

**The POLICY Project**

**Reproductive Health Interventions:  
Which Ones Work and What Do They Cost?**

**Varuni Dayaratna  
William Winfrey  
William McGreevey  
Karen Hardee  
Janet Smith  
Elizabeth Mumford  
Jeffrey Sine  
Ruth Berg**

**March 2000**

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## Preface

The goal of the POLICY Project is to create supportive policy environments for family planning and reproductive health programs through the promotion of a participatory policy process and population policies that respond to client needs. The project has four components—policy dialogue and formulation, participation, planning and finance, and research—and is concerned with crosscutting issues such as reproductive health, HIV/AIDS, gender, and intersectoral linkages.

The POLICY Project is implemented by The Futures Group International, Inc., in collaboration with Research Triangle Institute and The Centre for Development and Population Activities. The U.S. Agency for International Development (USAID) funds the project under Contract No. CCP–C–00–95–00023–04.

*POLICY Occasional Papers* are intended to promote policy dialogue on family planning and reproductive health issues and to present timely analysis of issues that will inform policy decision making. The papers are disseminated to a variety of policy audiences worldwide, including public and private sector decision makers, technical advisors, researchers, and representatives of donor organizations.

An up-to-date listing of POLICY publications is available on the project's home page. Copies of POLICY publications are available at no charge. For more information about the project and its publications, please contact:

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## Acknowledgments

Between December 1997 and January 1999, the Planning and Finance Group of the POLICY Project held four meetings to identify the costs associated with implementing the International Conference on Population and Development (ICPD) reproductive health agenda. These “Costing Cairo” meetings sought to identify the costs of various reproductive health interventions, gaps in funding, potential new sources of funding, and ways of making existing resources go further. More than 150 specialists in reproductive health discussed the results of their past and ongoing research on issues in the economics and finance of reproductive health. Those who offered formal papers or prepared background materials, and many of those who commented during the meetings, are acknowledged below.

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## Executive Summary

Given the scarcity of resources available to implement the ICPD *Programme of Action*, this paper assesses effective interventions and their cost for three main components of reproductive health: family planning, safe motherhood, and STD/HIV/AIDS prevention and treatment. The paper also suggests some of the economic criteria governments can use to determine the role of the public sector in providing and/or financing reproductive health services.

### Family Planning

- ❑ Ensuring that individuals have access to a range of family planning methods and related information can help reduce unwanted pregnancy and thus maternal mortality. Promotion of condoms can help prevent the spread of sexually transmitted diseases (STDs).
- ❑ Family planning is most effectively provided through a range of channels, including clinics, community-based distribution, social marketing programs, and the private sector. Comparing the costs of service delivery approaches is problematic in that each channel tends to serve different clients.
- ❑ Contraceptive methods involve a range of costs; IUDs and sterilization tend to be the least expensive methods per couple-year of protection (CYP), although both have high “up-front” costs. The pill tends to be the least expensive supply method. Family planning, however, is most effective if a range of methods is available so that clients can select a method that matches their needs. One solution to the scarcity of resources may be for governments to subsidize all contraceptive methods for the poor and only lower cost methods for other groups and to require users to pay for the incremental cost of more expensive methods.

### Safe Motherhood

- ❑ An estimated 40 percent of pregnant women develop complications that require the assistance of a trained provider; 15 percent require medical care to avoid death or disability.
- ❑ Good prenatal care is important; given current screening tools, however, it is not prudent to spend resources on screening as the sole mechanism for predicting women’s risk of developing complications. Instead, prenatal care should, among other activities, educate all women about danger signs, possible complications, and where to seek help.
- ❑ Micronutrient supplementation, including vitamin A, iron, folic acid, zinc, and calcium, show promising results in helping to improve pregnancy outcomes and reduce maternal mortality.
- ❑ The most crucial interventions for safe motherhood are to ensure that a health worker with midwifery skills is present at every birth, that transportation is available in case of emergency, and that quality and timely emergency care is available at the referral level.
- ❑ It is not only important that adequate access to emergency care be available but that women, families, and the community have confidence in the referral system and higher levels of care. Communities use emergency obstetric care services that they know to be functioning well.

- ❑ Nearly two-thirds of maternal deaths occur in the postpartum period; therefore, the World Health Organization (WHO) recommends that, if possible, community health workers visit women not attended at birth within 24 hours of delivery and again within three days.
- ❑ In many low-income countries, effective and safe postabortion care can significantly reduce maternal mortality rates by as much as one-fifth. Furthermore, such care can reduce overall health care costs as it is not uncommon for most beds in emergency gynecology wards to be occupied by women suffering from abortion complications, the treatment of which can cost five times the annual per capita health budget.
- ❑ The high cost of postabortion care can be reduced by switching from sharp curettage to manual vacuum aspiration (a safer and less expensive method), establishing referral systems and links with family planning and other reproductive health services, and preventing abortion through family planning.
- ❑ Substantial additional resources may not be required to improve emergency obstetric care. Most of the cost of providing such care is already paid through the maintenance of hospitals, health centers, and health care staff. Instead of creating new medical facilities and hiring new staff, emergency obstetric care can be improved by renovating existing facilities and training staff, including midwives and general practice physicians.

## **STD/HIV/AIDS**

- ❑ The best combination of STD/HIV/AIDS activities and services is general information and education, improved health-seeking behavior for STD treatment, wide access to condoms, and STD services with focused attention to core transmitters.
- ❑ WHO advocates the use of the syndromic management approach to managing STDs. This approach has limitations, however. It functions well for men with symptomatic urethral discharge and for women with genital ulcer disease, but not for women with vaginal discharge. The women who receive medical attention are often overtreated with drugs. More work is needed to develop cost-effective approaches to screening and treating reproductive tract infections.
- ❑ There are promising treatments to prevent mother-to-child transmission of HIV. Nevirapine has recently been shown to reduce transmission dramatically from mothers to infants at a fraction of the cost of treatment with Zidovudine (AZT) (US\$4 compared with US\$100), although universal HIV screening is not part of prenatal care in many developing countries and would raise the cost of prevention. Maternal syphilis diagnosis and treatment is also cost-effective.
- ❑ Blood screening for HIV/AIDS in high-prevalence areas has proven cost-effective.
- ❑ HAART (highly active antiretroviral therapy) for HIV/AIDS-infected individuals presently costs about US\$8,000 to US\$10,000 per person. Governments and donors will not be able to cover the cost of such treatment.
- ❑ In many developing countries, less than 1 percent of people living with AIDS will ever be treated, even if all reproductive health donor funds were allocated for that purpose.



## **Information, Education, and Communication (IEC) and Behavior Change Communication (BCC)**

- ❑ IEC and BCC have the potential to be highly effective in helping promote good reproductive health. Properly executed, IEC and BCC can encourage individuals to take preventive measures to protect their reproductive health as well as seek appropriate reproductive health services. IEC and BCC activities warrant government support if they convey appropriate messages to target audiences and are associated with services already in place.
- ❑ In the absence of these conditions, IEC and BCC activities are not only ineffective but also give rise to unsatisfied demand.

## **Some Economic Criteria for Governments to Use in Deciding Whether They Will Provide and/or Fund Services**

- ❑ From an economic standpoint, governments should intervene in reproductive health care if intervention increases efficiency and productivity in the health sector. Governments should redistribute resources to ensure equitable access to reproductive health services by all individuals.
- ❑ Governments should subsidize activities with large external or social benefits that go beyond the individual.
- ❑ Governments must regulate all sectors to ensure high-quality care and equitable access to reproductive health services.
- ❑ Government services are rarely more efficient than private sector services. Governments should encourage development of the private sector and provide subsidies to the poor so that they can afford needed services. To encourage development of the private sector, governments should provide similar subsidies to all providers (rather than only to government providers) either directly or through income transfers to individuals so that consumers can choose their own provider, thereby spurring competition and, it is hoped, better quality services for all.
- ❑ Governments should not provide subsidies to those able to pay for reproductive health services. Growing evidence suggests that some users, particularly in middle-income countries, can pay for family planning, maternal health, and postabortion care services.
- ❑ After reviewing implementation of the ICPD *Programme of Action*, the international community has reached consensus that certain basic services should be provided at the primary health care level and subsidized for those who cannot afford to pay for them. In low-income countries, where most individuals are too poor to pay for services, evidence suggests that it would be desirable for governments to subsidize family planning services, prenatal care that includes physical examinations, postpartum provision of family planning information and services, and postabortion services. In addition, skilled attendance at delivery and a functioning referral system and emergency care are essential to reduce maternal mortality. As for STD/HIV/AIDS, resources should be focused on prevention activities such as promotion and distribution of condoms to prevent STDs, STD treatment for high-risk groups, improved health-seeking behavior for STD treatment, and maternal syphilis treatment. Where HIV screening is part of prenatal care, provision of Nevirapine or AZT for infants of HIV-positive mothers may be feasible.

While governments should strive to ensure that their citizens have access to reproductive health services as agreed at the ICPD and ICPD+5, policymakers will have to begin with a narrower set of interventions consistent with current resource and capacity levels and decide how to phase in additional services as resources become available. It is clear that a substantial amount of work on costing interventions and services and measuring their effectiveness is necessary before we can say, with greater assurance, what combination of services works at the most reasonable cost. Data collected in one country or service delivery setting may not apply in others, and further research is needed. Still, while the data are not comprehensive or perfect, policymakers and others can use the information at hand to help make difficult decisions, especially on what to provide to low-income clients through public sector facilities or financing.

## Abbreviations

AIDS	Acquired immune deficiency syndrome
AZT	Zidovudine
BCC	Behavior change communication
CBD	Community-based distribution
CYP	Couple-year of protection
D&C	Dilation and curettage
DALY	Disability-adjusted life-year
DHS	Demographic and Health Surveys
GON	Gonococcal ophthalmia neonatorum
HAART	Highly active antiretroviral therapy
HIV	Human immuno-deficiency virus
ICPD	International Conference on Population and Development
IEC	Information, education, and communication
INCAP	Institute of Nutrition of Central America and Panama
IUD	Intrauterine device
MCH	Maternal and child health
MMR	Maternal mortality ratio
MVA	Manual vacuum aspiration
MWRA	Married women of reproductive age
PMM	Prevention of Maternal Mortality (Network)
RTIs	Reproductive tract infections
STDs	Sexually transmitted diseases
TBA	Traditional birth attendant
UNAIDS	United Nations Programme on HIV/AIDS
USAID	U.S. Agency for International Development
WDR93	1993 World Development Report
WHO	World Health Organization

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## Introduction

In Cairo in 1994, nearly 180 governments signed the ICPD *Programme of Action*, agreeing to develop national strategies that would ensure all individuals and couples access to a full range of reproductive health services as soon as possible and no later than 2015. In 1999, at a meeting for ICPD+5 to review progress on implementation of the Cairo agenda, the United Nations urged governments to

“strive to ensure that by 2015 all primary health care and family planning facilities are able to provide, directly or through referral, the widest achievable range of safe and effective family planning and contraceptive methods; essential obstetric care; prevention and management of reproductive tract infections, including sexually transmitted diseases, and barrier methods (such as female and male condoms and microbicides if available) to prevent infection” (United Nations, 1999).

Governments and donors are seeking the means to achieve the ICPD’s ambitious goal. The gap between available resources and the need for reproductive health services remains wide in part because governments and donors have not contributed the level of funding they pledged at ICPD (McGreevey, 1999; Potts et al., 1999). Countries undoubtedly require significant additional funding to achieve the goals of ICPD. At the same time, with financial resources scarce, programs must make the most efficient use of existing resources. Governments and donors face difficult choices and therefore need to know which reproductive health interventions work and how much they cost.

