

The Value of Contraception to Prevent Perinatal HIV Transmission

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Objective: The objective of this study was to highlight the value of preventing unintended pregnancies among HIV-infected women as a strategy to prevent perinatal HIV transmission.

Goal: The goal of this study was to assess the cost-effectiveness of family planning programs to avert HIV-positive births with the current programmatic emphasis: prenatal care services that provide and promote nevirapine for prevention of mother-to-child transmission of HIV.

Study Design: Cost-effectiveness analyses were conducted from the health system perspective during 1 year with a hypothetical sub-Saharan African population. Expected program costs were combined with number of HIV-positive births averted for each strategy.

Results: At the same level of expenditure, the contraceptive strategy averts 28.6% more HIV-positive births than nevirapine for prevention of mother-to-child transmission of HIV.

Conclusions: Increasing contraceptive use among nonusers of contraception who do not want to get pregnant is cost-effective and is an equally important strategy to prevent perinatal transmission as prenatal care programs that provide and promote nevirapine to HIV-infected mothers.

CONTRACEPTION OFFERS WOMEN, THEIR families, and their communities a variety of benefits. Use of contraception prevents early first births, lengthens birth intervals, and reduces the total number of children born to one woman; together, these effects reduce infant mortality.^{1,2} By preventing high-risk and unintended pregnancies and reducing the need for unsafe abortion, contraception improves women's health and reduces maternal mortality. Smaller families increase opportunities for educational, economic, and social activities. In the context of the HIV epidemic, contraception has an additional, yet underappreciated and undervalued, benefit: contraception prevents HIV-positive births.

Resources have increased dramatically to support the prevention of transmission of HIV from mother to child. Funding from the major HIV donors, the President's Emergency Fund and the Global Fund, is largely targeted to providing antiretrovirals (ARVs) to pregnant women to prevent mother-to-child transmis-

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sion (MTCT) despite the broader approach to prevent MTCT defined by the United Nations that includes preventing unintended pregnancies to HIV-positive women and despite consensus that development goals cannot be reached without linkages between family planning and HIV prevention.^{3,4} Existing services to prevent mother-to-child transmission (PMTCT) of HIV focus on one approach: providing ARV drug prophylaxis (usually nevirapine) to HIV-infected women during delivery and to the neonate within 72 hours after delivery.

Two studies have demonstrated the important role of family planning in HIV prevention. For eight sub-Saharan African countries, Sweat and colleagues estimated that a moderate decrease (between 5.6% and 34.8%, depending on the country) in the number of pregnancies to HIV-positive women results in an equivalent number of HIV-positive births averted as the current PMTCT efforts with nevirapine for HIV-positive women and their newborns.⁵ Stover and colleagues examined the benefits of adding family planning to PMTCT programs in 14 countries through the year 2007. In addition to the other positive benefits of family planning, including averting child deaths, avoiding orphans, and preventing maternal mortality, they demonstrated that family planning added to PMTCT services averts 71,000 child HIV infections compared with the 39,000 HIV-positive births averted with PMTCT only.⁶ Moreover, it has been estimated that current levels of contraceptive use in sub-Saharan Africa are already preventing 22% of HIV-positive births.⁷

This study builds on previous work to consider the contribution that vertically delivered, traditional family planning programs make in HIV prevention. Sweat and colleagues make a strong policy argument for the family planning as HIV prevention; however, it is outside the scope of their paper to describe how family planning programs can reach HIV-positive women. Stover and colleagues consider one programmatic approach by estimating the effect of adding family planning services to PMTCT services. This study assesses the costs and effectiveness of vertically delivered, traditional family planning programs and building demand for these services.

