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## Enhancing Maternal and Child Health using a Combined Mother & Child Health Booklet in Kenya

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### Abstract

Under Kenyan guidelines, HIV-exposed infants should be tested for HIV DNA at 6 weeks or at first clinical contact thereafter, as infants come for immunization. Following the introduction of early infant diagnoses programmes, however, many infants were not being tested and linked to care and treatment. We developed the Mother & Child Health Booklet to help relate mothers' obstetrical history to infants' healthcare providers to facilitate follow-up and timely management. The booklet contains information on the mother's pregnancy, delivery and postpartum course and her child's growth and development, immunization, nutrition and other data need to monitor the child to 5 years of age. It replaced three separate record clinical cards. In a 1 year pilot evaluation of the booklet in Nyanza province in 2007–08, the number of HIV DNA tests on infants increased by 34% from 9966 to 13 379. The booklet was subsequently distributed nationwide in 2009. Overall, the numbers of infants tested for HIV DNA rose from 27 000 in 2007 to 60 000 in 2012, which represents approximately 60% of the estimated HIV-exposed infants in Kenya. We believe that the booklet is an important strategy for identifying and treating infected infants and, thus, in progress toward Millennium Development Goal 4.

### Keywords

HIV; perinatal; Kenya; medical informatics

### INTRODUCTION

It has long been recognized that certain diseases that affect mothers during pregnancy ultimately affect their unborn babies. These include, among a large number of diseases,

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### CONFLICTS OF INTEREST

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anaemia, hypertension, diabetes mellitus, malaria, syphilis and HIV [1, 2]. In particular HIV can lead to failure to thrive and death in infected infants if undiagnosed and untreated.

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Testing for HIV DNA by polymerase chain reaction (PCR) offers definitive diagnosis as early as 6 weeks of age and is rapidly being incorporated into many child health programmes in sub-Saharan Africa [3, 4]. To be economically feasible, testing needs to be targeted to infants known to have been exposed to HIV. However, conveying an infant's HIV exposure to a child healthcare provider can be problematic. Thus, to make targeted testing as sensitive and specific as possible, the mother's HIV status needs to be relayed reliably to the health provider. Prior experience suggests that oral history alone is an insensitive method for establishing exposure, as mothers are uncomfortable with verbal disclosure of their positive status. An example of a possible solution can be found in Zimbabwe, where a clinical card shows continuum of care from mothers to infants [5].

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Before 2007 in Kenya, three separate medical records existed for each mother–infant pair: an antenatal card used during pregnancy and delivery, a separate postnatal card for family planning and a child welfare card for immunization and growth monitoring. The use of the antenatal card ended with delivery, and mothers did not carry any record of events during pregnancy to the child immunization clinic, making it impossible to determine whether infants needed testing for HIV. To facilitate linking HIV-exposed children to diagnostic services and HIV-infected children to early initiation of antiretroviral therapy, we designed a mother–child health booklet that links obstetrical and paediatric records specifically for the purpose of improving early infant HIV diagnosis, linking infected infants to care and treatment, and providing support for prevention efforts for mothers whose infants test PCR negative. At the time the booklet was developed, PCR testing was low. In 2006, only 4500 PCR tests were done in Kenya, mainly from research settings and on sick children, at fewer than 50 maternal–child health (MCH) clinical sites.

## METHODS

We evaluated uptake of the mother–child health booklet by assessing the number of PCR tests done for infant HIV diagnosis and the number of MCH clinics that offered testing.

### Setting

Kenya is an East African country that has total population of 38 million, a male to female ratio of 1:1.2, a fertility rate of 4.6% and an estimated 1.54 million deliveries annually [6]. There are approximately 6000 health facilities, with 5000 of these offering antenatal care and immunization services. According to the 2009 Kenya Demographic Health Survey (KDHS), maternal mortality is 488/100 000 live births and infant mortality 52/1000 live births (a major improvement from 78/1000 live births in 2003 (KDHS 2003)) [7]. Approximately 92% of all pregnant women (aged 15–49 years) attend antenatal clinic at least once; however, only 43% deliver in hospital. About 90% of infants are brought for the first immunization at 6 weeks, which include diphtheria, pertussis, tetanus, hepatitis B and *Haemophilus influenzae* type b as a pentavalent vaccine and oral polio vaccine. The proportion of infants brought for vaccination gradually declines with subsequent visits.

