



INFO Project  
Center for Communication  
Programs

**How providers  
can help women  
with HIV make  
reproductive  
decisions**

## Family Planning Choices for Women With HIV



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### Key Points

**Women with HIV have much the same reasons to have children or to prevent pregnancy as everyone else, but they have important additional issues to consider. These women's health care providers have the responsibility to help them make well-informed and well-considered choices and carry out their decisions with the least risk.**

#### **Women with HIV can use nearly any family planning method.**

- Correct and consistent use of male or female condoms can help avoid pregnancy and sexually transmitted infections (STIs). Other STIs can speed up progression of HIV disease.
- Especially if a woman with HIV cannot be certain of consistent condom use, an additional family planning method will offer further protection from pregnancy.
- All hormonal methods appear to be safe for women with HIV. Theoretically, certain anti-retroviral (ARV) medications could reduce the effectiveness of low-dose hormonal methods, but condom use would make up for that.
- Most women with HIV can have an IUD inserted, including women with AIDS if they are using ARVs and are clinically well. A woman who has AIDS and is not using ARVs should not have an IUD inserted, nor should

a woman with AIDS who is being treated but is not clinically well. An IUD already in place does not need to be removed if a woman becomes infected with HIV or other STIs, or she develops AIDS.

#### **Couples with HIV who are thinking about having children need facts on the actual risks and how to reduce the chances of HIV transmission.**

- Without treatment, 15% to 30% of infants of women with HIV are born infected. Another 10% to 20% are infected during breastfeeding.
- ARV prophylaxis and appropriate feeding practices can significantly lower the chances.
- Pregnancy does not have a major effect on progression of HIV disease.
- Women with HIV have a greater risk of adverse pregnancy outcomes such as preterm delivery or miscarriage.



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See companion INFO Reports,  
"Women and HIV:  
Questions Answered"

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**Cover Photo:** In the Korogocho slums of Nairobi, Kenya, a mother with HIV (on right) discusses family planning with an HIV activist and trainer. In the mother's lap rests one of her two children born after she was infected. Both children were born with HIV, but are receiving treatment and are healthy. Although her husband was exposed to HIV while trying for pregnancy, the couple carefully uses condoms now and her husband remains HIV-negative. She now trains others in her community on family planning and home-based care.

# Supporting the Reproductive Decisions of Women With HIV

With access to family planning services, supportive care, and the information needed to make good choices, women with human immunodeficiency virus (HIV), including women with acquired immune deficiency syndrome (AIDS), in many cases can lead healthy sexual and reproductive lives. Like all other women, women with HIV have the right to make their own decisions about their reproductive and sexual health.

Health care programs and providers can help women with HIV and their partners make and carry out informed reproductive health decisions (see Figure 1, p. 4). Women with HIV who decide to prevent or delay pregnancy can safely use almost any family planning method. Preventing unintended pregnancies among women with HIV is an important and cost-effective way to avoid the birth of HIV-infected infants (see box, p. 5). For those who are considering having children, providers can help them weigh the risks and consider the responsibilities (see box, p. 6). For clients with HIV who want children now, providers can help them minimize the risk of transmitting the virus to their partners or to the infant.

In many countries hard-hit by HIV/AIDS, health care systems and resources that provide this important care and support are not widely available. Expanding such services should be a top priority at every level, from donor agencies to national governments to health care providers.

## Providers Should Focus on the Reproductive Health Needs of Women With HIV

Health care providers who understand the impact of HIV on women's reproductive health, fertility desires, and family planning needs are better prepared to help clients with HIV make informed reproductive decisions.

### Women account for nearly half of the world's HIV cases.

Women account for nearly half of the estimated 40 million cases of HIV infection worldwide. In 2006 an estimated 17.7 million women ages 15 and older, or about 13 in every 1,000 such women, were infected—approximately one million more than in 2004 (102). More than three-fourths of these women live in sub-

Saharan Africa (see Web Figure 1), where there are three infected women for every two infected men (102). The numbers of women with HIV are increasing rapidly in many countries in this region (see Web Table 1). In South Africa, for example, prevalence of HIV among women attending public antenatal clinics was 35% higher in 2005 than it had been in 1999 (102).

In most places, unprotected vaginal intercourse with an HIV-infected partner causes most HIV infections in women (102, 221). In some regions of the world, such as Eastern Europe and Central Asia, use of injected drugs accounts for a growing number of infections among women, although accurate estimates are difficult (86).



*Anna, a young Rwandan with HIV, is an orphan who lost her mother to AIDS and her father in the genocide. In much of the world, new HIV infections are concentrated among young people. Giving young people with HIV information about reproductive health and family planning is important to ensuring their health and longevity.*

*Photo: © 2004 Eileen Dietrich, Courtesy of Photoshare*

### Women are biologically vulnerable.

Generally, studies have found that women are more susceptible to HIV infection than men when exposed to the virus during vaginal intercourse (130). U.S. and European studies of serodiscordant couples (that is, one partner is infected with HIV while the other is not) have found that male-to-female transmission is two to eight times more likely than female-to-male transmission (59, 157, 164). In general, women are more likely to become infected with STIs, including HIV, due to biological factors. Women have a greater area of exposed tissue (the cervix and the vagina) than men, and small tears may occur in the vaginal

tissue during sex, making an easy pathway for infection (256).

As for men, it is thought that the presence of the foreskin on the penis makes them more susceptible to HIV infection. A number of recent studies have found that men who have been circumcised are at lower risk for HIV infection than men who have not been circumcised (8, 9, 78, 79, 234). In light of this recent compelling evidence, the World Health Organization (WHO) and other United Nations (UN) agencies recommend that programs recognize circumcision as an effective intervention for HIV prevention (103).

A number of additional factors affect infectivity including stage of disease and viral load (the amount of virus in a person's

## How to Use This Report

With the help of this issue of *Population Reports*, family planning and HIV-care providers can:

- Understand how HIV affects women's reproductive health and childbearing decisions (see p. 3).
- Learn the latest, evidence-based information to help women with HIV think through their family planning choices (see p. 10).
- Inform women with HIV who are thinking about having children of the risks of transmitting HIV to the infant and/or uninfected partner and how they can reduce these risks (see p. 16).

While *Population Reports* frequently addresses service delivery aspects of the topics it covers, this issue does not address service delivery for women with HIV. For information on integrating reproductive health and HIV service delivery, please visit the Web site "Resources for HIV/AIDS and Sexual and Reproductive Health Integration" at <http://www.hivandsrh.org/>

blood). A study in Rakai, Uganda, found the overall transmission rate of HIV among serodiscordant couples to be 12 in every 10,000 acts of vaginal intercourse but as high as 82 per 10,000 coital acts in the period immediately after one partner became infected, when the viral load is high (233) (see box, p. 21). Factors that may increase women's susceptibility to HIV include the presence of sexually transmitted infections (STIs), particularly infection with the herpes simplex virus (HSV) (106), as well as bacterial vaginosis and candidiasis—infections that are not sexually transmitted (129, 212)—and very frequent use of spermicides (26, 111) (see p. 13).

It is not certain whether pregnancy increases a woman's susceptibility to HIV infection. A large study in Uganda found that preg-

nant women were more than twice as likely to become infected with HIV as women who were not pregnant (80). Another large study, in Uganda and Zimbabwe, did not find any difference (145).

**Young women are particularly at risk.** In much of the world new HIV infections are concentrated among young people, ages 15 to 24. In 2006 this population accounted for as many as 40% of new adult infections (102). Young women may be more vulnerable to HIV infection than are older women because of the physiological properties of an immature genital tract (174). Young women also may find it more difficult to negotiate condom use (113) (see box, p. 8). They may have older partners, who for that reason alone are more likely to be infected (122). In South Africa, for example, young women are four times more likely to be infected with HIV than are young men (102).

*Despite the desire to avoid having children, many women with HIV experience unintended pregnancies.*

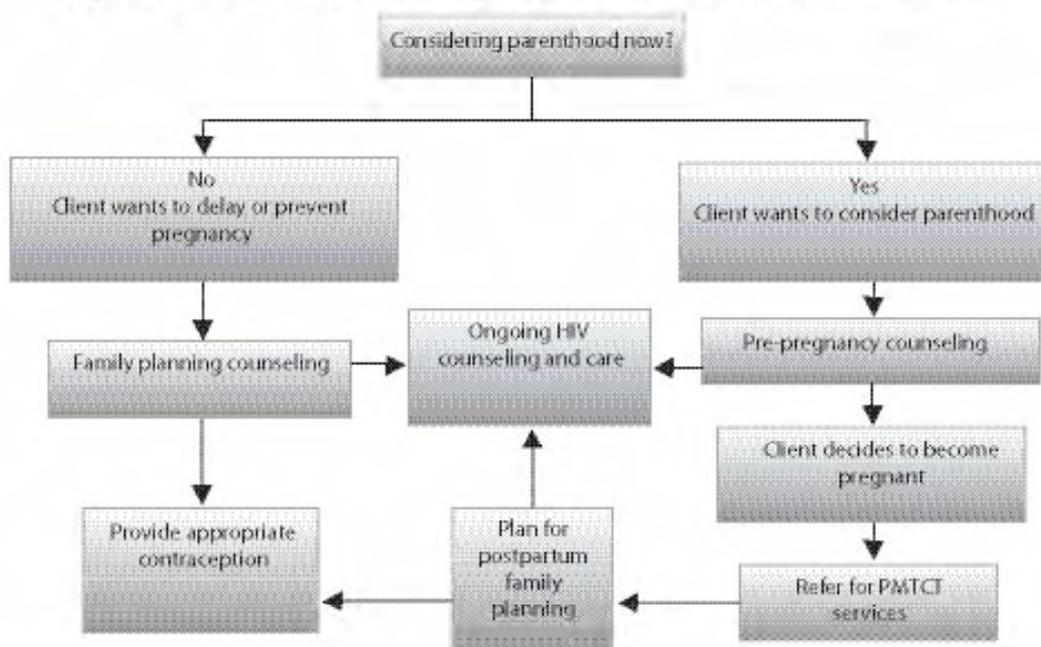
Because many women with HIV are diagnosed during their reproductive years, they inevitably face decisions about their reproductive future. Addressing the sexual and reproductive health needs of all young people, including those with HIV, is important to ensure their health and longevity.

### Many Women With HIV Are Sexually Active and Want Family Planning

Regardless of their fertility desires, many women with HIV are sexually active after learning of their infection (3, 42, 155, 188). In studies in developed and developing countries two to four of every five women with HIV report sexual activity (44, 49, 87, 138, 148, 241).

Women may resume or increase sexual activity as their health improves with the use of antiretroviral (ARV) medications (240). A study of 179 people in Kenya found that nearly 70% of those who had been receiving ARVs for 18 to 24 months were sexually active, compared with 50% of those who had been receiving ARVs for less than 6 months (190). Similarly, a study in Brazil found that, among 103 people with HIV, the percentage reporting at least one sexual encounter per month had increased from 60% initially to 78% by 24 months after starting ARVs (12).

