

Eliminating mother-to-child HIV transmission in South Africa

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Problem The World Health Organization has produced clear guidelines for the prevention of mother-to-child transmission (PMTCT) of the human immunodeficiency virus (HIV). However, ensuring that all PMTCT programme components are implemented to a high quality in all facilities presents challenges.

Approach Although South Africa initiated its PMTCT programme in 2002, later than most other countries, political support has increased since 2008. Operational research has received more attention and objective data have been used more effectively.

Local setting In 2010, around 30% of all pregnant women in South Africa were HIV-positive and half of all deaths in children younger than 5 years were associated with the virus.

Relevant changes Between 2008 and 2011, the estimated proportion of HIV-exposed infants younger than 2 months who underwent routine polymerase chain reaction (PCR) tests to detect early HIV transmission increased from 36.6% to 70.4%. The estimated HIV transmission rate decreased from 9.6% to 2.8%. Population-based surveys in 2010 and 2011 reported transmission rates of 3.5% and 2.7%, respectively.

Lessons learnt Critical actions for improving programme outcomes included: ensuring rapid implementation of changes in PMTCT policy at the field level through training and guideline dissemination; ensuring good coordination with technical partners, such as international health agencies and international and local nongovernmental organizations; and making use of data and indicators on all aspects of the PMTCT programme. Enabling health-care staff at primary care facilities to initiate antiretroviral therapy and expanding laboratory services for measuring CD4+ T-cell counts and for PCR testing were also helpful.

Abstracts in [عربي](#), [中文](#), [Français](#), [Русский](#) and [Español](#) at the end of each article.

Introduction

The magnitude of the problem of human immunodeficiency virus (HIV) infection in South Africa is illustrated in [Fig. 1](#), which shows the rise of the HIV pandemic since 1990 and its stabilization after 2004. In 2010, 30.2% of all pregnant women who attended public sector health-care facilities were infected.¹ The prevalence of HIV infection among pregnant women is likely to remain high for at least the next two decades because the number of people receiving life-long antiretroviral therapy (ART) in South Africa is still increasing and is predicted to plateau at around 3 million in 2016.²

In 2011, an estimated 70.4% of maternal deaths in South Africa were associated with HIV infection,³ as were half of all deaths of children younger than 5 years.⁴ Consequently, the success of programmes for the prevention of mother-to-child transmission (PMTCT) of HIV is critical for reducing maternal and child mortality and morbidity.

Evolution of the PMTCT programme

Although the burden of HIV infection in South Africa had been large for many years, the country did not implement a PMTCT programme until 2002. The main steps in the evolution of South Africa's PMTCT policy are listed in [Box 1](#).

In tandem with changes in policy, continuous efforts were also being made to improve the quality of the programme using operational research. A review of the initial 18 pilot sites for the PMTCT programme led to several

recommendations for improving health-care systems, including that the programme be scaled up to all facilities.⁵ It was also recommended that: training of front-line workers be improved; all health-care workers be given more support and supervision; managers' commitment to the programme be increased; the PMTCT programme be integrated into existing primary health-care services, especially maternal services and services for women and children.

An evaluation of a quality improvement programme in one district in KwaZulu-Natal province showed that, although HIV testing during pregnancy had become routine and universal, coverage was less extensive for other elements of the PMTCT cascade,⁶ such as ensuring that HIV-positive mothers are treated and continue on treatment; testing infants exposed to HIV; and identifying and treating HIV-positive infants. It was recommended that these elements be given more attention and that programme data related to them be simplified and monitored regularly.⁷

Paying attention to data and indicators, such as the proportion of HIV-positive mothers receiving ART or prophylaxis, is critical for improving the quality, coverage and impact of the PMTCT programme. This was demonstrated further in a study in 2008 in three districts in KwaZulu-Natal where "a data quality improvement intervention that involved specific training for health-care workers on the importance of public health information, monthly data reviews and feedback, and regular data audits was effective in significantly increasing the completeness and accuracy of the data used to monitor PMTCT services in South Africa".⁸

