

# Maternal HIV Testing and Identification of Perinatal HIV Exposure

(Last updated December 29, 2020; last reviewed December 29, 2020)

## Panel's Recommendations

- HIV testing is recommended as a standard of care for all sexually active women and should be a routine component of preconception care (AII).
- All women should be tested as early as possible during each pregnancy (see [Laboratory Testing for the Diagnosis of HIV Infection: Updated Recommendations](#) and [Recommended Laboratory HIV Testing Algorithm for Serum or Plasma Specimens](#) from the Centers for Disease Control and Prevention [CDC]) (AII).
- Partners of all pregnant women should be referred for HIV testing when their status is unknown (AIII).
- Repeat HIV testing in the third trimester is recommended for pregnant women with negative initial HIV antibody tests who are at increased risk of acquiring HIV, including those receiving care in facilities that have an HIV incidence of  $\geq 1$  case per 1,000 pregnant women per year, those who reside in jurisdictions with elevated HIV incidence (see [Revised Recommendations for HIV Testing of Adults, Adolescents, and Pregnant Women in Health-Care Settings](#) from CDC), or those who reside in states that require third-trimester testing (AII).
- Repeat HIV testing is recommended for pregnant women with a sexually transmitted infection (STI) or with signs and symptoms of acute HIV infection (AIII).
- Expedited HIV testing should be performed during labor or delivery for women with undocumented HIV status and for those who tested negative early in pregnancy but are at increased risk of HIV infection and were not retested in the third trimester (AII). Testing should be available 24 hours a day, and results should be available within 1 hour. If results are positive, intrapartum antiretroviral (ARV) prophylaxis should be initiated immediately (AI).
- Women who were not tested for HIV before or during labor should undergo expedited HIV antibody testing during the immediate postpartum period (or their newborns should undergo expedited HIV antibody testing) (AII).
- When a woman has a positive HIV test result during labor and delivery or postpartum, or when a newborn's expedited antibody test is positive, an appropriate infant ARV drug regimen should be initiated immediately, and the mother should not breastfeed while awaiting the results of supplemental HIV testing (AII). See [Antiretroviral Management of Newborns with Perinatal HIV Exposure or Perinatal HIV](#) for guidance.
- Results of maternal HIV testing should be documented in the newborn's medical record and communicated to the newborn's primary care provider (AIII).
- HIV testing is recommended for infants and children in foster care and adoptees for whom maternal HIV status is unknown, to identify perinatal HIV exposure and possible HIV infection (AIII), see [Diagnosis of HIV Infections in Infants and Children](#).

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

**Rating of Evidence:** I = One or more randomized trials in children<sup>†</sup> with clinical outcomes and/or validated endpoints; I\* = One or more randomized trials in adults with clinical outcomes and/or validated laboratory endpoints with accompanying data in children<sup>†</sup> from one or more well-designed, nonrandomized trials or observational cohort studies with long-term clinical outcomes; II = One or more well-designed, nonrandomized trials or observational cohort studies in children<sup>†</sup> with long-term outcomes; II\* = One or more well-designed, nonrandomized trials or observational studies in adults with long-term clinical outcomes with accompanying data in children<sup>†</sup> from one or more similar nonrandomized trials or cohort studies with clinical outcome data; III = Expert opinion

<sup>†</sup>Studies that include children or children and adolescents, but not studies limited to post-pubertal adolescents

## HIV Testing in Pregnancy

HIV infection should be identified prior to pregnancy (see [Preconception Counseling and Care for Women of Childbearing Age Living with HIV](#)) or as early in pregnancy as possible. In the United States, approximately 20% to 34% of infants with perinatal HIV exposure are born to women whose diagnosis was not known prior to pregnancy.<sup>1</sup> Early diagnosis provides the best opportunity to improve maternal health and pregnancy

outcomes, to prevent infant acquisition of HIV, and to identify HIV infection and start therapy as soon as possible in infants who acquire HIV. Universal voluntary HIV testing is recommended as the standard of care for all pregnant women in the United States by the Panel on Antiretroviral Therapy and Medical Management of Children Living with HIV and the Panel on Treatment of Pregnant Women with HIV Infection and Prevention of Perinatal Transmission (the Panels), the Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics, the American College of Obstetricians and Gynecologists, and the U.S. Preventive Services Task Force.<sup>2-6</sup> All HIV testing should be performed in a manner that is consistent with state and local regulations. CDC recommends the “opt-out” approach, which is allowed in many jurisdictions, and which involves notifying pregnant women that HIV testing will be performed as part of routine care unless they choose not to be tested.<sup>3</sup> The “opt-in” approach involves obtaining specific consent before testing, and this approach has been associated with lower testing rates.<sup>7,8</sup> The mandatory newborn HIV testing approach, which has been adopted by several states, involves testing newborns with or without maternal consent. In some areas, this applies to all newborns; in others, it applies only to the infants of mothers who have declined prenatal or intrapartum testing.