The primary mechanism of contraception as HIV prevention—in addition to correct and consistent condom use among serodiscordant couples, of course—is to prevent unintended pregnancies. Many countries still experience high levels of unintended childbearing, particularly in countries with high HIV prevalence. In select African countries, unintended childbearing ranges from

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31% in Senegal to 55% in Kenya.⁸ Unintended pregnancies are the direct consequence of unmet need for contraception, and in sub-Saharan Africa, estimates of unmet need range from 18% in Niger to 42% in Togo with a regional average of 19.4%.^{9–11} Because family planning programs are struggling with limited resources, the negative consequences for women and families associated with unintended childbearing are likely to worsen if funding does not keep pace with increasing demand for contraception.^{12,13}

The purpose of this study is to advocate for recognition of contraception as an important strategy to prevent perinatal HIV transmission. To do so, we take the service delivery perspective and calculate the cost-effectiveness of contraception to prevent HIV-positive births. In this strategy, contraception is used by nonpregnant women of unknown HIV status who do not want to get pregnant. To put the cost-effectiveness of this strategy into context, we also calculate the cost-effectiveness of voluntary counseling and testing (VCT) for HIV during prenatal care (PNC) and provision of nevirapine to those HIV-infected mothers (herein referred to as “nevirapine for PMTCT in PNC”).

Materials and Methods

Three main factors determine the number of HIV-positive births for a population of sexually active women of childbearing age: the level of contraceptive use, HIV prevalence, and use of ARV drug prophylaxis during pregnancy by HIV-infected women. To estimate the number of HIV-positive births prevented by contraceptive use and by nevirapine for PMTCT in PNC, we built a framework consisting of three steps. The first step was to estimate a baseline number of HIV-positive pregnancies in a hypothetical sub-Saharan Africa cohort of 100,000 sexually active women ages 15 to 49. Second, we estimated the number of HIV-positive births averted by increasing contraceptive use by nonpregnant women of unknown HIV status who do not want to get pregnant. We also estimated the number of HIV-positive births averted by increasing coverage of nevirapine for PMTCT in PNC. Finally, we estimated the cost of family planning services and outreach to motivate new users and the costs of services to provide and promote nevirapine for PMTCT in PNC. The study timeframe is 1 year.

For the first step to estimate a baseline number of HIV-positive pregnancies (Fig. 1), we estimated that 100,000 sexually active women ages 15 to 49 would have 40,188 pregnancies over 1 year. This estimate was achieved by dividing women into groups based on pregnancy status, contraceptive use status, and desire for pregnancy according to Demographic and Health Surveys (DHS) variables (Table 1). Because the level of contraceptive use in a population is correlated with the proportion of women who are pregnant or wanting to get pregnant, we selected existing DHS data from a country (Zambia) with a similar level of contraceptive use (20.2% for sexually active women) to that of all sub-Saharan Africa (18% for married women) to minimize errors that would be introduced by making incorrect assumptions about the proportion of women in each group.^{14,15} The probability of pregnancy differs by group based on their pregnancy status, contraceptive use status, desire for pregnancy, and fecundability. The contraceptive method mix is that for sub-Saharan Africa and includes modern and traditional methods.¹⁴

To estimate the baseline number of HIV-positive births in the hypothetical population (N_0 in Fig. 1), we made assumptions about the HIV prevalence (16.5%),¹⁷ the rate of transmission in absence of prophylaxis (30%),¹⁸ and the current level of coverage in PNC of nevirapine for PMTCT of 5% (weighted average for 30 African countries).¹⁹ We assumed that programs used the single-dose ne-

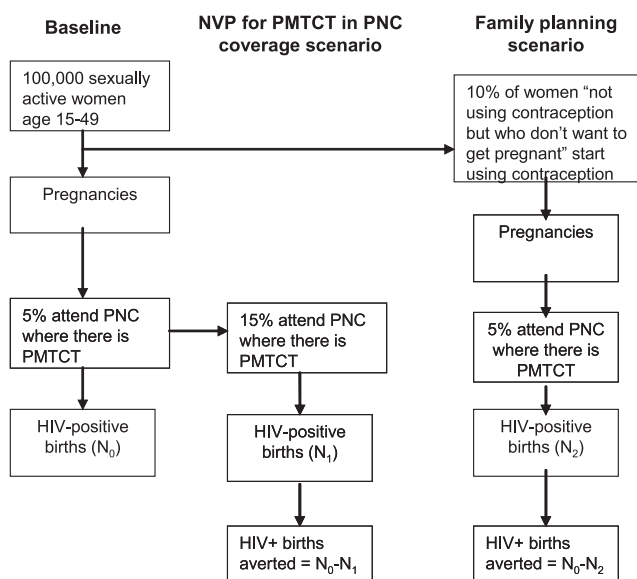


Fig. 1. Framework to estimate HIV-positive births averted by scenario.