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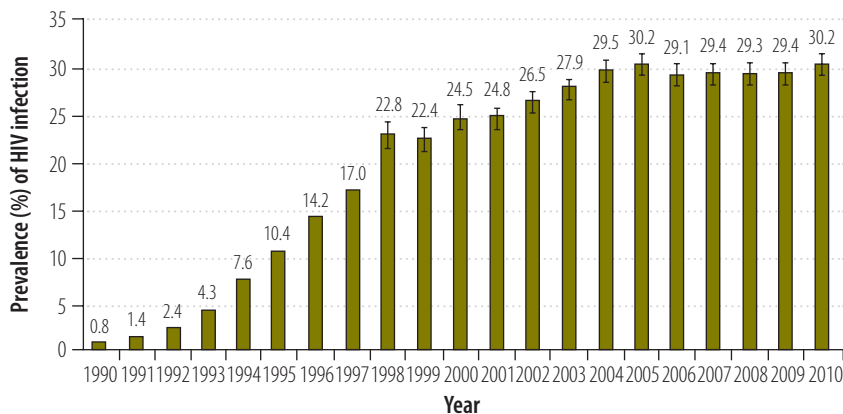
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Fig. 1. Prevalence of HIV infection in pregnant women, South Africa, 1990–2010



HIV, human immunodeficiency virus.

Note: The vertical lines above some of the bars represent 95% confidence intervals.

Box 1. Main steps in the evolution of South Africa's policy on the prevention of mother-to-child transmission of HIV, 1998–2011

- 1998–1999: a PMTCT programme was started at two midwife obstetric units in Khayelitsha, Cape Town by the Western Cape Department of Health, despite the lack of a national policy.
- 2000: thirteenth international HIV conference, Durban. Data presented indicated that antiretroviral drug regimens were effective in reducing mother-to-child transmission.
- 2001: the South African Ministry of Health endorsed the establishment of two research sites in each of the nine provinces for a period of 2 years to understand better the operational challenges of introducing antiretrovirals during pregnancy to reduce mother-to-child transmission.¹⁵
- 2001: this policy was challenged in the courts. In December 2001, the government was ordered by the court to develop a fully capable and effective national programme to reduce mother-to-child transmission by the following year.
- 2002: the government challenged the court order, but was unsuccessful. The PMTCT programme commenced.
- 2003: the government published a new operational plan for treating and caring for those infected with HIV. The plan included increased provision of nevirapine, the extension of treatment to all HIV-infected pregnant mothers and their children and the expansion of related health-care services, such as voluntary counselling and testing.
- 2004: introduction of comprehensive care management and treatment of HIV-infected individuals. Pregnant women with a CD4+ T-cell count < 200 cells/mm³ became eligible for HAART.¹⁶
- 2008: the Department of Health updated the PMTCT policy to include: (i) dual prophylaxis with zidovudine and nevirapine from 28 weeks' gestation; (ii) nevirapine treatment for pregnant women during labour and for their babies within 72 hours of delivery; and (iii) HAART for pregnant women with a CD4+ T-cell count < 200 cells/mm³.
- 2008: the Minister of Health launched the national PMTCT accelerated plan (A-plan) which aimed to reduce mother-to-child transmission of HIV from 12% in 2008 to less than 5% by 2011, in accordance with the National Strategic Plan 2007–2011.
- 2009: President Zuma's speech on World AIDS Day outlined changes to be implemented in 2010. This gave a clear indication that the political leadership required to address the scale of the problem was available.
- 2010: the Department of Health revised the PMTCT policy again to include lifelong HAART for HIV-positive women with a CD4+ T-cell count ≤ 350 cells/mm³ and dual ART from 14 weeks onwards in the pregnancy for HIV-positive women with a CD4+ T-cell count > 350 cells/mm³, in line with option A of World Health Organization guidelines.¹⁷ Infant prophylaxis was daily nevirapine for 6 weeks for all infants. Daily nevirapine was continued for all breastfeeding infants whose mothers were not on HAART, to reduce postnatal transmission.¹⁸
- 2011: following a national conference on breastfeeding, the Minister of Health endorsed a policy that breastfeeding should be exclusively used at public health facilities, with formula milk being reserved for when there are medical indications, and that the provision of free formula milk should be phased out.
- 2011: in line with a call from global agencies, the Department of Health developed a national action framework for eliminating mother-to-child transmission of HIV.