**Figure 1. Basic Family Planning Choices and Care for Women With HIV**



Adapted from Cates 2001 (21) and World Health Organization 2006 (251)

# Family Planning Is a Key Strategy to Reduce Mother-to-Child Transmission of HIV

Preventing unintended pregnancies among women with HIV will substantially reduce the number of infants with HIV infection. Thus it is a major element in the world strategy to prevent mother-to-child transmission of HIV.

Already, prevention of unwanted pregnancies avoids many births of HIV-infected infants. A study using mathematical modeling estimated that, if there had been no contraceptive use in the world in 2006, an additional 2,940 infants infected with HIV would have been born each day, thus tripling the number of infants with HIV (178) (see Figure 2). In sub-Saharan Africa, with relatively low levels of contraceptive use, in 2006 there would have been about one-third more HIV-positive births if there had been no contraception at all.

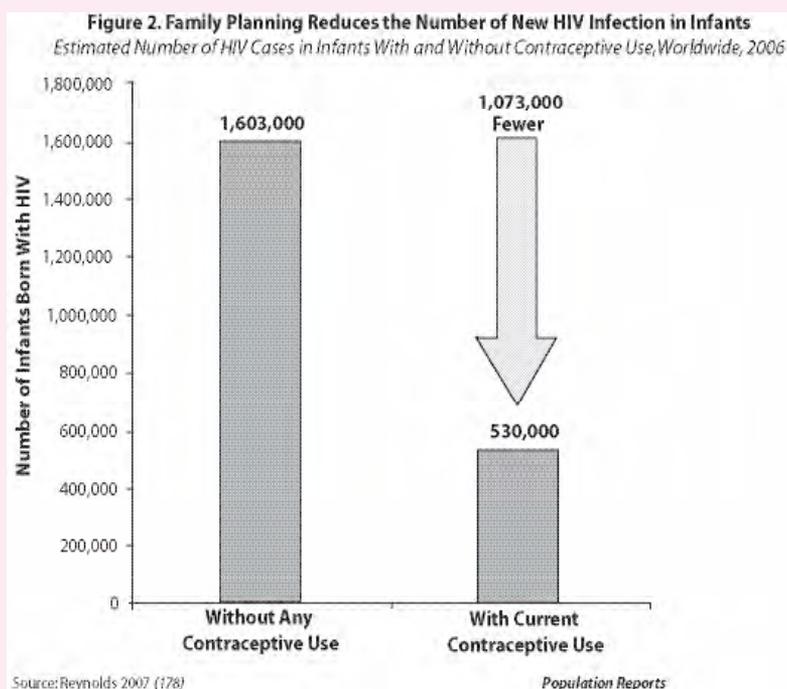
In sub-Saharan Africa, where rates of HIV prevalence among women are the world's highest, meeting the family planning needs of women with HIV has great potential to reduce further the number of HIV-positive births. It is estimated that one-fourth of all births in sub-Saharan Africa are unintended. Assuming that 25% of HIV-positive births are also unintended, meeting the family planning needs of all women with HIV in sub-Saharan Africa has the potential to avert 120,000 HIV-positive births each year (178).

Preventing unintended pregnancies in women with HIV also will reduce the number of abortions and the number of children orphaned by AIDS. Since the great majority of women with HIV do not know that they are infected (101), providing adequate family planning services for everyone would contribute greatly to preventing HIV-positive births—perhaps even more than would focusing just on the family planning needs of women who know that they have HIV.

Furthermore, preventing unintended pregnancies is a cost-effective strategy to prevent new HIV infections. Models show that for the same expenditure, increasing contraceptive use averts more HIV-positive births than a traditional preventing mother-to-child transmission (PMTCT) strategy of ARV prophylaxis (for disease prevention) (206, 211). For example, a study in eight African countries estimated that the same number of infections averted by providing nevirapine to all women with HIV giving birth could be averted at less cost by moderate reductions in the number of unintended pregnancies, ranging from 6% in Kenya to 35% in Rwanda (211). Both these strategies are important.

**Preventing unwanted pregnancy is a key element in the four-element strategy for preventing mother-to-child transmission of HIV.** As identified by the UN in the Glion Call to Action on Family Planning and HIV/AIDS in Women and Children (223), the four elements respond to health care providers' four opportunities to reduce mother-to-child transmission (246). The Glion Call to Action states that all four elements are essential for meeting the UN goal of halving the proportion of infants infected with HIV by 2010:

**1. Primary prevention of HIV infection.** Preventing HIV infection in women, including those who are pregnant or breastfeeding, is the most efficient way to avoid HIV infections in infants—and it saves women's lives as well. Programs and policy makers can give attention to strengthening primary prevention services, such as counseling



and testing, and condom provision. Providers can counsel couples on reducing their risk of acquiring HIV and other STIs, and offer condoms as needed.

- 2. Preventing unintended pregnancies in women with HIV.** Family planning provides couples with HIV an opportunity to prevent unintended pregnancies and to avoid having children who are infected with HIV. Strengthening family planning programs for all women, especially in high prevalence settings, will reach many infected women who still do not know their status and need family planning. Providers can help women who want to avoid pregnancy choose and use a family planning method effectively (see p. 10).
- 3. Preventing HIV transmission from women to their infants.** The risk that a woman with HIV will transmit the virus to her infant can be reduced in a number of ways—prophylaxis with ARVs during pregnancy and around the time of giving birth, certain ongoing ARV treatments (if the woman needs ARVs for her own health), cesarean-section delivery, and either avoiding breastfeeding altogether or exclusive breastfeeding for six months (see p. 16).
- 4. Providing care, treatment, and support for mothers with HIV and their children.** Offering ongoing care and treatment and support for mothers with HIV and their infants helps to ensure the mother's health and to protect the child's health and development.

To date, many HIV programs have focused mainly on the third element—specifically, providing ARVs to women who are already pregnant in order to reduce the risk of transmission of HIV to the infant (245). Much less attention has focused on preventing unintended pregnancies among women with HIV (207). Often this narrow focus is due to separate funding streams, which continue to treat family planning as if it were unrelated to HIV care. There is now a move, however, towards giving equal attention to all four strategic elements to prevent mother-to-child transmission of HIV.

# When a Woman With HIV Decides

Women with HIV may face difficult considerations when deciding about having a baby (239). Health care providers can help people with HIV address these considerations and think through their reproductive and family planning options (see box, p. 19).

Perhaps the most important consideration for many people when deciding about pregnancy is the baby's health and potential risk of dying. Even with treatment and special care, there is currently no way that a mother with HIV can completely eliminate all risk of transmitting the infection to her baby (see p. 18). Consequently, many women with HIV weigh this decision very carefully. For example:

*My decision-making process was a five-year battle between my heart and my head. My head said, "It's simply too big a risk. There are other ways to feel fulfilled. It's profoundly, deeply selfish to put a baby at risk. And besides, you have been in such good health for so many years now—what if the stress of pregnancy undermined your own health?" .... My heart, interestingly enough, had never been in conflict with this issue. It said simply, "I want this." —Rebecca, United States (46)*

*I have never been pregnant, so I don't know what it feels like, but I am conscious that for me becoming a mother is more complex than for women who are not living with HIV. Some people have said to me that women who are HIV-positive will automatically put their babies at risk. In fact, all pregnancies involve risk, whether a woman is HIV-positive or not. HIV does not take away my right to become a mother. —Violeta, Bolivia (96)*

A couple with HIV also may consider the risks that pregnancy can pose for their own health. For example, women with HIV may consider how pregnancy can increase the risk of miscarriage and other complications (see p. 17). Serodiscordant couples may consider the risk of transmitting the virus to the uninfected partner when attempting conception (see p. 21).

*Even though I would like to have a child, I will not. Before, I was frightened that, without access to nevirapine to prevent mother-to-child transmission, the baby would be infected. Even though nevirapine*

Many women with HIV who are sexually active want to prevent pregnancy. Some may decide not to have children to avoid the risks of transmission to a newborn and the potential health risks of pregnancy (see p. 17) (27). Others may worry about caring for children and leaving orphans behind (14).

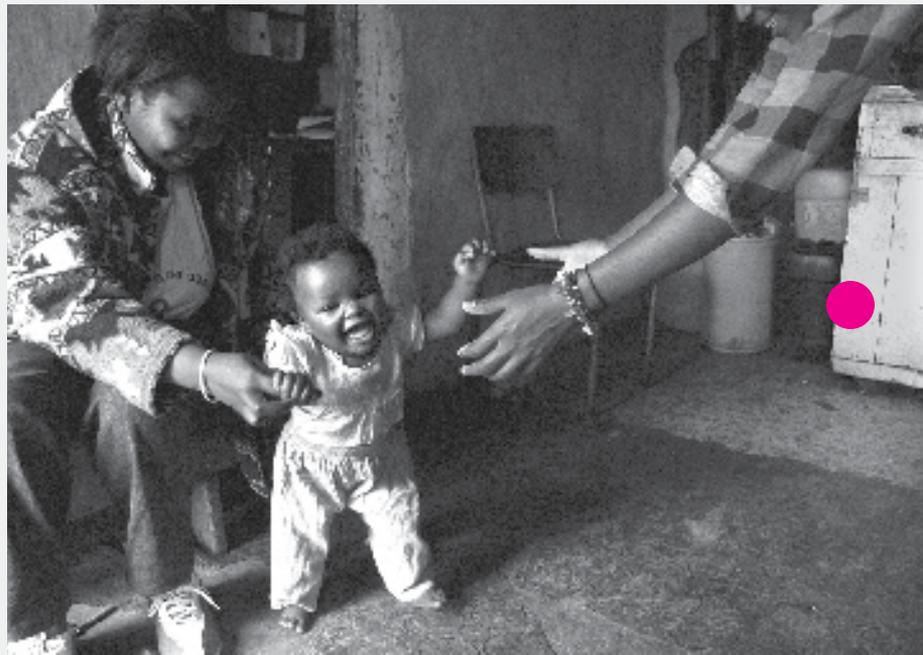
Despite the desire to avoid having children, many women with HIV experience unintended pregnancies. For example, a study of three South African programs for preventing mother-to-child transmission (PMTCT) of HIV found that 84% of the pregnancies among the 242 participants with HIV were unplanned (183). In a Ugandan study 82 of 85 women on ARVs who became pregnant had not wanted more children. Many of these women were surprised that they became pregnant because they had not conceived before they started ARVs (200).

*has recently become available in Kathmandu, I am still afraid I would have an unsafe delivery because of my poor health. —Asha, Nepal (96)*

Couples with HIV may also consider how their health in the future may affect the child and think about the possibility of leaving a young orphan.

*The most serious worry I have is dying and leaving [my children] behind. Where will I leave them? I have no-one else to turn to. When it's my turn and God takes me, who will look after my children? —Selafina, Rwanda (55)*

*Having Maddy has made me feel more mortal than ever. There are still days when I panic and say to myself, "Please let me see her grow up." Even though I've lived with this disease most of my adult life, it's my challenge every day to not panic and slide into a dark place. —Dawn, United States (210)*



Unplanned pregnancy can be a special concern for women taking some ARVs—in particular, the ARV medication efavirenz, as it may cause birth defects (70).

