Introduction

Updated: January 31, 2024
Reviewed: January 31, 2024

Recommendations regarding HIV screening in pregnancy, the treatment of pregnant people with HIV, and the use of antiretroviral (ARV) drugs to prevent perinatal (vertical) HIV transmission (i.e., during pregnancy and labor and delivery) and postnatal HIV transmission (i.e., through breastfeeding) have evolved considerably in the United States since the mid-1990s, reflecting changes in both the epidemic and the science of prevention and treatment. Current recommendations for universal prenatal HIV counseling and testing,[1] antiretroviral therapy (ART) for all pregnant people with HIV, scheduled cesarean delivery for people with plasma HIV RNA >1,000 copies/mL near delivery, appropriate infant ARV management, and infant feeding counseling have resulted in a dramatic decrease in the rate of perinatal transmission of HIV to 1% or less in the United States and Europe.[2-4] In the United States, the estimated number of annual live births to pregnant people with HIV decreased from 4,587 in 2010 to 3,525 in 2019, and the number of U.S.-born infants with perinatal HIV infection decreased from 74 in 2010 to 32 in 2019.[4]

In response to this success, the Centers for Disease Control and Prevention has developed a goal of eliminating perinatal HIV transmission in the United States, defined as reducing perinatal transmission to an incidence of <1 infection per 100,000 live births and a rate of <1% among infants exposed to HIV.[5] However, incomplete implementation of routine antenatal HIV testing and other recommended interventions remains a barrier to achieving this goal.[3,6] Laws that promote universal HIV testing for pregnant women vary by jurisdiction, and prenatal testing coverage is higher in states with stronger regulations for testing all pregnant women.[7-9] Testing coverage is also poorer in subgroups that are perceived by health care providers to be at low risk of HIV acquisition (e.g., married, White, non-Hispanic, or multiparous).[10,11] Additionally, despite recommendations for repeat HIV testing in the third trimester for people at high risk of acquiring HIV and rapid testing of the birthing parent in labor or newborn testing when HIV status of the birthing parent is not known, implementation is incomplete, and many states do not have laws in place to require testing in such circumstances.[12,13] To address such challenges, many states and the District of Columbia have developed additional strategies to advance progress toward eliminating perinatal HIV transmission.[14] To further support HIV prevention and the reduction of perinatal HIV transmission, the Panel on Treatment of HIV During Pregnancy and Prevention of Perinatal Transmission (the Panel) has now added guidance about the use of HIV pre-exposure prophylaxis in people at risk of HIV acquisition who are trying to conceive, pregnant, postpartum, or breastfeeding (see Pre-Exposure Prophylaxis (PrEP) to Prevent HIV During Periconception, Antepartum, and Postpartum Periods).

In addition to primary prevention of HIV infection in people who can become pregnant, the best way to prevent HIV acquisition in infants is to focus on appropriate overall medical care for cisgender women, transgender men, and gender-diverse individuals with HIV; this includes comprehensive reproductive health care, family planning and preconception care services, optimization of HIV treatment, and maintenance of care between pregnancies. A critical component of preventing perinatal HIV transmission is ensuring that a pregnant person with HIV receives ART that sustainably suppresses viral replication to below the level of viral load assay detection as early as possible during pregnancy or, ideally, before conception.

Additionally, in the setting of maternal ART that achieves consistently undetectable plasma viral load throughout pregnancy and the postnatal period along with appropriate neonatal ARV prophylaxis, the risk of HIV transmission postnatally through breast milk may be up to 1%. In response to these data, this Panel—as well as guidelines in many high-resource countries such as Canada, Britain, and Switzerland—recommend that pregnant people receive patient-centered, evidence-based counseling on infant feeding options, including breastfeeding[15,16] (see Infant Feeding for Individuals with HIV in the United States).