virapine regimen for mother and baby because it is the most cost-effective PMTCT ARV drug prophylaxis regimen.²⁰ We also used existing data to estimate the likelihood of women getting tested for HIV and accepting ARVs (Table 2).^{19,21,22}

TABLE 1. Sexually Active Women 15–49 by Exposure to Pregnancy, Probability of Pregnancy by Group, and Estimated Number of Pregnancies

| | 100,000 Sexually Active Women 15–49 | Probability of Pregnancy (%) | Pregnancies |
|--|-------------------------------------|------------------------------|-------------|
| Infecund/not having sex | 28,985 | 0 | 0 |
| Contraceptive users* | 20,238 | 10.1 | 2,045 |
| Want pregnancy | 13,377 | 85 [†] | 11,370 |
| Pregnant | 12,836 | 100 | 12,836 |
| Amenorrhoeic | 12,795 | 50 [‡] | 6,397 |
| Do not want pregnancy but no contraceptive use | 11,034 | 68 [§] | 7,503 |
| Breastfeeding amenorrhoeic | 735 | 5 | 37 |
| Total number of pregnancies | | | 40,188 |

*Method mix for current users in sub-Saharan Africa (includes traditional methods) from PRB, 2002, and method failure rate for typical users from Hatcher et al, 2004.^{14,45}

[†]Hatcher et al, 2004.⁴⁵

[‡]Some of these women will be postpartum but not breastfeeding and thus could return to fertility rapidly.⁴⁶ However, 50% is considered midrange because of the assumption that some of these women will have amenorrhoeic-associated fertility problems and therefore reduced fecundity.⁴⁷

[§]Estimate from Population Action International, et al, 2000.⁴⁸

^{||}Five percent is midrange (3.7–7.4%) from World Health Organization, 1999.⁴⁹

[¶]We assumed that only one singleton pregnancy per woman can occur in 1 year.

TABLE 2. Estimates, Ranges, and Data Sources of the Probability That Pregnant Women Attending Prenatal Care (PNC) Receive Various Services to Prevent Mother-to-Child Transmission (PMTCT), Including One-Way Sensitivity Analyses

| Probability | Simulation Estimates (%) | Ranges (%) | Source for Estimates | One-Way Sensitivity Results: Threshold at Which Nevirapine for PMTCT Becomes More Cost-Effective Than Family Planning Intervention |
|---|--------------------------|------------|----------------------|--|
| Pregnant women attend PNC with health professional | 92 | 32–95 | 50 | — |
| Attend PNC where there is a nevirapine program | 5 | 0–100* | 19 | — |
| Receive HIV counseling | 82 | 17–100 | 21, 22 | None |
| Get HIV tested (all get results) [†] | 85 | 53–100 | 19, 21, 22 | None |
| HIV-infected mother and newborns receive nevirapine | 51 | 14–78 | 21, 22 | 67% |
| Efficacy of nevirapine | 50 | 20–64 | 51 | 65% |
| MTCT rate with no treatment | 30 | 25–35 | 52 | — |

*The weighted average for 30 African countries is 5%.¹⁹

[†]We assumed that 100% of women who agree to HIV testing obtain their results⁵³ because rapid HIV testing is becoming widely available.

Nonpregnant women who do not want a pregnancy but are not using contraceptive methods make up 11% of all women in the hypothetical cohort (Table 1). The proportion of women in this group is lower than the proportion of women with unmet need in sub-Saharan Africa.¹¹ Our criteria for assigning women to the former group are more conservative than the DHS definition of unmet need because our criteria exclude women who are currently pregnant or amenorrheic. The proportion of pregnancies to women in the group “do not want a pregnancy but not using contraception” at 18.7% (or 7503 of 40,188 total pregnancies) is lower than the proportion of unintended pregnancies reported for almost all countries in the region.¹⁶ Thus, 18.7% is probably a conservative estimate of the level of unintended pregnancies in sub-Saharan Africa.