**Unmet need for family planning is high among women with HIV.** Many women with HIV want to avoid pregnancy but have an unmet need for family planning—that is, they are not using family planning despite wanting to avoid pregnancy, and thus they risk unintended pregnancy (42, 47, 49, 179, 196).

In almost all places with a generalized heterosexual epidemic and high HIV prevalence, unmet need for family planning is high. For example, in sub-Saharan African countries available survey data indicate that 13% to 41% of currently married women have unmet need (222, 236). Overall estimates for

# About Pregnancy

## What Can Health Care Providers Do?

To help women with HIV and their partners with their decision, health care providers can:

- **Give appropriate and accurate information.** When making reproductive and family planning decisions, women need HIV-specific information and services. Providers need to be sure that they know the chances of mother-to-child transmission, for example, and neither exaggerate nor underplay them in discussions with clients (see p. 16). Furthermore, providers can tailor information to a woman's individual situation. For example, if a couple with HIV desires a child but does not want to undergo pregnancy, providers can help them explore ways to adopt a child.
- **Encourage partners' involvement.** Providers can encourage a woman to disclose her HIV status to her partner, suggest testing if a partner's HIV status is unknown, and encourage couples to make reproductive and family planning decisions jointly (see box, p. 8). For serodiscordant couples, providers can help explore options for safer conception (see p. 21).
- **Offer support for decision-making.** Many women with HIV who are pregnant or who are considering pregnancy report facing stigma and discrimination from health care workers (41, 224). To ensure that women can freely make informed choices and can carry out their decisions, providers can offer supportive care, free from personal bias and judgment (see Web tool, "Assess Your Attitudes and Beliefs About People With HIV").
- **Help women to carry out decisions.** Providers can help women who decide to prevent or delay pregnancy choose an appropriate contraceptive method (see p. 10). For women who decide to have children, providers can help them plan for as safe and healthy a pregnancy as possible. Providers also can help pregnant women with HIV plan for postpartum family planning.

*A young mother with HIV was able to prevent transmitting the virus to her baby by taking nevirapine at the time of delivery. Women with HIV face difficult considerations when deciding about having a baby. Those who decide to become pregnant can take steps to lower the risk of transmitting the virus to their babies and uninfected partners. Photo: Susan Winters Clarke*

unmet need among women with HIV are not available, but a few small studies indicate that their rates may be higher than rates for women in general. For example, among clients of counseling and testing facilities in Zimbabwe in 2005, 39% did not wish to get pregnant but did not use a family planning method (88). The Zimbabwe Demographic and Health Survey from the same year indicated that the level of unmet need among married women in the general population was 13% (25). Similarly, a Ugandan study found that nearly three-fourths of sexually active men and women with HIV who did not use condoms or another contraceptive method did not want any more children (152). The Uganda Demographic and Health Survey from the same year indicated that the level of unmet need among married women in the general population was 41% (222).

Unmet need for family planning may be common among women with HIV who have recently had children. In a study evaluating a PMTCT program in Rwanda, 92% of women with HIV interviewed in the postpartum period reported not wanting additional children, yet only 54% were using any contraceptive method (187). This finding highlights the importance of helping pregnant women with HIV think about their postpartum family planning options early in pregnancy.

***A Ugandan study found that nearly three-fourths of sexually active men and women with HIV who did not use condoms or another contraceptive method did not want any more children.***

Many of the factors contributing to unmet need among women with HIV are similar to those for other women, including having little or incorrect knowledge of contraceptive options and limited access to family planning services (20, 42). In addition, some women with HIV may feel reluctant to seek family planning services, fearing stigma and discrimination (40). (See Web tool, "Assess Your Attitudes and Beliefs About People With HIV," to identify how a health care provider's attitudes and beliefs may affect service provision.)

## Many Women With HIV Want to Have Children in the Future

Women with HIV have much the same desires to have children as do other women (84, 155, 199). Surveys in developed and developing countries have found that 18% to 43% of women with HIV wanted children in the future (27, 152, 161, 165, 205). In general, people with HIV want children for reasons common to many other people who desire parenthood. For example, in Uganda people with HIV expressed a desire for children to continue the family lineage, to have a child of a specific sex, or because they did not yet have any children (152). In Mumbai, India, people with HIV said that they wanted children for security later in life, to prove they are fertile, and to leave something of themselves behind after death (199).

Often, however, women with HIV who would like to have children in the future do not expect that they will have them. For example, a U.S. study found that 3 of every 10 women with HIV who desired children did not expect to have any (27). Those who both desired and expected to have children were more likely to be younger, to have fewer or no children, and to know their partners' HIV status (27). The discrepancy between fertility desires and expectations most likely reflects a range of considerations, including health status, infertility, the partner's desire for children, or fear that the pregnancy would be dangerous or that the child will be born infected with HIV (see box, p. 6). Discussing family planning options with women with HIV who are unsure about pregnancy can help them to avoid unintended pregnancy.

# Helping Women Talk With Their Partners About Contraception and Safer Sex

Women with HIV face many decisions about living with HIV. Decisions about sex and childbearing can be among the most important. For a woman who is married or otherwise has a steady sex partner, making and carrying out those decisions successfully usually involves talking with her partner.

This can be difficult. She first needs to tell him about her HIV status if she has not already done so. She may also need to ask her partner if he knows his HIV status and, if not, encourage him to seek HIV testing. Then there are issues of safer sex, whether to plan for future children, and contraception to be discussed and decided. These topics can be very hard for many couples to discuss, even when both partners do not have HIV. When one or both partners have HIV, these topics can be even harder to discuss and yet all the more urgent.

A health care provider can help a woman with HIV plan how to talk with her partner. A provider and client can discuss when, where, and how the woman can bring up these sensitive topics and how she can prepare to do so. The client can practice what she might say in a role-play with the provider.

The counseling points that follow outline some guidance for providers that they can offer their clients. In the box at the right are key suggestions for providers. This guidance is adapted from a tool prepared by the World Health Organization to help clients and providers with decisions about family planning and childbearing. The complete tool is available at: [http://www.who.int/reproductive-health/publications/fphiv\\_flipchart/index.htm](http://www.who.int/reproductive-health/publications/fphiv_flipchart/index.htm)



A billboard in Gaborone, Botswana, encourages men to get involved and help reduce mother-to-child transmission (MTCT) of HIV. Women who have HIV need the support of their partner to discuss and decide about issues of safer sex, whether to plan for future children, and contraception. Photo: © 2007 Lee Mantini, Courtesy of Photoshare

## For counseling a woman with HIV

### Tips for talking with her partner

#### Where

- Choose a place that is comfortable for both of you.
- Suggest a quiet place, but close to safety if needed.
- Find a neutral ground.

#### When

- Talk at a time when you are both relaxed and comfortable.
- Avoid distractions or rushing.
- Can be discussed over a period of time, not just at one sitting.
- Discuss before sex starts.

#### How

- Stress the good things.
- Emphasize partner's caring, your concern.
- Start with what you both agree on.
- Focus on safety and good health, not mistrust.
- Talk about good examples, such as people that your partner respects.
- Try to reach agreement.

#### Be prepared

##### Stay safe

- Don't risk your safety.
- Consider having another trusted person there.
- Start with general facts and watch reactions.

##### Get the facts right

- Provider can answer your questions.

##### Plan

- Decide, where, when and how to start.
- What if discussion goes badly? Turns violent?
- Counseling as a couple

##### Practice

- Rehearse with provider or friends.

#### How to help a woman with HIV talk with her partner:

- Offer suggestions but let client decide what can work.
- Discuss doubts and fears. Don't dismiss them.
- Reassure clients that they can succeed. With permission, tell the stories of others who have succeeded.
- Suggest that seeing a health care provider together as a couple is sometimes very helpful.
- Help the client practice what she will say.
- Arrange a follow-up visit to discuss what happened.



Adapted from World Health Organization 2006 (251).

## Information Communication Technology: Mobile Phones Keep Women With HIV in Contact With Care

Mobile telephones continue to become more common in developing countries. In 2000 there were an estimated 46 mobile phones per 1,000 people. By 2005 the ratio had climbed to 258 phones per 1,000 people (243). This growing coverage suggests that mobile phones can provide a wide-reaching method of transmitting information, particularly through text messaging (also known as Short Messaging Service, or SMS) (162). Text messaging provides a way to send information at low cost either to individuals or, through automated messaging, to groups (162, 203).

Pilot projects in reproductive health, HIV, and other areas of health care show the potential of text messaging to help providers reach and serve women with HIV in areas where mobile phones are common (127, 162, 203):

- A hotline in the Philippines known as the “FamPlan Hotline” responded to people’s questions about reproductive health and HIV sent via text, voice, and e-mail messaging. Press conferences, publicity events, public service announcements on radio and television, and leaflets and stickers publicized the hotline (13). Over two years the hotline received more than 65,000 questions on topics such as reproductive anatomy, family planning, pregnancy, sexuality, and HIV. Some 94% of these questions arrived via text messaging (162). Since most mobile phone users pay the equivalent of just US\$0.02 per text message, the hotline was an inexpensive way for people to get direct answers to their specific questions (13).

- In 2002 a doctor in Cape Town, South Africa created the service On-Cue Compliance to help tuberculosis (TB) patients take their medications on time. For US\$1.50 per patient per month, the company sends computer-generated reminder messages to patients’ mobile phones (17, 93). An evaluation found the program to be a more cost-effective and convenient way to improve adherence than directly observed therapy, which requires clinic visits (93). Now On Cue also provides reminder messages to TB patients in Australia, Belgium, and the United Kingdom (17).
- A company in the United Kingdom launched a text messaging service called “My Pill” in 2005. This service sends text messages to women at the same time each day reminding them to take their oral contraceptive pill (85). To sign up, women send a text message to “My Pill” indicating the date that they take the first pill in a cycle and the time of day that they take their pills. The charge for the service appears on clients’ monthly mobile phone bills (85).

Family planning and HIV-care providers could apply similar strategies to their own work. Possibilities include sending messages reminding women when to take their ARV medications, appointment reminders for when it is time for a contraceptive injection, or follow-up messages encouraging clients to return to the clinic to get their HIV or STI test results. Programs could offer to answer clients’ specific questions about family planning and HIV via text messages. Also, programs could use text

messaging to keep in touch with staff in the field—for example, to answer their technical questions on the spot, to alert providers to staff meetings, or to send informational reminders, such as “Most women with HIV can use IUDs.”



Banners in the Philippines promote the FamPlan Hotline, a service that replied to questions about reproductive health and HIV by sending text messages to mobile phones. Text messaging shows great potential for providers to reach and inform women with HIV. Photo: Academy for Educational Development Social Acceptance Project-Family Planning

## When Services Are Made Available and Accessible, Many Women With HIV Use Family Planning

As with women generally, women with HIV are more likely to use family planning if information and services are easily accessible. Recent examples of the use of information communication technology (ICT) have proven effective in expanding the reach of information about reproductive health, family planning, and HIV (see box, p. 6).