A critical role of the Panel is to evaluate the many ARV drugs that are available for adults and assess the risks and benefits of using these drugs in people who are pregnant or are trying to conceive. The National Institutes of Health (NIH) Office of AIDS Research Advisory Committee (OARAC)–sponsored Panel on Antiretroviral Guidelines for Adults and Adolescents primarily considers efficacy and safety evidence when making recommendations for ART. Secondary considerations include characteristics that help promote adherence, such as improved tolerability or convenience (e.g., whether a regimen is available as a fixed-dose combination with once-daily dosing). When considering which ARV drugs to recommend for use in people who are pregnant (or who may become pregnant), the Panel generally uses data from efficacy studies performed in nonpregnant adults; however, because short-term tolerability and safety may be different in pregnancy and drug exposure can change during pregnancy, evidence from direct safety and pharmacokinetic (PK) studies in pregnant people is required.[17]

In addition to considering direct evidence about short-term safety in pregnant people, the Panel also must make judgments about fetal safety. The Panel makes an initial assessment based on data from preclinical animal studies, analyses of reports to the Antiretroviral Pregnancy Registry, and all available postmarketing surveillance data. Robust evidence about fetal safety is not available at the time of drug licensure and remains limited for most licensed drugs.[18]

When strong evidence of harm to the fetus (or birthing parent) or unacceptable drug exposure exists, it is straightforward for the Panel to make recommendations against the use of a specific drug; however, this situation is unusual. More often, the Panel must make recommendations for ARV drugs for which there are insufficient PK data in pregnant people and/or inadequate safety information on fetal exposure early in pregnancy or during the periconception period. Policymakers, regulators, clinicians, and community advocates are striving to improve the availability of data on ARV drug exposure and safety in people who are pregnant or breastfeeding, or in those who are of reproductive potential.[19-23]

In the meantime, to ensure that pregnant people are not denied the best available ART—while acknowledging that some drugs have not yet been evaluated sufficiently for evidence of harm to the fetus or birthing parent—the Panel uses a graded approach to make recommendations for regimens to use during pregnancy. Selection of ARV drugs should be individualized according to the pregnant person's ARV history, results of drug-resistance testing, and presence of comorbidities. In general, people who are already on a fully suppressive regimen when pregnancy occurs should continue their regimens. The Panel classifies ARV drugs for use in people who are pregnant or trying to conceive as *Preferred*, *Alternative*, *Insufficient Data to Recommend*, *Not Recommended Except in Special Circumstances*, and *Not Recommended* (see Table 6. What to Start: Initial Antiretroviral Regimens During Pregnancy for People Who Are Antiretroviral-Naive and Table 7. Situation-Specific

Recommendations for Use of Antiretroviral Drugs in Pregnant People and Nonpregnant People Who Are Trying to Conceive):

- *Preferred:* ARV drugs that are designated as *Preferred* in pregnancy are those that have proven durable efficacy in clinical trials in adults. *Preferred* drugs have acceptable toxicity and ease of use, pregnancy-specific PK data to guide dosing, and available data that suggest a favorable risk-benefit balance compared with other ARV options, incorporating outcomes for pregnant people, fetuses, or newborns. Some *Preferred* drugs may have minor toxicity or incompletely evaluated teratogenicity risks that are offset by other advantages for people with HIV who are pregnant or trying to conceive.
- *Alternative:* Preferred ARV drugs for nonpregnant adults that do not meet the above criteria can be considered as options for *Alternative* drugs in pregnant people when available data on the use of these drugs in pregnancy are generally favorable, but still limited. Most *Alternative* drugs or combinations are associated with more concerns (or insufficient data) related to PK, dosing, tolerability, formulation, administration, or drug–drug interactions than those in the *Preferred* category, but they are acceptable for use in pregnancy. Some *Alternative* drugs or combinations may have known risks that are offset by other advantages for people with HIV who are pregnant or trying to conceive.
- *Insufficient Data to Recommend:* The drugs and drug combinations in this category are approved for use in adults, but pregnancy-specific PK or safety data are too limited to make a recommendation for use in pregnant people. In some cases, it may be appropriate to continue using these drugs or drug combinations in patients who become pregnant on ART that has been fully suppressive and well tolerated, with consideration of additional virologic monitoring during pregnancy.
- *Not Recommended Except in Special Circumstances:* Although some drugs are not recommended for initial ART in ART-naive people because of specific safety concerns or very limited safety and efficacy data in pregnancy, there may be circumstances in which ART-experienced people need to initiate or continue using specific drugs to reach or maintain viral suppression.
- *Not Recommended:* Some drugs are designated as *Not Recommended* in pregnancy because they have inferior virologic efficacy (and thus are not recommended for adults in general), because PK data demonstrate low drug levels and a risk of viral rebound during pregnancy, or because there is evidence of serious safety concerns for the fetus or birthing parent.

