



Assessing missed opportunities for the prevention of mother-to-child HIV transmission in an Eastern Cape local service area

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Background. Prevention of new HIV infections is a critical imperative for South Africa; the prevention of mother-to-child transmission (PMTCT) is one of the most efficacious HIV prevention interventions.

Objective. Assessment of a PMTCT programme to determine missed opportunities.

Setting. The Kouga local service area (LSA), bordering Nelson Mandela Bay Municipality (Port Elizabeth) in the Eastern Cape.

Methods. An assessment was conducted in 2007 before implementing technical support for strengthening the PMTCT programme, including: interviews with 20 PMTCT managers, 4 maternity staff and 27 other health workers on service provision, management, infrastructure, human resources and the health information system; 296 antenatal clinic users on their service perceptions; 70 HIV-positive women on HIV knowledge, infant feeding, coping, support and service perceptions; 8 representatives from community organisations and 101 traditional health practitioners (THPs). Observations

were conducted during site visits to health facilities, and the District Health Information System (DHIS) data were reviewed.

Results. Staff had high levels of awareness of HIV policies and most had received some relevant training. Nevirapine uptake varied by clinic, with an average of 56%. There were many missed opportunities for PMTCT, with 67% of pregnant women tested for HIV and only 43% of antenatal care attendees tested during a previous pregnancy. Only 6% of HIV-positive women reported support group participation.

Conclusions. Reducing missed opportunities for PMTCT requires strengthening of the formal health sector, intersectoral liaison, and greater community support. Priority areas that require strengthening in the formal health sector include HIV counselling and testing; family planning and nutrition counselling; infant follow-up; human resources; and monitoring and evaluation.

S Afr Med J 2009; 99: 174-179.

Paediatric HIV remains an important public health problem in HIV high-burden countries, with more than 90% of new HIV infections in children occurring through mother-to-child-transmission (MTCT).¹ In South Africa in 2006, an estimated 38 000 children acquired HIV infection around the time of birth, and an additional 26 000 children were infected through

breastfeeding.² The South African *National Strategic Plan (NSP) on HIV & AIDS and STIs, 2007 - 2011* aims to reduce MTCT to less than 5% of infants born to HIV-positive women by 2011.² This target can be achieved by implementing interventions that include antiretroviral (ARV) prophylaxis to HIV-positive women and their infants, obstetric interventions and complete avoidance of breastfeeding.^{3,4} International prevention of mother-to-child-transmission (PMTCT) guidelines recommend that HIV-positive women avoid all breastfeeding when replacement feeding is acceptable, feasible, affordable, sustainable and safe (AFASS). In the absence of AFASS conditions, breastfeeding should continue after 6 months, in combination with complementary feeding.⁵ As exclusive breastfeeding carries a lower risk of HIV transmission than mixed feeding, there is advocacy for its promotion in resource-constrained settings.⁶⁻⁸

Since 2002, implementation of single-dose nevirapine-based PMTCT programmes in South Africa has progressed, but these rely on efficiently functioning health systems. An evaluation of PMTCT pilot sites found that 85% of tested pregnant women received their HIV test result, but only 55% of HIV-positive women received nevirapine prophylaxis.⁹ A Cape Town study found that health policy, health services and health-seeking behaviour accounted for the problems experienced.¹⁰ Studies in the rural Eastern Cape have shown that – despite the

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availability of free health care – socio-economic constraints, poor roads and telecommunications, and an under-developed transport system are obstacles to PMTCT service provision.^{11,12} Health system failures (such as non-availability of counsellors and supplies, incorrect health education, and non-provision of nevirapine) result in missed opportunities.¹³

Renewed global efforts are required for greater access to comprehensive, integrated programmes to prevent HIV infection in infants and young children, and towards using antenatal and postnatal services to improve women's health. In South Africa, the NSP and the revised 2008 PMTCT guidelines provide a major impetus for reducing missed opportunities for PMTCT.

The Kouga local service area (LSA), bordering the Nelson Mandela Bay Municipality in the Eastern Cape, with a population of over 400 000 and an estimated HIV prevalence of 19.9% in 2007, was selected for PMTCT programme strengthening by the Eastern Cape Department of Health.¹⁴ There are 20 fixed clinics (including 1 community health centre (CHC)) providing primary health care (PHC) services, complemented by 6 satellite clinics and 9 mobile service points. Delivery services are provided by 3 hospitals and the CHC, which is the only facility that provides integrated antenatal, delivery and postnatal services.