This paper addresses three issues that are fundamental to making programmatic choices regarding reproductive health care: What interventions within the fixed main components of reproductive health are considered effective? What do the interventions cost? What economic criteria can governments use to decide whether they will provide an intervention?

This paper examines some interventions associated with three main components of reproductive health<sup>1</sup>—family planning, maternal health care (including postabortion care), and STD/HIV/AIDS prevention and treatment—from cost-benefit and cost-effectiveness perspectives.<sup>2</sup> In addition, it discusses the effectiveness of IEC and BCC programs. While funding availability is crucial for the successful

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<sup>1</sup> There are many ways to operationalize the ICPD definition of reproductive health services. The following reproductive health concerns are generally included in definitions of reproductive health: prevention of unintended pregnancy through family planning services; provision of safe pregnancy services to reduce maternal morbidity and mortality, including services to reduce perinatal and neonatal mortality; provision of postabortion care services and safe abortion (where permitted by law); prevention and treatment of reproductive tract infections (RTIs), sexually transmitted diseases (STDs), and HIV/AIDS; provision of reproductive services to adolescents; improvement of maternal and infant nutrition, including promotion of breastfeeding; screening and management of specific gynecological problems such as reproductive tract cancers, breast cancer, and infertility; and addressing social problems such as prevention and management of harmful practices, including female genital cutting and gender-based violence.

<sup>2</sup> Cost-effectiveness analysis, closely related to cost-benefit analysis, can help to determine health sector priorities. In cost-effectiveness analysis, the effect or impact of an intervention is measured in terms of the change in status of the desired outcome (e.g., health status or some broader aspect of welfare). With cost-benefit analysis, the effect or impact of an intervention is translated into monetary terms to obtain a ratio of costs to benefits (Mishan, 1982; Reynolds and Gaspari, 1985).

implementation of a given intervention, government decisions about services and information programs are not based solely on financial considerations. In addition, governments clearly have an important role to play in ensuring equity and quality of care through regulatory and programmatic interventions. Moreover, ICPD participants agreed to promote women's empowerment and to ensure reproductive rights through reproductive health and related activities. While vital for ensuring good reproductive health, these additional criteria for defining reproductive health programs are outside the scope of this paper.

## Family Planning

By permitting individuals and couples to determine when and how many children to have, family planning provides far-reaching benefits. The impact of family planning on child health and survival has been well documented. In addition, by reducing unwanted or high-risk pregnancies, family planning can reduce maternal injury, illness, and death associated with childbirth and abortions (Shane, 1997). Surveys in Bangladesh, Egypt, Ghana, Mali, Niger, and Senegal found that 10 million women were not using any family planning service yet intended to do so within the next 12 months. They wished either to defer or end their childbearing. If these women avoided (unwanted) pregnancies and faced the same maternal risks as suggested by the averages in their countries, about 20,000 maternal deaths would be averted per year (see Appendix 1). Finally, family planning contributes to slower population growth, a reduction in poverty, and preservation of the environment (Cincotta and Engelman, 1997; World Bank, 1998a). From both an individual and a country perspective, investments in family planning yield substantial benefits.

### What Works?

Contraceptive technology “is a medical success story,” according to Trussell et al. (1995:494). While the contraceptive “cafeteria” could still be expanded, the various methods available today provide individuals in various circumstances with choices at different stages of their life cycles. Some methods protect against further pregnancy (permanent methods) or help postpone childbearing (reversible methods). One method, the condom, also protects against sexually transmitted diseases. For many years, the prescription for a successful family planning program has been to focus on increasing access to a range of contraceptive methods. Contraceptives have been provided through a variety of mechanisms—from clinics to community-based distribution (CBD) systems and pharmacies, to private providers, to social marketing. While some programs have concentrated on certain methods or certain delivery systems, most at least nominally make a range of methods available through more than one delivery mechanism.

Each delivery mechanism has been shown to be effective in reaching women (and to a lesser extent, men) (Bertrand, 1991; Ross and Frankenberg, 1993). The widest range of methods can be provided through hospitals and clinics, as opposed to health posts, which generally provide limited care. Integration with comprehensive maternal and child health (MCH) and STD/HIV services is also most feasible at the hospital and clinic levels.

CBD programs, which generally reach rural populations with limited mobility and poor access to clinic services, can be an effective approach for delivering contraceptive services. In fact, without CBD, clients in many countries would not receive services at all (Finger, 1999). One assessment of 28 CBD projects, mostly in Asia and Latin America, suggested that contraceptive prevalence rates typically doubled from 15 percent or less to around 30 percent within one or two years of program initiation (Osborn and Reinke in Ross and Frankenberg, 1993). Evidence from Africa also shows that CBD programs can substantially increase contraceptive use (Population Council, 1999). At the same time, CBD may be even more effective when it is linked with other approaches. According to Phillips et al. (1999:47), in Africa, “evidence suggests that social acceptability represents a more important determinant of CBD impact than geographic accessibility. For this reason, male outreach, community mobilization, use of women’s networks, and other strategies involving social organizations may be more important to the success of CBD efforts than is the simple provision of accessible services.”

Social marketing of contraceptives, through which contraceptives are distributed through existing retail outlets at subsidized prices, is designed to complement other forms of service delivery and to attract users who can pay for various methods (Stover and Heaton, 1998). In some countries, social marketing programs cover an appreciable proportion of the urban population and an increasing proportion of the

rural population. Well-designed social marketing programs need not become substitutes for other delivery mechanisms (Stover, 1993; Ross and Frankenberg, 1993; Helig, 1998). Yet social marketing has proven effective in promoting the use of condoms both for contraception and for preventing the spread of STDs and HIV (Helig, 1998; AIDSCAP, 1997). According to 1997 social marketing sales figures for 55 countries, the number of couples served by social marketing programs increased from 14.4 million in 1996 to more than 16 million couples in 1997 (DKT International, 1998). Programs in the 55 countries sold 937 million condoms and 54.5 million cycles of pills. Condom sales increased by 20 percent in one year and pill sales by 5 percent.

Consistent with the ICPD goal of helping individuals and couples satisfy their reproductive intentions, a range of contraceptive methods must be provided along with the information clients need to make an informed decision about the best contraceptive method for their individual circumstances. In addition, services should be high quality, thus implying the technical and interpersonal competence of providers and clients' acceptance of methods and services (Bruce, 1990; Kols and Sherman, 1998; Koenig et al., 1997; Mroz et al., 1999). If contraceptive methods are widely available and clients are given the information they need to select a method, contraception is likely to be used. For example, an operations research study in Kenya showed that exposing women to information about family planning during prenatal care (through provider counseling, IEC materials, or discussions with other women) doubled the likelihood that women would use family planning (Ndhlovu, 1997). Providing information, including information on side effects, not only helps clients choose the method most appropriate for their individual needs, but also helps them use the method with greater confidence and for longer periods (Prabhavathi and Sheshadri, 1988; Piotrow and Meyer, 1991; Cotten et al., 1992; Murphy and Steele, 1998; CPFH, 1989; Sealza, 1995).

Many family planning programs have set forth the dual goals of reducing fertility and helping couples and individuals satisfy their reproductive intentions. Given the large unmet need<sup>3</sup> for family planning in many countries around the world, such goals are generally compatible (Sinding et al., 1994). In fact, reducing the gap between the stated need for contraception among women and men and actual contraceptive use is a priority for many family planning programs. Jain (1999:s42) contends, however, that "the extent of change in unmet need at the aggregate level ... is not an appropriate indicator of the success or failure of family planning programs." Using data from Peru, Jain (p. s39) estimated that "[a]pplying the proportions who had an unintended pregnancy to the distribution of women according to their unmet need status in 1991–1992 shows that if the program had focused on eliminating unmet need [by attracting new users], the proportion having unintended pregnancies would have been 17%; if the program had emphasized eliminating unintended pregnancies among women who initially had no unmet need, the proportion would have been only 6%." Rather than adopting a sole focus on reducing unmet need by motivating women (and men) to initiate contraceptive use, programs should also pay attention to reducing unintended pregnancies among those women who are already using contraception, mainly through improving the quality of services and use-effectiveness of the methods.

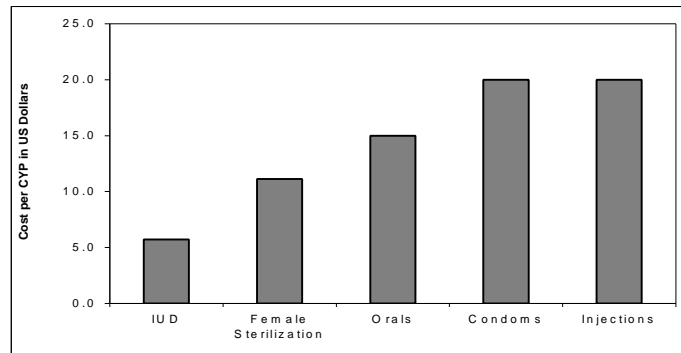
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<sup>3</sup> Unmet need is defined in various ways, but a fairly standard measurement defines it as the number of women (often married) who are sexually active and fecund (but not currently pregnant) and desire to space or limit childbearing but who are not using contraception.

## Costs of Methods and Services

One indicator used to measure the relative costs of alternative contraceptive methods is couple-years of protection (CYP). This concept helps compare method costs by showing the cost of one year of protection for each method. IUDs and voluntary sterilization have the lowest cost per CYP; although from the user's point of view, these methods are relatively costly because of the higher initial costs—both in time and money—of IUD insertion and sterilization procedures.<sup>4</sup> Oral contraceptives are among the least costly supply methods (see Figure 1). Condoms and injectables are usually more expensive than the pill.<sup>5</sup> Implants, such as Norplant®, are much more costly per CYP.

**Figure 1. Cost per CYP for Selected Contraceptive Methods**



Source: Stover and Heaton, 1997.

Based on estimates of CYP conversion factors.

Note: Male sterilization was not included in this analysis; however, it is likely to be even more cost-effective than female sterilization, particularly in areas where men have multiple partners.

CYP was developed as a crude output measure for public sector family planning providers; thus, the costs based on CYP do not capture the full costs of various methods. In particular, CYP does not reflect service quality and masks barriers to service that can limit access or increase overall costs. For example, some clinic providers in Kenya do not administer oral contraceptives or injectables to unmarried women while one-third of providers in Burkina Faso require a husband's consent before providing oral contraceptives to a woman. In Senegal, sterilization is available only after a woman has given birth to six children (Miller and Miller, 1998). These and other restrictions on service access inhibit efficiency and effectiveness in ways that general cost assessments do not capture.

Studies have generally used CYP to compare the costs of various delivery systems. For example, the use of social marketing to target groups for family planning has been shown to be cost-effective (Stover and Heaton, 1998). In Colombia, social marketing costs one-half to three-quarters as much per CYP as delivery through CBD. One analysis of 14 countries found that CBD was the most expensive way to deliver contraceptives (Barberis and Harvey, 1997) (see Appendix 2); however, comparing the costs of CBD and other distribution channels is problematic because programs generally serve different populations.

<sup>4</sup> As labor costs increase, IUD costs may exceed the cost of pills. In addition, the relative cost of IUDs increases if the method is used for less than eight years.

<sup>5</sup> When condoms are used for disease prevention and not just for fertility control, their presumptive benefits in light of that purpose are greater.



Another problem with using CYP to study the costs of CBD is that it does not consider client costs such as travel time and expenses to reach a clinic, client preferences, or the need for dual protection against pregnancy and STDs (Finger, 1999). In an attempt to measure the costs of CBD versus clinics, the Planned Parenthood Association of South Africa considered clients' travel cost and found that when client costs were included, CBD was cheaper—at about US\$42 per CYP<sup>6</sup> compared to \$44 at clinics. The costs of CBD declined in the second year of the program to about \$25 per CYP (Sinanovic in Finger, 1999).