For women with HIV, integrating family planning services into HIV care can also help improve access to information and services. For example, in Zimbabwe about three-fourths of clients at HIV counseling and testing services said they would be more likely to seek out family planning services if they were offered in the same facility (88). Many women with HIV prefer to obtain family planning from their HIV care provider rather than disclose their HIV status to another health care provider (35). Providing both HIV and family planning services at the same facility enables providers to offer more convenient, more comprehensive services (61).

Family planning services meet an important need for women with HIV. At the same time, they serve a major public health purpose: Preventing unwanted pregnancy among women with HIV is an important and cost effective way to reduce the number of infants who become infected with HIV (see box, p. 5).

# Women With HIV Can Safely Use Most Contraceptive Methods

With few exceptions, women with HIV who decide to prevent or delay pregnancy can safely use almost any contraceptive method. Providers can help women with HIV choose and use a method that suits their needs and preferences in much the same way that they counsel other women. (For guidance specific to women with HIV, see Table 1.)

## Current WHO Guidance Gives Women With HIV a Choice of Many Methods

Having HIV, AIDS, or using ARVs poses no limitations on use of hormonal methods such as oral contraceptive pills (OCs), injectable contraceptives, and implants. Condoms, of course, have a special role, helping to prevent both pregnancy and STIs when they are used consistently and correctly. By following the standard precautions, health care personnel can provide all methods that require procedures—injectables, implants, IUDs, vasectomy, and female sterilization—without fears that they will become infected with HIV (see Web box, “Test Yourself: Safety Precautions and Infection Prevention in the Workplace”).

**Current guidance from WHO indicates that virtually all methods are safe for nearly every woman with HIV.**

**Most women with HIV can use IUDs.** Some have questioned the safety of using the intrauterine device (IUD) among women with HIV. They have expressed concern that pelvic inflammatory disease (PID) (infection of the upper reproductive tract, usually

caused by gonorrhea or chlamydia) might be more common in IUD users with HIV than in IUD users without HIV (121). Regardless of HIV status, it is not advisable to insert an IUD in any woman who has gonorrhea or chlamydia. Because there is a higher rate of PID in the first 20 days after IUD insertion than after the first 20 days (63), there is concern that the insertion procedure could introduce these disease organisms from the lower reproductive tract to the upper (248).

Special concern about women with HIV has proved unfounded, however. Evidence indicates that PID is not significantly more common among IUD users with HIV than among IUD users who are not infected with HIV (144, 198).

In 2004 the World Health Organization updated its guidance, based on recent research, and now advises that women with HIV can generally start using either a copper-bearing IUD or a hormonal IUD (248). Specific guidance includes:

- Women with HIV who do not have AIDS can generally have copper-bearing and hormonal IUDs inserted.
- Women with AIDS who are on ARVs and are clinically well generally also can have the IUD inserted.
- IUD insertion usually is not recommended for women who have AIDS and are not on ARVs, however. The IUD also is not usually recommended for women who are using ARVs but are not clinically well.
- If an IUD user becomes infected with HIV or if an IUD user with HIV develops AIDS, the IUD generally does not need to be removed. She should be monitored for signs of PID.

**Female sterilization and vasectomy are safe for couples with HIV.** Couples who want a permanent method of contraception can choose female sterilization or vasectomy, regardless of whether one or both of them have HIV. Women and men who are infected with HIV, including those who have AIDS, can safely undergo female sterilization or vasectomy. In some cases sterilization should be delayed. For example, women or men who have acute AIDS-related illness may have to wait until their condition is resolved before they can undergo the procedures. For people with AIDS special arrangements should be made to perform the procedure in a setting with a qualified provider who can carefully assess the specific person’s condition, including the need for general anesthesia, with appropriate equipment and support (99, 248). While some women and men with HIV find sterilization or vasectomy a good choice, providers need to be careful to avoid putting pressure on any client to have a permanent procedure, and informed choice must be assured (45).



Sean Sprague/SpraguePhoto.com

A counselor talks to a pregnant woman with HIV in São Paulo, Brazil. Providers can help women think about their postpartum family planning options early in pregnancy.

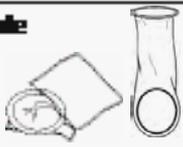


# Table 1. Comparing Contraceptive Methods for People With HIV

Providers can use the information in this table as they help women or men with HIV choose a contraceptive method.

**Important points:**

- All methods are safe for people who are infected with HIV, have AIDS, or are taking ARV medications, except as specifically noted.
- Except for male and female condoms, none of these methods helps to prevent transmission of STIs, including HIV.
- Dual method use—that is, using condoms and another method of contraception together—helps to protect against STIs and provides more protection against pregnancy than condom use alone (see box, p. 14).

Method	Considerations for Women With HIV
<b>Male and female condoms</b> 	<ul style="list-style-type: none"> <li>- The only method that helps protect against both pregnancy and STIs, including HIV.</li> <li>- Must be used correctly every time to be fully effective.</li> <li>- Maintaining consistent and correct use can be difficult.</li> </ul>
<b>Combined oral contraceptives (COCs)</b> 	<ul style="list-style-type: none"> <li>- Not known if certain ARVs decrease effectiveness of COCs. In case they do, condoms provide extra contraceptive protection.</li> <li>- Taking pills every day, without missing pills, is particularly important to compensate for any possible decrease in effectiveness when on ARVs.</li> </ul>
<b>Progestin-only pills (POPs)</b> 	<ul style="list-style-type: none"> <li>- Not known if certain ARVs decrease effectiveness of POPs. In case they do, condoms provide extra contraceptive protection.</li> <li>- Particularly appropriate for breastfeeding women who want pills. Exclusive breastfeeding, which is the safer breastfeeding option to reduce risk of HIV transmission to the infant, provides additional protection against pregnancy.</li> <li>- For women who are not breastfeeding, taking pills every day, without missing a pill or pills, is particularly important in order to compensate for any possible decrease in effectiveness when on ARVs.</li> </ul>
<b>Progestin-only and combined injectable contraceptives</b> 	<ul style="list-style-type: none"> <li>- Not likely that ARVs reduce effectiveness of injectable contraceptives. Still, women using ARVs should be especially careful to return on time for injections.</li> <li>- Condoms could be used for additional protection from pregnancy, especially as the time of the next injection approaches or if a woman is late for her next injection.</li> <li>- It is not necessary to have the next injection early or to shorten the injection interval.</li> </ul>
<b>Implants</b> 	<ul style="list-style-type: none"> <li>- Not known if certain ARVs decrease effectiveness of implants. In case they do, condoms provide extra contraceptive protection.</li> </ul>
<b>Emergency contraceptive pills (ECPs)</b> 	<ul style="list-style-type: none"> <li>- It is thought that ARVs do not reduce the effectiveness of ECPs.</li> <li>- No evidence for increasing the ECP dosage for women on ARVs.</li> </ul>
<b>Copper-bearing intrauterine device (IUD) and levonorgestrel intrauterine device</b> 	<ul style="list-style-type: none"> <li>- A woman who is at risk of HIV infection or who is infected with HIV can generally have an IUD inserted.</li> <li>- A woman who has AIDS, is taking ARVs, and is clinically well can generally have an IUD inserted.</li> <li>- A woman should usually not have an IUD inserted if she has AIDS and is not taking ARVs, or if she is taking ARVs, but is not clinically well.</li> <li>- If a woman develops HIV or AIDS while she has an IUD in place, it generally does not need to be removed.</li> <li>- A woman who has gonorrhea or chlamydia should not have an IUD inserted.</li> <li>- IUD users with AIDS should be monitored for pelvic inflammatory disease.</li> </ul>
<b>Female sterilization and vasectomy</b> 	<ul style="list-style-type: none"> <li>- Delay sterilization and vasectomy if currently ill with AIDS-related illness.</li> <li>- Special arrangements are needed to perform female sterilization on a woman with AIDS and a vasectomy on a man with AIDS. The procedure should be undertaken only in settings with experienced staff and sufficient equipment and support.</li> <li>- Female sterilization and vasectomy do not prevent transmission of HIV.</li> </ul>

Continued on next page

**Table 1. Continued**

<p><b>Lactational amenorrhea method (LAM)</b></p> 	<ul style="list-style-type: none"> <li>- Women who are infected with HIV or who have AIDS and choose to breastfeed their infant can use LAM.</li> <li>- Exclusive breastfeeding (without introducing any other foods, liquids, or water) for the first six months of a baby's life is the safer breastfeeding pattern to minimize the risk of HIV transmission through breastmilk. This pattern of breastfeeding is compatible with LAM.</li> <li>- If a woman's monthly bleeding returns before six months, she will need another contraceptive method while continuing to breastfeed exclusively.</li> <li>- Women with HIV and their health care providers need to consider the infant feeding options available and to weigh their various risks and consequences.</li> </ul>
<p><b>Fertility awareness methods</b></p> 	<ul style="list-style-type: none"> <li>- Calendar-based fertility awareness methods rely on regular menstrual cycles. For women with advanced HIV (low CD4+ cell count), irregular cycles may be common and make these methods difficult to use.</li> <li>- For most people, fertility awareness methods are less effective than are other modern methods of contraception.</li> </ul>
<p><b>Spermicides</b></p> 	<ul style="list-style-type: none"> <li>- Women at high risk of HIV infection and who have very frequent intercourse should not use spermicides.</li> <li>- Women with HIV infection, including AIDS, should not use spermicides.</li> </ul>
<p><b>Diaphragm</b></p> 	<ul style="list-style-type: none"> <li>- Diaphragms may help keep infectious organisms from reaching the cervix, however a recent study found that diaphragms do not protect against HIV infection (281).</li> <li>- Because diaphragms are used with spermicide, they are not generally recommended for women at high risk for HIV infection or women who are infected with HIV.</li> </ul>

Sources: *Cales* 2001 (21); *Gued* 2004 (83); *Rabkin* 2005 (176); World Health Organization 2005 (248); World Health Organization 2007 (256)

**Table 2. Drug Interactions: Combined Oral Contraceptives and Antiretroviral (ARV) Medications**

While there is some theoretical concern that ARVs might reduce the effectiveness of combined oral contraceptives (COCs), women taking ARVs can still generally use COCs. Providers can use the table below to guide counseling and prescribing. In general, if a woman using ARVs wants to use COCs, she can be given a formulation with at least 30µg of estrogen, counseled about the importance of taking COCs every day (without missing pills), and encouraged to use condoms consistently. Correct and consistent condom use would help to make up for any decrease in effectiveness of the oral contraceptives as well as help to protect an uninfected sexual partner (195).