ART, antiretroviral therapy; HAART, highly active antiretroviral therapy; HIV, human immunodeficiency virus; PMTCT, prevention of mother-to-child transmission.

In addition, a 2008 initiative in which data were used to improve quality of care in the programme focused attention on the health districts with the worst performance and strengthened implementation of the PMTCT cascade by sharing good practices.⁹

Between 2008 and 2011, major changes in professional practice occurred, including a shift towards nurses initiating and managing the use of ART. Nurses and midwives at primary care antenatal facilities were trained to provide ART for eligible pregnant women.

Results

In 2005, slightly fewer than 50% of all pregnant women were routinely tested for HIV infection. By 2009, testing was virtually universal. The maternal treatment regimen used for PMTCT has also changed over the past 10 years, from single-dose nevirapine to either dual therapy with nevirapine and zidovudine from the 14th week of pregnancy onward or highly active antiretroviral therapy (HAART; **Box 1**) for women with a CD4+ T-cell count below 350 cells/mm³.

The testing of infants to identify HIV infection early has also increased. The results of routine tests in public health-care facilities are shown in **Table 1**. Between 2008 and 2011, the proportion of the estimated number of infants exposed to HIV who were tested before reaching the age of 2 months increased from 36.6% to 70.4%. Over the same period, the proportion of infants tested who were HIV-positive decreased from 9.6% to 2.8%.¹⁰

In 2010, the first national population-based survey of the effect of the South African PMTCT programme on early HIV transmission from mother to child reported an overall transmission rate of 3.5%. When the survey was repeated in 2011, the transmission rate was found to be 2.7%.^{11,12}

The main lessons learnt during improvement of the PMTCT programme were: changes in national PMTCT policy should be implemented rapidly at all facilities; the efforts of partner organizations should be coordinated with those of the formal health-care sector; and data and indicators should be used to provide motivation (**Box 2**).

Table 1. Polymerase chain reaction testing for HIV in infants younger than 2 months born in public health-care facilities, South Africa, 2008–2011¹⁰

Year	No. of HIV-exposed infants	No. (%) of HIV-exposed infants tested with PCR	No. (%) of infants with positive PCR results
2008	240 739	88 006 (36.6)	8405 (9.6)
2009	232 227	120 354 (51.8)	7481 (6.2)
2010	241 645	144 501 (59.8)	6293 (4.4)
2011	241 645	170 030 (70.4)	4770 (2.8)

HIV, human immunodeficiency virus; PCR, polymerase chain reaction.

Box 2. Summary of the main lessons learnt

- Changes in PMTCT policy should be implemented rapidly at the field level: for example, changes in treatment regimes and in criteria for starting ART should be translated into action on the ground through training and guideline dissemination.
- There should be good coordination at the field level between the formal health-care sector and partner organizations, such as international health agencies and international and local nongovernmental organizations, to support PMTCT policies.
- Greater attention should be paid to data and indicators relating to all aspects of the PMTCT programme as this information can provide motivation.

ART, antiretroviral therapy; PMTCT, prevention of mother-to-child transmission.

Challenges

Despite the remarkably successful implementation of the PMTCT programme in South Africa, many challenges remain. Some health districts have done better than others in ensuring that good quality data are collected routinely and that data are used by health workers and managers to continuously monitor and improve the programme. Moreover, there is also a need for mentoring and supportive supervisory systems that can help facilities use data effectively on a regular basis.^{7,13}

In South Africa, pregnant women visit antenatal clinics at a relatively advanced stage of pregnancy; fewer than

40% of them attend for the first time before 20 weeks' gestation. Some pregnant women even go into labour without having attended an antenatal clinic once. The PMTCT policy introduced in 2010 (Box 1) requires HIV-positive pregnant women to attend an antenatal clinic early, at 14 weeks' gestation, so that interventions can be started as soon as possible. Increasing early attendance will require interventions at both the individual and community levels to raise demand for services. In addition, changes in attitudes towards health-care services and in their organization will be needed to boost supply.

Ensuring that all infants undergo early HIV testing is another important

challenge, as is making sure that all those who test positive are referred for treatment. In addition, more attention should be given to testing infants exposed to HIV when they are older than 2 months, particularly since breast-feeding may result in on-going postnatal exposure to the virus.