The Panel systematically reviews all new information from the Antiretroviral Pregnancy Registry, published studies, and other sources to update the drug recommendations. The Panel also coordinates with the Panel on Antiretroviral Guidelines for Adults and Adolescents when there are concerns related to drug safety in pregnancy.

These guidelines update the January 2023 *Recommendations for the Use of Antiretroviral Drugs During Pregnancy and Interventions to Reduce Perinatal HIV Transmission in the United States*. The Panel, a working group of the NIH OARAC, develops these guidelines. The Panel collaborates with the companion NIH OARAC Panel on Antiretroviral Therapy and Medical Management of Children Living with HIV to jointly develop recommendations in overlapping areas (e.g., Pregnancy and Postpartum HIV Testing and Identification of Perinatal and Postnatal HIV Exposure, Diagnosis of HIV Infection in Infants and Children, Antiretroviral Management of Infants with Perinatal HIV Exposure or HIV Infection), as well as to ensure general harmony between the guidelines. Health care providers should discuss the information in these guidelines with pregnant people with HIV in

order to make collaborative, informed decisions regarding the use of ARV drugs during pregnancy, the use of scheduled cesarean delivery to reduce the risk of perinatal transmission of HIV, the use of ARV drugs in infants who have been exposed to HIV, and the method of infant feeding.

The guidelines are structured to address the care of all pregnant individuals with HIV, their infants, and people who are trying to conceive. Many of the studies that informed these guidelines included only cisgender women and, as a result, data specifically relevant for transgender men and gender-diverse people who are pregnant or are trying to conceive often are not available. The Panel continues to advocate for greater inclusion of transgender and gender-diverse people in research. When making recommendations, the Panel will strive for clarity about the appropriateness of extrapolating information from study populations of cisgender women to all people assigned female sex at birth. The Panel has begun to make changes in language throughout the guidelines to be inclusive of transgender and gender-diverse individuals assigned female sex at birth. Gender-inclusive language is now used for recommendations and general content (e.g., using "pregnant people" or "pregnant patients" vs. "pregnant women" when appropriate). The Guidelines will continue to refer to cisgender women as "women" and will refer to transgender and gender-diverse individuals where indicated for specific content. When reviewing data, results will be presented using the same terms used in the studies and publications being described (e.g., women, pregnant women, transgender men). The Panel is committed to updating and maintaining gender-inclusive language throughout the guidelines and has developed a new section to provide additional content (see Perinatal HIV Prevention for Transgender and Gender-Diverse People Assigned Female at Birth), in addition to content available in the Adult and Adolescent Antiretroviral Guidelines (see Transgender People with HIV). The Panel recognizes the importance of the countless contributions to date of the many cisgender women who have shaped our current scientific knowledge base for perinatal HIV treatment, care, and prevention through their participation in research studies in the United States and internationally. Without them, this work and these guidelines would not be possible. At the same time, changes to incorporate gender-inclusive language highlight the importance of providing care that addresses the needs of transgender and gender-diverse populations and begins to close a gap in providing gender-affirming pregnancy-related care and perinatal HIV prevention services.

The recommendations in these guidelines are accompanied by discussions of common circumstances that occur in clinical practice and the factors that influence treatment considerations. The Panel recognizes that strategies to prevent perinatal transmission and concepts related to managing HIV in pregnant people are evolving rapidly, and the Panel will continue to consider new evidence and adjust recommendations accordingly. The current guidelines are available on the Clinicalinfo website. The National Perinatal HIV hotline (1-888-448-8765) is a federally funded service that provides free clinical consultation to providers caring for patients with HIV or at risk for HIV and their children, and it serves as a resource for obtaining expert consultation on individual cases.

The Panel's recommendations are designed to ensure that cisgender women, transgender men, and gender-diverse individuals who can become pregnant receive the full benefit of ART for their own health and to prevent perinatal transmission. However, the Panel recognizes that people have the right to make informed choices about treatment during pregnancy, even when their choices differ from their health care providers' recommendations.