ARV	Effect on Contraceptive Hormone Level*	Effect on ARV Level
<b>Protease inhibitors (PIs)</b>		
Amprenavir	Increase	Decrease
Atazanavir	Increase	No data
Darunavir	Decrease	No change
Fosamprenavir	Decrease	Decrease
Indinavir	Increase	No data
Lopinavir + Ritonavir	Decrease	No data
Nelfinavir	Decrease	No data
Ritonavir	Decrease	No data
Saquinavir	No change	No change
Tenofovir	No change	No change
Tipranavir	Decrease	Decrease
<b>Non-nucleoside reverse transcriptase inhibitors (NNRTIs)</b>		
Delavirdine	May increase	No data
Efavirenz	Increase	No change
Nevirapine	Decrease	No data

\*Estrogen levels only

Sources: Adapted from World Health Organization 2004 (248). Additional information from HIV InSite 2007 (90) and U.S. Department of Health and Human Services 2006 (166)



**Avoid spermicides.** Spermicides containing nonoxynol-9 (N-9), and, by assumption, other spermicides that work in a similar manner, do not protect against HIV infection or STIs, and in fact, they may increase the risk of HIV infection in women who use these products very frequently, such as several times a day (111). Therefore, spermicides are not recommended for women at high risk of HIV infection or who have HIV infection. The concern about spermicides is that they may increase susceptibility to HIV infection or another strain of HIV. Re-infection with another strain of HIV may accelerate the progression of HIV disease (77).

The increased risk may occur because N-9 disrupts the membranes of cells in the lining of the vagina, possibly making entry easier for infectious organisms (255). Women who have multiple daily acts of intercourse should be advised to choose another method of contraception (226). Some folk medicine practices, such as douching with lime juice, may also damage the vaginal lining and should be discouraged (173).

### **Emergency contraception is safe for women with HIV.**

Emergency contraception can help prevent pregnancy after unprotected intercourse. It is an important option for all women, including women with HIV. Women can take emergency contraceptive pills (ECPs) up to five days after unprotected intercourse, although they are more effective the sooner they are taken after intercourse (249). If taken within three days (72 hours) after intercourse, ECPs reduce the risk of pregnancy by at least 75% (219). There are no data available on interactions between ECPs and ARVs. It is thought, however, that ARVs will not reduce the effectiveness of ECPs because ECPs contain higher doses of hormones than daily oral contraceptives. There is currently no evidence to justify increasing the ECP dosage for women on ARVs. Emergency contraception may be administered vaginally if the hormones taken orally cause nausea and vomiting (51, 140).

Many women, including women with HIV, lack sufficient knowledge about emergency contraception. Focus-group discussions among women with HIV in Australia, India, Kenya, South Africa, and Thailand found that many are not aware of the option (42). Providers can advise or remind women with HIV that emergency contraception can help prevent pregnancy in case of unprotected intercourse—for example, if a condom breaks or slips or is not used, if a woman starts her pack of OCs three days late or more or she forgets three or more pills in the first week, or if her IUD is expelled. Providers can give ECPs to clients to take home in advance in case the need arises. ECPs do not help to prevent STIs including HIV infection.

### **Women With HIV Have Special Questions About Hormonal Methods and IUDs**

To help answer these questions, providers need up-to-date information on a number of topics (see companion *INFO Reports*, “Women and HIV: Questions Answered”). While research on many of these topics is limited, current knowledge is sufficient to support the guidance. Many of the concerns

involve hormonal methods and are theoretical at this stage. Hormonal methods remain an important and effective contraceptive option for women with HIV.

- **Acquisition.** Hormonal methods and IUDs do not appear to increase most women’s risk of becoming infected with HIV if exposed to the virus (see below).
- **Progression.** Some studies, but not others, suggest that hormonal contraceptives may affect factors that influence the speed of progression of HIV disease (see below).
- **Infectivity.** Some studies, but not others, suggest that women with HIV could be more likely to transmit HIV if they use certain hormonal contraceptive methods (see p. 15).
- **Side effects.** Side effects of hormonal contraceptives and IUDs do not appear to be different or more frequent in women with HIV than in uninfected women (see p. 15).
- **Drug interactions.** Some ARVs may reduce the amount of hormone in the blood, but whether this decreases contraceptive effectiveness is not known. Hormonal contraceptives do not appear to reduce the effectiveness of ARVs (see p. 16).

### **Acquisition: For Most, No Additional Risk With Hormonal Methods, IUDs**

A woman who does not have HIV may ask a provider if hormonal methods or IUDs increase her chances of getting HIV. The most carefully conducted studies conclude that hormonal methods do not increase the risk of acquiring HIV among women in the general population (108, 143, 150). The largest and most rigorous study, involving over 4,500 women in Uganda and Zimbabwe, found that women using combined oral contraceptives (COCs) or the progestin-only injectable depo-medroxyprogesterone acetate (DMPA) and reporting no condom use were not more likely to become infected with HIV than users of other, nonhormonal contraceptives (143). Similarly, a study in South Africa found that the numbers of new cases of HIV were similar among women using either progestin-only injectables or COCs and among women not using any hormonal method, after adjusting for differences in sexual risk behaviors and the presence of STIs (150). Limited evidence also suggests that women using the copper-bearing IUD are not at greater risk of acquiring HIV (105, 128, 141, 197).

Among populations at high risk of HIV exposure, such as sex workers, some studies find that hormonal contraception increases the risk of HIV acquisition (116, 128). For example, sex workers in Kenya using COCs or DMPA had a 1.5 times and 1.8 times greater risk, respectively, of acquiring HIV than sex workers who were not using these methods, after adjusting for condom use and number of sexual partners (116).

### **Progression: Could Hormonal Methods Speed Up Disease?**

Some studies, but not others, find that hormonal contraceptives may affect factors that speed the progression of HIV disease. A recent, carefully conducted study among 186 women in Uganda and Zimbabwe found no association between viral set

# Dual Protection Strategies Help Prevent Pregnancy and STIs

By practicing dual protection, women with HIV take steps to prevent unplanned pregnancy, prevent transmission of HIV to an uninfected partner, and protect themselves against STIs. For women with HIV, these strategies include:

- **Consistent and correct use of male or female condoms.** One method, condoms, when used consistently and correctly, can protect against both pregnancy and STI transmission during vaginal sex (see Web box, “Male and Female Condoms at a Glance”). As typically used<sup>1</sup>, however, pregnancies occur among 15 per 100 women in the first year that their partners use male condoms. This is less protection against pregnancy than hormonal methods or intrauterine devices typically provide. As female condoms are typically used, pregnancies occur among 21 per 100 women in the first year of use (219).

Condoms protect best against STIs spread by discharge, such as HIV, gonorrhea, and chlamydia. They also protect against STIs spread by skin-to-skin contact, such as herpes and human papillomavirus (256). On average, male condoms are 80% to 95% effective in protecting people from HIV infection when used consistently and correctly with every act of sex. Evidence on female condoms is not as extensive as male condoms, and it is not certain whether they provide the same level of protection against HIV and other STIs as male condoms (137, 228, 235).

- **Use of condoms along with another contraceptive method** (also called “dual method use”). Using condoms and another contraceptive method together provides extra protection against pregnancy beyond what condom use alone provides. (Male and female condoms should not be used together; friction may lead to slipping or tearing of the condoms.) This strategy may be a choice for women who want to be sure to avoid pregnancy but cannot always count on their partners to use condoms.

<sup>1</sup> Pregnancy rates during typical use reflect how effective methods are on average, including people whose use of the method is not consistent or always correct. Pregnancy rates during consistent and correct use reflect the best observed effectiveness rates among people who say they have followed instructions for proper use (220).

point and use of either the DMPA or COCs at the time of HIV acquisition (142). The viral load “set point” refers to the point at which the amount of virus in a newly infected person levels off after the immune system initially attacks infected cells. Both a higher viral load set point and, to a lesser degree, infection with multiple subtypes of HIV, have been found to predict faster progression of the natural course of HIV infection (77, 115, 134, 160, 202). In contrast, a study of 161 sex workers in Mombasa, Kenya, found that women using DMPA at the time of HIV acquisition had a higher viral load set point, on average, and women using OCs or DMPA were more likely to be infected with multiple subtypes of HIV than women who used no contraceptive method at the time of infection (6).

Similarly, among women with established HIV infection, there is limited and conflicting evidence regarding whether

- **Condoms and emergency contraception.** Emergency contraceptive pills can be used as back-up protection against pregnancy in the event that a condom fails, is used incorrectly, or is not used (22) (see p. 13). Emergency contraception does not help to prevent STIs.
- **Avoiding all types of penetrative sex.** Abstaining from penetrative sexual contact is the only certain way to prevent both pregnancy and sexual transmission of HIV and other STIs, but in fact it is often difficult to maintain abstinence. Abstinence is not feasible for many women, particularly those who are married or cohabitating.

## Correct and Consistent Use of Condoms Can Be Difficult

While many people use condoms more often after learning that they have HIV infection (84), correct and consistent use of condoms, with or without another method, is often difficult (39, 123). A study in Burkina Faso, for example, found that nearly 40% of women who had tested positive for HIV during pregnancy started using hormonal contraceptives after they gave birth, but only 8% consistently used condoms (155).

There are various reasons that women and couples do not use condoms consistently. The cost or lack of availability of condoms may preclude their use (32). Whether or not they have HIV, many women have little control over condom use, when they have sex, or, in some circumstances, even with whom they have sex. Some women with HIV may fear disclosing their HIV status to their partners. Some women with HIV report that their partners refuse to use condoms, despite the risk that these men may face (87). Some women with HIV may feel there is no need to use condoms if they know or think that their partner also is infected with HIV.

Thus, pressing condom use on all women may not be helpful and could be counterproductive. When condom use is not an option, assuring effective contraception with a different method may be more realistic. The best strategy is the one that a woman with HIV is able to practice effectively in the situation that she faces.

starting a hormonal contraceptive affects disease progression. An analysis of U.S. data found no association between contraceptive use and changes in viral load over time among 177 women with established HIV infection who started OCs, DMPA, or *Norplant*<sup>®</sup> implants (23). A study of postpartum women with HIV in Kenya also found no significant immediate or longer-term effects of the use of OCs or DMPA on viral loads or CD4+ cell counts (see box, p. 21, for an explanation of CD4+ cells) (181). A recent randomized trial in Lusaka, Zambia, among postpartum women with HIV, however, found that progression to AIDS (as indicated by a fall in CD4+ cell counts to less than 200 cells) or death was more common among women randomly assigned to hormonal contraception than among those assigned to the copper-bearing IUD (209). A substantial number of women discontinued their randomized assigned methods, switched their contraceptive methods, or withdrew

from the study. Further analysis suggests this is not likely to account for the finding, however (208).

More studies are needed to better understand whether there is a relationship between use of hormonal contraceptives and disease progression. A 2007 WHO technical meeting recommended further investigation and asked researchers currently studying cohorts of HIV-infected women to examine their data (254). At this point the evidence on disease progression is limited. Providers may want to advise women who ask about disease progression that researchers are looking into it but that there are no limitations on use of hormonal methods because of this or any other concern regarding HIV.

### **Infectivity: Limited and Unclear Evidence on Viral Shedding**

Limited evidence suggests that women with high amounts of HIV in their genital secretions are more likely to transmit the virus to an uninfected partner during unprotected vaginal intercourse than women with low amounts of HIV in their secretions (7, 170). Evidence is conflicting as to whether COCs, DMPA, and possibly other hormonal contraceptives increase genital shedding, either indirectly by increasing a woman's susceptibility to STIs, or directly by affecting the concentration of virus in genital secretions through shedding of HIV-infected cells from the cervix or vagina (31, 89, 109, 146, 231).