Despite the substantial increase in the number of facilities that can administer ART, 15% of public health-care facilities in South Africa are still not able to initiate treatment (Department of Health, South Africa, unpublished data, 2012). This inconveniences pregnant women, who may have to be referred to another facility for treatment initiation, and increases the possibility that they will be lost to follow-up.

South Africa is implementing a national action framework for PMTCT that covers the 5 years from 2012 to 2016.¹⁴ The framework was tailored to individual districts and provinces and aims to provide a clear understanding of the operational issues that influence the continuous improvement of PMTCT programmes. In addition, there are on-going efforts to increase the ability of local health-care workers to collect high-quality data and use those data to improve the PMTCT programme.

If the national action framework for PMTCT is implemented in tandem with the envisaged strengthening of the health-care system, there is a high probability that, within the next 5 years, South Africa will be on the path to achieving the global goal of eliminating mother-to-child HIV transmission by 2015. ■

Competing interests: None declared.

ملخص

القضاء على انتقال فيروس العوز المناعي البشري من الأم إلى الطفل في جنوب أفريقيا

المشكلة أصدرت منظمة الصحة العالمية مبادئ توجيهية واضحة للوقاية من انتقال فيروس العوز المناعي البشري من الأم إلى الطفل. إلا أن ضمان تنفيذ جميع مكونات برنامج الوقاية من الانتقال من الأم إلى الطفل بجودة عالية في جميع المرافق يفرض تحديات. الأسلوب على الرغم من بدء جنوب أفريقيا برنامج الوقاية من الانتقال من الأم إلى الطفل في عام 2002، بعد معظم البلدان الأخرى، إلا أن الدعم السياسي زاد منذ عام 2008. وتلقت البحوث التشغيلية مزيداً من الاهتمام وتم استخدام المعطيات الموضوعية على نحو أكثر فعالية. المواقع المحلية في عام 2010، كان حوالي 30٪ من جميع السيدات الحوامل في جنوب أفريقيا إيجابيات لفيروس العوز المناعي البشري وكان نصف جميع حالات الوفاة لدى الأطفال الذين تقل أعمارهم عن 5 سنوات مرتبطاً بالفيروس.

التغيرات ذات الصلة في الفترة من 2008 إلى 2011، زادت النسبة المقدرة للرضع المعرضين لفيروس العوز المناعي البشري الذين تقل أعمارهم عن شهرين وأجري لهم اختبارات تفاعل البوليميراز المتسلسل الروتينية للكشف المبكر عن انتقال فيروس العوز المناعي البشري من 36.6٪ إلى 70.4٪. وانخفض معدل انتقال فيروس العوز المناعي البشري المقدر من 9.6٪ إلى 2.8٪. وأشارت المسوح السكانية التي أجريت في 2010 و2011 إلى معدلات انتقال بنسبة 3.5٪ و2.7٪، على التوالي. الدروس المستفادة شملت الإجراءات الحاسمة لتحسين حصائل البرنامج ما يلي: ضمان التنفيذ السريع للتغيرات في سياسة الوقاية من الانتقال من الأم إلى الطفل على الصعيد الميداني من خلال التدريب ونشر المبادئ التوجيهية؛ وضمان التنسيق الجيد مع الشركاء التقنيين، مثل الوكالات الصحية الدولية والمنظمات الدولية

الأولية من بدء العلاج بمضادات الفيروسات القهقرية وتوسيع نطاق الخدمات المخبرية من أجل قياس إحصاءات الخلايا التائية المساعدة CD4+ واختبار تفاعل البوليميراز المتسلسل.

والمحلية غير الحكومية؛ والاستفادة من البيانات والمؤشرات في جميع جوانب برنامج الوقاية من الانتقال من الأم إلى الطفل. وكان من المفيد أيضاً تمكين موظفي الرعاية الصحية في مرافق الرعاية

الخلاصة

إزالة انتقال فيروس نقص المناعة البشرية من الأم إلى الطفل

المشكلة منظمة الصحة العالمية وضعت إرشادات واضحة لوقاية انتقال فيروس نقص المناعة البشرية (HIV) من الأم إلى الطفل (PMTCT). ومع ذلك، فإن تنفيذ PMTCT في جميع المنشآت الصحية يمثل تحدياً.