An assessment of missed PMTCT opportunities – defined as a failure to use an opportunity for PMTCT at an appropriate health service encounter – was conducted in the Kouga LSA in 2007 to gather information on the status of PMTCT programme implementation before initiating further activities. Approval was obtained from the HSRC research ethics committee and the Eastern Cape Department of Health and funding from the US Centers for Disease Control and Prevention (CDC).

Methods

All hospitals and fixed PHC clinics in the LSA were included. Questionnaires and checklists were based on Family Health International tools,¹⁵ adapted and pilot-tested for use in South Africa. Site visits were made to each health facility to assess infrastructure, availability of policies, guidelines, pharmaceuticals, equipment and supplies. The research team conducted all interviews, after written informed consent had been obtained from each respondent. Information on PMTCT service use was extracted from the District Health Information System (DHIS).

Interviews were conducted with the PMTCT programme coordinator or clinic manager at each PMTCT site ($N=20$), heads of maternity wards at each delivery facility ($N=4$), and at least one other nurse ($N=9$) or lay counsellor ($N=18$). Structured questionnaires focused on service provision and management; infrastructure, equipment and supplies; human resources; and the health information system. The selection of health workers was based on their availability during the site visit.

Missed opportunities for PMTCT were assessed by interviewing women at antenatal and postnatal clinic visits, and by using the DHIS. Exit interviews were conducted with 296 women who used antenatal clinic services during the assessment period, by means of a questionnaire that explored perceptions of services and the PMTCT programme. Clinic staff recruited a convenience sample of 70 HIV-positive women who had used PMTCT services previously. Using a semi-structured questionnaire, their knowledge of HIV and AIDS, perceptions of PMTCT, infant feeding, coping and support was evaluated.

A sample of 47 herbalists and diviners and 54 traditional birth attendants (TBAs) was recruited through key informants, and interviewed at their workplaces or homes. The semi-structured questionnaire focused on their practice characteristics, HIV and PMTCT knowledge and attitudes, and their involvement in pregnancy, delivery and post-natal care. Representatives from each of 8 community-based organisations (CBOs) providing HIV-related services in the Cacadu District were interviewed using a semi-structured questionnaire that explored their role in PMTCT and maternal and infant care, and their suggestions for strengthening PMTCT services in the area.

Data analysis was done using SPSS version 14.

Results

Health service assessment

Thirteen (65%) of the 20 clinics provided antenatal care (ANC) services on 5 days per week, and 5 clinics (25%) provided ANC on only 1 day per week. New and follow-up ANC appointments (65%) were generally provided on the same days. HIV test results were available on the day of testing at all clinics, except where discordant rapid test results required laboratory confirmation. Nurses' reported case load ranged from 10 or less (7 out of 9, 78%) to 60 or more (1 out of 9, 11%) clients per nurse per day.

Of the PMTCT sites surveyed, most met the national PMTCT criteria (Table I). Of the 14 applicable criteria (excluding infant ARV prophylaxis), only 2 criteria were met in all clinics, i.e. the provision of HIV voluntary counselling and testing (VCT), and referral of HIV-positive women to an antiretroviral treatment (ART) site. Only 6 clinics had support groups for pregnant HIV-positive women.

In general, the 4 delivery facilities complied with the PMTCT delivery site criteria, including the provision of HIV counselling before and after delivery, having a written policy for routine care of pregnant women, using a confidential share-code to identify HIV-positive women, providing nevirapine for HIV-positive pregnant women and their babies, vitamin A administration, and immunisation. However, only 2 of the 4 delivery facilities made explicit family planning appointments for women after delivery. All 4 facilities reported infant feeding

**Table I. Compliance of PHC clinics in the Kouga LSA with national PMTCT site criteria**

Criterion	Proportion (%) of clinics meeting criterion
On-site counselling for HIV testing	18/18 (100)
On-site HIV testing	17/18 (94)
Private room in which voluntary counselling and testing (VCT) can be conducted	17/18 (94)
Daily availability of VCT	16/18 (89)
Referral to an ART site	18/18 (100)
CD4 count testing	17/18 (94)
Nevirapine prophylaxis given to HIV-positive pregnant women at 28 weeks' gestation	17/18 (94)
Nevirapine prophylaxis given to neonates within 72 hours of birth	5/18 (28)
Antenatal counselling on infant feeding	15/18 (83)
Postnatal counselling and support for infant feeding	15/17 (89)
Adequate supply of free infant formula	10/16 (63)
PCR testing for infants for HIV infection	13/18 (72)
At least 2 health workers trained in PMTCT per facility	7/17 (41)
A support group specific to HIV-positive mothers and pregnant women	6/17 (35)
A Mothers-to-Mothers-to-Be programme (optional)	3/16 (19)

counselling, but staff were uncertain whether HIV-positive women should be advised to breastfeed for 4 or 6 months, and whether formula feed should be given by bottle or by cup.