Some studies suggest that hormonal contraceptives might indirectly affect infectivity among women with HIV by increasing their susceptibility to some STIs (37, 73, 107). A study of Kenyan sex workers with HIV, after taking into account demographic characteristics and sexual behavior, found that those who used hormonal contraceptives were more likely to have chlamydia and cervicitis (117). It is thought that coinfection with an STI—that is, when a woman is infected with both HIV and another STI—can increase genital shedding of HIV, which might increase the risk of transmitting the virus to sexual partners (132).

Two studies in Kenya found that women who began using DMPA or COCs shed more HIV-infected cells from the cervix than before they used them (231) or when compared with women not using hormonal contraception (146). In contrast, studies have generally found no association between hormonal contraception and genital shedding of cell-free virus—that is, HIV that exists outside of cells within the bloodstream (109, 231). It is not fully understood whether there is a difference in infectiousness between HIV-infected cells and virus free of cells (100, 167, 193). The only available direct study of transmission, involving 156 women with HIV, found no association between the use of hormonal contraception and HIV transmission to uninfected male partners (59).

IUDs do not appear to increase the infectiousness of women with HIV. The same study that examined risk of transmission among oral contraceptive users found that copper-bearing

IUDs did not increase the risk of HIV transmission from women with HIV to uninfected partners beyond the risk inherent in unprotected vaginal sex (59). The two studies that have looked at the prevalence of HIV-infected cells in the cervix found no greater shedding due to IUD use (146, 180).

While some concern about the effect of hormonal contraceptives on the risk of HIV transmission is warranted, the most important advice for women with HIV who use hormonal contraception and their uninfected partners is to continue using condoms (see box, p. 14). Correct and consistent use of condoms minimizes the chances that, during sexual intercourse, the penis will come into contact with genital secretions that might contain HIV. Many factors influence how infectious a woman with HIV is, including stage of disease, whether she has a concurrent STI, and whether or not she is using ARVs.

### **Side Effects: Similar for Women With HIV and for Uninfected Women**

Contraceptive side effects such as bleeding changes with hormonal methods or IUDs do not appear to be different in women with HIV and uninfected women. Observational studies of 41 women using implants in Thailand (213, 214) and 18 women using the hormonal levonorgestrel-releasing IUD (LNG-IUD) in Finland (89, 118) found that both methods were acceptable to women with HIV. Only a few women discontinued their method, none experienced pregnancy, and the frequency and type of side effects were similar to those experienced by women not infected with HIV in other studies. As for the copper-bearing IUD, a Kenyan study found that IUD users with HIV experienced no more PID or expulsions due to infection or pain than uninfected women in the 24 months following insertion (144). Studies of hormonal contraceptive use in the



*A health care worker in Chiang Mai, Thailand shows a client with HIV a wristwatch that can help her remember to take her ARV medicine on time. Clients who take ARVs and use oral contraceptive pills or injectable contraceptives should also remember to take pills or receive follow-up injections on time.*

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U.S. (232) and Kenya (117) and of DMPA and COCs specifically in Zambia (209) found contraceptive side effects in women with HIV to be similar in type and frequency to those among uninfected women in other studies.

## Drug Interactions: Do ARVs Reduce the Effectiveness of Low-Dose Hormonal Contraceptives?

Limited evidence suggests that certain ARVs could alter blood levels of contraceptive hormones in women using low dose OCs (248). Theoretically, this could influence the effectiveness of these contraceptives. The biological basis behind this concern is that some classes of ARVs—the protease inhibitors (PIs) and the non-nucleoside reverse transcriptase inhibitors (NNRTIs)—speed up processing of hormonal contraceptives in the liver. This would lower the levels of estrogen and progestin in the blood (153, 195) (see Table 2, p. 12).

Two small studies reported that the ARVs nevirapine and ritonavir could lower both estrogen and progestin levels enough to increase risk of contraceptive failure. Both studies evaluated the effect of just a single dose of COC; one pill containing 50µg of estrogen (plus a progestin) in one study (163) and one pill containing 35µg of estrogen (plus a progestin) in the other (135). No information is available on women taking a pill every day. Thus, it is not clear whether or how much contraceptive effectiveness would be reduced (153). A conclusive observational study of actual pregnancy rates among pill users would be difficult because inconsistent or incorrect pill use, which could lead to pregnancy, would be hard to distinguish from the effect of the ARV.

Despite the theoretical concern about contraceptive effectiveness, women taking ARVs still generally can use COCs. If a woman using ARVs wants to use COCs, she can be given a formulation with at least 30µg of estrogen, counseled about

the importance of taking COCs every day (without missing pills), and encouraged to use condoms consistently. Correct and consistent condom use would help to make up for any decrease in effectiveness of the oral contraceptives as well as help to protect an uninfected sexual partner (195).

There is less concern that these ARVs could reduce the effectiveness of progestin-only injectable contraceptives (POIs) and implants. POIs provide high hormone levels, and, with both methods, the hormones are absorbed into the blood before they are metabolized by the liver, in contrast with OCs, which are first metabolized in the liver and then enter the bloodstream. The few studies available find that ARVs have little or no effect on hormone levels in DMPA users with HIV (30, 33, 153). At this time there are no studies on the effect of ARVs on the effectiveness of combined estrogen-progestin injectables or the progestin-only injectable NET-EN, but no effect is expected because injectable contraceptives do not pass first through the liver. Still, providers can emphasize returning on time for the next injection. This will help to ensure that hormone levels remain high enough to prevent pregnancy (195). Two studies are underway to further evaluate potential interactions between DMPA and ARVs (153).

**Hormonal contraceptives do not appear to reduce the effectiveness of ARVs.** A limited number of studies indicate that hormonal contraceptives do not influence the effectiveness of the ARVs tested. One study among women with HIV in the U.S. found no significant changes in the blood plasma levels of the ARVs nelfinavir, efavirenz, or nevirapine 12 weeks after women started using DMPA (33). Similarly, studies have found that use of COCs has no effect on plasma levels of the ARVs nevirapine or fortovase (131, 135). Studies in rats have found that combined injectables reduce the concentration of amprenavir by 20%. It is not known whether this effect occurs in humans (260).

## Women With HIV Need the Facts About Pregnancy

Women with HIV who desire children face risks that need special consideration. Some of the risks can be reduced, and many women can conceive, carry a pregnancy to term, and avoid passing HIV to their infants. To make informed decisions about pregnancy, women and their partners need to know that:

- HIV infection somewhat reduces the chances of conceiving and carrying a baby to term.
- Pregnancy usually will not have a major effect on the progression of HIV disease.
- The chances of poor pregnancy outcomes are greater for women with HIV.
- Without treatment, 1 to 3 of every 10 infants of mothers with HIV will be born with HIV infection, and an additional 1 or 2 in every 10 breastfed infants will be infected. With special care, these odds can be lowered.

- An uninfected sex partner may have to risk infection while trying for conception. (Also see box, p. 19.)

In addition, women or couples need to consider their own specific situations when deciding about pregnancy—for example, where will the baby receive health care, and will their families help with child-raising?

### HIV Infection Reduces Fertility

HIV infection may reduce both female and male fertility, but does not cause complete infertility. Studies find that women with HIV have lower pregnancy rates and birthrates than women without HIV, even after adjusting for factors such as age, breastfeeding, reported frequency of sexual intercourse, and use of contraceptives (50, 68, 76, 82, 92, 185, 188, 192, 217, 259).

How HIV infection reduces fertility is not clear, but it is known that the impact of HIV on pregnancy rates is greatest among women who are symptomatic (50, 82), are at later stages of disease progression (186, 192), or have high viral loads (156). Coinfection with other STIs such as syphilis (which women with HIV are more susceptible to) may further reduce fertility (15, 159). For instance, a large Ugandan study found that HIV infection reduced the likelihood of pregnancy by 65%, whereas infection with both HIV and syphilis reduced the likelihood of pregnancy by 72% compared with the chances of pregnancy among women without either HIV or syphilis (82).

Men with HIV have fewer live, swimming sperm, less ejaculate, and lower total sperm counts than men who do not have HIV (53, 158). Sperm counts are lowest when CD4+ cell counts are low (158). (A CD4+ cell count, also called a T4 cell count, is a laboratory measure of the immune system's response to HIV. The lower the CD4+ cell count, the weaker the immune system (see box, p. 21).

### Pregnancy Poses Little Risk of Faster HIV Disease Progression

Studies from developed countries suggest that pregnancy has no measurable effect on the progression of HIV disease when compared with HIV progression in women who are not pregnant (69, 136, 182, 189, 225). In the one developing-country study of 140 Haitian women with HIV, however, pregnant women with HIV were 3.7 times more likely to show HIV-related symptoms before women who were not pregnant, but the pregnant women did not progress to clinically defined AIDS any faster than women who were not pregnant (48) (see box, p. 21, for a definition of clinically defined AIDS).

### HIV Infection Increases Risk of Poor Pregnancy Outcomes

For reasons that are not clear, HIV infection increases the risk of poor pregnancy outcomes such as low birth weight, preterm delivery, and miscarriage (18, 44, 133, 184, 186). For example, a meta-analysis found that risk of miscarriage among women with HIV is 2.8 to 6 times greater than the risk among uninfected women (18). In Dar es Salaam, Tanzania, women with HIV who had severe symptoms were more than twice as likely to have infants of low birth weight and about twice as likely to give birth prematurely as women without HIV (34). In a European study women with HIV were 4.5 times more likely than women without HIV to develop postpartum fever (puerperal fever), but they were no more likely to have other signs of infection (65).

Certain opportunistic infections associated with HIV infection can complicate pregnancy (133). Pregnant women with both HIV and malaria face a 2- to 3-fold greater risk for preterm delivery, restricted intrauterine growth, and neonatal death than pregnant women with HIV who do not have malaria (229). Pregnant women with HIV and tuberculosis also are more likely to experience these same complications as well as maternal anemia and low birth weight (171).



UNICEF Papua New Guinea, 2004, Pirozzi

*At an antenatal clinic in Papua New Guinea, a nurse talks to pregnant women about HIV/AIDS. If a pregnant woman does not know her HIV status, getting an HIV test can help her determine whether she needs ARVs to prevent mother-to-child transmission of HIV and how she should feed her infant after delivery.*

### Women's Health Affects the Chances of MTCT

If no particular precautions are taken, women infected with HIV have a 15% to 30% chance of passing the virus to their infants during pregnancy, labor, or delivery (43). If these women breastfeed in typical fashion (give both breastmilk and other liquids or food before six months), breastfeeding will transmit HIV to another 10% to 20% of infants (36, 54, 154). In other words, for every 20 births of women with HIV, 3 to 6 would be born infected, and another 2 to 4 would be infected if breastfed. Thus, without special care, as few as 3 or as many as 10 in every 20 babies would be infected. If treatment and proper feeding are possible, however, the risks can be reduced.

Women with HIV are at greater risk of passing HIV to their infants if they have:

- High viral load,
- Certain other STIs, or
- Malaria or other parasitic infection.

