 92
- 19. Rollins N , Mzolo S , Little K HIV prevalence rates amongst 6 week old infants in South Africa: the case for universal screening at immunisation clinics (abstract THAC0104). 16th International AIDS Conference 2006; Toronto, Canada
- 20. WHO, UNAIDS, UNICEF Towards universal access. Scaling up priority HIV/AIDS interventions in the AIDS sector. April 2007; Accessed date 22 October 2007
- 21. Myer L , Rabkin M , Abrams EJ , Rosenfield A , El-Sadr WM Focus on women: linking HIV care and treatment with reproductive health services in the MTCT-Plus Initiative. Reprod Health Matters. 2005; 13: 136- 46
- 22. The annual report. 2004; The MTCT-Plus Initiative, Columbia University, Mailman School of Public Health; Accessed date 22 October 2007

Figure 1

Involvement of Male Partners of the Index HIV-infected Women in the MTCT-Plus Program, from HIV voluntary counseling and testing to the initiation of antiretroviral treatment. August 2003 to August 2005, Abidjan, Côte d'Ivoire

Declared: Partner identified by index woman, Informed: Women disclosed to male partner identified, Tested: HIV tested among male partners of index women aware of woman's status, HIV Positive: Of male partners, those found HIV positive

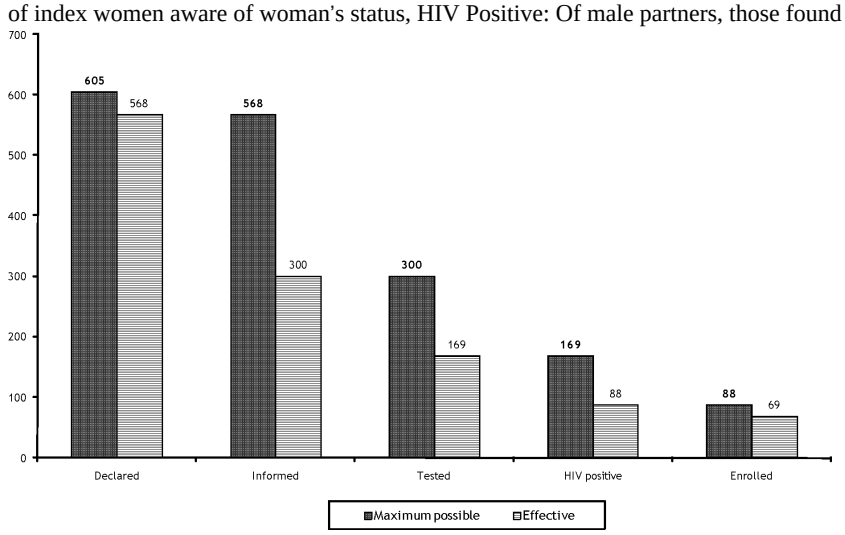

Table 1

Package of care and interventions offered in the MTCT-Plus Program (Abidjan, Côte d'Ivoire) since 2003.

Family-centered services with continuous and unrestricted access to adult and pediatric HIV prevention, care and treatment services
Regularly scheduled clinical and immunologic monitoring
Cotrimozaxole prophylaxis for opportunistic infections and severe bacterial infections as well as malaria treatment
Antiretroviral therapy, when indicated
Psychological & social support
Nutritional counseling & support, infant feeding counseling and support, when appropriate
Referral to family planning and tuberculosis services
Tuberculosis treatment
Outreach activities engaging patients/families in HIV care and prevention through education, support and outreach, establishment of strong links to community resources
Minimal fee for transport of patients to the clinic

Table 2

Characteristics of HIV-infected women enrolled in the MTCT-Plus program in Abidjan, August 2003-August 2005 (N=605).

	Number	Percentage
Median age (range)	**28 (15–46)**	
<18 years	4	0.7
18 – 24 years	133	21.9
25– 29 years	234	38.7
>=30 years	234	38.7
Time of enrolment		
Prepartum	291	48.1
Postpartum	314	51.9
Median number of children (IQR) per index woman (excluding current pregnancy)	**2 (1–3)**	
0	65	10.7
1	146	24.1
2	162	26.8
>=3	232	38.3
Education		
Illiterate	203	33.6
Primary school education	214	35.4
Secondary school education	164	27.1
University education	24	4.0
CD4+Lymphocytes		
Median CD4/mm3 (IQR)	351 (219 – 527)	
<200/mm^3	133	21.9
200–349/mm^3	164	27.1
350–499/mm^3	123	20.4
≥500/mm^3	185	30.6
WHO staging		
Stages 1 and 2	460	76.0
Stages 3 and 4	145	24.0
Eligibility for ART		
Eligible (2003 WHO Criteria) *	259	42.8
Starting ART at enrolment	246/259	94.9
Partner identification		
No partner registered	21	3.5
Died before enrolment	16	2.6
Living partner registered at enrolment	568	93.9

* Between August 2003 and December 2004: stage 4, stage 3 or stage 2 and CD4 count<350/mm^3 and CD4<200/mm^3 and since January 2006 the patients with Stage 2 and CD4<350/mm^3 were not eligible for receiving ART.

ART: antiretroviral treatment, IQR: Interquartile range

WHO: World Heath Organization

Table 3

Family structure of HIV-infected index women enrolled in the MTCT-Plus program. August 2003 to August 2005 in Abidjan, Côte d'Ivoire[*].

Category of family	N (%)
1: Family with one HIV-infected member identified	
With no partner	37 (6.1)
With partner and children of unknown HIV status	355 (58.7)
W HIV-negative partner and no HIV infected child diagnosed	81 (13.4)
2: Family with two HIV infected members identified	
Woman and HIV-infected partner followed up in the program, no infected child diagnosed	59 (9.8)
Woman and HIV infected partner followed-up in another program, no child infected diagnosed	19 (3.1)
Woman and partner of unknown status and at least one child HIV-infected	36 (6.0)
Woman and partner with unknown status and at least one other HIV-infected adult patient, no infected child diagnosed	7 (1.2)
3: Family with three or more HIV-infected members identified	
Woman and HIV-infected partner and at least one HIV-infected child followed-up in the program	9 (1.5)
Woman and HIV-infected partner and at least one other HIV-infected adult followed up in the program and no infected child diagnosed.	1 (0.2)
Woman and at least one HIV-infected child and at least one other HIV-infected adult followed up in the program (outside of the partner)	1 (0.2)

[*] Eleven HIV-infected infants were also enrolled whose mothers had died before enrolment into the program (index infant)

Table 4

ART Regimens and Status on treatment for adults and children in the MTCT Plus program. August 2003 to August 2005, Abidjan, Côte d'Ivoire.

	Adult index women	Adult men	Children
Initial ART regimen	251[*]	41	43
2 NRTI + 1 NNRTI	245	37	4
2NRTI + 1 PI	5	4	39
3 NRTI	1	0	0
Follow-up on ART			
Cumulative person –months	3182	498	434
Median per patient in months (IQR)	13 (9–17)	13 (8–18)	12 (5–15)
Status as of August 31st 2005			
Alive	239	36	41
Lost to follow-up	6 (2.5)	2 (5.5)	0 (0.0)
Deceased	6 (2.5)	3 (8.3)	2 (4.9)

ART: antiretroviral treatment NRTI: nucleoside reverse transcriptase inhibitors, NNRTI: Non-nucleoside reverse transcriptase inhibitors, PI: Protease inhibitors, IQR: interquartile range

[*] This includes 246 index women and 5 other adult women