Safe obstetric practices were generally observed; staff at all 4 delivery facilities reported that they performed episiotomies only occasionally, avoided artificial rupture of membranes, and limited the number of vaginal examinations. However, staff had limited knowledge of the vaginal examination guidelines.

Ninety per cent (18 out of 20) of managers were aware of the national PMTCT guidelines, but only 70% (14 out of 20) were aware of the provincial guidelines. Guidelines on PMTCT, VCT, sexually transmitted infection (STI) management, and family planning for HIV-positive women were available at more than 80% of clinics. Guidelines for infant feeding counselling, integrated management of childhood illnesses (adapted to HIV), and baby-friendly facilities were available at most clinics, but only half of the clinics had a written policy on confidentiality.

Supply shortages of critical items were reported by managers at 17 of the 19 clinics, including vaccines (18%), syphilis drugs (31%), nevirapine tablets (13%), lancets (12%), HIV rapid test kits (29%), infant formula (35%), and condoms (12%). Clinic managers ($N=19$) reported a lack of supplies (89%), inadequate patient transport (78%), staff shortages and high patient loads (67%), demoralised overworked staff (56%), and insufficient training or supervision (44%) as obstacles to providing PMTCT services. In contrast to the clinics, all delivery facilities reported sufficient supplies and equipment, including sterilising equipment, protective clothing, delivery packs, cord ligatures, disposable needles and syringes, sharps containers, sterile gauze, disinfectants and gloves, which was confirmed by observation during site visits.

As formal training records were not available, the extent of health worker training in PMTCT service provision could not be verified. Nurses reported training from 1 day on specific topics (e.g. HIV counselling) to more comprehensive training over 2 weeks. Of the 9 nurses interviewed, 7 felt confident about counselling HIV-positive women on infant feeding options, but only 56% (10 out of 18) of lay health counsellors reported that their training equipped them to provide information to patients about PMTCT. Eight out of 9 nurses (89%) requested additional training in paediatric HIV management, ART provision, family planning, PMTCT and VCT. Lay counsellors requested additional training on PMTCT services, basic counselling skills, antenatal care, VCT, family planning and supervision.

Missed opportunities for PMTCT

Of 296 ANC attendees interviewed, 74% reported that they had been offered HIV counselling and testing; 43% of those with a previous pregnancy (79 out of 183) reported that they had been tested for HIV during their last pregnancy.

The standard PMTCT protocol specifies that HIV-positive pregnant women should be supplied with nevirapine at 28 weeks' gestation, to be taken at the onset of labour. However, of the 70 HIV-positive mothers interviewed, only 28 (40%) were aware of the PMTCT programme; 13 out of 70 (19%) reported that they had not been given nevirapine during ANC visits; and 17 out of 70 (24%) reported that their baby had not been given nevirapine syrup within 3 days of delivery. Although most HIV-positive mothers knew how HIV transmission occurred, 19 (27%) incorrectly believed that if a woman were infected with HIV, her baby would **always** become infected.



Nurses in the delivery facilities were uncertain of family planning guidelines for HIV-positive women. This was confirmed in the interviews with HIV-positive women – only 39 (56%) reported receiving family planning advice or counselling. Although 56 (80%) of HIV-positive women reported using some form of contraception, only 11 (16%) used condoms.

Of the HIV-positive mothers, 58 (83%) reported using formula feeding. Few HIV-positive women reported mixed feeding, although health care workers reported challenges with promoting the recommended infant feeding practices. More than half (43 out of 70, 61%) of the HIV-positive mothers interviewed did not believe that traditional medicines could harm an unborn baby, and half (34 out of 70, 49%) reported using gripe water to pacify their babies.

The frequency of missed opportunities for PMTCT estimated from DHIS information on the 20 clinics for the period April to July 2007 (Table II) differed from estimates based on reports by antenatal and postnatal service users. The DHIS records showed that 76% of ANC attendees received HIV counselling at an ANC visit, with 67% undergoing HIV testing. Eighteen per cent of pregnant women who accepted testing were HIV-positive and were therefore eligible for PMTCT services, but the number of nevirapine packs distributed at 28 weeks' gestation was far less than the number of pregnant women with HIV-positive results. The number of nevirapine packs distributed was 56% of the number of HIV-positive pregnant

women, ranging from 20% at a remote rural clinic to 94% at an urban clinic.