In addition to the costs of contraceptive methods, the costs of unintended pregnancies must be considered in any decision to limit or expand provision of contraceptive services. Trussell and Kowall (1998) show that the failure rates of various contraceptive methods differ considerably. For example, the failure rate in the United States for typical use of male condoms is 14 percent; for the pill, 5 percent; implants, 0.05 percent; Copper T-380A IUDs, 0.8 percent; female sterilization, 0.5 percent; and male sterilization, 0.15 percent. The traditional methods of periodic abstinence and withdrawal have failure rates of approximately 19 to 25 percent. Contraceptive failure rates may be even higher in developing country settings.

Governments face a delicate balancing act with regard to providing contraceptives. Fully subsidizing all methods is costly. A more limited list of offerings can save money but denies some women and men access to a preferred method, thereby reducing continuation (Pariani et al., 1991). Charging full price for contraceptives would also deter many women and men from practicing family planning. Experience with user fees for contraception has been mixed. Small increases in fees for methods do not always adversely affect use, but large increases do tend to result in a decrease in use of the methods (Brambila, 1998; Shane and Chalkley, 1998).

Governments may choose to partially subsidize family planning methods, for example, by providing the same absolute subsidy per CYP or a fixed percent of the cost of each method. Government could provide full subsidy to the poor for all methods and require users with the economic means to do so to pay for their contraceptives. Cross-sectional analysis by Foreit (1999) on use of commercial and government sources of family planning and MCH services in 11 countries in Africa, Asia, Latin America, and the Near East suggests that users at all socioeconomic levels were more likely to be able to afford to pay for the methods (pills and condoms) that had lower initial cost to the user than the more effective and long-term methods of sterilization and the IUD. If governments focused their subsidy on the more costly, long-term methods, they could reserve full subsidy for users unable to pay at all and consider instituting installment programs for those who would be able to pay over time for the more costly methods.

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<sup>6</sup> Unless otherwise noted, all costs in this paper are stated in U.S. dollars.

## Safe Motherhood

Reduced maternal mortality is a major goal of the ICPD *Programme of Action* and of the Safe Motherhood Initiative, which was launched in 1987. Viewed as a life-time risk to women, maternal mortality is by far the most common cause of death among women worldwide between the ages of 18 and 44,<sup>7</sup> accounting for 18 percent of all deaths among women in their reproductive years. At present, an estimated one woman in 12 will die of maternal causes in West Africa (Maine and Rosenfield, 1999). Maternity-related causes, which include hemorrhage, sepsis, eclampsia, hypertension, obstructed labor, and abortion, accounted for 4.6 percent of the overall world burden of disease borne by women in 1990 (see Table 1 and *World Development Report 1993* [hereafter *WDR93*], pp. 216–217). The death of a woman in her reproductive years can have severe consequences for the community and the economy as well as for her family (Starrs, 1998). Interventions to save the lives of pregnant women also contribute to saving the lives of infants and children (Strong, 1992).

**Table 1. Causes of Maternal Death Worldwide**

Causes	Percent
Severe bleeding/hemorrhage	25
Infection/sepsis	15
Unsafe abortion	13
Eclampsia/hypertension	12
Obstructed labor	8
Other direct causes*	8
Indirect causes**	20
Total	100

Source: Starrs, 1998: Figure 1.

\* Other direct causes include ectopic pregnancy, embolism, and anesthesia-related complications.

\*\*Indirect causes include anemia, malaria, and heart disease.

There are several potential components of a safe motherhood package, some of which overlap with other reproductive health interventions (e.g., family planning and postabortion care) (see Box 1). With respect to maternity-related care, the components of safe motherhood can be broken into three phases: prenatal, delivery, and postnatal care. An estimated 40 percent of pregnant women in developing countries develop complications that require the assistance of a trained provider, and 15 percent require medical care to avoid death or disability (Tinker and Koblinsky, 1993; UNICEF, WHO, and UNFPA, 1997).

### Prenatal Care

Even though safe motherhood experts concur that good quality, evidence-based prenatal care is important,<sup>8</sup> they also agree that prenatal care “should not spend scarce resources on screening mechanisms that attempt to predict a woman’s risk of developing complications” (Starrs, 1998:25). Thus, while all women should be asked about previous difficult pregnancies and deliveries and some women

<sup>7</sup> While we focus on maternal mortality in this paper, maternal morbidity is also a problem. Of the women who are pregnant each year, an estimated 40 percent (or 50 million) experience pregnancy-related health problems, with 15 percent experiencing serious or long-term complications. An estimated 300 million women today suffer from pregnancy-related health problems and disabilities, such as anemia, uterine prolapse, fistulae (holes in the birth canal that allow leakage from the bladder or rectum into the vagina), pelvic inflammatory disease, and infertility (Starrs, 1998; Fortney and Smith, 1996; Stewart et al., 1997). If health facilities are in place to address the conditions that lead to maternal mortality, the same facilities can be used to treat maternal morbidity.

<sup>8</sup> Two reviews of the literature suggest that little routine prenatal care (measurement of weight and blood pressure and abdominal examination), with the exception of some nutritional interventions, has much impact on reducing maternal mortality (McDonagh, 1996; Rooney, 1992). Thus, more research is needed to establish “evidence-based” prenatal care, to ensure that the diagnostic or therapy used has been scientifically proven to accomplish what it is supposed to.

should be watched carefully, the available screening tools do not have sufficient predictive power to determine confidently which women will or will not develop a problem that will require emergency care and, in the aggregate, make a difference to maternal mortality.

Good prenatal care should therefore educate women about danger signs, potential complications, and where to seek care. Other prenatal care services generally include detecting fetal lie, monitoring blood pressure, and checking urine for sugar, protein, and infection, although these conditions should be checked late in pregnancy to be of the most use. In addition, prenatal care should include preventive care such as counseling on hygiene, nutrition, delivery, tetanus toxoid immunization, iron and folate supplementation, breastfeeding, and family planning. Finally, prenatal care offers women the opportunity to be treated for existing conditions that might be aggravated by pregnancy, such as malaria (Tinker et al., 1994).

Leading up to and during pregnancy, many women lack adequate levels of micronutrients (Mackey, 2000). According to WHO (1996), anemia in pregnant women ranges from 20 percent in Europe to 79 percent in Southeast Asia. Vitamin A deficiency is also a significant problem for pregnant women. A mother's micronutrient status can contribute to several causes of maternal death, including hemorrhage, anemia, eclampsia, sepsis, and perhaps malaria (Mackey, 2000). In a review of 21 studies, Ross and Thomas (1996) concluded that perhaps 20 percent of maternal mortality in Africa and 23 percent in Asia is attributable to anemia. Harrison (1982) has observed that maternal mortality risk decreases as hemoglobin levels rise.

In some low-income settings, vitamin A supplementation may significantly reduce maternal mortality. In Nepal, for example, a double-blind randomized clinical trial of two forms of vitamin A compared with a placebo found that pregnant women taking the two types of vitamin A were 40 percent less likely than those taking the placebo to die as a result of pregnancy. The study also found that only half of the women took their vitamin A supplement at least 80 percent of the time; thus, with improved compliance, maternal mortality might have been reduced even further (West et al., 1999). A follow-up study in Bangladesh has been designed to investigate in more detail the effects of vitamin A on maternal mortality.

**Box 1. Potential Components of a Safe Motherhood Package**

- Community education on safe motherhood
- Evidence-based prenatal care and counseling
  - Nutritional advice and food supplements
  - A broad and growing spectrum of micronutrients and vitamin supplements, including iron and folic acid
  - Iodization of edible oils and salt and vitamin A in areas of endemic deficiency
  - Blood pressure screening
  - STD screening and treatment for syphilis
  - Antiretroviral therapy for the infants of HIV-positive mothers (where screening exists)
  - Tetanus toxoid immunization
  - Treatment of urinary tract infections
- Skilled assistance during childbirth
- Care for obstetric complications and emergencies
- Postpartum care
- Safe abortion and postabortion services
- Family planning information and services
- Adolescent reproductive health education and services

Sources: WHO, 1994; Starrs, 1998; Tsui et al., 1997; Prescott et al., 1996.

## Safe Delivery and Emergency Obstetric Care

Most women in low-income countries give birth at home. For the more than 30 countries that have participated in Demographic and Health Surveys (DHS), an average 55 percent of births take place at home. In three Asian countries—Bangladesh, Nepal, and Pakistan—over 80 percent of births are home deliveries. Women delivering at home may well benefit from the presence and involvement of their social support system, which includes friends and relatives who cannot stay with mother and child in a hospital.

In the event of complications, however, high maternal mortality rates can result unless women have access to essential obstetric care.<sup>9</sup> Thus, increasing the proportion of births occurring in well-equipped health facilities could cut both maternal and neonatal mortality rates but would be costly (Rosen and Conly, 1998). Even shifting half the births that currently occur at home to a hospital would require from 11 percent of total donor spending on reproductive health in Zimbabwe to 99 percent of donor spending on reproductive health in Côte d'Ivoire (see Appendix 3).<sup>10</sup>

In some developing countries, institutional deliveries are the norm. For example, Sri Lanka and Vietnam with extremely modest per capita incomes (\$700 and \$240, respectively) experience a high percentage of

“The single most critical intervention for safe motherhood is to ensure that a health worker with midwifery skills is present at every birth, and transportation is available in case of an emergency. A sufficient number of health workers must be trained and provided with essential supplies and equipment, especially in poor and rural communities.”

Source: Starrs, 1998:29.

institutional deliveries and thus have achieved very low maternal mortality ratios (30 and 120, respectively). Côte d'Ivoire has the same per capita income as Sri Lanka but a maternal mortality ratio of 830. Clearly, political will and a commitment to safe motherhood can mobilize scarce resources for effective services. However, given that most developing countries would find it impossible to accommodate a large share of births in medical facilities, systems need to be in place to ensure the identification of high-risk births and the rapid referral and movement of women to facilities that are properly equipped and staffed. The lower cost alternative is to ensure the presence of a skilled attendant at all births.<sup>11</sup> In fact, upgrading the skills and increasing the numbers of midwives is the approach now widely recognized as a key link in the safe motherhood system. Skilled birth attendants can ensure a clean delivery,

<sup>9</sup> According to the WHO, essential care of obstetric complications consists of the ability to carry out surgery (i.e., caesarean section, treatment of sepsis, removal of an ectopic pregnancy); the ability to provide intravenous oxytocin; the provision of anesthesia; medical treatment for shock, sepsis, anemia, and hypertensive disorders of pregnancy; replacement of blood; manual procedures (e.g., removal of the placenta, repair of episiotomies and perineal tears, and vacuum extractions); monitoring of labor, including the use of a partograph; management of problem pregnancies, including severe anemia, diabetes, twins, and malpresentation; manual vacuum aspiration for treatment of incomplete abortions; and provision of special care for neonates, including resuscitation.

<sup>10</sup> Appendix 3 calculates the expenditures necessary to shift 50 percent of home births to health facilities and compares the estimated costs to the amount of donor resources spent on reproductive health in 1995.

