OPINION

CALL TO ACTION: PREVENTION OF MOTHER-TO-CHILD TRANSMISSION OF HIV

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The prevention of mother-to-child transmission of HIV (PMTCT) programme is a critical intervention to reduce the incidence of paediatric HIV infections. It is also a key intervention to decrease infant, child and maternal mortality. The optimal implementation of a sound, evidence-based PMTCT programme is essential to meet both the HIV reduction targets in the National Strategic Plan and to achieve Millennium Development Goals (MDGs) 4 (reducing infant and child mortality) and 5 (reducing maternal mortality). Since 2001, South Africa has been implementing a programme to prevent mother-to-child transmission (MTCT) of HIV. Since 2007, national PMTCT policy has evolved into a strong, enabling framework that should reduce vertical transmission significantly. This paper reviews the milestone studies that have contributed to our knowledge about drug regimens to reduce MTCT, and reviews the latest South African PMTCT guidelines and the possible future changes. Strengthened/revised drug regimens for PMTCT are essential but insufficient for measureable decreases in HIV transmission and improvements in maternal and child health. The main challenge is implementation. Until the enhanced PMTCT policy is effectively operationalised, measurable achievements will remain elusive.

Prevention of mother-to-child transmission of HIV (PMTCT) is the single most effective medical intervention to significantly reduce the burden of HIV in communities, and its optimal implementation is essential to meet both the HIV reduction targets in the National Strategic Plan (NSP)[1] and to achieve Millennium Development Goals (MDGs) 4 (reducing infant and child mortality) and 5 (reducing maternal mortality).[2] In 1994 the landmark Paediatric AIDS Clinical Trial Group (PACTG) 076 study found a 67% reduction in HIV transmission when pregnant women were given zidovudine (AZT) from the second trimester onwards and when infants received AZT for the first 6 weeks of life.[3] By demonstrating that vertical transmission was preventable, these data represented the most dramatic results in HIV research at the time. Global inequities were also highlighted, as the PACT 076 PMTCT interventions were not feasible in resource-limited settings. PACTG 076 was quickly followed by studies from Thailand[4] and Africa (Petra)[5] demonstrating that shorter courses of therapy were also highly effective, but these were still not feasible for large-scale implementation in most resource-limited settings. However, Thailand did implement the short-course therapy in 1999 as part of its national PMTCT policy. In 1999 the Ugandan HIVNET 012 study, conducted in a breastfeeding population, found that just a single dose of nevirapine (NVP) to the mother and a single dose to the child could reduce HIV transmission to 13%,[6] making PMTCT now accessible in resource-limited settings. Countries all over the world quickly implemented the PACTG and HIVNET 012 PMTCT regimens; in the USA, for example, transmission rates dropped sharply once guidelines for the use of AZT were adopted. Over a period of 6 years transmission rates in the USA dropped sharply and remain below 2% today largely as a result of HAART (highly active antiretroviral therapy) to mothers.[7] Over the decade after PACTG 076, evidence of the superiority of HAART or multidrug therapy to prevent mother-to-child transmission (MTCT) accumulated. In 2004, the Thailand PHPT-2 study found that the use of AZT combined with NVP ('dual therapy') could reduce HIV transmission to 1.9%,[8] forming the basis of the current South African PMTCT policy.

Since 1999 and the initial drug trials much work has been done to minimise, and possibly eliminate, vertical transmission of HIV. The World Health Organization (WHO) developed a comprehensive strategic four-pronged approach, based on providing a continuum of appropriate care for mothers and their infants, to prevent HIV infection in infants and young children and optimise maternal and child health. The four-prong strategy includes: (*i*) primary prevention of HIV infection; (*ii*) prevention of unintended pregnancies among HIV-infected women; (*iii*) prevention of HIV transmis-