The current guidelines have been structured to reflect the management of an individual birthing parent–infant pair and are organized into a brief discussion of prepregnancy care followed by principles for managing the care of pregnant people and their infants during the antepartum,

intrapartum, and postpartum periods. Although perinatal transmission of HIV occurs worldwide, these recommendations have been developed for use in the United States, including updated considerations around infant feeding in the United States. Alternative antiretroviral drug recommendations may be appropriate in other countries (see the World Health Organization guidelines for more information).

Guidelines Development Process

Table 1. Outline of the Guidelines Development Process

Topic	Comment
Goal of the Guidelines	Provide guidance to HIV care practitioners in the United States on the optimal use of antiretroviral (ARV) agents to treat pregnant people with HIV, prevent HIV acquisition during pregnancy, and prevent perinatal HIV transmission in infants exposed to HIV.
Panel Members	The Panel is composed of approximately 41 voting members who have expertise in managing the care of pregnant people with HIV (e.g., training in obstetrics/gynecology, infectious diseases, or women's health), the pharmacology of ARV drugs during pregnancy, and the interventions for prevention of perinatal transmission (e.g., specialized training in pediatric HIV infection). The Panel also includes community representatives with knowledge of HIV infection in pregnant people and interventions for the prevention of perinatal transmission. The U.S. government representatives, appointed by their agencies, include at least one representative from each of the following U.S. Department of Health and Human Services agencies: Centers for Disease Control and Prevention (CDC), U.S. Food and Drug Administration (FDA), Health Resources and Services Administration (HRSA), and National Institutes of Health (NIH). Members who do not represent U.S. government agencies are selected by Panel members after an open call for nominations. Each member serves on the Panel for a 3-year period, with an option for reappointment. The Panel also may include liaison members from the National Perinatal HIV hotline, the American Academy of Pediatrics Committee on Pediatric AIDS, the American College of Obstetricians and Gynecologists, the Society of Obstetricians and Gynaecologists of Canada, and the Canadian Pediatric and Perinatal Research Group. A list of all Panel members can be found in the Guidelines Panel Members section.
Financial Disclosures	All members of the Panel submit an annual written financial disclosure that reports any association with manufacturers of ARV drugs or diagnostics used to manage HIV infection. See Financial Disclosure for a list of the latest disclosures.
Users of the Guidelines	Providers of care to pregnant people with HIV and infants who have been exposed to HIV
Developer	The Panel on Treatment of HIV During Pregnancy and Prevention of Perinatal Transmission—a working group of the Office of AIDS Research Advisory Council (OARAC)
Funding Source	Office of AIDS Research, NIH
Evidence for Recommendations	The recommendations in these guidelines are generally based on studies published in peer-reviewed journals. On some occasions, particularly when new information may affect patient safety, unpublished data that were presented at major conferences or prepared by FDA and/or manufacturers as warnings to the public may be used as evidence to revise the guidelines.
Recommendation Grading	See Table 2.

Topic	Comment
Method of Synthesizing Data	Each section of the guidelines is assigned to a small group of Panel members with expertise in the area of interest. A structured literature search is conducted by a technical assistance consultant and provided to the Panel working group. The members review and synthesize the available data and propose recommendations to the entire Panel. The Panel discusses all proposals during monthly teleconferences. Proposals are modified based on Panel discussions and then distributed, with ballots, to all Panel members. If substantive comments or votes against approval are made, the recommended changes and areas of disagreement are brought back to the full Panel (via email or teleconference) for review, discussion, and further modification to reach a final version that is acceptable to all Panel members. The recommendations in these final versions represent the consensus of Panel members and are included in the guidelines as official Panel recommendations.
Other Guidelines	These guidelines focus on pregnant people with HIV and their infants. Other guidelines (all of which are available on the Clinicalinfo website) outline the use of ARV agents in nonpregnant adults and adolescents with HIV; use of ARV agents in infants and children with HIV; treatment and prevention of opportunistic infections (OIs) in adults and adolescents with HIV, including pregnant people; treatment and prevention of OIs in children who have been exposed to HIV or who have HIV infection; and treatment of people who experience occupational or nonoccupational exposure to HIV. Preconception management for nonpregnant people of reproductive potential is discussed briefly in this document. However, for a more detailed discussion of the issues surrounding the treatment of nonpregnant adults, please consult the Adult and Adolescent Antiretroviral Guidelines and the Adult and Adolescent Opportunistic Infection Guidelines.
Update Plan	The Panel meets monthly by teleconference to review data that may affect the content of the guidelines. Updates may be prompted by new drug approvals (or new indications, new dosing formulations, and/or changes in dosing frequency), significant new safety or efficacy data, or other information that may have a significant impact on the clinical care of patients. In the event of significant new data that may affect patient safety, the Panel may issue a warning announcement and recommendations on the Clinicalinfo website until the guidelines can be updated with the appropriate changes.
Public Comments	A 2-week public comment period follows the release of the updated guidelines on the Clinicalinfo website. The Panel reviews comments to determine whether additional revisions to the guidelines are indicated. The public also may submit comments to the Panel at any time at HIVinfo@NIH.gov.