**High viral load.** Early in the course of infection and late in the course of HIV disease may be when mother-to-child transmission (MTCT) is most likely. Most people are not aware



*A billboard in Livingstone, Zambia, encourages mothers to seek out services for prevention of mother-to-child transmission of HIV (PMTCT). Although PMTCT services are expanding, progress has been slow in the countries hardest hit by HIV.*

*Photo: © 2007 Lee Mantini, Courtesy of Photoshare*

of infection just after it occurs, but a woman who knows that she has HIV and who wants a child can be advised that the chances of MTCT may rise if her health starts to deteriorate.

The risk of MTCT appears to be tied to the level of viral load (an indication of the amount of HIV in the body). When viral loads are high, risk of MTCT is high. Conversely, when viral loads are low, risk of MTCT is low. When viral loads are high, CD4+ cell counts are low. Thus, the level of risk of MTCT roughly corresponds to the inverse of CD4+ cell counts. A CD4+ cell count below  $200 \times 10^6$  cells per liter of blood indicates high risk of MTCT. Counts between 200 and 500 indicate moderate risk, and counts above 500 indicate low risk (72, 97, 139).

***Without special care, as few as 3 or as many as 10 in every 20 babies of mothers with HIV would be infected with HIV.***

High viral loads occur during primary HIV infection—the first phase of infection, when a person is newly infected with HIV and the virus replicates quickly before the immune system develops antibodies (104) (see box, p. 21). Thus, if a woman becomes infected during certain stages of pregnancy or while breastfeeding, the chances of MTCT are high. Levels of virus also are high late in the course of infection, when the immune system fails. HIV progresses less rapidly among women who are well-nourished, and maintaining adequate nutrition can help keep viral loads low (see box, p. 22).

#### **Herpes simplex virus (HSV), gonorrhea, and syphilis.**

Women with HIV who also have HSV infection (HSV is the virus that causes herpes), gonorrhea, or syphilis are more likely to transmit HIV to their infants. Studies in Kenya, Malawi, and the U.S. found that women infected with HIV and either HSV or syphilis were two to five times more likely to pass HIV to their

infants during pregnancy or delivery than women who did not have HSV or syphilis (28, 52, 100, 149). In Tanzania women with HIV who had gonorrhea were 5.5 times more likely to pass HIV to their infants during pregnancy than women with HIV who did not have gonorrhea (64).

Screening and early treatment of maternal syphilis and gonorrhea before and during pregnancy may help reduce infant HIV infections. PMTCT programs may want to consider routine screening for syphilis, which is a low-cost test (216). Also, suppressing HSV with the ARV valacyclovir reduces genital shedding of HIV by about 60%, which is assumed to help reduce the chances of MTCT (151). Providers need to advise women with HIV to take additional precautions to prevent STIs if they are considering pregnancy. For women considering pregnancy who are already coinfecting with both HIV and another STI, providers need to explain the increased risk of MTCT, provide treatment, and discuss delivery by cesarean section (see p. 20), if available.

**Malaria or other parasitic infections.** Women with HIV are more susceptible to malaria infection than women without HIV (112, 147), and the presence of HIV doubles the risk for placental malaria infection (presence of the malaria parasite in the placenta) compared with the risk for women who have malaria but who do not have HIV (71, 169). Placental malaria infection in turn increases the chances of MTCT. In Kenya and Uganda pregnant women with HIV and placental malaria were two to three times more likely to transmit HIV to their infants during labor and delivery than mothers with HIV but no malaria (5, 16).

Also, a study in Kenya found that pregnant women coinfecting with HIV and one or more parasitic worms (lymphatic filariasis, schistosomiasis, and/or hookworm) were more than seven times more likely to pass HIV to their infants than women with HIV who were not infected with parasitic worms (71).

### **Special Care Can Help Reduce the Risk of MTCT**

Combined, interventions such as ARV medications, cesarean-section delivery, and avoidance of breastfeeding have been able to reduce the risk of mother-to-child transmission of HIV in developed countries to below 2% (58, 97), compared with 25% to 50% (for women who breastfeed as it is typically practiced) without these measures. So far, however, few women in developing countries have access to the necessary services and to safe infant formula. Efforts to provide and encourage replacement feeding where appropriate or, if that is not possible, to encourage and support exclusive breastfeeding are expanding (see p. 20). Access to ARVs for MTCT reduction and to cesarean-section delivery has been slow to expand in the countries hardest hit by HIV. WHO estimated that, at the end of 2005, fewer than 10% of pregnant women with HIV were receiving services—even if only counseling and support—to help prevent HIV transmission to their infants. As a result of insufficient services, an estimated 1,800 infants with HIV were born each day whose infections could have been avoided by these measures (257).

# What People With HIV Need to Know About Pregnancy and Preventing Pregnancy



Providers can use this list to ensure that they give women or couples with HIV accurate information, according to their needs and situation.

## PREVENTING PREGNANCY

- Condoms are the only method that helps to protect against both pregnancy and STIs. With both male and female condoms, consistent and correct use is crucial to assure the best protection.
- Using condoms and another contraceptive method at the same time provides even more protection from pregnancy than condoms alone.
- Even if it is not possible to use condoms, a woman can use another contraceptive method to protect herself from pregnancy.
- A woman with HIV, including AIDS, and women on antiretroviral (ARV) medications can use almost any family planning method, including the intrauterine device (IUD) in many circumstances. It is recommended that she avoid spermicides, however.

## BECOMING PREGNANT

### *Reduced fertility*

- Women with HIV may have some difficulty becoming pregnant and maintaining a pregnancy.
- Men with HIV also may be less fertile.
- Neither HIV infection nor ARVs cause complete infertility. People with HIV still need to use a contraceptive method correctly if they want to prevent pregnancy.

### *Risks to baby*

- There is much greater chance that babies of women with HIV will be miscarried, born prematurely, or be low weight at birth.
- If the woman has HIV, she can pass HIV to her infant during pregnancy, childbirth, or breastfeeding. Without special care, as few as 3 or as many as 10 in every 20 babies would be infected.
- If a woman with HIV also has malaria or another sexually transmitted infection (STI) such as herpes simplex virus, gonorrhea, and syphilis, she is more likely to pass HIV to her infant during pregnancy and delivery.
- ARVs given to the mother and/or infant greatly lower the risk of infecting the infant. The risk also can be lowered by cesarean-section delivery and by avoiding breastfeeding altogether or else practicing exclusive breastfeeding (giving only breastmilk), as opposed to mixed-feeding.

### *Risks to mother*

- Pregnancy does not speed up the course of HIV infection, but it is best to avoid pregnancy when the health of the mother is poor.
- HIV infection raises the risk of childbirth complications such as postpartum fever and anemia, particularly if delivery is by cesarean-section.
- Opportunistic infections such as pneumonia, malaria, and tuberculosis can increase the risk of poor pregnancy outcomes such as preterm delivery and neonatal death.

### *Risks to partner*

- If the woman is uninfected and her partner is infected, she may have to risk acquiring HIV while attempting to become pregnant. To lower the risk, advise having sex without condoms only on days that the woman is fertile.
- If the woman is infected and the man is not, artificial insemination would avoid the risk of transmitting HIV to him.
- If the partner has not been tested and will not get tested for HIV, it is safest to assume that he or she does not have HIV and to take precautions that minimize the risk of HIV transmission.

### *Care and treatment before and during pregnancy*

- ARV regimens may need to be changed before trying to become pregnant—in particular, efavirenz may cause birth defects if taken during pregnancy.
- If there is any risk that she might get an STI, a woman should avoid sex or use condoms during pregnancy. STIs pose dangers to the baby and to the woman with HIV.
- Family planning after the child is born can be discussed and decided during pregnancy, and discussion of family planning choices can continue after the baby is born.
- Seek antenatal care and prevention of mother-to-child transmission of HIV services before and during pregnancy, if available.

### *Feeding the baby*

- A woman with HIV should breastfeed exclusively (no other food or liquid) for the first six months and wean the child over a period ranging from two days to three weeks if appropriate replacement feeding is available.
- If—and only if—replacement feeding is acceptable, feasible, affordable, sustainable, and safe, mothers should not breastfeed.

**ARVs can significantly reduce the risk of MTCT.** ARVs given as prophylaxis (for disease prevention) reduce MTCT of HIV by decreasing replication of HIV—and thus the amount of virus (viral load)—in pregnant women and by protecting newborns during and after exposure to HIV. For pregnant women with HIV not taking ARVs for their own health, WHO recommends providing zidovudine (AZT) from 28 weeks of pregnancy (or as soon as possible thereafter); AZT and lamivudine (3TC) plus a single dose of nevirapine (NVP) during labor; and AZT and 3TC for seven days postpartum for women and a single dose of NVP and AZT for one week for infants (250). The simplest regimen, and the most practical and cost-effective regimen in resource-low settings, is a single dose of NVP given to the mother at the onset of labor plus a single dose for the infant soon after birth. These regimens can reduce MTCT by one-third to nearly two-thirds (230, 247). Women receiving ARVs as on-going treatment for their own health do not need an additional short course of ARVs during labor, but their infants should be given a single dose of NVP plus AZT for one week after birth or, at minimum, a single dose of NVP soon after birth. ARV regimens may need to be altered before trying for pregnancy, however—in particular, there is concern that efavirenz can cause birth defects if taken during pregnancy (70).

To date, studies have not found that the ARVs given as prophylaxis during pregnancy for MTCT place mothers and infants at greater risk for serious or life-threatening events or increase the likelihood of congenital defects or abnormal growth patterns (218, 250). Still, these treatments are not without drawbacks. Mild anemia can occur in mothers but it is temporary (230). Preterm birth is more common among women using regimens involving two or three ARVs in combination compared with single ARV regimens (110, 119). There is a concern that women who have received nevirapine during a previous pregnancy will develop NVP-resistant mutations of HIV (56, 66), which, if spread, would make it difficult to successfully treat infected mothers and their babies with NVP in the future (247). A few studies have found that NVP resistance in some individual women decreases over time, however (67, 230).

Currently, the use of ARVs by the mother and/or baby solely to prevent HIV transmission through breastfeeding is not recommended. (Breastfeeding women with HIV who require ARV therapy for their own health should continue to receive ARVs, however.) A number of clinical trials are underway (247). Preliminary results from a trial in Mozambique suggest that giving a pregnant woman a combination of AZT/3TC/NVP from week 28 of pregnancy and up to one month after delivery significantly reduces HIV levels in breastmilk compared with HIV levels in the breastmilk of women not treated (75).

**Benefits and risks of elective cesarean-section.** Elective cesarean-section (cesarean-section performed before labor and before rupture of membranes) reduces the risk of MTCT during labor and delivery by 50% to 70%, as it avoids contact between the newborn and the mother's tissues during delivery (57, 58, 95, 97). In many settings elective cesarean-section is seldom feasible, however (204). Also, women with HIV are more likely than other women to experience complications following cesarean-section, including more fevers, wound infections, and anemia (65, 114, 125, 126). Decisions about elective cesarean-section need to take into account its availability, the status of the woman's health, whether the technique can be performed safely, and what follow-up care is available (246).