Partners of pregnant women also should be encouraged to undergo HIV testing when their status is unknown, consistent with the [2006 CDC recommendations](#) for HIV testing of all individuals in the United States. Testing will facilitate linkage to care if a partner is diagnosed with HIV infection. Because women are more susceptible to HIV acquisition during pregnancy and the postpartum period,<sup>9</sup> clinicians also can initiate a discussion about preventive interventions, including [pre-exposure prophylaxis](#), for a pregnant woman without HIV who is at risk for acquiring HIV, e.g., living with a partner who has or is at high risk for HIV (see [Prophylaxis \(PrEP\) to Reduce the Risk of Acquiring HIV During Periconception, Antepartum, and Postpartum Periods](#)).

Clinicians should assess a woman’s risk of acute HIV infection, particularly late in pregnancy, because a pregnant woman may receive a negative result for expedited or rapid HIV testing when she is in the window period (the window period lasts up to 15 days post-infection when using the combined antigen/antibody immunoassay, and up to 28 days when using other assays). However, during this period she will be viremic,<sup>10</sup> with a high risk of perinatal transmission to her newborn. The HIV RNA assay can detect the presence of HIV as early as 10 days post-infection, so this test should be used when acute HIV infection is suspected. See [Acute HIV Infection](#) for more information.

Providers should be aware that gaps in maternal HIV testing do occur and can contribute to missed opportunities for preventing perinatal HIV transmission.<sup>11-14</sup> Maternal HIV testing should be performed as early as possible during pregnancy, wherever a woman seeks care (including emergency departments and prenatal clinics), to avoid missed opportunities to identify pregnant women with HIV. Repeat HIV testing should be performed in the third trimester for women who are at increased risk of acquiring HIV or who are living in areas of high HIV incidence, and at the time of a diagnosis of a sexually transmitted infection (STI), or when they show symptoms and signs of possible acute HIV infection. Women with unknown or undocumented HIV status who present to care in labor should be tested during delivery or as soon as possible after delivery.<sup>11-14</sup>

Determining antenatal maternal HIV status enables—

- Women with HIV to receive appropriate antiretroviral therapy (ART) and prophylaxis against opportunistic infections;
- Initiation of treatment in the identified women to maintain and improve their health, decrease risk of HIV transmission to their fetus/infant and their partners;<sup>3,15,16</sup>
- Referral of partners for testing, which allows them to initiate either treatment if the results are positive or preventive interventions if the results are negative;
- Provision of ART to the mother during pregnancy and labor, and provision of an appropriate antiretroviral (ARV) drug regimen to the newborn, to reduce the risk of perinatal transmission;

- Counseling of women with HIV about the indications for (and potential benefits of) scheduled elective cesarean delivery to reduce the risk of perinatal transmission of HIV;<sup>17–19</sup>
- Counseling of women with HIV about the risks of HIV transmission through breast milk (in the United States, breastfeeding is not recommended for women with HIV, see [Counseling and Managing Women Living With HIV in the United States Who Desire to Breastfeed](#);<sup>20</sup> and
- Early diagnostic evaluation of infants exposed to HIV (see [Diagnosis of HIV Infection in Infants and Children](#)), as well as testing of other children, to permit prompt initiation of ART and any indicated prophylaxis measures.<sup>2,21–23</sup>

New technology has made it possible to detect HIV earlier and has reduced the performance time for laboratory-based assays, which now can be completed in <1 hour. Accordingly, the Panels now base their recommendations for HIV testing on [CDC’s 2014 Laboratory Testing for the Diagnosis of HIV Infection: Updated Recommendations](#).<sup>24</sup> The guidelines recommend that clinicians initiate HIV testing with an immunoassay that is capable of detecting HIV-1 antibodies, HIV-2 antibodies, and HIV-1 p24 antigen (referred to as an antigen/antibody combination immunoassay). Individuals with a reactive antigen/antibody combination immunoassay should be tested further with an HIV-1/HIV-2 antibody differentiation assay (referred to as supplemental testing). Individuals with a reactive antigen/antibody combination immunoassay and a nonreactive differentiation test should be tested with a Food and Drug Administration–approved plasma HIV RNA assay to establish a diagnosis of acute HIV infection (see CDC’s [Recommended Laboratory HIV Testing Algorithm for Serum or Plasma Specimens](#)).

Discordant HIV testing results can be seen, requiring careful evaluation and often repeat tests. Early in HIV infection, prior to HIV seroconversion, the antigen-antibody screen will be negative and the HIV RNA assay will be positive. This is seen in acute infection, because the HIV RNA assay is positive before the antigen/antibody screen. The test combination of a positive antigen-antibody screen, negative antibody differentiation assay, and positive HIV RNA assay also can be seen early in HIV infection, because the IgG-based antibody differentiation assay is positive later in infection than the antigen capture or the IgM result in the antigen-antibody screen.

Clinicians should be aware that as more individuals undergo repeat HIV testing, the number of false-positive screens will increase. The combination of a positive antigen-antibody screen with a negative antibody differentiation assay and a negative HIV RNA assay is seen in persons without HIV infection who have a false-positive antigen-antibody screen.