<sup>11</sup> According to the WHO, the definition of a skilled attendant, in the context of midwifery, implies the ability to provide competent care and assistance during pregnancy, labor, childbirth, and the postpartum period. A skilled attendant can be a midwife, a nurse with additional midwifery education, or a physician with appropriate training. A skilled birth attendant meets the following criteria: ensures a clean, safe, normal delivery without unnecessary intervention; recognizes and responds appropriately to early warning signs of complications by managing them if within her or his competence (e.g., removal of placenta, repair of perineal or vaginal tears, administration of oxytocin for uterine hemorrhage, etc.) or making prompt referral to those who can carry out necessary obstetrical/surgical interventions; listens to the woman and provides her with culturally sensitive emotional support; provides both non- and pharmacological (if available) pain relief; monitors maternal and fetal well-being throughout the delivery and immediate postpartum period; ensures that the newborn breathes on its own; provides the newborn with protection from hypothermia and cord infection; and ensures initiation of early breastfeeding (Starrs, 1998:31).

recognize complications, and make referrals to facility-based care. Some midwives can even treat selected complications themselves.

For many years, safe motherhood experts assumed that traditional birth attendants (TBAs), particularly trained attendants, could provide the necessary services. In practice, though, the several programs that tried to build on the potential strengths of TBAs have met with variable success. In 1989, the Institute of Nutrition of Central America and Panama (INCAP) trained the government nursing staff in how to train more than 400 TBAs in rural Quetzaltenango, Guatemala. The three-day training sessions focused on recognition and timely referral of maternal and newborn complications, including bleeding, swelling of hands and face during pregnancy, malpresentation, prolonged labor, retained placenta, postpartum bleeding, and maternal and neonatal infections. One year after the training, recognition of danger signs among TBAs declined from 81 to 68 percent. Similarly, the proportion of women with complications who used health facilities based on a TBA's referral declined from approximately 20 to 13 percent (Bailey et al., 1994). Ghana (Eades et al., 1993) and Indonesia (Tsui et al., 1997) experienced a similar lack of success with respect to appropriate referrals generated by trained TBAs. By contrast, a program in rural northeast Brazil that trained TBAs in recognition and referral achieved a relatively high success rate in both TBAs and self-referrals (Tsui et al., 1997). In a remote area of central India, a project to train various types of providers, including TBAs, in the diagnosis and treatment of childhood pneumonia found that the proportion of error-free case management by TBAs improved from 57 to 83 percent between 1988 and 1991 (Bang et al., 1994).

The report from the 1998 safe motherhood conference notes that training TBAs "is perhaps the most hotly debated issue within the Safe Motherhood Initiative." One specialist observed that "studies have shown that traditional birth attendants cannot prevent or treat most life-threatening obstetric complications, so it is a waste of resources to train them" (Fortney quoted in Starrs, 1998:30). That is not to say that TBAs do not have a role to play in promoting safe motherhood. According to Nguyen et al. (1998:4), "While a TBA herself generally cannot prevent death once a complication arises, she can contribute to making motherhood safer... given training on clean and safe delivery practices, proper management of labor, early recognition of complications, and referral strategies.... Ensuring TBAs are familiar with referral facilities (and that first-referral providers [including midwives] understand the role of TBAs) is especially important." In a cross-national analysis of DHS data from 34 countries, Hutchinson and McGreevey (1999) found that the presence of any attendant (doctor, nurse/midwife, or TBA) regardless of training resulted in better birth outcomes compared with the presence of only a family member or friend. They hypothesized that TBAs, while not able to do anything themselves to prevent or deal with an emergency, may be able to hasten the decision to seek care.

Some countries are training more midwives. By 1996, for example, Indonesia had placed nearly 50,000 trained midwives in villages nationwide. The goal over time is to turn midwives into private practitioners through a franchising mechanism whereby the government trains the midwives, deploys them to an equipped health post, and supervises them for a set period of time to ensure that poor women receive a minimum package of services in each village. The results are encouraging despite problems related to the quality and content of training, the lack of supervision and support, the midwives' young age, and communities' resultant lack of trust. In 1996, skilled attendants in Indonesia were present at delivery in 55 percent of births compared with 39 percent in 1993 (Starrs, 1998).

One of the main issues in providing emergency obstetric care is that women and their families fail to seek care when needed. Maine (1997b), among others, has emphasized the need to reduce the three delays associated with seeking emergency obstetric care (see Box 2). The first delay involves the time between awareness of a life-threatening complication in delivery and the decision to seek help. The second involves the time to transport the patient from home to health facility. The third involves the time from arrival at the facility to treatment.

The presence of a skilled birth attendant may help reduce the first delay. The mother alone, or family members, may procrastinate in the face of extended labor or fail to recognize a condition such as pre-eclampsia. A skilled birth attendant, however, is sufficiently experienced to know when to seek help, as well as capable of taking the effective next steps to reduce maternal mortality. It is not only important that adequate access to emergency care be available but also that women, their families, and the community have confidence in the referral system and higher levels of health care. A recent study of maternal deaths in Haiti, for example, found that “a lack of confidence in available medical options was a crucial factor in delayed or never made decisions to seek care” (Barnes-Josiah et al., 1998:981). In addition, the high cost of hospital fees can be an important obstacle to the use of emergency obstetric care. Some countries, such as Indonesia, are experimenting with social insurance programs designed specifically to cover the cost of emergency obstetric care (Behrman and Knowles, 1998).

**Box 2. The Three Delays to Emergency Obstetric Care**

When complications arise, the mother giving birth at home may need to be referred to emergency medical services. Successful referral confronts three sequential delays:

- delay in deciding to seek appropriate care;
- delay in reaching a treatment facility; and
- delay in receiving adequate treatment at the facility.

Shortening any or all of these delays can make the difference between life and death. The first can be shortened by the presence of a skilled attendant. The second requires some type of transport. The third depends on the skill and responsiveness of medical personnel and the availability of equipment, supplies, and drugs.

Sources: Maine, 1997b; Tsui et al., 1997

**Box 3. Benefits of a Community Health Center**

In Juaben, Ghana, a multidisciplinary team upgraded services by establishing a blood bank and operating theater. Midwives were trained in life-saving skills. Although the health center had many of the characteristics of a hospital, midwives played a large part in the delivery of services. Over the evaluation period, the number of women coming in for care almost tripled while the percentage of women referred to higher levels in the health system declined. Furthermore, no deaths were reported at the facility.

Source: Djan et al. in Maine, 1997a.

In many countries, the core of the referral system for emergency obstetric care is the community health center, which provides the first level of institutional health care and has qualified personnel to supervise skilled birth attendants (see Box 3). Community education, mobilization, and IEC programs can stress the importance of prompt reporting to community health centers when complications arise.

The Prevention of Maternal Mortality (PMM) Network introduced a process for improving safe motherhood services in parts of Africa. By using a quality-improvement approach, PMM teams identified problems in health facilities and developed and implemented

plans for effecting reductions in mortality rates. Through a spillover effect, improved services and clinical systems generated improved quality in other aspects of health care and led to increased use of the facilities for high-risk deliveries. Communities used emergency obstetric care services that they knew to be functioning well. Some communities that offer effective safe motherhood services support self-financing transportation schemes (Shehu et al., 1997).

**Postnatal Care**

As Table 2 shows, maternal deaths are most common in the postpartum period. In fact, most (78 percent) maternal deaths in the postpartum period occur within the first 24 to 48 hours after delivery, mainly as a result of postpartum hemorrhage or hypertensive disorders. Most deaths that occur after 48 hours are due to sepsis.

**Table 2. Timing of Maternal Deaths in Developing Countries**

<b>Time of Death</b>	<b>Percentage of All Maternal Deaths</b>
During pregnancy	24
During delivery	16
After delivery	61

Source: Starrs, 1998.

It is critical that women be monitored during the postpartum period; women, their families, and providers are often unaware of the potential dangers associated with postpartum recovery (Starrs, 1998). WHO recommends that women not attended at birth be visited by community health workers within 24 hours of delivery and again within three days of delivery. Community health workers are trained to detect and treat problems that might affect the mother as well as to counsel the mother on breastfeeding, care of the baby, hygiene, immunizations, family planning, and maintaining good health.

### **Postabortion Care**

Complications from unsafe abortion account for 13 percent of maternal deaths. Effective and safe postabortion care would significantly reduce mortality rates by as much as one-fifth in many low-income countries (Maine, 1997a). Postabortion care involves strengthening the capacity of health institutions to offer and sustain three specific service components: emergency treatment services for complications of spontaneous or unsafely induced abortion, postabortion family planning counseling and services, and links between emergency postabortion treatment services and reproductive health care (Greenlade et al., 1994; Salter et al., 1997).

Complications of unsafe abortion cost health care systems a tremendous amount in terms of hospital space, providers' time, antibiotics, blood, and supplies. In East and Southern Africa, for example, "[it] is not uncommon for the majority of beds in emergency gynecology wards to be occupied by women suffering abortion complications" (REDSO/ESA, 1996). In some countries, more than one-half of gynecological admissions in hospitals are for complications of unsafe abortion (Kinoti et al., 1995). Another study in Egypt found that one in five admissions to public sector obstetrics and gynecology departments during the 30-day study period were women undergoing treatment for a spontaneous or induced abortion (Huntington et al., 1998).

Operations research projects of the Population Council and its partners have conducted over 30 studies on postabortion care in Africa, Asia, and Latin America. The goal of the projects is to maximize the quality of services while minimizing costs (King et al., 1998; Huntington et al., 1998). The Population Council and IPAS have developed modules with study protocols and questionnaires (called DATAPAC) for use by countries to assess the quality and costs of their postabortion care services. Studies in Kenya and Mexico, for example, examined the costs per intervention of the two medical procedures most commonly used for postabortion care—manual vacuum aspiration (MVA) and sharp curettage (D&C)—to see which method is safer and more cost-effective. Results from these and other studies show that MVA is safer and less costly. It requires fewer supplies and leads to fewer complications and shorter hospital stays than sharp curettage; further, client satisfaction with MVA is generally higher. The cost of the MVA

procedure was between 20 and 70 percent below the alternative (see Table 3). MVA also offers the advantages of easy training and broad applicability, including use by nonphysicians at lower level health facilities. Thus, switching from sharp curettage to MVA, establishing referral systems, and preventing abortion through provision of family planning services can contribute to the sustainability of health care systems.

**Table 3. Costs of Postabortion Care Using Two Technologies in Mexico and Kenya**

Country	Intervention (MVA or D&C)	Cost per Case (1996 US\$)		
		Low	Medium	High
Mexico	Manual vacuum aspiration	—	74	—
	Dilation and curettage	89	—	266
Kenya	Manual vacuum aspiration	3	—	6
	Dilation and curettage	4	—	17

Source: Johnson et al., 1993.

### The Cost of Safe Motherhood Services

Safe motherhood interventions are difficult to cost because the entire health system must function if the interventions are to succeed. It is extremely difficult to measure the effectiveness of multifaceted interventions that take place in many different locations (household, community, health post or center, and referral hospital) of a region or country. Despite methodological difficulties, the costing analysis for WHO's mother-baby package and the World Bank's estimates for the effectiveness of maternal health interventions suggest that the cost of the entire package of services is about \$3 per person per year in low-income countries.<sup>12</sup> In middle-income countries, the cost of the mother-baby package is about \$6 per year primarily because of higher labor costs. The cost per life saved (mothers and infants) is about \$230 (Starrs, 1998).<sup>13</sup>

Few studies have assessed the costs of individual maternal health interventions. Mumford et al. (1998) found that fewer than 20 studies explored the costs of maternal nutrition, immunizations, and obstetric care. Further, these studies focused on programs or projects in only 11 countries. Given differences in methodologies and interventions, it is difficult to draw conclusions about the cost of services. For example, the costs of tetanus toxoid immunization and iron supplements vary widely. According to one study, tetanus toxoid vaccination can avert a neonatal death at a cost somewhere between \$27 and \$225. Iron supplements administered to highly anemic pregnant women can save lives at a cost of \$13 per DALY gained (Berman et al., 1991). The cost to screen women for anemia may be higher than the cost associated with general distribution of iron supplements as part of standard prenatal care. Published after the Mumford review, one study that determined the costs of providing maternal health care in Uganda found a range of costs for prenatal and delivery care at four health facilities (public and mission hospital and public and mission health center). Costs ranged from \$2.21 for prenatal care at the public health

<sup>12</sup> The mother-baby package includes antenatal care, normal delivery care, essential care for obstetric complications (hemorrhage, obstructed labor, eclampsia, sepsis, and abortion complications), neonatal care, postpartum family planning, and management of STDs (WHO, 1997).