Basis for Recommendations

The recommendations in these guidelines are based on scientific evidence and expert opinion. Each recommendation statement includes a letter **(A, B,** or **C)** that represents the strength of the recommendation and a Roman numeral **(I, II,** or **III)** that represents the quality of the evidence that supports the recommendation.

Table 2. Rating Scheme for Recommendations

Strength of Recommendation	Quality of Evidence for Recommendation
A: Strong recommendation for the statement B: Moderate recommendation for the statement C: Optional recommendation for the statement	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

References

1. U.S. Preventive Services Task Force, Owens DK, Davidson KW, et al. Screening for HIV infection: US preventive services task force recommendation statement. *JAMA*. 2019;321(23):2326-2336. Available at: https://pubmed.ncbi.nlm.nih.gov/31184701.

2. Peters H, Francis K, Sconza R, et al. UK mother-to-child HIV transmission rates continue to decline: 2012–2014. *Clin Infect Dis*. 2017;64(4):527-528. Available at: https://pubmed.ncbi.nlm.nih.gov/28174911.

3. Nesheim SR, FitzHarris LF, Mahle Gray K, Lampe MA. Epidemiology of perinatal HIV transmission in the United States in the era of its elimination. *Pediatr Infect Dis J*. 2019;38(6):611-616. Available at: https://pubmed.ncbi.nlm.nih.gov/30724833.

4. Lampe MA, Nesheim SR, Oladapo KL, et al. Achieving elimination of perinatal HIV in the United States. *Pediatrics*. 2023;151(5). Available at: https://pubmed.ncbi.nlm.nih.gov/37070379.

5. Nesheim S, Taylor A, Lampe MA, et al. A framework for elimination of perinatal transmission of HIV in the United States. *Pediatrics*. 2012;130(4):738-744. Available at: https://pubmed.ncbi.nlm.nih.gov/22945404.

6. Andrews MM, Storm DS, Burr CK, et al. Perinatal HIV service coordination: closing gaps in the HIV care continuum for pregnant women and eliminating perinatal HIV transmission in the United States. *Public Health Rep*. 2018;133(5):532-542. Available at: https://pubmed.ncbi.nlm.nih.gov/30096026.

7. FitzHarris LF, Johnson CH, Nesheim SR, et al. Prenatal HIV testing and the impact of state HIV testing laws, 2004 to 2011. *Sex Transm Dis*. 2018;45(9):583-587. Available at: https://pubmed.ncbi.nlm.nih.gov/29485541.

8. Salvant Valentine S, Poulin A. Consistency of state statutes and regulations with centers for disease control and prevention's 2006 perinatal HIV testing recommendations. *Public Health Rep*. 2018;133(5):601-605. Available at: https://pubmed.ncbi.nlm.nih.gov/30096022.

9. Olakunde BO, Pharr JR, Adeyinka DA. HIV testing among pregnant women with prenatal care in the United States: an analysis of the 2011–2017 national survey of family growth. *Int J STD AIDS*. 2020;31(7):680-688. Available at: https://pubmed.ncbi.nlm.nih.gov/32538331.