Managers reported that existing data collection systems did not enable ongoing follow-up of HIV-positive pregnant women from the antenatal period through labour and delivery to the postnatal period because antenatal and postnatal care was provided at clinics, while deliveries took place in hospitals and the CHC. Although women are given a record of ANC visits, the confidential share-code system, which uses the name of the grandmother to code the pregnant woman's HIV status, contributed to difficulties in follow-up because many women gave different names at antenatal visits and at delivery. This made it difficult to determine the mother's HIV status and to assign the correct code to her newborn baby.

Although 72% of PHC clinics provided polymerase chain reaction (PCR) testing of babies born to HIV-positive women, the DHIS showed that the number of infants tested for HIV by PCR at 6 weeks and at 9 months was low in relation to the number of women who tested HIV-positive at an ANC visit, confirming that many babies born to HIV-positive women were lost to follow-up by the PMTCT programme.

Traditional health practitioners and community structures

Of the 47 herbalists and diviners, 49% reported that their clients included pregnant women. Most (89%) of the 54 TBAs reported involvement in pregnancy care and conducting a

Table II. Missed opportunities for PMTCT based on DHIS data for April - July 2007

Indicator	No.	Estimated proportion (%) of opportunities for PMTCT that were missed
Pregnant women who had an ANC visit	1 415	
Pregnant women receiving HIV pre-test counselling at an ANC visit	1 069	346/1 415 (24%) of those on an ANC visit were not given counselling
Pregnant women who were tested for HIV at an ANC visit	955	460/1 415 (33%) of those on an ANC visit were not tested for HIV 114/1 069 (11%) of those given counselling at an ANC visit were not tested for HIV
Pregnant women who had a positive HIV test result	170	170/955 (18%) of those tested had an HIV-positive result and were therefore eligible for PMTCT services
HIV-positive pregnant women who accepted nevirapine	138	32/170 (19%) of those with an HIV-positive test result did not accept nevirapine
HIV-positive pregnant women who collected nevirapine	95	75/170 (44%) of those with an HIV-positive test result did not collect nevirapine 43/138 (31%) of those who accepted nevirapine did not collect nevirapine
Infants of HIV-positive women tested for HIV at 6 weeks using PCR	63	The number of infants born to HIV-positive women was not available Based on the number of pregnant women who had an HIV-positive test result, an estimated 107/170 (63%) of eligible infants were not tested for HIV using PCR 6 weeks after birth
Infants of HIV-positive women tested for HIV at 9 months using PCR	16	The number of infants born to HIV-positive women was not available Based on the number of pregnant women who had an HIV-positive test result, an estimated 154/170 (91%) of eligible infants were not tested for HIV using PCR 9 months after birth



postnatal visit (77%), but only 56% knew that HIV MTCT can be prevented; 89% indicated willingness to work with the clinic.

Community support structures were limited. Few organisations provided HIV-related services in the area, and interviews with community representatives generally revealed broad focus areas and no links to local health services. Although 35% (7 out of 20) of the clinics had support groups for HIV-positive pregnant women or mothers, only 6% of HIV-positive women reported participating in a support group.

Discussion

Although the assessment documented several challenges in PMTCT programme implementation, there are many programme strengths, including an existing health care infrastructure, PHC service availability, trained nurses with high levels of awareness of national policies, and a pool of lay health counsellors.

A critical starting point for ensuring universal PMTCT access is eliminating missed opportunities, including the provision of VCT to pregnant women and ARV prophylaxis to HIV-positive women and their babies. Despite the availability of VCT services, only 67% of pregnant women were tested, according to the DHIS, while 79 out of 104 (43%) of ANC attendees reported that they had been tested during a previous pregnancy. This represents a missed opportunity of 33% for VCT, according to the DHIS, and 57% according to ANC attendees. As knowledge of the woman's HIV status is a prerequisite for effective PMTCT programme implementation, this resulted in missed opportunities at all subsequent health service contacts. Reasons for missed opportunities for effective PMTCT implementation vary. Managers cite health system (staff shortages, workload, poor morale, lack of supplies) and socio-economic (transport, migration) constraints, similar to the factors found in the Cape Town study that focused on obstacles to PMTCT.¹⁰

Of HIV-positive women, 44% missed opportunities for family planning counselling after delivery, and 84% were not using condoms. This highlights the importance of family planning and HIV service integration and ensuring women's access to reproductive health choices and care during pregnancy and childbirth. These aspects should receive more attention in PMTCT programme implementation; staff should be trained accordingly.