<sup>13</sup> DALY (disability-adjusted life-year), the present value of future streams of disability-free life lost as a result of death, disease, or injury, is a measure of health benefits (Bobadilla and Saxenian, 1993). The cost per life saved (or per DALY) is inversely related to the total fertility rate, or the average number of children per woman, other factors being equal. Since many of the costs of a safe motherhood program are fixed, costs per person depend in part on the number of births across which the costs are spread.



center to \$6.43 at the mission health center; for a normal delivery, costs ranged from \$2.71 at the public health center to \$33.90 at the public hospital. Costs were higher for obstetric complications (a caesarean section cost \$73.10 at the public hospital and \$86.48 at the mission hospital (Levin et al., 1999)).

Taking a systems approach, Maine and Rosenfield (1999) conclude that provision of more emergency obstetric care, which is essential for reducing maternal mortality, would not necessarily require additional resources. They contend that most of the cost of providing emergency obstetric care is already covered. For example, Bangladesh operates an extensive nationwide system of hospitals, health centers, and health posts, with most positions for physicians filled. Thus, the expense of improving the emergency obstetric care system largely involves upgrading existing infrastructure, staff, and service provision guidelines.

Community programs have a vital place in emergency obstetric care because they can ensure women's access to such care when needed. The PMM Network, discussed above, documented several attempts at community mobilization (Maine, 1997b). In general, costs were lowest and sustainability greatest in community mobilization programs that made use of existing capacity. In other words, providing or improving emergency obstetric care need not be costly when the necessary facilities and staff are in place—and they are in place in many areas. Renovation of facilities and training of staff (often midwives or general practice physicians), though not without cost, are required in many countries but cost far less than developing new medical facilities.

# STD/HIV/AIDS

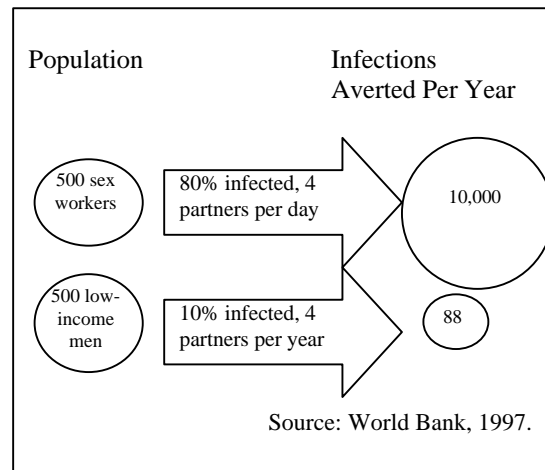
## What Works?

The HIV/AIDS pandemic is far more serious than what the ICPD *Programme of Action* projected, and the ICPD global cost estimates are significantly lower than the costs countries will incur in efforts to prevent HIV/AIDS. Given the rapid reproduction and lengthy dormant period of HIV, preventing each case of an STD or HIV has far-reaching health benefits for the individual, his or her partners, and others. Thus, treatment of STDs has important social benefits that extend well beyond the individual; it prevents the transmission of STDs and slows the spread of HIV. Indeed, the presence of an STD can exacerbate HIV transmission by a factor of up to 10.

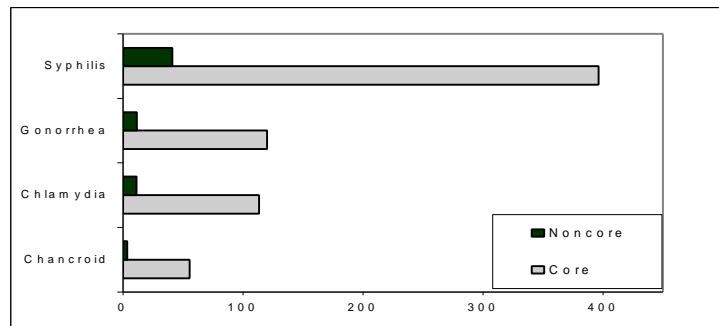
Preventive measures targeted to “core” transmitter groups—groups of persons who have many partners and engage in high-risk sexual behavior—yield widespread benefits. In fact, studies indicate that targeted prevention is far more cost-effective than untargeted appeals to the general population (see Figure 2). Efforts to increase condom use among sex workers in Nairobi, for example, were estimated to be over 100 times more effective than subsidizing condoms for the general population (World Bank, 1997).

Targeting core transmitter groups for both prevention and cure of STDs is also more effective than trying to serve the general population (see Figure 3). Yet efforts focused on these groups can be counterproductive if they intensify the stigma against core transmitters and cause them to avoid cooperation with public health agencies.

**Figure 2. Infections Averted Per Year by Raising Condom Use to 80 Percent in Nairobi**



**Figure 3. Targeting Core versus Noncore Groups DALYs Saved per STD Case Prevented or Cured**



Source: Over and Piot, 1996:s168.

UNAIDS advocates the adoption of a “public health package” to reduce the incidence and prevalence of STDs and HIV/AIDS (see Box 4). Likewise, USAID has issued guidance to its field offices on priority activities to reduce STDs (see Box 5).

**Box 4. Public Health Package Component for STD Control**

- Promoting safer sexual behavior
- Strengthening condom distribution programs
- Promoting health care-seeking behavior
- Integrating STD control into primary health care and other health care services
- Providing specific services for populations at increased risk
- Providing comprehensive case management
- Preventing and caring for congenital syphilis and neonatal conjunctivitis
- Providing early detection of asymptomatic and symptomatic infections

Source: UNAIDS, 1998.

In light of the difficulty of laboratory testing for STDs, WHO advocates the syndromic management approach (UNAIDS, 1998).<sup>14</sup> With this approach, clients presenting with signs and symptoms of STDs are treated for all important causes of symptoms. The syndromic approach is most reliable in the case of men with symptomatic urethral discharge and women with genital ulcer disease (UNAIDS, 1998; Adler et al., 1996; Dallabetta et al., 1996); it is least effective for women with

**Box 5. USAID Guidance on Priority Actions to Reduce STDs**

USAID recently identified priority uses of funds for STD interventions that capitalize on the strengths of family planning and MCH programs. These interventions can often be added at low marginal cost, promote synergy, and complement other efforts to prevent transmission of STDs and HIV.

- “Increased efforts to reach high transmitters rather than the general population;
- Prevention and STD treatment for high transmitters, complementing other efforts;
- Social marketing of condoms (and potentially of antibiotics for men with STD symptoms);
- Behavior change communication to reduce unsafe, unprotected sex;
- Aggressive condom promotion both in clinics and in non-clinical settings;
- Advocacy/policy reform to promote appropriate resources and STD/HIV prevention;
- Counseling services to increase knowledge, perception of personal risk, behavior change, contraceptive method selection, etc.;
- Programs directed at adolescents;
- Antenatal syphilis testing and treatment;
- Use of syndromic management interventions in carefully selected settings;
- Links with programs that treat symptomatic men and add a component to treat their partners; and
- Voluntary HIV counseling and testing, as appropriate.”

Source: USAID, 1998.

vaginal discharge. Such women tend to be overtreated with drugs, particularly in cases of vaginal

<sup>14</sup> The main features of the syndromic approach are classification of the main causative pathogens by the clinical syndromes they produce; use of flow charts derived from this classification to manage a particular syndrome; treatment for all important causes of the syndrome; notification and treatment of sex partners; and no expensive laboratory procedures.

discharge in which cervicitis due to gonorrhoea and/or chlamydial infection is not the predominant cause of the discharge. This lack of diagnostic precision as well as the increased cost of drugs has raised some serious questions about the use of the syndromic approach, thus increasing the urgency of finding less costly screening and treatment technologies.

### **The Costs of STD/HIV/AIDS Interventions**

Several preventive interventions have proven cost-effective in the area of STDs and HIV/AIDS. For example, diagnosis and treatment of maternal syphilis is less expensive than treatment of neonatal syphilis (Dallabetta et al., 1996). In addition, AZT administered to infants of HIV-positive mothers is not expensive (Prescott et al., 1996), although universal screening of pregnant women would increase the costs. A recent study in Uganda shows promising results from using Nevirapine to reduce dramatically the transmission of HIV from mother to infant. Of more than 300 women who took Nevirapine, 40 infants were infected with the virus versus 77 newborns treated with AZT. Compared with a short course of AZT treatment, which costs approximately \$100, Nevirapine treatment costs \$4 (*New York Times*, 1999a).

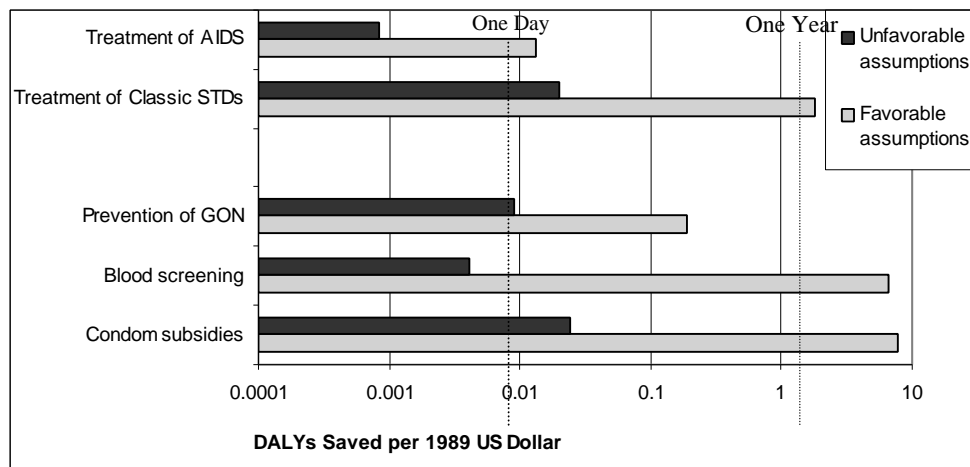
In Malawi, a study of the costs of drugs for treating genital ulcers in men and women and urethral discharge in men compared current diagnosis and treatment practice with use of the syndromic approach<sup>15</sup> and found that drug costs were the same (Costello et al., 1998). The average cost per patient using the current practice was \$1.06 compared with \$1.07 for the syndromic approach. Mostly as a result of ineffective prescribing practices, the study showed a substantial waste of drugs in the treatment of STDs, accounting for about half the costs of the drugs in the study. Other studies in sub-Saharan Africa have shown that cost savings of 60 to 75 percent could be realized with better prescribing practices for STDs (Foster in Costello et al., 1998). A WHO analysis estimated that when all direct costs are considered, syndromic management is two to three times less expensive than clinical diagnosis and three to four times less expensive than laboratory-based etiologic diagnosis (Islam et al., 1994). An intervention study in Mwanza, Tanzania, showed that STD case management at the primary health care level can be cost-effective. In the intervention area, the incidence of HIV declined by 42 percent as a result of the program (compared with a control area). The cost of the program was \$0.45 per capita (Grosskurth et al., 1995).