10. Koumans EH, Harrison A, House LD, et al. Characteristics associated with lack of HIV testing during pregnancy and delivery in 36 U.S. states, 2004–2013. *Int J STD AIDS*. 2018;29(12):1225-1233. Available at: https://pubmed.ncbi.nlm.nih.gov/29969977.

11. Aslam MV, Owusu-Edusei K, Nesheim SR, et al. Trends in women with an HIV diagnosis at delivery hospitalization in the United States, 2006-2014. *Public Health Rep*. 2020;135(4):524-533. Available at: https://pubmed.ncbi.nlm.nih.gov/32649273.

12. Salvant Valentine S, Caldwell J, Tailor A. Effect of CDC 2006 revised HIV testing recommendations for adults, adolescents, pregnant women, and newborns on state laws, 2018. *Public Health Rep*. 2020;135(1_suppl):189S-196S. Available at: https://pubmed.ncbi.nlm.nih.gov/32735201.

13. Szlachta-McGinn A, Aserlind A, Duthely L, et al. HIV screening during pregnancy in a U.S. HIV epicenter. *Infect Dis Obstet Gynecol*. 2020;2020:8196342. Available at: https://pubmed.ncbi.nlm.nih.gov/32454582.

14. Gnanashanmugam D, Rakhmanina N, Crawford KW, et al. Eliminating perinatal HIV in the United States: mission possible? *AIDS*. 2019;33(3):377-385. Available at: https://pubmed.ncbi.nlm.nih.gov/30475262.

15. Khan S, Tsang KK, Brophy J, et al. Canadian Pediatric & Perinatal HIV/AIDS Research Group consensus recommendations for infant feeding in the HIV context. *J Assoc Med Microbiol Infect Dis Can*. 2023;8(1):7-17. Available at: https://pubmed.ncbi.nlm.nih.gov/37008587.

16. Powell AM, Knott-Grasso MA, Anderson J, et al. Infant feeding for people living with HIV in high resource settings: a multi-disciplinary approach with best practices to maximise risk reduction. *Lancet Reg Health Am*. 2023;22:100509. Available at: https://pubmed.ncbi.nlm.nih.gov/37287494.

17. Abrams EJ, Mofenson LM, Pozniak A, et al. Enhanced and timely investigation of ARVs for use in pregnant women. *J Acquir Immune Defic Syndr*. 2020(Online ahead of print). Available at: https://pubmed.ncbi.nlm.nih.gov/33298793.

18. Renaud F, Mofenson LM, Bakker C, et al. Surveillance of ARV safety in pregnancy and breastfeeding: towards a new framework. *J Int AIDS Soc*. 2022;25 Suppl 2(Suppl 2):e25922. Available at: https://pubmed.ncbi.nlm.nih.gov/35851994.

19. Mofenson LM, Pozniak AL, Wambui J, et al. Optimizing responses to drug safety signals in pregnancy: the example of dolutegravir and neural tube defects. *J Int AIDS Soc*. 2019;22(7):e25352. Available at: https://pubmed.ncbi.nlm.nih.gov/31298496.

20. Task Force on Research Specific to Pregnant Women and Lactating Women. Report to secretary, Health and Human Services and Congress 2018. Available at: https://www.nichd.nih.gov/sites/default/files/2018-09/PRGLAC_Report.pdf

21. U.S. Department of Health and Human Services, Food and Drug Administration Center for Drug Evaluation and Research (CDER) , Center for Biologics Evaluation and

Research (CBER) Postapproval pregnancy safety studies guidance for industry. 2019. Available at: https://www.fda.gov/media/124746/download

22. Abrams EJ, Calmy A, Fairlie L, et al. Approaches to accelerating the study of new antiretrovirals in pregnancy. *J Int AIDS Soc*. 2022;25 Suppl 2(Suppl 2):e25916. Available at: https://pubmed.ncbi.nlm.nih.gov/35851757.

23. Penazzato M, Lockman S, Colbers A, et al. Accelerating investigation of new HIV drugs in pregnancy: advancing the research agenda from theory to action. *J Int AIDS Soc*. 2022;25 Suppl 2(Suppl 2):e25912. Available at: https://pubmed.ncbi.nlm.nih.gov/35851834.