KDHS 2009 found that only 77% of babies had received a complete immunization series by 24 months [8].

Since 2006, Kenya has integrated HIV services into MCH services. At 6 weeks, mothers come for postnatal care, which includes postnatal review, family planning and counselling on breastfeeding. Infant services include growth monitoring, immunization, dispensing insecticide-treated bed nets and treatment of any inter-current illnesses. HIV-exposed infants are tested for HIV DNA and, if infected, receive prophylaxis with co-trimoxazole and nevirapine. Other services integrated into immunization visits include provision of water purifiers. Over 80% of health facilities have embraced prevention of mother-to-child transmission (PMTCT) in health programs [8]. All pregnant women coming for antenatal services are offered HIV testing and counselling; those found to be infected are started on antiretroviral drugs for prophylaxis or treatment. Kenya supports exclusive breastfeeding in the first 6 months of life with antiretroviral chemoprophylaxis for exposed uninfected infants. As a result, Kenya had a 10-fold increase in exclusive breastfeeding from 3.2% in 2003 to 33% in 2009. This increase was coupled with a decrease in infant mortality from 78/1000 live births in 2003 to 52/1000 live births in 2009 [9–11].

### **Development of the mother–child health booklet**

The difficulty in identifying HIV-exposed infants for prompt HIV testing and linkage to care prompted the establishment of a taskforce to develop a tool linking maternal and childcare. In early 2006, a technical working group on PMTCT was formed to conceptualize a combined mother–child health booklet and investigate tools used in the region and elsewhere. Most tools within the region were similar to what Kenya had at the time. Tools from Asia, and especially Japan, had captured maternal and child records in one book, which provided a guide to the development of Kenya's first Mother–Child Health Booklet that combined maternal and infant medical records [10].

The taskforce shared the idea with national stakeholders, donor agencies and implementing partners. Several meetings took place, sometimes as groups focusing on different aspects, and at times as individual meetings with key persons. This project successfully brought together United States government (Centres for Disease Control and Prevention, United States Agency for International Development (USAID), Department of Defense (DOD) and United Nations agencies [World Health Organization (WHO), United Nations Joint Programme on HIV/AIDS (UNAIDS), United Nations Children's Education Fund (UNICEF)] in a collaborative effort. Discussions centred on content of booklet, issues of stigma if mother's HIV status were to be put in the booklet, cost of producing the booklet and sustainability. At that time, three separate government departments managed maternal health, child health and child immunization programmes, a situation that raised issues of ownership and management of the new booklet. In addition, there were concerns that mothers might not bring children for immunizations if HIV testing were integrated into immunization services. It was feared that inclusion of the HIV status in the immunization record, which is often required for school enrolment, would expose the child to stigma in school and result in mothers not using the booklet. Stakeholders agreed that the booklet

could be designed in such a way as to conceal a child's serostatus, with the immunisation records taking centre stage.

We combined information from existing antenatal, postnatal and child welfare cards and added additional essential information. In the end, the booklet contained information on the HIV status of the mother, drugs used in pregnancy, infant and young child nutrition, immunisation records, WHO growth monitoring charts and required actions in maternal-child emergencies. The first part of this booklet had maternal medical information during pregnancy, delivery and the postpartum period, with the mother's HIV status and antenatal profile. Child information occupied the second half of the book and included immunisation, growth charts and milestones, feeding recommendations and danger signs, mother's serologic results and baby's HIV DNA results at 6 weeks. While the booklet was designed to be used throughout pregnancy and childhood, operationally its key use at the six-week visit, when the mother returns for postnatal review and cervical cancer screening, the infant receives immunisations and growth monitoring, and HIV-exposed infants are identified for HIV DNA testing and linkage to care and prompt antiretroviral treatment if found to be infected. Stakeholders had an opportunity to revise the initial draft as per their areas of interest and specialization, and thereafter review and edit the final copy, which was then presented to the Ministry of Health for ratification and adoption as a national tool. Copies of the 26-page booklet, which is small enough for mothers to carry in their bags for hospital visits, were subsequently printed and distributed to key stakeholders.