sion from mother to child; and (*iv*) provision of care and support for HIV-infected mothers and their infants, partners and families.[9] This comprehensive strategy states that because primary HIV infection during pregnancy and breastfeeding poses an increased threat of MTCT, HIV prevention efforts should address the needs of pregnant and lactating women, especially in high-prevalence areas. The third prong (PMTCT) comprises five interventions, namely: (*i*) increasing access to HIV testing and counselling; (*ii*) provision of antiretroviral (ARV) therapy, the choice depending on local feasibility, efficacy and cost; (*iii*) implementation of safe delivery practices, including avoiding invasive obstetric procedures such as artificial rupture of membranes, fetal scalp monitoring and episiotomy; and (*iv*) providing optimal counselling and support on infant-feeding methods and provision of care and support, through all health programmes, for HIV-infected mothers, their infants, partners and families. This paper focuses mainly on the third prong, but acknowledges the importance of the other strategies.

THE DEVELOPMENT OF SOUTH AFRICAN POLICY ON PMTCT, AND EXPERIENCES THEREOF

In South Africa, the use of a single dose of NVP (at the onset of labour for mother, and within 72 hours for the baby) to prevent MTCT of HIV was implemented in 2001. Although the policy was in place, significant implementation obstacles remained. At the inception of the programme there was insufficient guidance on *how* to implement PMTCT, resulting in inconsistent programme implementation across the country, and in PMTCT being mainly a vertical programme that was implemented independently of maternal, neonatal and child health services. The science also continued to advance.

As the evidence continued to mount on the superiority of multidrug therapy, academics, clinicians and civil society in South Africa mobilised and advocated for the urgent adoption of an updated PMTCT policy incorporating dual therapy, particularly in the wake of updated WHO PMTCT guidelines in 2006.[9] In early 2008 the National Department of Health (NDoH) updated the PMTCT guidelines.[10] Changes included: (*i*) a slight change in the testing strategy, calling this a *routine offer of voluntary counselling and testing;* (*ii*) the addition of AZT from 28 weeks of gestation and a renewed emphasis on getting CD4 counts on all pregnant women to determine the need for initiation of highly active antiretroviral therapy (HAART) in pregnancy (CD4 cell count <200 cells/µl or WHO clinical stage 4); and (*iii*) improved guidance on infant feeding options and a greater emphasis on ensuring infant diagnosis at 6 weeks of life. These guidelines are undergoing further review at the time of writing, with recommendations from the PMTCT guidelines committee to lower the threshold for the initiation of HAART in pregnancy, starting with a CD4 count of 350 cells/ µl or less. This significant change, coupled with the new proposed paediatric guidelines (NDoH 2009) calling for the early treatment of all HIV-infected infants regardless of CD4 count, creates the necessary policy framework to set South Africa on a path to achieving both MDGs 4 and 5 and the HIV reduction targets set in the NSP 2007 - 2011.

CURRENT STATE OF THE NATIONAL PMTCT PROGRAMME

While a sound PMTCT policy is a significant step in the right direction, in itself this is insufficient for programme success. Data show that implementation of the national PMTCT programme has been fraught with challenges since its inception:[11] among other issues, these relate to lack of health system capacity to absorb the programme into routine care, lack of health worker knowledge about PMTCT, confusing messages about PMTCT and infant feeding, and PMTCT messages that do not fit into current socio-cultural frames of reference. Consequently all of the available evidence on HIV seroprevalence and maternal and child mortality indicate that South Africa is well behind in meeting its NSP and MDG targets, and is therefore unlikely to achieve these without a major improvement in the performance of its HIV programmes.

Data from several PMTCT-related studies show that early vertical transmission rates vary from 7% to 19%,[12-14] that 9-month HIV-free survival might range between 64% and 80%,[15] and that guidelines on infant feeding and especially breastfeeding cessation were not feasible and not adhered to,[16] despite the implementation of PMTCT interventions. National data on the effectiveness and impact of the PMTCT programme are still unavailable. In the first half of 2009, approximately 40% of HIV-exposed infants accessed an HIV polymerase chain reaction (PCR) test before 3 months of age nationally compared with approximately 32% over the same time period in 2008 (unpublished data). While it is encouraging that the average prevalence of positivity among those tested declined from 10% in 2008 to 7% in 2009, there is no measure of the rate of paediatric HIV infection in the more than half of HIV-exposed infants in the country whose mothers are less likely to be accessing PMTCT services.