The DHIS showed that few babies were tested for HIV infection despite the availability of PCR testing. The referral system should be improved, with better co-ordination between clinics and delivery sites to improve mother and baby outcomes.

Although 83% of HIV-positive women reported formula feeding, lay health counsellors lacked confidence to counsel

mothers about infant feeding practices, and nurses were uncertain about exclusive breastfeeding guidelines. The use of gripe water and other traditional medicines must be addressed in infant feeding guidelines. The need for additional training of professional nurses, and for a formal system to update staff on new or revised guidelines, was identified. Lay counsellors require comprehensive training, role clarification and supervisory support. A formal supervisory system needs to be established and communicated.

The lack of participation of HIV-positive women in support groups is a major concern, as participation assists HIV-positive women to deal with stigma and isolation, provides emotional support, improves HIV knowledge and promotes positive living.^{16,17}

Discrepancies between information reported by HIV-positive women at postnatal visits and that from the DHIS reflect challenges in the monitoring and evaluation (M&E) system, exacerbated by the share-code system. Other M&E challenges were lack of time for data entry, insufficient staff, lack of recent training, and migration of clients. The reporting system, comprising numerous data entry registers, hinders the integration of information and raises doubts about the accuracy and quality of the information submitted.

Conclusion and recommendations

Prevention of new HIV infections is critical, and PMTCT is one of the most efficacious interventions. To reduce missed opportunities for PMTCT, we propose a framework (Fig. 1) based on our findings and a modification of the 1978 Alma-Ata Declaration.¹⁸

Strengthening of the formal health sector is a requisite for enhancing the PMTCT programme to ensure its integration into existing PHC services. Many PHC clinic managers function as PMTCT programme champions, and a brief orientation could help staff to understand the concept of missed opportunities as well as to develop strategies for reducing these, within comprehensive PHC. Health system improvements should include implementing the new PMTCT guidelines, addressing staff development needs, supportive supervision and better utilisation of the M&E system.

Intersectoral liaison is needed between formal health services and traditional practitioners. Attempts must be made to improve the latter's knowledge of HIV and AIDS and to encourage them to refer clients to formal health services to reduce missed PMTCT opportunities.

Community capacity to support PMTCT needs to be enhanced by effective 'edutainment' programmes to increase community knowledge and awareness of HIV prevention and PMTCT. HIV-positive women need psychosocial support and expanded peer support to encourage PMTCT programme adherence.

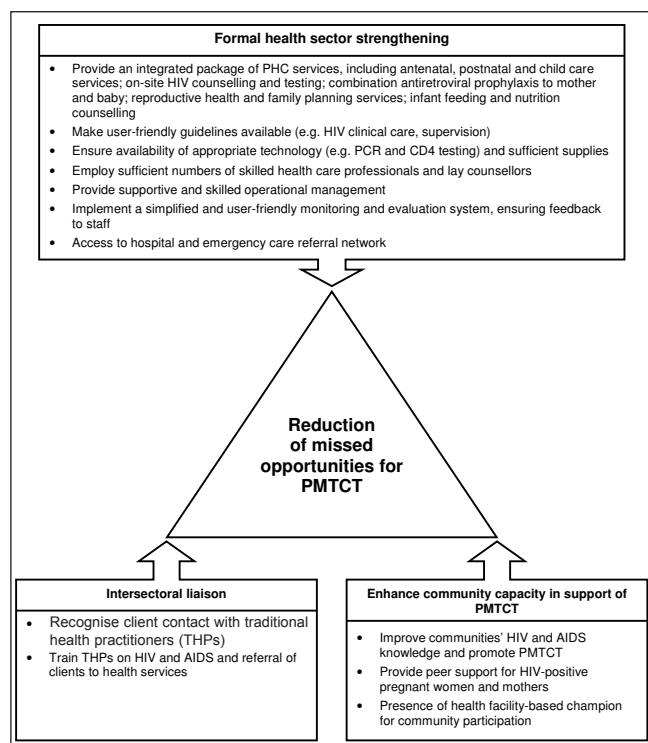


Fig. 1. A framework for reducing PMTCT missed opportunities.

The 2008 revised national PMTCT protocol can re-energise South Africa's commitment to universal access and further reduce the number of infant HIV infections.

We thank the Centers for Disease Control and Prevention (CDC) for their support (Co-operative Agreement 1U2G PS 000570-01 CDC); the Eastern Cape Department of Health Management (in particular the Kouga LSA staff and managers) for their support and encouragement; and Nico Jacobs for administrative assistance. This article is the work of the authors and does not necessarily reflect official views of the CDC.

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Accepted 4 September 2008.