



**Recommendations for the Use of Antiretroviral Drugs in
Pregnant Women with HIV Infection and Interventions to Reduce
Perinatal HIV Transmission in the United States**

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General Principles Regarding Use of Antiretroviral Drugs during Pregnancy

Panel's Recommendations

- Initial evaluation of pregnant women living with HIV should include an assessment of HIV disease status and plans to initiate, continue, or modify antiretroviral therapy (ART) **(AI)**. The National Perinatal HIV Hotline (888-448-8765) provides free clinical consultation on all aspects of perinatal HIV care.
- All pregnant women living with HIV should initiate ART as early in pregnancy as possible, regardless of their plasma HIV RNA copy number or CD4 T lymphocyte count, to prevent perinatal transmission **(AI)**. It is recommended that the HIV viral load be maintained below the limit of detection throughout pregnancy and lifetime of the individual living with HIV **(AII)**.
- To minimize the risk of perinatal transmission, antiretroviral (ARV) drugs should be administered at all time points (including antepartum and intrapartum) to the woman as well as postnatally to the neonate **(AI)**.
- The known benefits and potential risks of all medications, including ARV drugs used during pregnancy and postpartum, should be discussed with all women living with HIV **(AIII)**.
- The importance of adherence to ARV drug regimens should be emphasized during patient counseling **(AII)**.
- ARV drug-resistance genotype studies should be performed before starting ARV drug regimens in women who are ARV-naive **(AII)** or ARV-experienced **(AIII)** and before modifying ARV drug regimens **(AII)** in women whose HIV RNA levels are above the threshold for resistance testing (i.e., >500 to 1,000 copies/mL).
- In pregnant women who are not already receiving ART, ART should be initiated before results of drug-resistance testing are available, because **earlier viral suppression has been associated with lower risk of transmission**. If ART is initiated before results are available, the regimen should be modified, if necessary, based on resistance assay results **(BIII)**.
- Coordination of services among prenatal care providers, primary care and HIV specialty care providers, and, when appropriate, mental health and drug abuse treatment services, intimate partner violence support services, and public assistance programs is essential to help ensure that women living with HIV adhere to their ARV drug regimens **(AII)**.
- Providers should initiate counseling about key intrapartum and postpartum considerations during pregnancy, including mode of delivery, maternal lifelong HIV therapy, family planning and contraceptive options, infant feeding, infant ARV prophylaxis, timing of infant diagnostic testing, and neonatal circumcision **(AIII)**.

Rating of Recommendations: A = Strong; B = Moderate; C = Optional

Rating of Evidence: I = One or more randomized trials with clinical outcomes and/or validated laboratory endpoints; II = One or more well-designed, nonrandomized trials or observational cohort studies with long-term clinical outcomes; III = Expert opinion

In addition to the standard antenatal assessments for all pregnant women, the initial evaluation of women living with HIV should include an assessment of HIV disease status and recommendations for HIV-related medical care. This initial assessment should include the following:

- Review of prior HIV-related illnesses and past CD4 T lymphocyte (CD4) cell counts and plasma HIV RNA levels;
- Current CD4 cell count;
- Current plasma HIV RNA level;
- Assessment of the need for prophylaxis against opportunistic infections, such as *Pneumocystis jirovecii* pneumonia and *Mycobacterium avium* complex (see the [Adult and Adolescent Opportunistic Infections Guidelines](#));
- Screening for hepatitis A virus (HAV), hepatitis C virus, and tuberculosis in addition to standard screening for hepatitis B virus (HBV) infection;
- Screening for and treatment of sexually transmitted infections (STIs), such as syphilis, *Chlamydia trachomatis*, and *Neisseria gonorrhoea*;¹⁻³
- Assessment of the need for HAV, HBV, influenza, pneumococcus, and Tdap immunizations;^{4,5}

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- Complete blood cell count and renal and liver function testing;
- HLA-B*5701 testing if abacavir use is anticipated (see [Table 10](#));
- History of prior and current antiretroviral (ARV) drug use, including prior ARV use for prevention of perinatal transmission or treatment of HIV and history of adherence problems;
- Results of prior and current ARV drug-resistance tests;
- History of adverse effects or toxicities caused by previous ARV regimens;
- **Screening for depression and anxiety and an assessment of the need for** supportive care (e.g., mental health services, substance abuse treatment, smoking cessation), as well as support to help ensure lifelong antiretroviral therapy (ART);⁶
- Screening for intimate partner violence and assessment of the need for related supportive care;
- Referral of sexual partner(s) for HIV testing and ARV treatment or prophylaxis; *and*
- Referral of children for HIV testing

The National Perinatal HIV Hotline

The National Perinatal HIV Hotline (888-448-8765) is a federally funded service provides free clinical consultation to providers caring for women living with HIV and their infants.

How Antiretrovirals Prevent Perinatal Transmission and Improve Maternal Health

All pregnant women living with HIV should receive ART early in pregnancy, regardless of their viral load or CD4 cell count, for their own health and for the prevention of perinatal HIV transmission. ARV drugs are important for maintaining maternal health because they decrease the rate of HIV disease progression and reduce the risk of opportunistic disease and the risk of maternal death. ARV drugs reduce the risk of perinatal transmission of HIV in all pregnant women, regardless of their CD4 cell counts and HIV RNA levels. ARV drugs can reduce perinatal transmission through several mechanisms. Antenatal drug administration decreases maternal viral load in blood and genital secretions.⁷⁻⁹ Strict adherence to an ARV regimen is needed to achieve rapid viral suppression and minimize the risk of perinatal transmission. Although the risk of perinatal transmission in women with undetectable plasma HIV RNA levels appears to be extremely low, perinatal transmission has been reported among women on ART (see [Recommendations for Use of Antiretroviral Drugs During Pregnancy](#)).¹⁰⁻¹³ Low-level cervicovaginal HIV RNA and DNA shedding has been detected even in women treated with ART who have undetectable plasma viral loads.¹⁴⁻¹⁶ Penetration of ARV drugs into the female genital tract varies by drug.¹⁷⁻²⁰