النهج على الرغم من أن جنوب إفريقيا قد بدأت تنفيذ PMTCT في عام 2002، إلا أنها كانت متأخرة عن معظم البلدان الأخرى. ومع ذلك، فإن الدعم السياسي قد ازداد منذ عام 2008. وقد حظيت الأبحاث التطبيقية باهتمام أكبر، والبيانات الموضوعية قد أصبحت أكثر فاعلية.

الوضع المحلي في عام 2010، حوالي 30% من النساء الحوامل في جنوب إفريقيا لديهن فيروس نقص المناعة البشرية، وحوالي نصف الأطفال الذين تقل أعمارهم عن 5 سنوات قد ماتوا بسبب الفيروس.

التغييرات بين عامي 2008 و2011، انخفضت نسبة الأطفال الذين تقل أعمارهم عن 2 أشهر تعرضوا للعدوى بفيروس نقص المناعة البشرية، وذلك بفضل إجراء اختبار تفاعل البوليميراز المتسلسل (PCR) الروتيني للكشف

عن انتقال فيروس نقص المناعة البشرية في وقت مبكر. انخفضت نسبة انتقال الفيروس من 36,6% إلى 70,4%. تقديرات انتقال الفيروس انخفضت من 9,6% إلى 2,8%. أظهرت استطلاعات السكان في عامي 2010 و2011 أن معدلات انتقال الفيروس انخفضت إلى 3,5% و2,7% على التوالي.

الدروس المستفادة تحسين النتائج يتطلب إجراء خطوات أساسية: ضمان تنفيذ التدريب والتوجيه في الموقع بسرعة، وضمان التنسيق الجيد مع الشركاء الفنيين، مثل الوكالات الدولية والمحلية والمنظمات غير الحكومية؛ وضمان التنسيق الجيد مع الشركاء الفنيين، مثل الوكالات الدولية والمحلية والمنظمات غير الحكومية؛ واستخدام البيانات والبيانات الموضوعية. كما كان من المفيد أيضاً تمكين موظفي الرعاية الصحية في مرافق الرعاية

Résumé

Élimination de la transmission du VIH de la mère à l'enfant en Afrique du Sud

Problème L'Organisation mondiale de la Santé a élaboré des lignes directrices claires pour la prévention de la transmission mère-enfant (PTME) du virus de l'immunodéficience humaine (VIH). S'assurer que tous les éléments du programme de PTME soient mis en œuvre de manière qualitative dans tous les établissements présente cependant des défis.

Approche Bien que l'Afrique du Sud ait lancé son programme de PTME en 2002, plus tard que la plupart des autres pays, le soutien politique a augmenté depuis 2008. La recherche opérationnelle a reçu davantage d'attention, et les données objectives ont été utilisées plus efficacement.

Environnement local En 2010, environ 30% de toutes les femmes enceintes en Afrique du Sud étaient séropositives, et la moitié de tous les décès d'enfants de moins de 5 ans étaient associée au virus.

Changements significatifs Entre 2008 et 2011, la proportion estimée de nourrissons de moins de 2 mois exposés au VIH, ayant subi une réaction en chaîne par polymérase (PCR) de routine visant à détecter

la transmission précoce du VIH, est passée de 36,6% à 70,4%. Le taux estimé de transmission du VIH a diminué, passant de 9,6% à 2,8%. Les enquêtes basées sur la population en 2010 et 2011 ont signalé des taux de transmission de 3,5% et 2,7%, respectivement.

Leçons tirées Voici certaines actions essentielles pour améliorer les résultats du programme: assurer la mise en œuvre rapide des changements de politique de PTME sur le terrain, grâce à la formation et à la diffusion des lignes directrices; assurer une bonne coordination avec les partenaires techniques, comme les agences de santé internationales et locales et les organisations non gouvernementales; et utiliser les données et les indicateurs relatifs à tous les aspects du programme de PTME. Il est aussi utile de permettre au personnel soignant des établissements de soins de santé primaires d'initier un traitement antirétroviral et de développer les services de laboratoire pour les décomptes de cellules CD4 + T et les tests PCR.