Simulation Model: Increasing Coverage of Nevirapine for Preventing Mother-to-Child Transmission and Contraceptive Use

For the second step, we estimated the number of HIV-positive births averted by two scenarios: increasing contraceptive use or increasing coverage of nevirapine for PMTCT (Fig. 1). Just for the group of women “do not want a pregnancy but not using contraception” (11% of all women in the hypothetical cohort in Table 1), we simulated increasing contraceptive use from none to when 10% of these women begin using contraception. This increased the hypothetical population’s contraceptive prevalence by 1.1%. We assumed that new users use modern contraceptive methods for at least 1 year. The method mix was also an important input because the method mix has implications for the contraceptive failure rate and costs. For new method acceptors, we applied the method mix projected for the year 2000 for sub-Saharan Africa (hormonal methods 85%, condoms 9%, other 8%).²³ For the nevirapine for PMTCT in PNC scenario, we increased coverage of PNC programs that promote and provide nevirapine for PMTCT from its current level of 5% to 15%.

We calculated the number of HIV-positive births averted in each scenario by subtracting the number of HIV-positive births, N_2 in the family planning scenario and N_1 in the NVP for PMTCT in PNC scenario in Figure 1, from the baseline number, N_0 .

Program Costs for Nevirapine for Preventing Mother-to-Child Transmission in Prenatal Care and to Increase Contraceptive Use

As a final step, we estimated the costs associated with each strategy. The family planning first-year program costs included the cost of commodities, distribution of commodities, supplies, personnel, and facility overhead in year 2000 U.S. dollars (Table 3).²⁴ Costs incurred in the case of complications were excluded. To stimulate demand for contraception, a cost associated with outreach efforts was added based on a study in Tanzania and included training costs, supervision salary, and provider salary.²⁵ The number of outreach visits needed to recruit new users was estimated based on a study conducted in Burkina Faso. For this analysis, we estimated that 2.3 outreach visits per new user would be required to result in 10% of current nonusers initiating contraceptive use.²⁶

The costs of programs that provide and promote nevirapine for PMTCT came from various published sources and included the cost of promoting testing and prophylaxis services (e.g., leaflets, community information campaign), the cost of training existing PNC staff in counseling and testing, the cost of pretest HIV counseling, the cost of HIV testing and posttest counseling, and the cost of nevirapine (Table 3). No costs for training and hiring new staff, for management or supervision, for maintenance of the drug stock, or for health system enhancements were specified. Because the costs included in each study were not always apparent, we considered the range of cost estimates available in the literature for each activity.

Sensitivity analyses were performed by changing the costs of either intervention. The cost of VCT and nevirapine makes up the majority of the total costs of nevirapine for PMTCT intervention (Table 3), so we varied the cost of VCT from \$4 to \$18.50 and the cost of the nevirapine doses for mother and infant from \$1.13 to \$8.00 simultaneously.

For family planning services, the cost of the method and services make up most of the costs compared with outreach visits. To achieve a range of costs for each method, we used findings from four studies that included direct and indirect costs of family planning services.^{27–30} From these studies, we calculated the first-year costs including the method, initial visit, follow-up visits, and removal (if any). Because we lacked information on the variation