Another issue in developing HIV/AIDS prevention programs is the debate over the effectiveness of prevention versus treatment interventions. Treatment of HIV-positive individuals and AIDS cases is expensive (see Figure 4). A dollar spent on AIDS treatment will save far fewer lives, measured through DALYs, than a dollar spent on preventive measures such as condom subsidies or blood screening. Under the most favorable cost assumptions (palliative and home care only, low clinic costs), palliative care and care dealing largely with opportunistic infections cost \$75 per DALY saved. Less cost-effective alternatives, such as antiviral treatment and high clinic costs, put the cost per DALY saved at over \$1,000. In contrast, preventive strategies such as blood screening in high prevalence countries may cost as little as \$0.15 per DALY saved. Furthermore, as strains of retroviral drug-resistant HIV emerge, prevention becomes even more crucial.

### **Figure 4. Impact of Alternative STD Interventions**

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<sup>15</sup> In the study, in 144 patient encounters, 13 percent of STD cases were treated syndromatically with exact drugs and dosages according to the Malawi Standard Treatment Guidelines (two drugs for each syndrome). Another 56 percent received effective treatment for one disease in the syndrome and 31 percent ineffective treatment for any disease in the syndrome (Costello et al., 1998).



Source: Over and Piot, 1996:s 173. Note: Cost-effectiveness of alternative STD interventions assumes no

displacement of private sector provision. In a favorable scenario for each alternative, intervention is targeted to the core group(s), classic STD prevalence is high, clinic costs are low, and only opportunistic illnesses are treated. GON stands for gonococcal ophthalmia neonatorum (prevention by application of antibiotic ointment at birth). For further details, see Appendix 4.

When the information in Figure 4 was published in 1996, the promising HAART (highly active antiretroviral therapy, a cocktail of three drugs) had not yet been developed and tested. HAART's appearance and widespread use since 1996 have had a dramatic impact on AIDS-related mortality, although there is some question about the therapy's long-term benefits. Deaths from AIDS in the United States in 1997 were 47 percent less than the number of deaths in 1996.<sup>16</sup> At the June 1998 Joint United Nations Programme on HIV/AIDS (UNAIDS) Congress in Geneva, the French government took the lead in recommending the introduction of HAART throughout the highly affected countries of sub-Saharan Africa. For people living with AIDS, however, HAART is tremendously expensive as well as difficult to administer. Overall, the therapy costs about \$8,000 to \$10,000 per year per case. Considering the cost and the latest UNAIDS data on prevalence in six sub-Saharan African countries, we compared treatment costs with current donor assistance in support of HIV/AIDS abatement (see Appendix 5). In the countries in question—Botswana, Malawi, Namibia, Swaziland, Zambia, and Zimbabwe—in no case could as many as 1 percent of people living with AIDS be treated with HAART, even if all reproductive health donor funds were allocated to that purpose.

In two middle-income countries—Brazil and Mexico—the social security system pays for HAART for system beneficiaries, most of whom are in the middle of the income scale. In 1997 the cost in Brazil exceeded \$600 million. If all persons living with AIDS in Mexico received treatment, the projected cost in 2000 would be \$350 million (Saavedra and Magis, 1998). Total international donor assistance for HIV/AIDS in 1997 was about \$300 million and certainly will not reach the magnitude required to finance HAART for people living with AIDS in low- and middle-income countries. The scarce resources of governments in low-income countries must go first to targeted prevention of STDs and HIV/AIDS.

Under the sponsorship of UNAIDS, the World Bank, and USAID, the AIDS Economic Network conducts face-to-face and electronic workshops on finance and economic issues associated with the fight to control

<sup>16</sup> More recent data from the Centers for Disease Control and Prevention have shown that nationwide AIDS deaths dropped by only 20 percent from 1997 to 1998. According to Dr. Helene Gayle, who directs the AIDS program for the Centers for Disease Control and Prevention, "In this era of better therapies, it is clear that people are becoming complacent about prevention.... Even if we get better treatments, we are naïve in thinking we will wipe out AIDS by treatment alone" (*New York Times*, 1999b).

the AIDS pandemic. In one discussion in which economists and public health specialists predominated, participants gave short shrift to the fact that HAART is not cost-effective when compared with preventive measures made available in low-income, highly affected countries. Instead, participants focused largely on one question: How can we find the money to pay for HAART? The appeal of containment and “cure” is so great that it is difficult to get even scientists to focus on realistic resource scenarios. Governments in low-income countries face the graver problem of balancing the pleas of those currently infected with HIV against the wishes of the not-yet-affected millions to remain disease-free.

## Information, Education, Communication (IEC) and Behavior Change Communication (BCC)

By exposing potential and current consumers of reproductive health services to information on the availability and benefits of various interventions, IEC and BCC campaigns are designed to allow people to assess the value of pursuing healthy behaviors. Community participation in information and service programs can provide the support and underpinning that people need to engage in healthy behavior.

Studies and experience in several countries show that IEC and BCC are effective in raising awareness and motivating healthy behavior.

- Analysis of DHS data for Burkina Faso, Ghana, Kenya, Madagascar, Namibia, and Zambia found a strong association between exposure to the mass media and the following: reproductive behavior, greater knowledge and use of contraception, intention to use contraception, family size preference for fewer children, and the intention to stop childbearing. Evidence also suggests an association between mass media messages and a later age at marriage. Radio was the most effective means of spreading the messages, followed by print and television (Westoff and Bankole, 1997).
- In Tanzania, results from a nationally representative sample of women in 1994 found that the more types of media women were exposed to, the more likely they were to use contraception. Women who recalled six media sources of messages about family planning were 11 times more likely to use a modern method of contraception than women who could recall no media sources (Jato et al., 1999).
- In Tanzania, another study found that an education-entertainment radio soap opera broadcast in parts of the country, and later extended to the entire country, had strong behavioral effects on the adoption of family planning and influenced listeners to talk with their spouses and peers about contraception (Rogers et al., 1999).
- In Zimbabwe, messages via television, radio, and print media on spacing and limiting births had a significant impact on birth spacing desires and fertility intentions (Guilkey and Jayne, 1997).
- Mass media programs directed at adolescents have been associated with increased awareness of family planning, increased condom use, and no increase in sexual activity (McCauley and Salter, 1995).
- In many countries, health education messages have significantly increased the likelihood of contraceptive use (Kincaid et al., 1995; Kiragu et al., 1996; Robey et al., 1994; Robey et al., 1996; Kane et al., 1998).
- In Ghana and Kenya, listening to the radio was found to be a key determinant of ideal family size, reducing family size ideals significantly more for husbands than for wives (Perkins, 1998).
- Analysis of a reproductive health mass media campaign in Bolivia that included radio and television spots on family planning, birth spacing, pre- and postnatal care, breastfeeding, and abortion prevention found that 85 percent of those surveyed had been exposed to the campaign and could recall messages. The high rate of exposure had a substantial effect on awareness, knowledge, and behavior change. Communication (with other than a partner) about family planning increased as did knowledge of healthy practices for new mothers. Use of contraception increased among women and men (Valente et al., 1996; Valente and Saba, 1998).
- Health education programs can increase knowledge about the signs of obstetric complications and about the need for immediate treatment and may lead to increased use of emergency obstetric services (Olaniran et al., 1997; Bello et al., 1997). Following a community education effort in Ghana, three times more women with obstetric complications presented themselves for treatment, and they arrived earlier and thus in better condition (Opoku et al., 1997).
- In Jamaica, a BCC strategy that used culture, music, drama, celebrity endorsements, and humor to communicate messages about safer sex contributed to increased awareness of AIDS and knowledge

of methods of prevention (particularly the condom). At the same time, condom use increased dramatically (AIDSCAP, 1996; McFarlane et al., 1999)

- In Cameroon, as a result of exposure to an intervention to strengthen the primary health care response to HIV/AIDS through community participation, villagers' knowledge, attitudes, and behavior improved more than in a control area (Ramasoota, 1998).
- In Uganda, the Ministry of Health credited an extensive IEC campaign with achieving dramatic changes in sexual behavior, increased knowledge of HIV/AIDS, and a decline in new HIV/AIDS infections (Uganda Ministry of Health, 1997).
- In Bangladesh, a program to sensitize religious leaders about HIV/AIDS in their communities led more than one-half of the leaders to engage in increased discussion on the topic with community members (Mahmud et al., 1998).
- An evaluation of AIDS-related activities, materials, and methods in Nigeria concluded that mass media cannot bring about lasting changes in knowledge, attitudes, and behavior without the support of families, schools, communities, professional groups, and NGOs (Ademuwagun, 1992).

In the field of reproductive health, an important notion is taking hold: motivating behavior change through the diffusion of new ideas and information communicated by social networks and various types of media (such as television, radio, films, books, magazines, and newspapers) (Townsend, 1991; Kincaid, 1993; Bongaarts and Watkins, 1996; Rutenber and Watkins, 1997; Kincaid et al., 1999). A study of a reproductive health information campaign in Bolivia, for example, suggests that mass media has a strong influence on people who lack personal contact with users of an innovation (in this case family planning). An understanding of the networks through which information passes before it reaches individuals should increasingly drive IEC and BCC activities.<sup>17</sup>

In addition, many countries plan IEC and BCC campaigns at the central level, often without the involvement of local providers, communities, and representatives from the target groups. Messages for family planning are typically designed for adult women and ignore other target groups such as men, adolescents, newlyweds, and opinion leaders. Communication strategies are not always well linked with services such that messages often do not reach the audiences most in need of services. In the area of HIV education and prevention, the Institute of Health Policy Studies (1991) at the University of California has published a list of attributes of HIV education programs that work and do not work (see Appendix 6). The attributes that work could also be applied to IEC and BCC programs worldwide and other components of reproductive health.

Communication campaigns need regular review to monitor their effectiveness and to ensure that they promote good reproductive health for all. Furthermore, Aral and Peterman (1998) contend that while behavioral interventions (including communication programs) have been shown to lead to desired changes in knowledge, attitudes, perceptions, self-efficacy, skills, and self-reporting behavior (such as condom use, number of sex partners, and the practice of unprotected sex), most behavior change is measured at the individual level. Clearly, additional population-based studies are needed to measure the impact of various interventions.

Communication campaigns need to move beyond sensitization to providing information about specific behaviors that, for example, reduce reproductive tract infections, unwanted pregnancies, obstetrical complications, and sexually transmitted diseases. As a case in point, the 1998 safe motherhood

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<sup>17</sup> Not all IEC and BCC activities are consistent with the ICPD themes of empowering women to exercise their reproductive rights and ensuring that men assume responsibility for their own and their partner's reproductive health. For example, communication campaigns that exhort men to "take charge" of contraception can result in women becoming less empowered to exert their reproductive rights.



conference in Sri Lanka highlighted risks to women in the postpartum period. The conference report concluded that “[a]wareness needs to be raised among women, the community, and health care professionals about the postpartum period as a time of significant risk, and warning signs for postpartum complications need to be included in education campaigns about obstetric emergencies and the need for referral” (Starrs, 1998:37).

In sum, growing evidence suggests that IEC and BCC programs are effective—and could be even more effective. As such, several types of communication activities warrant government support when they convey appropriate messages, take into consideration target audience needs and tastes, and link messages with available services. Absent these conditions, communication programs will not only be ineffective but will also give rise to unsatisfied demand.

