So you want to have a baby

HIV and reproductive health

Dr. Darrell Tan and Dr. Sharon Walmsley

People living with HIV are often bombarded with information about condoms and safe sex practices, because condom use is the best way to prevent HIV and other sexually transmitted infections (STIs), short of sexual abstinence. But what if you hope to have a child? Today, the combination of highly active antiretroviral therapy (HAART) and advances in reproductive technologies provide new chances for safe reproduction.

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The most important step in having a baby is careful planning with your partner and your health care provider. HIV infection shouldn't be a reason to forego having a child. But it's important to recognize the risks involved in trying to conceive, including that of transmitting HIV to an uninfected sexual partner and to your infant. Some people may wish to consider adoption or using artificial insemination with an HIV-negative donor. Whichever way you plan to bring a child into your life, it's important to consider who might care for the child should you and your partner become incapable of doing so.

Birth control and STI prevention

Planning ahead means careful use of birth control and protection against transmission of STIs and HIV. Condoms are the only contraceptive that also protects against HIV infection. Vasectomy (getting a man's tubes tied), female sterilization and birth control pills aren't effective in preventing HIV transmission, since the virus is found in semen and vaginal secretions. Antiretroviral therapy (HAART) can also interact with the birth control pill.

When used properly, latex condoms are up to 97% effective in stopping pregnancies. Air should be squeezed out of the tip of the condom before it's used, and only water-based lubricant should be used (oil-based products can cause latex to break down). Always remember to check the expiry date on the condom package.

Condoms don't protect completely against certain STIs, such as herpes, gonorrhea, syphilis and human papillomavirus (the cause of genital warts), as these conditions often involve areas of skin that can't be completely covered. People with genital lesions or symptoms of STIs (such as abnormal discharge, burning or ulcers) should abstain from sex until the STI is diagnosed and completely treated. Problems like these increase the risk of HIV transmission even when using a condom.

Conception without infection

Couples where one partner is HIV-positive and the other is HIV-negative are called "serodiscor-

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dant". Lessening the risk of infecting the HIV-negative partner is a main concern for serodiscordant couples who are trying to conceive. Even if both partners are HIV-infected, unprotected intercourse can result in potentially dangerous "superinfection" of one partner with the other partner's virus strain.

In general, it's estimated that the risk of an HIV-positive man infecting an HIV-negative woman is between 1 in 200 (0.5%) and 1 in 2000 (0.05%) per unprotected sex act. The risk of an HIV-positive woman infecting an HIV-negative man is slightly less, at 1 in 700 (0.14%) to 1 in 3000 (0.03%). Although these numbers sound small, the additive effect of multiple sexual encounters, particularly for a couple trying to conceive, means that the risk can escalate rapidly. Other factors can also increase this risk, including the viral load of the HIV-positive partner, the infectiousness of the HIV strain, mucosal damage during intercourse, and the presence of STIs in either partner.

In studies where unprotected intercourse was limited to the time around ovulation, HIV transmission rates were approximately 4% per pregnancy achieved.

She's positive, he's negative

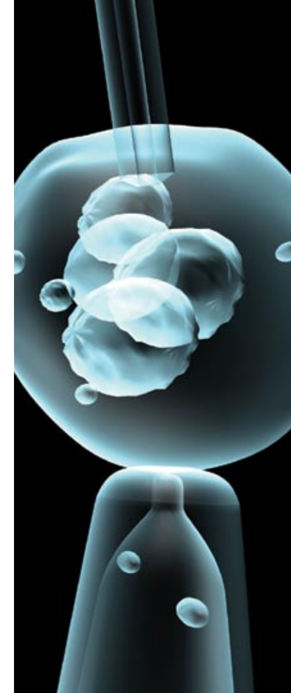
For serodiscordant heterosexual couples where the woman is HIV-infected, artificial insemination is the easiest approach to pregnancy. Couples can even be taught to perform this themselves. The man ejaculates into a sterile container, and the semen is transferred to the woman using a syringe or "turkey baster". The semen should be deposited high in the vagina, and attempts should be made around the time of ovulation to maximize the chances of success. It's important to ensure that no other STIs or genital lesions are present.

He's positive, she's negative

This situation poses the highest risk of HIV transmission to the partner. Treatment of the man's HIV infection with antiretrovirals (ARVs) may decrease this risk, but even when a man's viral load is undetectable in blood tests (less than 50 copies/mL), HIV can still be sexually transmitted to his partner because the viral load in his semen may be higher. Unfortunately, routine testing of semen samples for evidence of HIV is not yet possible. But new reproductive technologies can be used to decrease the amount of virus in seminal fluid.

"Sperm washing"

It may sound strange, but "sperm-washing" has become a useful way for HIV-positive men to father children since it was first developed in Italy over 15 years ago. The service is available at a clinic in London, Ontario, but not elsewhere in Canada. Although sperm cells themselves don't typically become infected with HIV, semen also contains white blood cells and plasma which do carry the virus. Sperm washing techniques can reduce viral content of semen by up to 10 million times, which drastically decreases (but doesn't eliminate) the likelihood of HIV transmission. Typically, semen is filtered to remove the unwanted components. Some methods also include a "swim-up" step in which only the most active spermatozoa are collected. The procedure is also useful for removing hepatitis C virus from seminal plasma. It hasn't been proved to work for hepatitis B, however, so a woman planning insemination with washed-sperm techniques should be screened for hepatitis B and vaccinated if necessary.