Furthermore, data from the just-released 2008 National Antenatal Sentinel HIV and Syphilis Prevalence Survey found that HIV infection among antenatal clinic attendees is at an unacceptably high level of 29.3%.[17] This figure is a national aggregate, with a range of seroprevalences across provinces and even more vari-

ation across the 52 districts. The distribution of HIV prevalence by district in 2008 ranged from 2.2% in the district of Namakwa (Northern Cape) to 45.7% in uMgungundlovu (KwaZulu-Natal), the highest recorded in the country. An investigation into these differences as well as the coverage and quality of PMTCT services across all districts would be instructive in designing implementation strategies.

The District Health Barometer (DHB), an annual assessment of performance on key health indicators in the public health sector conducted by the Health Systems Trust, corroborated evidence of suboptimal PMTCT programme implementation based on the District Health Information System (DHIS).[18] The DHB has published data since 2005, so improvements over time can be measured. The 2007/2008 report found that the national antenatal HIV testing average increased from 69% in 2006 to 80% in 2007/2008. While this indicates an improvement in testing rates, the numbers are well short of the NSP 2009 target of 90%. The report also found huge variations in the uptake of NVP by pregnant women, ranging from 12% to 108%, with a national average of 76% – an increase on the 61% from the year before. While there are significant weaknesses with this data set, the trend and overall data set across all districts provide useful insights into the level of coverage and quality of the programme nationally.

A review of three South African mortality audit reports (*Saving Mothers – 2004, Saving Babies* and *Saving Children*) called the 'Every Death Counts' report found South Africa in the unenviable position of being a country where maternal and child mortality has *increased* since the baseline for the MDGs in 1990.[19] In that report, citing the *Saving Mothers* report of 2004, the largest cause of maternal mortality was reported to be non-pregnancy related, with infections such as HIV, tuberculosis and pneumonia accounting for the deaths of approximately 38% of the women.[19] Similarly, HIV/AIDS accounted for 35% of premature deaths among neonates and children.[19] The latest *Saving Mothers* report (2005 - 2007) sadly shows the same trend as earlier, with about 44% of maternal deaths caused by non-pregnancy-related infections (mostly AIDS).[20] The time to consider a paradigm shift from narrowly thinking of PMTCT as simply an intervention of reducing vertical transmission of HIV to seeing this programme as key for the survival of women, children and indeed families is long overdue.

The available data indicate that a sound PMTCT policy is insufficient to assure HIV transmission rates of less than 5%. South Africa now faces a more mundane struggle in the battle against HIV: the battle of implementation.

CHALLENGES AND OPPORTUNITIES

There are numerous and varied implementation challenges faced by the programme at several levels. The interruption of essential drugs, scarce human resources at sites, HIV stigma and discrimination, and lack of clear operational guidelines at provincial and local levels remain serious hurdles to achieving smooth implementation of the programme and optimisation of maternal and child health outcomes. A culture of accountability for optimisation of the programme and attainment of targets is required at all levels of health care providers as well as by health care managers from facility level up to the NDoH.

Under the current system, there are few incentives for health care personnel to ensure that the PMTCT programme is performing optimally. For instance, no health manager's annual performance appraisal takes PMTCT performance targets into account, and health care facilities are not routinely audited on PMTCT outcomes with a view to assigning responsibility for improved performance. In order to strengthen the focus of health care facilities and ensure management support and rigorous stewardship, the NDoH should not only request accurate reports on PMTCT indicators (e.g. percentage of mothers tested for HIV) on a regular basis, but also include the site's PMTCT programme performance in every relevant manager's portfolio of performance assessment. Programme data collected at a site are rarely used for ongoing feedback to staff on their own performance, or as a tool for quality improvement. Health care facilities and provincial and district departments of health must make use of data to monitor PMTCT performance and assist all sites in meeting national goals.