### **Pilot testing, revision and dissemination**

The roll out of the booklet was planned in three phases: pilot phase, revised booklet and national roll out of the revised booklet. This activity was classified as programme evaluation not involving human subjects research with no unique identifiers linking patients to outcomes. Nyanza province was selected for pilot because it had the highest adult HIV prevalence in Kenya [8]. National, provincial and district health managers launched the pilot phase in August 2007 and continued it through July 2008. Participants were trained on use of new booklet and accompanying register. Questions and issues arising during training were addressed. Health managers went back with enough booklets for their districts and were asked to organize similar orientation meetings for their health workers and disseminate booklets to every health facility. Every pregnant mother visiting the antenatal clinic (ANC) was to be issued with the booklet until the booklets replaced all previously used cards. The final revised booklet was given a purple cover to distinguish it from the yellow pilot booklet (Fig. 1). The Mother & Child Health Booklet was officially launched in Kenya in April 2010, followed by mass printing and dissemination to all provinces.

## **RESULTS**

Two hundred and fifty thousand booklets were distributed during the pilot phase to health facilities in Nyanza, and health workers were asked to provide feedback on the challenges faced in using the booklet. Most health workers reported that the booklet made it easy for them to identify HIV-exposed infants. During the pilot period, the number of infants tested

for HIV DNA increased in Nyanza from 9966 to 13 379, a 34% increase compared with 9% overall increment in the remaining seven provinces where the booklet was not introduced.

After final revision, 1.5 million booklets were distributed nationally each year, in line with annual expected deliveries. HIV DNA testing in infants rose from 27 000 in 2007 to 55 000 in 2010 to 60 000 in 2012, which represents approximately 60% coverage of estimated HIV-exposed infants. Additionally the booklet is being used by an estimated 2000 clinics nationwide.

## DISCUSSION

The Mother & Child Health Booklet has been disseminated to all health facilities in the country. Objective evidence suggests that it has been widely adopted and that this has been temporally associated with an increased use of HIV DNA testing of exposed infants. While other reasons may have contributed to increases in HIV DNA testing, we suggest that at least part of this was owing to the booklet removing impediments to the identification of exposed infants. However, given the ecological nature of these data, we cannot directly measure the attributable benefit of adding HIV DNA testing for HIV-exposed children to the booklet to the increased uptake of the testing.

We also believe that the combined booklet has enabled integration of MCH services, and, as a result, mother-and-infant pairs can be attended to in the same setting by the same health provider. In addition, the combined booklet together with HIV Exposed Infant Register enables tracking of mother's and infant's health using the same record, which reduces missed opportunities for interventions for both mother and infant in a 'one-stop shop' model. Unfortunately, our study did not include a direct enumeration of the number of times that data on maternal HIV status and the final status of HIV-exposed infants was recorded. These metrics should clearly be monitored as part of ongoing quality improvement. Additional benefit may accrue from increasing awareness of danger signs in pregnant mothers and infants that require medical attention, which appear in pictorial form in the booklet.

In Asian countries where MCH handbooks have been used for many years, handbooks have been instrumental in reducing maternal and child mortality [11]. While other factors, such as availability of test kits, pneumococcal vaccine, reduction in communicable diseases, better nutrition, provision of mosquito nets to prevent malaria and others, have undoubtedly contributed to reduction of infant mortality, we believe that the use of the Mother & Child Health Handbook in Kenya has been an important strategy in progress toward Millennium Development Goal 4.