Without treatment, an HIV-infected mother has a 20-30% risk of passing the virus on to her baby. This figure can be reduced to 1-2% through several methods

Sperm washing can be followed by either intrauterine insemination (as in "She's positive…") or *in vitro* (test tube) fertilization. *In vitro* may be somewhat more effective for couples with fertility difficulties, but is much more expensive, and many clinics won't perform the procedure for those who are HIV positive.

As of 2004, nearly 5000 cycles of assisted reproduction had been completed in serodiscordant couples in the European CREATHE network (Centers for Reproductive Assistance to HIV couples in Europe). Their preliminary results show no cases of HIV infection in over 500 babies born. Another report on a special kind of *in vitro* fertilization, intracytoplasmic sperm injection (IVF-ICSI), demonstrated a pregnancy rate per attempt of 38.1% and no cases of horizontal (to a partner) or vertical (to the baby) HIV transmission. These results are promising, although many of the people participating were "lost to follow-up," meaning that their medical outcomes aren't known.

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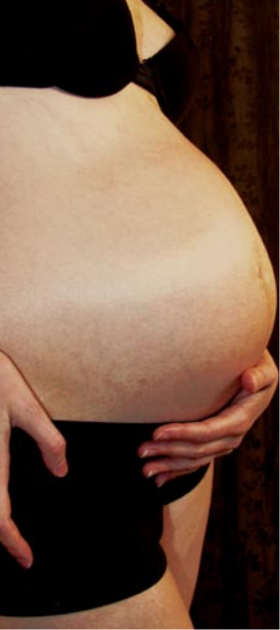

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Does HIV affect fertility?

Some reports have suggested that HIV may decrease fertility, but data on the issue is extremely limited. Fertility problems are in fact very common in the general population, affecting 10% to 20% of heterosexual couples at some time, particularly with increasing age of the woman.

Preventing mother-to-child transmission (MTCT) of HIV

HIV-infected women who become pregnant need to understand the risk of MTCT and the measures available to minimize this risk. Without treatment, an HIV-infected mother has a 20-30% risk of passing the virus on to her baby. This figure can be reduced to 1% to 2% through several methods, including HAART for the mother, use of additional anti-HIV medications at the time of delivery, planned caesarian section, and avoidance of breastfeeding.

Taking antiretrovirals during pregnancy

Combination therapy with HAART is the standard of care in HIV-infected pregnant women in Canada. Based on the results of pivotal clinical trials, most experts recommend including AZT as part of the combination (see box this page). Pregnant women shouldn't avoid taking HAART if it's needed for their own health. When prescribed solely for the purpose of preventing MTCT, the medications should be started during the second trimester to lessen fetal exposure to HAART medications.

In general, HAART medications are safe during pregnancy, although notable exceptions include efavirenz (Sustiva®), which has been associated with fetal malformations, and the combination of ddI (Videx™, didanosine) and d4T (stavudine, Zerit™), which can increase the risk of liver damage and lactic acid buildup in the mother. The Antiretroviral Pregnancy Registry is an international collaborative project that monitors ARV drug safety in pregnancy, and is an excellent source of information. You can also get information from Motherisk (Hospital for Sick Children, Toronto), or pregnancy medication information services in other cities. Overall, the successes in preventing MTCT in recent years mean that the unproven risks of HAART in pregnancy are generally outweighed by their known benefits.

The goal of treatment is to reduce the mother's viral load to undetectable levels (less than 50 copies/mL) at term, since the greatest risk of MTCT happens at the time of labour and delivery. To achieve this goal, and to maximize future HIV treatment options, it's important to take ARVs consistently and at the same time each day. It's also important to discuss your plans with your doctor before you become pregnant to make sure you get the best treatment. AZT should also be given intravenously during delivery, and orally to the baby after birth. Unfortunately, vertical transmission can still occur, likely due to shedding of virus in the genital tract and other unknown factors.

Other measures

Elective, or pre-scheduled, caesarian section has been shown to decrease MTCT rates by about 50%. This strategy likely works by lowering the baby's exposure to the virus in the birth canal and by lessening the chance that a woman's waters break prematurely. However, the studies showing this effect didn't include enough women taking effective HAART regimens, meaning that it's not clear if caesarian section is helpful when viral loads are below 50 copies per millilitre.

Another strategy is to avoid breastfeeding. Doing so provides a significant reduction in MTCT. One study in Kenya showed that HIV transmission occurred in 36.2% of women who breastfed their infants compared to only 20% in those who used formula.

Strategies for preventing MTCT

AZT during pregnancy, at delivery, and to the newborn for 6 weeks: In a key study published in 1994, this strategy decreased transmission rates from 25.5% to 8.3%. This remains a common strategy in many parts of the world.

Highly Active Antiretroviral Therapy (HAART): Rates of MTCT decrease with the number of ARVs used during pregnancy, from 20.0% with 0 drugs, to 10.4% with 1 drug, 3.8% with 2 drugs, and 1.2% with 3 drugs (Women and Infants' Transmission Study Group). HAART is the standard of care for treating HIV and for preventing MTCT in Canada, and should usually include AZT.

Planned caesarian section: Studies have shown an approximate 57% decrease in HIV transmission rate in pregnant women who aren't taking ARVs, but are taking only AZT.

Avoidance of breastfeeding: A 24-month study in Kenya showed a decrease in HIV transmission from 36.2% in breastfed infants to 20% in formula-fed infants.

Motherisk: **www.motherisk.org**
1-888-246-5840
The Antiretroviral Pregnancy Registry
www.apregistry.com

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