TABLE 3. Cost of First-Year Family Planning Services and Outreach to Motivate New Users (Year 2000 U.S.\$) and Estimates, Ranges, and Data Sources for Cost of Services to Promote Nevirapine to Prevent Mother-to-Child Transmission (PMTCT) in Prenatal Care (PNC)

| Service | Estimated Cost for Study | Range | References |
|--|--------------------------|---|---|
| Family planning services and outreach method* | | | |
| Combined oral contraceptives | \$13.77 | \$5.94–46.32 | 24, 27 |
| Intrauterine device | \$10.09 | \$5.28–39.02 | 24, 27 |
| Depo-Provera (DMPA) | \$20.21 | \$8.13–30.84 | 29, 30 |
| Male condoms | \$9.62 | \$6.65–13.24 | 28, 29 |
| Tubal ligation | \$84.82 | \$51.51–144.48 | 24, 27, 30 |
| Norplant implants | \$43.42 | \$38.27–\$112.55 | 24, 30 |
| 2.3 outreach visits | \$4.90 | — | 25, 26 |
| Nevirapine for PMTCT† | | | |
| Training existing providers and advertising service per PNC client | \$1.00 | Training staff: \$0.02–0.91 Advertising: \$0.10–2.58 | Training staff ^{54–56} Advertising ^{55–58} |
| Total cost of voluntary counseling and testing (in PMTCT) | \$8.50 | \$4–18.5 | 5, 31, 33, 54, 56, 59–61 |
| Cost per completed mother and infant nevirapine dose | \$4.20 | \$1.13–8 | 5, 20, 31, 54, 61 |
| Total PMTCT cost per client | \$13.70 | | |

*Costs include cost of commodity and direct and indirect first-year service delivery costs, including initial visits, any follow-up visits, and removal. We assume revisits to the health facility for condom users are not necessary.

†Denominators and cost years not always apparent.

in the first-year costs for three methods (tubal ligation, injectable, implant), we multiplied the couple-year protection costs by the length of use of the method to obtain first year costs.³⁰

Finally, to demonstrate how an improvement in effectiveness of the nevirapine for PMTCT intervention would change the results, we conducted one-way sensitivity analyses. Holding constant the other proportions, we increased the proportion of women who get pretest counseling to determine if at any point increasing the percentage of women who get pretest counseling makes nevirapine for PMTCT the more cost-effective option. Similarly, we increased the proportion of women who accept testing and posttest counseling holding other proportions constant, then we increased the proportion of women who receive nevirapine, and finally we increased the efficacy of nevirapine. This analysis was conducted to identify at which levels nevirapine for PMTCT become the more cost-effective intervention.

Because we focused on the infant's HIV status at birth, the costs of breastfeeding alternatives for HIV-infected mothers, the costs of caring for an HIV-infected infant, and the costs incurred because children become orphans after their mothers die are excluded.

Results

Contraceptive use averts more HIV-positive births and does so at lower costs than nevirapine for PMTCT (Table 4). At current levels of nevirapine for PMTCT in PNC coverage (5%), 1973.1 HIV-positive births are expected in the hypothetical population (N_0). Increasing the coverage of nevirapine for PMTCT from 5% to 15%, the total cost is \$27,856.83 and the intervention results in 32.5 HIV-positive births averted in 1 year (N_0-N_1). This is more costly with less effect compared with if 10% of women who do not want a pregnancy but are not using contraception begin using contraception. This intervention costs \$21,956.70 and averts an additional 33.1 HIV-positive births (N_0-N_2).

The cost per HIV-positive birth averted of a single-dose nevirapine regime is \$856.66 (Table 4), higher than previous studies of the cost-effectiveness of nevirapine to prevent PMTCT^{20,31} but significantly lower than costs per HIV-positive birth averted found in a study of national PMTCT program costs.⁵ The cost per HIV-positive birth averted is \$663.47 for the family planning strategy.

TABLE 4. Incremental Cost-Effectiveness of Two Strategies to Avert HIV-positive Births

| Strategy | Incremental Comparison | | | |
|--|------------------------|----------------------------|--|--------------------------|
| | Cost | No. of HIV-Positive Births | Additional HIV-Positive Births Averted | Cost-Effectiveness Ratio |
| Current coverage of nevirapine to prevent mother-to-child transmission in prenatal care (5%) | | 1973.1 | | |
| Increase coverage of nevirapine to prevent mother-to-child transmission from 5% to 15% | \$27,856.83 | 1940.5 | 32.5 | \$856.66 |
| 10% of nonusers who do not want to get pregnant begin family planning use | \$21,956.70 | 1940.0 | 33.1 | \$663.47 |