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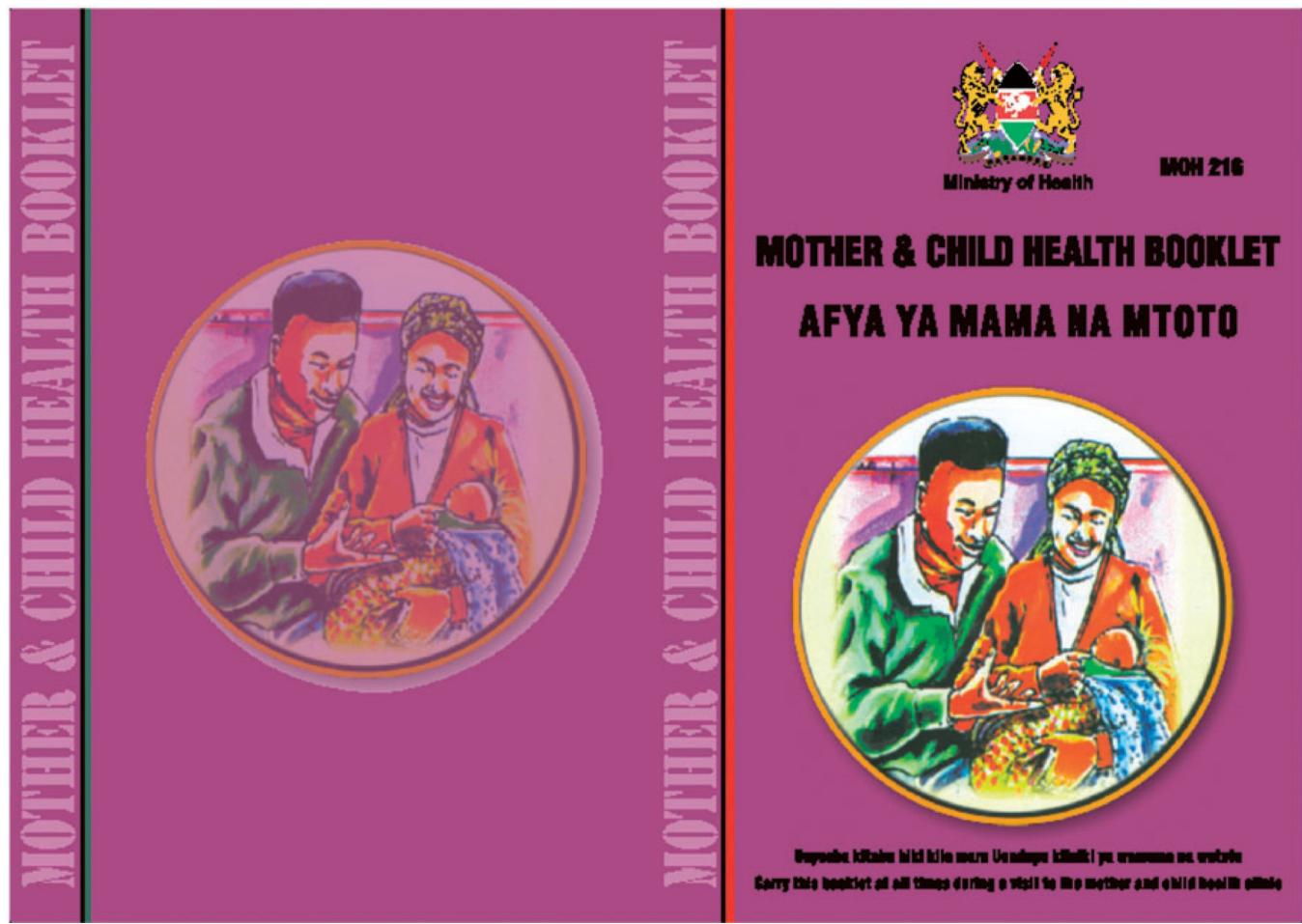
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**Fig. 1.**  
Final version of Mother & Child Health Booklet, Kenya, 2009.