Резюме

Недопущение передачи ВИЧ от матери к ребенку в Южной Африке

Проблема Всемирная организация здравоохранения разработала четкие рекомендации по предотвращению передачи от матери ребенку (ПМР) вируса иммунодефицита человека (ВИЧ). Однако реализация всех компонентов программы ПМР с высоким качеством и во всех учреждениях оставляет желать лучшего.

Подход Хотя Южная Африка начала свою программу ПМР в 2002 г., то есть, позже, чем большинство других стран, политическая поддержка программе возросла с 2008 г. Оперативным исследованиям стало уделяться больше внимания, а объективные данные стали использоваться более эффективно.

Местные условия В 2010 г. около 30% всех беременных женщин в Южной Африке показывали положительный анализ на ВИЧ, а половина всех случаев смерти среди детей до 5 лет была связана с данным вирусом.

Осуществленные перемены Между 2008 и 2011 гг., по оценкам ВОЗ, доля находящихся в группе риска заражения ВИЧ детей в возрасте до 2 месяцев, которым была проведена диагностика по методу полимеразной цепной реакции (ПЦР) для выявления

ранней передачи ВИЧ-инфекции, увеличилась с 36,6% до 70,4%. Оцениваемый уровень передачи ВИЧ-инфекции снизился с 9,6% до 2,8%. Опросы населения, проведенные в 2010 и 2011 гг., показали уровень передачи ВИЧ 3,5% и 2,7%, соответственно.

Выводы Следующие важные мероприятия позволили улучшить результаты программы: содействие быстрому применению изменений в области политики ПМР на местном уровне через обучение и распространение инструкций, обеспечение надлежащей координации с техническими партнерами, такими как международные учреждения здравоохранения, международные и местные неправительственные организации, а также практическое использование данных и показателей по всем аспектам программы ПМР. Также были полезны такие меры, как наделение медперсонала в учреждениях первичной медико-санитарной помощи возможностью начинать антиретровирусную терапию и использование лабораторных служб для измерения числа Т-лимфоцитов CD4 + и диагностики по методу ПЦР.

Resumen

Cómo eliminar la transmisión del VIH de la madre al niño en Sudáfrica

Situación La Organización Mundial de la Salud ha presentado unas directrices claras para la prevención de la transmisión del virus de la inmunodeficiencia humana (VIH) de la madre al niño. No obstante, habrá que superar algunos desafíos para asegurar la puesta en marcha de todos los elementos del programa de prevención a fin de alcanzar un nivel de calidad elevado en todas las instalaciones.

Enfoque Aunque Sudáfrica inició su programa de prevención en el año 2002, más tarde que la mayoría de los países, el apoyo político ha aumentado desde 2008. Se ha prestado más atención a las investigaciones operativas y los datos objetivos se han utilizado con mayor eficacia.

Marco regional En 2010, alrededor del 30% de las mujeres embarazadas en Sudáfrica eran seropositivas, y la mitad de todas las muertes en niños menores de cinco años estuvieron asociadas al virus.

Cambios importantes Entre los años 2008 y 2011, la proporción estimada de niños menores de dos meses expuestos al VIH que se sometió a las pruebas rutinarias de reacción en cadena de la polimerasa

aumentó del 36,6% al 70,4%, y la tasa estimada de transmisión del VIH se redujo del 9,6% al 2,8%. Las encuestas de población de los años 2010 y 2011 reflejaron unas tasas de transmisión del 3,5% y el 2,7%, respectivamente

Lecciones aprendidas Las actividades fundamentales para mejorar los resultados del programa incluyeron: garantizar la implementación rápida de los cambios en la política de prevención de la transmisión a nivel de campo mediante cursos formativos y la difusión de las directrices; garantizar una coordinación adecuada entre los socios técnicos, tales como las agencias sanitarias internacionales y las ONG locales e internacionales; y utilizar los datos e indicadores acerca de todos los aspectos del programa de prevención de la transmisión del VIH de la madre al niño. También resultó muy útil permitir al personal sanitario de los centros de atención primaria iniciar terapias antirretrovirales y ampliar los servicios de laboratorio para realizar los recuentos de linfocitos T CD4+ y las pruebas de reacción en cadena de la polimerasa.

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