## Economic Criteria for Governments to Use in Deciding Whether to Provide and/or Subsidize Interventions

While countries should strive to provide the full array of reproductive health services they agreed to at the ICPD, current resource and capacity levels mean that countries will have to begin with a narrower set of interventions and decide how to phase in needed services as additional resources become available. It is clear that a substantial amount of work on costing interventions and services and measuring their effectiveness is necessary before we can say, with greater assurance, what combination of services works at the most reasonable cost (see Appendix 7). Furthermore, the best set of interventions varies with the circumstances of the individual country. Still, while the data are not comprehensive or perfect, policymakers and others can use the information at hand to help make difficult decisions on what to offer among the array of reproductive health interventions and how to make the provision of these services more equitable.

Policymakers face the important economic decision of how to use limited resources to produce the most benefit for the most people. Using an economics framework for evaluating policy interventions in reproductive health and family planning services, Behrman and Knowles (1998) note two justifications for government policy intervention: to increase efficiency<sup>18</sup> and productivity and to redistribute resources by targeting resources to those in need (also see Musgrove, 1999). Behrman and Knowles advocate cost-benefit analysis<sup>19</sup> of efficiency gains of policies and services based on a standard welfare economics framework.

In some cases, for example, it might make sense for governments to subsidize services on efficiency grounds. High maternal mortality suggests a market failure that justifies government intervention in safe motherhood services. For safe motherhood markets to be efficient, however, household heads (typically males) have to allocate household resources in such a way to maximize the welfare of all household members, not only their own welfare. If household heads fail to give full weight to women's and children's welfare in their decisions, markets will not be efficient. Thus, governments might subsidize emergency obstetric care in situations in which insurance is not available (i.e., government-financed risk pooling).

In general, though, while some government providers of reproductive health services may be efficient, "monopolistic government agencies financed out of a central budget are rarely efficient and are often highly inefficient" (Behrman and Knowles, 1998:719). Rather than providing all reproductive health services, governments could encourage the growth of the private sector and provide subsidies to the poor so that they could afford the services provided by private organizations. According to a UNFPA report on family planning program sustainability, however, promoting greater private sector involvement in offering family planning may be more easily suggested than implemented, particularly if the government

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<sup>18</sup> According to Behrman and Knowles (1998:699), "An investment (or expenditure) in population and reproductive health services is efficient if the additional (or marginal) social benefits of the last unit of that investment just equal its additional (marginal) social cost." Put another way, to use resources efficiently, goods and services should be produced to the point where each good/service is worth what was given up, but an added one would not be. When this level of production holds for all goods and services, allocative efficiency is said to be achieved. More value could not be produced with the same resources.

<sup>19</sup> One caution about using the cost-benefit or cost-effectiveness approach is in order. The methodology does not automatically distinguish between goods and services that would be produced and consumed privately in the absence of government intervention and goods and services that would not be produced. The method should not dictate that governments undertake functions for which markets work sufficiently well, thereby substituting government resources for private resources in providing goods and services whose benefits accrue mainly to the direct user. One of Behrman and Knowles's contributions is to show how to use the method for nonpublic goods for which the market is not working sufficiently well.

continues to subsidize its own service facilities without offering equal subsidies to private sector facilities (UNFPA, 1995). In this case, the private sector cannot compete with the public sector's artificially low prices (often zero). But providing similar subsidies to all providers, either directly or through income transfers to individuals so that they can choose their own provider, will generate competition and, it is hoped, better quality services for all.

Furthermore, although markets may be efficient, equity problems may lead to government intervention in redistributing resources. Berhman and Knowles illustrate the use of "benefit incidence" analysis to show the degree to which program benefits are "distributed" to the poor. They provide a benefit incidence analysis of the Vietnam family planning program to demonstrate that the program is only weakly "pro-poor." "[T]he main source of inequality in the distribution of family planning benefits received stems from the greater use of more heavily subsidized government providers (i.e., hospitals) by the higher income quintiles" (Berhman and Knowles, 1998:715).

In reviewing the implementation of ICPD, the international community has concluded that certain basic services should be provided at the primary health care level and subsidized for those who cannot afford to pay for them. In low-income countries, where most individuals are too poor to pay for services, evidence suggests that it would be desirable for governments to subsidize family planning services, prenatal care that includes physical examinations, postpartum provision of family planning information and services, and postabortion services. In addition, skilled attendance at delivery and a functioning referral system and emergency care are essential to reduce maternal mortality. As for STD/HIV/AIDS, resources should be focused on prevention activities, such as promotion and distribution of condoms to prevent STDs, STD treatment for high-risk groups, improved health-seeking behavior for STD treatment, maternal syphilis treatment, and Nevirapine or AZT for infants of HIV-positive mothers, where HIV screening is part of prenatal care.

Governments can decide whether the accrued benefits of interventions reside with the direct beneficiary or disperse to others and whether potential beneficiaries are inherently poor and hence in need of subsidy to receive the benefits. An added feature of many of the low-cost interventions noted in this paper is that they provide benefits external to the immediate recipient of the intervention. Often, these types of goods are called "public goods" from which it is impossible to exclude anyone. Spraying for mosquitoes to prevent malaria is an example of a public good. A feature of public goods is that people do not purchase the socially optimal amount of the goods because they cannot reap all the benefits that accrue from their purchase. Often, therefore, governments step in to ensure that a socially optimal quantity of the service is provided.

Interventions with large "external" or social benefits include most IEC and BCC programs; family planning, particularly condom distribution programs for disease prevention; prevention of maternal mortality; STD treatment programs for high-risk groups; and blood screening in high-prevalence areas and countries. However, focusing on low-cost interventions and those with large external benefits and extending them to the poor through targeting and subsidies would exhaust the financial resources of most low-income countries. Moreover, if donor support continues at currently low levels, governments will not be able to do much more right now. Governments can, however, best help individuals and families by

- making sure that clients and potential clients have the information they need to make sound reproductive health choices;
- setting up or strengthening the existing legal and regulatory environment to ensure regulations that both support private sector initiatives and allow clients to choose providers while ensuring an acceptable level of quality and reasonable prices among all types of providers (see Hardee and Smith, 2000); and

- subsidizing reproductive health services (as opposed to information) only for those not able to pay for them. Experience with NGOs in many countries contributes to a growing awareness that many users can, at the least, pay for the commodities they need for family planning. Likewise, many recipients, particularly in middle-income countries, can pay for maternal care and postabortion care services. In low-income countries, however, millions of families are too poor to pay for needed goods and services.

Governments, donors, and individuals face an enormous challenge in reaching the goal of the 1994 ICPD: universal access to good quality reproductive health services by 2015. By including economic factors among the array of criteria for deciding on reproductive health programs and focusing on interventions that work and can be provided at relatively low cost, countries will be better able to reach the ICPD goal.

## Appendices

## Appendix 1 The Health Benefits of Family Planning

The calculations for the number of maternal deaths averted if contraceptives are used by all intenders is based on the following inputs:

1. Number of married women of reproductive age (MWRA) who are not using family planning but intend to use a method within a year.
2. Among intenders, approximately 30 percent of these women are assumed to be unprotected and therefore will give birth within a year (number of unwanted births averted over a year).
3. Number of unwanted births averted is multiplied by the maternal mortality ratio (MMR) to produce the estimated number of maternal deaths that could be averted.

**Table A1. Estimating the Number of Maternal Deaths Averted**

Country	Percent Not Using a Method <sup>1</sup>	Percent Intending to Use Within a Year <sup>2</sup>	Number of Women Married or in Union <sup>3</sup>	Number of Women Intending to Use <sup>4</sup>	Number of Births Averted over the Course of One Year <sup>5</sup>	MMR <sup>6</sup>	Estimated Number of Maternal Deaths Averted <sup>7</sup>
Bangladesh	55.4	41.7	25,804,392	5,961,279.14	1,788,383.74	850	15,201
Niger	95.6	18.1	1,910,827	330,641.80	99,192.54	593	588
Egypt	52.1	34.2	11,170,795	1,990,434.56	597,130.37	170	1,015
Mali	93.3	31.4	1,980,756	580,286.20	174,085.86	580	1,010
Ghana	79.7	31.7	2,698,050	681,659.59	204,497.88	740	1,513
Senegal	87.1	30.5	1,565,910	415,991.76	124,797.53	510	636

Source: Analysis conducted by the POLICY Project.

<sup>1</sup> DHS report.

<sup>2</sup> DHS report.

<sup>3</sup> Synthesis based on International Database—Bureau of the Census and DHS reports (i.e., number of women of reproductive age \* percent married).

<sup>4</sup> Married women of reproductive age \* percent noncontraceptors who intend to use a method with a year.

<sup>5</sup> Estimate based on 30 percent of unprotected women who will give birth in a given year.

<sup>6</sup> World Bank, 1998b.

<sup>7</sup> MMR (per 100,000 births) \* number of unwanted births averted.

**Appendix 2**  
**Low-Cost Family Planning Service Delivery Options**

**Table A2. Examples of Family Planning Service Delivery with Weighted Costs per CYP of less than US\$5**

Mode of Service Delivery	Country	CYP	Cost/CYP (US\$)
Sterilization	India	51,532,875	1.88
	Colombia	932,400	0.24
Social marketing (methods not specified, but largely condoms and pills)	India	3,652,262	2.15
	Egypt	2,036,110	2.03
	Bangladesh	1,436,821	1.96
	Indonesia	815,467	1.32
	Colombia	648,721	1.51
	Mexico	55,794	1.58
Clinic-based services, excluding sterilization	Egypt	2,213,981	4.46
	Kenya	40,733	4.27
Community-based distribution (CBD)	Indonesia	380,744	5.00
	Egypt	24,284	3.73
Clinic-based services with sterilization	India	76,387,554	3.29
	Colombia	1,230,557	1.80
	Mexico	4,827	1.90
Clinic-based services and CBD	Brazil	77,741	3.61

Source: Barberis and Harvey, 1997.

**Appendix 3**  
**Calculating the Expenditures Necessary to Shift 50 Percent of Current Home Births to Health Facilities**

**Table A3. Data and Calculations**

<b>Country</b>	<b>Percent of Home Deliveries</b>	<b>Births per 1,000 Population</b>	<b>Projected Total Population, 1999</b>	<b>Number of Births in 1998</b>	<b>50 Percent of Home Births</b>	<b>Cost of Shifting 50 Percent of Home Births to Health Facilities (US\$)</b>	<b>International Spending on Reproductive Health 1995 (US\$)</b>	<b>Cost of New Health Facility Births as Percent of Donor Resources</b>
Bangladesh	96.0	27	129,798,253	3,504,553	1,682,185	28,597,145	65,404,000	43.7
Nepal	91.7	33	24,302,653	801,988	367,711	6,251,095	17,994,000	34.4
Côte d'Ivoire	54.8	39	15,818,068	616,905	169,032	2,873,543	2,912,000	98.7
Ghana	56.9	40	18,887,626	755,505	214,941	3,654,000	14,518,000	25.2
Madagascar	53.9	44	14,873,387	654,429	176,369	2,998,266	10,798,000	27.8
Mali	62.7	51	10,429,124	531,885	166,746	2,834,681	12,411,000	22.8
Rwanda	72.5	39	8,153,933	318,003	115,276	1,959,693	2,604,000	75.2
Senegal	51.3	43	10,051,930	432,233	110,868	1,884,752	14,021,000	13.4
Zambia	48.7	42	9,663,535	405,868	98,829	1,680,093	11,449,000	14.7
Zimbabwe	30.4	35	11,163,160	390,711	59,388	1,009,597	9,338,000	10.8

**Calculation procedure using Bangladesh as an example:**



Number of births in 1998 = (births per 1,000 population/1,000)\*total population  
= (27/1,000)\*129,798,253  
= **3,504,553**

50 percent of home deliveries = (number of births in 1998)\*(percent of home deliveries)\*0.5  
= **1,682,185**

Cost of a health facility birth = \$17 (Nepal)

Cost of shifting 50 percent of home births to health facilities = (50 percent of home deliveries)\*(cost of a health facility birth)  
= (1,682,185\*17)  
= **\$28,597,145**

Cost of new health facility births as percent of donor resources = (cost of additional health-facility births/donor resources)\*100  
= (\$48,615,157/65,404,000)\*100  
= **43.7%**

Sources:

Percent home deliveries:	Demographic Health Surveys.
Births per 1,000 population:	Population Reference Bureau, 1998.
Adult population:	Bureau of the Census, 1998.
Cost of health facility birth:	POLICY Project work in Nepal.
International donor spending on reproductive health:	UNFPA/NIDI, 1995.