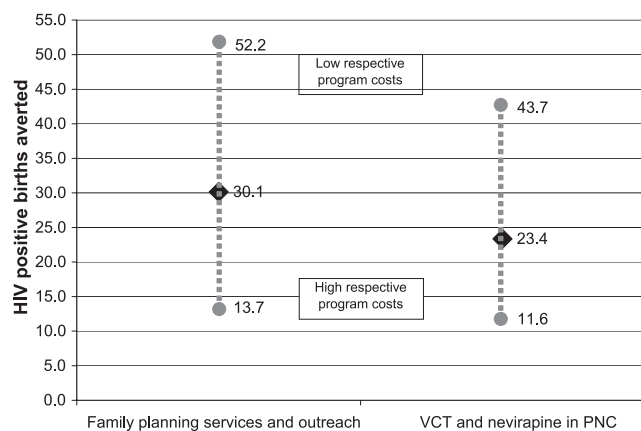


Fig. 2. Comparison of the number of HIV-positive births averted by strategy given U.S. \$20,000 program cost with range of family planning and voluntary counseling and testing (VCT) and nevirapine costs.

If \$20,000 were available for an intervention to prevent HIV-positive births, an intervention to increase contraceptive use among nonusers would avert 30.1 HIV-positive births, whereas targeting that money to a nevirapine for PMTCT program would only prevent 23.4 HIV-positive births, or 22.3% fewer HIV-positive births averted (Fig. 2).

Sensitivity Analyses

Different assumptions about the costs of either program change the relative cost-effectiveness. Our results suggest that if VCT costs were as modest as their lowest cited value of \$4 (pretest counseling, testing, and posttest counseling) and the cost of nevirapine was \$1.13, and all other assumptions remained the same, nevirapine for PMTCT would avert 43.7 HIV-positive births with a program cost of \$20,000 (Fig. 2). On the other hand, when family planning program costs decrease to their lowest cited levels in Table 3, as many as 52.2 HIV-positive births are averted with a program cost of \$20,000. At its highest costs, nevirapine for PMTCT would avert 11.6 HIV-positive births, and with high family planning costs, the number of HIV-positive births averted drops to 13.7.

Improving the effectiveness of the nevirapine for PMTCT intervention also changes the results. If the efficacy of nevirapine improves, the threshold at which nevirapine for PMTCT becomes the more cost-effective intervention is a 65% reduction in mother-to-child transmission (from our assumption of 50%) (Table 2). Independently, if the proportion of women receiving nevirapine increased from 51% to 67%, then nevirapine becomes the more cost-effective option. However, either increasing the proportion of women who get pretest counseling or the proportion of women who accept testing and posttest counseling to their highest possible values of 100% still makes nevirapine for PMTCT a less cost-effective option.

The results of this study are most relevant to sub-Saharan African because 66%, or 25 million, of the estimated number of people living with HIV and AIDS globally live in this region.³² Sub-Saharan Africa is also where contraceptive prevalence is lowest, resulting in many unintended pregnancies. Seven countries in sub-Saharan Africa have an HIV prevalence of 16.5% or higher, the assumed HIV prevalence in this study, although the regional average is 7.5%.³² Decreasing the HIV prevalence or the vertical transmission rate (in absence of prophylaxis) in these simulations

does not change the relationship between the two strategies but would decrease the overall number of HIV-positive births.

Discussion

Our study demonstrates that increasing contraceptive use among women who do not want to become pregnant and who may not necessarily know their HIV status is at least as cost-effective as reducing HIV transmission by nevirapine for PMTCT. Our assumptions concerning the costs and probability of using nevirapine for PMTCT services makes this an optimistic scenario. For example, the low cost of \$4 for VCT comes from a study in Zambia,³³ a country with low salaries for service providers. A country with low VCT costs would most likely also have low contraceptive service delivery costs and vice versa. On the other hand, all costs of family planning services and methods are in the first year, and in the subsequent years, costs will be lower for many methods. Annualizing costs over the length of time the method would be used will reduce yearly costs. Thus, although some of our scenarios show that testing and treatment can be more cost-effective than contraception, the combination of costs to achieve those outcomes, i.e., high contraceptive services costs and low PMTCT costs, is unlikely to occur.