Infant pre-exposure prophylaxis should also be used to prevent perinatal transmission, as maternal viremia is not the only risk factor for HIV transmission. Pre-exposure prophylaxis is achieved by administering ARV drugs to the mother that cross the placenta and produce adequate systemic drug levels in the fetus. In addition, infant post-exposure prophylaxis is achieved by administering drugs to the infant after birth, providing protection from cell-free or cell-associated virus that may have entered the fetal/infant systemic circulation during labor and delivery. The importance of the pre- and post-exposure components of prophylaxis in reducing perinatal transmission is demonstrated by the reduced efficacy of interventions that involve administration of ARVs only during labor and/or to the newborns.²¹⁻²⁸ Therefore, combined preconception ART, confirmation of antepartum plasma viral load suppression, scheduled surgical delivery (if indicated, based on most recent maternal plasma viral load), intrapartum continuation of the current regimen with the addition of intravenous zidovudine (if indicated, based on the most recent maternal plasma viral load), and infant ARV prophylaxis are all recommended to prevent perinatal transmission of HIV.

General Principles of Drug Selection

In general, the guidelines for the use of ART in pregnant women are the same as those for women who are not pregnant. However, the Perinatal Guidelines may differ from the Adult and Adolescent Guidelines in

some instances where regimen selection has been modified based on concerns about specific drugs or limited experience with newer drugs during pregnancy (see [Table 6](#) and [Recommendations for Use of Antiretroviral Drugs During Pregnancy](#)).

The benefits and **potential** risks of ARV drug use during pregnancy should be considered and discussed with women (see [Table 10](#) and [Supplement: Safety and Toxicity of Individual Antiretroviral Agents in Pregnancy](#)). Potential risks of these drugs should be placed into perspective by reviewing the substantial benefits of ARV drugs for maternal health and for reducing the risk of transmission of HIV to infants. Counseling of pregnant women about ARV use should be directive and noncoercive, and providers should help women make informed decisions regarding the use of ARV drugs.

Discussions with women about initiation of ART regimens should include information about:

- Maternal risk of disease progression and the benefits and risks of therapy for maternal health;
- Benefits of ART for preventing perinatal transmission of HIV;¹¹
- Benefits of therapy for reducing sexual transmission to partners who do not have HIV when viral suppression is maintained;²⁹
- The need for strict adherence to the prescribed drug regimen to avoid resistance, optimize health outcomes, and minimize the risk of perinatal HIV transmission;
- Potential adverse effects of ARV drugs for mothers, fetuses, and infants, including potential interactions with other medications the women may already be receiving (see [Recommendations for Use of Antiretroviral Drugs During Pregnancy](#));³⁰⁻³² and
- The limited long-term outcome data for infants who were exposed to ARV drugs *in utero*, especially for newer ARV drugs.

In pregnant women with HIV who are not currently receiving treatment, **plasma HIV RNA levels should be measured, and ART should be initiated**. In women with plasma HIV RNA levels above the threshold for resistance testing (i.e., >500 to 1,000 copies/mL), ARV drug-resistance testing should be sent off before starting ART; however, ART should be initiated before results of drug-resistance testing are available, because earlier viral suppression is associated with lower risk of perinatal transmission.^{33,34} The ART regimen can be modified, if necessary, based on resistance assay results³⁵ (see [Antiretroviral Drug Resistance and Resistance Testing in Pregnancy](#)). Counseling should emphasize the importance of adherence to the ARV drug regimen to minimize the development of resistance and support the effectiveness of ART in achieving viral suppression. Women with poor adherence during pregnancy are more likely to have detectable viral load at delivery.³⁶

Transplacental passage of ARV drugs is thought to be an important mechanism of infant pre-exposure prophylaxis. Thus, when selecting an ARV regimen for a pregnant woman, at least one nucleoside/nucleotide reverse transcriptase inhibitor agent with high placental transfer should be included as a component of the ART regimen (see [Table 10](#)).³⁷⁻⁴¹

Patient Counseling and Coordination of Care

Coordination of services among prenatal care providers, primary care and HIV specialty care providers, mental health and drug abuse treatment services, and public assistance programs is essential to ensure that women living with HIV are well supported during all stages of their pregnancies and the postpartum period. Medical care of pregnant women living with HIV requires coordination and communication between HIV specialists and obstetric providers. General counseling should include current knowledge about risk factors for perinatal transmission. Risk of perinatal transmission of HIV has been associated with potentially modifiable factors, including cigarette smoking, illicit drug use, and genital tract infections. Besides improving maternal health, cessation of cigarette smoking and drug use and treatment of STIs and other genital tract infections may reduce the risk of perinatal transmission. Women should be assessed for mental health concerns and the risk of intimate partner violence and referred to services that are appropriate for each woman's individual circumstances.

In addition, providers should begin to counsel women living with HIV about what to expect during labor, delivery, and the postnatal period. This includes discussions about the mode of delivery and the possible use of intrapartum zidovudine, as well as family planning and contraceptive options during the postpartum period. Providers should also discuss the possibility of simplifying a woman's ARV regimen after delivery, which can help promote long-term adherence to ART. Discussions regarding the prevention of postnatal transmission to the neonate should also include recommendations about infant feeding, neonatal ARV prophylaxis, infant diagnostic HIV testing, and the avoidance of pre-mastication of food.

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