**Safer infant feeding practices.** Exclusive breastfeeding for six months (giving only breastmilk to infants) poses about half the risk of MTCT posed by six months of mixed feeding (giving both breastmilk and replacement food), according to a large observational study in South Africa (36). At 26 weeks postpartum 15% of infants exclusively breastfed for 24 weeks before switching to replacement feeding had acquired HIV, compared with 27% of infants who were mixed-fed from before 14 weeks and 26% of infants who were initially exclusively breastfed and then mixed-fed from 14 weeks. This study confirms earlier findings from South Africa and Zimbabwe which found that exclusive breastfeeding reduces HIV transmission by one-fourth to one-third compared with mixed-feeding (38, 94).

Replacement feeding eliminates the risk of HIV transmission through breastfeeding. In low-resource settings, however, replacement feeding often poses risks of malnutrition and illness from contaminated water. WHO and other United Nations agencies recommend that mothers with HIV exclusively breastfeed their infants for the first six months of life and then wean the baby over a period ranging from two days to three weeks unless replacement feeding is acceptable, feasible, affordable, sustainable, and safe. If at six months replacement feeding does not meet these five criteria, mothers should continue breastfeeding with

## Resources for HIV/AIDS & Sexual and Reproductive Health Integration



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additional complementary foods and stop breastfeeding once a nutritionally adequate and safe diet without breastmilk can be provided (253).

### **Serodiscordant Couples Can Take Steps for Safer Conception**

For people with HIV who desire children, an important issue is how to achieve conception as safely as possible when one partner has HIV and the other does not. The options depend on whether the male or female partner has HIV. If the partner of a person with HIV has not been tested, providers can strongly encourage testing so that the couple can take appropriate steps to care for the partner's health and can make informed decisions. In situations where the partner has never had—and will not get—an HIV test, it is safest to assume that he or she does not have HIV and to take precautions to minimize the risk of HIV transmission.

**When a woman has HIV and her partner does not.** One option for such couples is to have unprotected sex only when a woman is fertile. This minimizes but of course does not eliminate risk to the uninfected male partner. The most cautious approach may be to have sex just once in a cycle. A woman with a 28-day cycle is usually fertile between days 8 and 15, counting from the first day of menstrual bleeding. Providers can instruct the couple on how to calculate the days when the woman is most fertile (calendar days method or symptoms-based method; for more information see "Family Planning: A Global Handbook for Providers," at <http://www.fphandbook.org>). In a study in Spain 62 HIV-discordant couples using such a strategy achieved 76 conceptions between 1998 and 2005. None of the uninfected partners became infected (10).

Theoretically, another option would be in-home insemination with her partner's sperm. This would pose no risk of HIV infection to the man.

# From Exposure to AIDS: The HIV Disease Continuum

When a person is infected with HIV, the virus enters the bloodstream and primarily infects the T helper lymphocyte cells (a type of white blood cell, also known as CD4+ cells). These cells coordinate the actions of other immune system cells to help fight disease. After HIV enters a cell, it produces new copies of itself, which can then go on to infect other cells. Over time, HIV infection greatly reduces the number of CD4+ cells, thus weakening the immune system. The process usually takes several years.

People with HIV generally progress through four distinct stages of the disease:

## **Stage 1: Primary HIV Infection**

In this first stage of HIV disease, the virus replicates quickly, and the amount of virus in the body (viral load) increases dramatically. This stage lasts a few weeks and may involve a short flu-like illness. During this stage, a person can relatively easily infect others, including an infected woman's developing fetus. The immune system begins to respond to the virus by producing HIV antibodies as well as other white blood cells that kill virus-infected cells. The immune reaction is known as seroconversion.

There are no HIV-specific antibodies detectable at this early stage of infection. An HIV test can usually detect antibodies only after 12 weeks of infection.

## **Stage 2: Clinically Asymptomatic Stage**

During this stage a person with HIV experiences no symptoms or mild symptoms such as swollen glands, weight loss, oral ulcers, and nail fungal infections. HIV antibodies are detectable in the blood, and people remain infectious. This stage lasts for an average of 10 years.

During this stage HIV is very active in the lymph nodes. The small amount of HIV RNA (HIV genetic material) that escapes the lymph nodes can be measured by the viral load test. This test helps health care providers track the progression of HIV in the body and can help people with HIV and their health care providers make choices about treatment strategies.

## **Stage 3: Symptomatic HIV Infection**

Over time HIV infection severely damages the

immune system. HIV mutates and becomes stronger, killing more CD4+ cells. The body is not able to replace these cells as fast as they are destroyed.

Symptoms develop as the immune system fails. Many of the symptoms are mild at first, but the symptoms worsen as the immune system further weakens. Symptoms can include severe weight loss, chronic diarrhea, persistent fever, and susceptibility to certain infections, known as opportunistic infections, such as tuberculosis and a certain type of pneumonia.

## **Stage 4: Progression from HIV to AIDS**

When a person's immune system further deteriorates, the illnesses experienced become more severe and lead eventually to a diagnosis of AIDS—the most advanced stage of the disease. During this stage, viral loads and infectivity are again very high.

As defined by WHO, an adult with HIV is diagnosed with AIDS if he or she develops one or more of a specific number of severe opportunistic infections or cancers and/or has a CD4+ cell count below  $200 \times 10^6$  cells per liter of blood. It is possible for someone to be very ill with HIV but not be diagnosed as having AIDS.

WHO recommends that a person with a CD4+ cell count below  $200 \times 10^6$  per liter start ARV treatment. Providers should consider treatment if the CD4+ cell count is below 350 and should start ARV treatment before the CD4+ cell count falls below 200.

As CD4+ cell and viral load tests are not available worldwide, WHO has developed a classification system—known as clinical staging—that uses symptoms to assess disease progression once HIV-infection is confirmed through antibody testing. This 4-stage system helps health care providers to determine the correct times to start treatments and to follow up response to treatment. If HIV disease is classified as Stage 4 (severe), the person should start ARV treatment, whether or not a CD4+ cell count can be done and regardless of its result. For more information on WHO's clinical staging system, visit <http://www.who.int/hiv/pub/guidelines/HIVstaging150307.pdf>

Sources: Avert 2007 (4); Hoffman 2006 (91); WHO 2006 (252); WHO 2006 (258)

## Good Nutrition Helps Women With HIV Stay Healthy in Pregnancy

Good nutrition is particularly important for pregnant women with HIV, both for their own health and for their infants'. Malnutrition can weaken women's immune systems. A weakened immune system may increase the rate of disease progression and the chances of developing opportunistic infections (215, 237). Malnutrition also increases maternal morbidity and mortality, and increases the chances of poor birth outcomes (2, 60, 62, 64). Health care providers can advise pregnant women with HIV to eat adequate amounts of appropriate food and micro-nutrients, if possible, and to gain weight.

To avoid vitamin and mineral deficiencies common among pregnant women, particularly women with HIV, women need to eat more food and a variety of foods, such as more fruits and vegetables, animal products, and

foods fortified with vitamins and minerals, during both pregnancy and lactation (168, 177). Pregnant women with HIV do not need additional protein compared with women without HIV, but their energy needs increase as they enter later stages of disease and may have more HIV-related symptoms as indicated by skin lesions and blotches, weakness, and weight loss. Providers can advise all pregnant women, including those with HIV, to eat at least one extra serving per day of the local staple food (an inexpensive food high in energy, such as rice or cornmeal) (1).

For women with HIV, gaining an appropriate amount of weight during pregnancy helps to improve both the mother's and the infant's health (168) (see Web Table 2).

To maintain good health during pregnancy, women with HIV should try to:

- Gain at least one kilogram (kg) per month in their second and third trimesters (the average woman should gain about 10 kg total, but this varies by body size and activity level);
- Eat small, frequent meals and, if possible, high-protein energy foods such as milk, eggs, cheese, and meats with and between meals;
- Seek treatment immediately for nausea, vomiting, diarrhea, fever, appetite loss, mouth sores, and/or bloating;
- Rest and limit strenuous physical activity (encourage other family members to help with domestic chores).

Finally, providers should give pregnant women information about programs that distribute food and provide nutritional supplements (1).

Using a simple tool such as a syringe, pipette, or other clean receptacle, the woman or man could insert semen into the vagina at the time that she is most likely to be fertile. The success of in-home insemination has not been studied (11).

**When a man has HIV and his partner does not.** Achieving pregnancy safely is more difficult in this situation. The only way to avoid the risk of transmitting HIV is artificial insemination using semen from a donor who has been tested and does not have HIV. Nevertheless, there are a number of approaches that may reduce the risk of transmission to the uninfected woman. One approach is to limit unprotected sex to the days that a woman is fertile; and the most cautious approach may be to have sex just once in a cycle. A study in the Democratic Republic of Congo between 1987 and 1990 found that, among 92 couples in which only the male had HIV and 85% of unprotected sex acts occurred during the woman's fertile period, 14 women became pregnant and 1 woman was infected (188).

Typically, the chances of pregnancy per act of sex during the fertile period are higher than the chances of transmitting HIV per act of sex. The overall chance of pregnancy with one act of unprotected intercourse is 3.1% but varies from 2.9% on day 8 of the cycle to a peak of at 8.6% on day 13 and declining to 7.2% on day 15 (238). The probability of transmitting HIV during one act of unprotected sex generally is 0.8% or less, but it can be higher, depending on factors such as viral load (74, 81, 233).

ARVs suppress viral loads in blood to undetectable levels in almost 70% of patients by 6 months of therapy and in 57% of patients by 12 months, according to a meta-analysis of 10 developing-country studies (98). ARVs also reduce the viral load

in seminal plasma (the fluid that nourishes and protects sperm cells). Thus, ARV treatment should reduce the risk that a man will infect his partner (172, 175). Still, some studies have found HIV in the genital tract when none was detectable in seminal plasma (19, 227), and people with undetectable seminal plasma viral loads theoretically can still pass HIV to their partners. Couples should not assume that they are no longer at risk for transmitting HIV during intercourse while using ARVs.

Where available, another option is "sperm washing," a process that separates sperm from seminal fluid, which carries most of the HIV. This process reduces the concentration of HIV to below detectable limits in most samples. Still, experts recommend testing all processed sperm before insemination (29). The purified sperm are then inseminated directly into the woman's uterus when she is ovulating and most likely to become pregnant. In U.S. and Italian studies none of a total of 931 uninfected women who received washed sperm developed HIV infection (191, 194). In Italy nearly 80% of the couples achieved pregnancy (191). (The women in this study were given fertility drugs to assure ovulation.) Sperm washing is not widely available in developing countries and too costly for most people.

Finally, giving ARVs to an uninfected woman around the time that she is exposed to HIV during sex, known as post-exposure prophylaxis (PEP), theoretically could help limit HIV transmission (120). Most of the findings on the benefits of PEP come from studies among health care workers exposed to HIV through needle sticks or other accidents in the workplace. Limited evidence from animal studies and observational studies of people suggests that PEP also can reduce the risk of HIV infection through intravenous drug use or sex (201).

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