We rely on single-dose nevirapine for mother and baby in this study because evidence suggests that the regimen is a cost-effective choice to reduce MTCT after a pregnancy has occurred.²⁰ Concern is growing, however, that brief exposure to nevirapine may result in HIV resistance,^{34,35} and recent evidence suggests that women exposed to nevirapine at delivery and taking triple-drug combination therapy containing nevirapine were more likely to have detectable viral loads after 6 months.³⁶ The long-term, large-scale implications for ARV therapy regimens for PMTCT in sub-Saharan Africa are far from known. Combination ARV regimens such as zidovudine and lamivudine taken from 34 to 36 weeks of pregnancy boosted by single-dose nevirapine have the potential to reduce vertical transmission by four fifths compared with the 50% reduction assumed in this study.³⁷ Developed countries have achieved rates of transmission as low as 1% to 2%. Despite the increased efficacy of other regimens, it is reasonable to expect that delivering a more complex ARV regimen than single-dose nevirapine will face major hurdles and high costs in limited resource settings. It is unlikely that changing the regimen would increase the cost-effectiveness of ARVs for PMTCT.

Regarding family planning costs, we built in the costs of outreach to attract new contraceptive users. Reducing unmet need has long been an objective of family planning programs.¹⁰ Extending education, communication, and services through outreach programs could reduce unmet need.³⁸ In the African context, recent evidence suggests that prioritizing fertility reduction among women with unmet need will be more effective than decreasing contraceptive failure among current users.³⁹ Community-based distribution of contraception and outreach are interventions that have been shown to increase demand for family planning.^{26,40–42} Demand mobilization is at least as powerful as strengthening clinic services in attracting new users.^{26,41}

The proportion of pregnancies to women who do not want a pregnancy but are not using contraceptive methods is 18.7%, lower than the proportion of unintended pregnancies reported for almost all countries in the region.¹⁶ Thus, for this study, 18.7% is probably a conservative estimate of the level of unintended pregnancies in sub-Saharan Africa. In a population in which levels of unintended childbearing are higher, these simulations will underestimate the effectiveness of a strategy to increase contraceptive use. If anything, it is likely we underestimated the level of unintended

childbearing because we did not include amenorrheic women in our target group for contraception in this study, and in reality, some of these women may have an unmet need for contraception. Thus, contraceptive services have the potential to avert many more HIV-positive births.

Because we focused on the number of HIV-positive births averted at the time of delivery, these simulations do not take into account the costs associated with providing breastfeeding alternatives for babies born to HIV-infected mothers. The actual costs associated with HIV-positive infants are higher than what was estimated in this study. Furthermore, encouraging HIV-infected mothers to reduce or avoid breastfeeding will decrease the contraceptive effect that occurs as a result of lactational amenorrhea and result in an even greater need for contraceptive methods among HIV-positive postpartum women.

This study did not attempt to estimate what costs would be incurred for PNC programs to reduce dropout rates associated with HIV testing and nevirapine provision, although the results of the study suggest the biggest gains in effectiveness could be made by increasing the proportion of women who accept nevirapine. Some of the challenges to improving retention include stigma reduction, lack of trained staff, and inadequate facilities to protect confidentiality.^{43,44} Taking the costs into account of improving infrastructure, facility capacity, and other barriers to access would make the strategy of preventing unintended pregnancies among HIV-infected women relatively more cost-effective.

Our findings suggest that, in addition to the other well-known benefits of contraception, family planning services and outreach in the general population to reduce unintended pregnancies can make a major contribution to averting vertical transmission of HIV. To have the greatest effect on averting HIV-positive births, resources must be appropriately distributed both to interventions that prevent unintended pregnancies among HIV-infected women as well as to antiretroviral therapy for PMTCT. Family planning has a crucial role to play in HIV prevention programs.

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