Health care facilities must also re-invigorate their HIV counselling and testing programme to ensure that all women entering antenatal clinics are offered an HIV test and all infants attending well-baby/immunisation clinics are assessed for HIV exposure. There is a move within the NDoH towards provider-initiated counselling and testing, placing a greater emphasis on health care providers to ensure they discharge their duty to present HIV testing as a routine procedure with life-saving benefits. Given that approximately 3% of women who initially test negative will seroconvert during pregnancy,[22] systems must also be in place to retest HIV-negative women at around 34 weeks of gestation and in the immediate postnatal period before mother and baby are discharged. Health care workers bear a responsibility to both mothers and children to ensure that no woman leaves a health care facility unaware of her HIV status. Failure to do so would be tantamount to negligence, given the availability of life-saving and

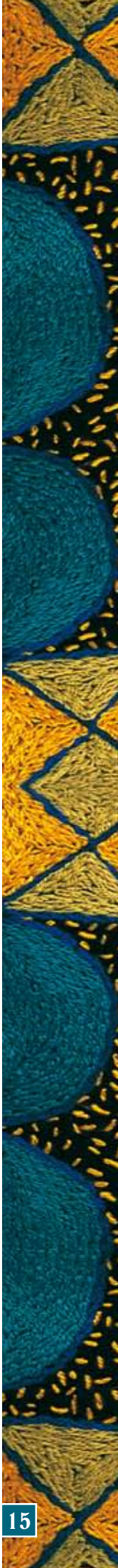
life-prolonging therapy, not to mention the option of preventing a paediatric HIV infection. Retesting should also be strongly encouraged at later points in the postnatal period when the mother is seen as part of her follow-up care.

PMTCT targets can only be achieved by deliberately addressing the challenges and weaknesses in the system. All health care personnel in the facility must be educated on the importance of PMTCT and of the integral role the programme plays in infant, child and maternal survival. A designated team with an identified leader must take responsibility for PMTCT programme performance. Until there is a renewed emphasis on responsibility for the PMTCT programme within each health care facility, a lack of programme ownership will continue to prevail.

While the challenges may seem vast, there are a number of outstanding solutions that have been applied to overcome key bottlenecks and challenges in PMTCT implementation in South Africa from which much can be learned. The NDoH, Medical Research Council, University of the Western Cape and UNICEF jointly developed a 'Possible solutions' document that highlighted these.[21] The document highlights districts or facilities that have applied a comprehensive or selective approach to overcoming key bottlenecks in PMTCT. Of note is the success that facilities have experienced when they integrate PMTCT care into routine care, e.g. when the birth register was adapted to include PMTCT information, when community-based activities to increase the demand for PMTCT services were implemented, or when data were used at a local level to monitor and improve PMTCT-related care. This 'Possible solutions' document highlights that progress can be achieved when health care facilities apply ingenuity, creativity and commitment to improving PMTCT programmes.

CONCLUSION

PMTCT has been implemented in South Africa since 2001, first in 18 pilot sites and now nationally in more than 3 000 facilities. Despite the limited documented impact of the programme (and there is a dearth of data in this regard), PMTCT has now received support for renewed action at the highest political level. The current Minister of Health (Hon. Aaron Motsoaledi) has been frank in his admission that 'South Africa is losing the battle against HIV and that maternal deaths are at unacceptably high levels'. His administration has renewed its commitment to the programme and has announced an accelerated PMTCT programme aimed at improving its coverage and quality. The NDoH is currently revising the PMTCT policy, which it is hoped will initiate HAART in all pregnant women with a CD4 count <350 cells/µl and in all HIV-infected infants less than 12 months old. These policy changes will help set South Africa on a path towards achieving HIV reduction targets and improved child and maternal health. The government is demonstrating leadership and political will. As health care workers we must recommit to the PMTCT programme, bring a shared sense of responsibility and accountability for improving maternal, newborn and infant health, and move beyond policies so that they become sustained action at all levels of the health care system. It is only when this occurs that we will meet the targets set in the NSP and meet the 4th and 5th MDGs.



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