**Appendix 4**  
**The Cost-Effectiveness of HIV/AIDS Prevention versus Treatment**

**Table A4. Best Estimates of HIV/AIDS Intervention Cost-Effectiveness in Developing Countries**

<b>Intervention</b>	<b>Parameter</b>	<b>Unfavorable Assumption</b>	<b>Favorable Assumption</b>		
<b>PREVENTION</b>	Condom subsidies/IEC	Cost	High	Low	
		Target group	Noncore	Core	
		Target disease	Chancroid and HIV	Syphilis and HIV	
		Cost per DALY	\$40.91	\$0.13	
	Blood screening	Cost of test	Expensive	Inexpensive	
		Target group	Noncore	Core	
		Prevalence	<0.1%	>5%	
		Cost per DALY	>\$244	\$0.15	
	GON	Prevalence	<0.1%	>1%	
		Cost per DALY	>\$111	<\$5.32	
	<b>TREATMENT</b>	Classic STDs	Hourly clinic cost	\$10	\$2
			Target group	Noncore	Core
HIV epidemic			No	Yes	
Prevalence			<1%	>5%	
Cost per DALY			>\$50	<\$0.56	
AIDS		Hourly clinic cost	\$10	\$2	
		Treatment	Antivirals	Palliative and home care only	
		DALYs gained	2	1	
		Cost per DALY	\$1,200	\$75	

Source: Reproduced from Over and Piot, 1996.

**Appendix 5**  
**The Cost of Antiretroviral Therapy in High-Prevalence Countries**  
**Compared with Available Donor Resources for HIV/AIDS**

**Table A5a. The Cost of Antiretroviral Therapy for All**

<b>Country</b>	<b>Adult HIV Prevalence (End 1997)</b>	<b>Percent of Infected Adults Who Can Be Treated with Current (1995) Donor Resources</b>
Botswana	25	0.2
Malawi	15	0.4
Namibia	20	0.3
Swaziland	18	0.6
Zambia	19	0.2
Zimbabwe	26	0.1

Source: See Table A5b for details on calculation method and sources. Annual cost of treatment assumed to be \$8,000 (equivalent to cost for Thailand).

**Table A5b. Data and Calculations for Calculating the Cost of Antiretroviral Therapy for All**

<b>Country</b>	<b>Adult Prevalence Percent (15–49) End 1997</b>	<b>Adult Population (15–49) Total, 1999</b>	<b>Number of Infected Adults</b>	<b>International Spending on Reproductive Health, 1995</b>	<b>Number of Infected Adults Who Can Be Treated with Current (1995) Donor Resources</b>	<b>Percent of Infected Adults Who Can Be Treated with Current (1995) Donor Resources</b>
Botswana	25.10	714,642	179,375	3,187,000	398	0.22
Malawi	14.92	4,603,108	686,784	22,000,000	2,750	0.40
Namibia	19.94	764,501	152,441	3,447,000	431	0.28
Swaziland	18.50	449,665	83,188	4,354,000	544	0.65
Zambia	19.07	4,209,840	802,816	11,449,000	1,431	0.18
Zimbabwe	25.84	5,480,118	1,416,062	9,338,000	1,167	0.08

Annual cost of treating an HIV-positive individual with antiretroviral therapy in Thailand = US\$8,000

**Calculation procedure using Botswana as an example:**

Number of infected adults = (adult prevalence)\*(adult population)  
= 25.1\*714,642  
= **179,375**

Number of infected adults who can be treated with current donor resources = total donor resources/cost of treatment  
= 3,187,000/8,000  
= **398**

Percent infected adults who can be treated with current donor resources = (Number infected adults who can be treated with current resources/total infected adults)\*100  
= (398/179,375)\*100  
= **0.22**

Sources:

Adult prevalence: UNAIDS/WHO, 1998.

Adult population: Bureau of the Census, 1998.

International donor spending on reproductive health: UNFPA/NIDI, 1995.

## Appendix 6

### Characteristics of HIV Education and Prevention Programs that “Work” and “Do Not Work”

#### Characteristics of HIV Education and Prevention Programs that “Work” and “Do Not Work”

Work	Do not Work
Programs with <b>clearly defined target groups</b> (i.e., by age, sex, sexual orientation, race/ethnicity, risk behaviors, culture, peer and social group, life circumstances, neighborhood)	Programs that are “generic” or “homogenized” and aimed at the “general population” or at “types” of people
Programs with <b>clearly defined objectives</b> (i.e., what behaviors are being targeted for change, what changes in behavior—new behaviors—are to be achieved by whom)	Programs that try to send a “universal message” about HIV; there is no universal message or universal receiver
Programs with clearly defined interventions (i.e., intervention can be explained to anyone in simple terms)	Programs that give ambiguous, vague, or inappropriate messages
Programs that are <b>“for, of, and by” the target group</b> <ul style="list-style-type: none"> <li>▪ Use “natural leaders among peers”</li> <li>▪ Developed for peers by peers</li> <li>▪ Carried out or led by peers</li> <li>▪ Use a common language, literacy level</li> <li>▪ Cultural and social context is appropriate, program “rings true” to people’s personal experience</li> </ul>	<ul style="list-style-type: none"> <li>▪ Programs that are devised by “experts” or professionals who are not familiar with the people whom they are trying to reach</li> <li>▪ Programs developed from the “top down” rather than from the “bottom up”</li> <li>▪ Programs with a “do unto” rather than a “do with” orientation</li> <li>▪ Programs that lack community input and have no accountability to the community</li> <li>▪ Programs that use translations to develop educational materials</li> </ul>
Programs that <b>provide group support for individuals’</b> initiating and maintaining behavior change <ul style="list-style-type: none"> <li>▪ Individuals develop sense of trust in the group, and share personal unsafe sex or drug experiences in group</li> <li>▪ Group then provides support for initiating behavior change, opportunities to learn and practice skills in safer sex or drug use behavior, support for adopting new behaviors, support for individuals who have “relapsed,” and support for maintaining new behaviors over time. Personal sharing in the group leads to transformation of both the individual and the group, which in turn lays the groundwork for broader changes in community norms in behavior.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Programs that rely on one-way communication or didactic approach</li> <li>▪ Programs that are impersonal and not user friendly</li> <li>▪ Programs that fail to address sexuality and sexual orientation in young people and in adult women and men</li> <li>▪ Programs that fail to reinforce maintenance of safer behaviors</li> </ul>
Programs that <b>enhance individual self-esteem</b> or provide concrete incentives to individuals	Programs that send messages that are judgmental, moralistic or attempt to instill fear
Programs that <b>draw on the spiritual resources</b> and strengthen the spiritual life of individuals	Programs that ignore nontraditional channels of personal change and transformation
Programs that use <b>“cultural resiliency factors”</b> to reach and empower the target population	
Programs that <b>change the physical and social environment</b> of individuals	

<b>Work</b>	<b>Do not Work</b>
Programs that <b>raise the visibility of and lend support</b> to HIV/AIDS prevention programs in the wider community (newspapers, radio, TV, billboard coverage about HIV prevention)	
Programs that <b>reach people where they live, where they work, and where they go</b>	Programs that provide HIV education and prevention outside the context of people's lives and other critical services in the community
Programs that <b>use multiple strategies in HIV prevention and link program components</b> , including information, behavior change, services, support, treatment, etc.	Programs that leave out critical components to reach target populations  Programs that do things one way (e.g., information-only programs)
Programs that are <b>tailored to the needs of people</b> in different geographic areas and in different stages of the HIV/AIDS epidemic	
Programs that are <b>focused on achieving incremental changes</b> over the long term	Programs focused only on short-term results (e.g., one-shot HIV education)

Source: Institute for Health Policy Studies, 1991.

## Appendix 7

### Review of Information on Costs, Cost-Effectiveness, and Cost-Benefit of Reproductive Health Interventions

A recent literature review scanned 163 published works that, by their titles or content, seemed to have information on costs, cost-effectiveness, or possible benefit-cost ratios (Mumford et al., 1998). For reproductive health other than family planning, the authors found 75 examples of unit cost data and 17 instances of cost-effectiveness estimates but only six studies involving inter-disease measures of health outcomes measured in a denominator such as DALYs. There were no cases of scientific data that reported benefit-cost ratios that were inclusive of the range of interventions extending to both family planning and reproductive health. Furthermore, the cost of interventions depends on so many factors that cost data are usually shown with wide ranges (see Table A7). In short, we lack a scientific basis for assessing, comparing, and setting priorities necessary to make valid choices among alternative interventions and packages of interventions. The conceptual problems associated with cost-effectiveness analysis are addressed by the National Research Council's Committee on Population, Panel on Reproductive Health in Tsui et al. (1997) and by Berman (1995).

For several reasons, it is difficult to synthesize data on costs, benefits, and effectiveness for use in decisions on resource allocation priorities. First, costs can vary considerably across countries because of differences in resource availability and other circumstances. Second, cost data based on different units of output (cost per visit, cost per patient, cost per inpatient or outpatient day) are difficult to compare. Third, cost data based on units of output that cannot be linked to health outcomes have limited usefulness. Fourth, most health interventions have been studied for their costs and effectiveness. Fifth, effectiveness data are likely to be particularly sensitive to local contexts. Finally, most cost-effectiveness analyses value health outcomes only—not the nonhealth benefits of interventions.

**Table A7. Imprecision of Cost Estimates—Some Examples**

<b>Source of Discrepancy</b>	<b>Intervention Costed</b>	<b>Lower End of Range</b>	<b>Upper End of Range</b>	<b>Citations</b>
<b>Different sets of countries and methodologies</b>	Nonhospital antenatal care (cost per visit)	\$1.20	\$6.00	World Bank, 1993a World Bank, 1994
<b>Different sets of countries and methodologies</b>	Mother-baby package (DALY)	\$18.00	\$58.00	World Bank, 1993a Raviez et al., 1995
<b>Existence or non-existence of complications</b>	A cesarean delivery in Bolivia (cost per delivery)	\$55.83	\$103.84	Rosenthal and Percy, 1991
<b>Different facility levels</b>	Normal delivery in Bolivia (cost per delivery)	\$11.00	\$16.00	Dmytraczenko et al., 1998
<b>Different facilities (at same level)</b>	Postabortion care—dilation and curettage (cost per case)	\$4.40	\$17.19	Johnson et al., 1993
<b>Whether or not cost-effective methods were used for screening</b>	Blood-screening in developing countries (per DALY)	\$0.18	\$286.05	Over and Piot, 1996
<b>Level of chlamydia prevalence</b>	Detection and treatment of chlamydia among pregnant women (cost per adverse outcome averted)	\$84.92	\$307.88	Schulz et al., 1992
<b>Size of clinic</b>	Detection of cervical cancer in Honduras (cost per visit)	\$5.60	\$12.89	Bratt et al., 1993
<b>Different facilities have different levels of productivity</b>	Detection of cervical cancer in Zimbabwe (cost per visit)	\$25.84	\$85.15	Collins et al., 1995



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