These examples should make it clear that for any positive HIV 1/2 antigen-antibody screen, an HIV RNA assay should be done, since it is the HIV RNA assay that is needed to resolve questions raised by discordant results on the antigen-antibody screen and the antibody differentiation assay.

The antigen/antibody combination immunoassay is the test of choice and can be done quickly (referred to as an expedited test), but it requires trained laboratory staff and, therefore, may not be available in some hospitals 24 hours a day. When this test is unavailable, initial testing should be performed by the most sensitive expedited or rapid test available. Every delivery unit needs to have access to an HIV test that can be done rapidly (i.e., in <1 hour) 24 hours a day. If the test result is positive, the test to confirm HIV infection should be performed as soon as possible (as with all initial assays with positive results). Older antibody tests have lower sensitivity in the context of recent acquisition of HIV than antigen/antibody combination immunoassays. Therefore, testing that follows the 2014 CDC algorithm should be considered if HIV risk cannot be ruled out. Results of maternal HIV testing should be documented in the newborn’s medical record and communicated to the newborn’s primary care provider.

### ***Repeat HIV Testing in the Third Trimester***

Repeat HIV testing during the third trimester, before 36 weeks gestation, is recommended (see [Acute HIV Infection](#))<sup>25</sup> for pregnant women with negative results on their initial HIV antibody tests who<sup>5</sup>—

- Are at high risk of acquiring HIV (e.g., those who are injection drug users or partners of injection drug users, those who exchange sex for money or drugs, those who are sex partners of individuals with HIV, those who have had a new sex partner or more than one sex partner during the current pregnancy, or those who have a suspected or diagnosed STI during pregnancy); *or*
- Are receiving health care in facilities where prenatal screening identifies 1 or more pregnant women with HIV per 1,000 women screened, or who reside in a jurisdiction that has a high incidence of HIV or AIDS in women between the ages of 15 and 45 years (a list of jurisdictions where such screening is recommended is found in the [2006 CDC recommendations](#); a more up-to-date list is forthcoming), or who reside in states that require third-trimester testing; *or*
- Have signs or symptoms of acute HIV (e.g., fever, lymphadenopathy, skin rash, myalgia, headaches, oral ulcers, leukopenia, thrombocytopenia, elevated transaminase levels).<sup>3,26–28</sup>

Women who decline testing earlier in pregnancy should be offered testing again during the third trimester. An antigen/antibody combination immunoassay should be used, because these tests have a higher sensitivity in the setting of acute HIV infection than older antibody tests.<sup>24,29</sup> When acute HIV infection is suspected during pregnancy, during the intrapartum period, or while breastfeeding, a plasma HIV RNA test result should be performed in conjunction with an antigen/antibody combination immunoassay (see [Acute and Recent \[Early\] HIV Infection](#) in the [Adult and Adolescent Antiretroviral Guidelines](#)).

Providers should be proactive in assessing a woman's HIV acquisition risk and implementing third-trimester HIV retesting when indicated in areas where it is not routine. A recent study in Baltimore found that only 28% of women were retested for HIV despite the high incidence of HIV in Maryland and a high frequency of clinical risk factors.<sup>14</sup> A study of data from 2007 to 2014 on Florida children with perinatal HIV exposure found that perinatal HIV transmission was associated with poor or late prenatal care, diagnosis of maternal HIV during labor and delivery or after birth, and, in some cases, acute maternal infection (as indicated by negative results for initial tests). In addition, the study noted that third-trimester HIV tests were not performed in a portion of the patients.<sup>30</sup> In a more recent study from a high-prevalence area of Florida, 91.7% had first- or second-trimester screening, and although only 82.2% had a third-trimester test, 89.3% of those without third-trimester screening had rapid testing upon admission.<sup>31</sup>

Repeat HIV testing at other times during pregnancy also should be considered when clinically indicated. For example, repeat testing should be performed when a woman presents with symptoms that are suggestive of an STI, a confirmed STI diagnosis, or symptoms or signs that are consistent with acute HIV infection.

### **HIV Testing During Labor in Women with Unknown HIV Status**

Women in labor whose HIV status is undocumented should undergo HIV testing in order to identify HIV infection in the mothers and HIV exposure in their infants. HIV testing during labor has been found to be feasible, accurate, timely, and useful both in ensuring prompt initiation of intrapartum maternal ARV for fetal/infant prophylaxis (see [Intrapartum Care for Women with HIV](#)) and in developing an appropriate ARV regimen for infants who are at high risk of perinatal HIV transmission (see [Table 11](#)).<sup>2–4,21,27,32,33</sup>

Policies and procedures must be in place to ensure that staff are prepared to provide patient education and expedited HIV testing, that appropriate ARV drugs are available whenever needed, and that follow-up procedures are in place for women who receive an HIV diagnosis and for their infants.

If the antigen/antibody combination immunoassay is not available, initial testing should be performed by the most sensitive expedited test available.

A positive expedited HIV test result must be followed by a supplemental test.<sup>24</sup> Immediate initiation of maternal intravenous intrapartum zidovudine is recommended to prevent perinatal transmission of HIV pending the supplemental result (see [Intrapartum Care for Women with HIV](#)).<sup>2–4,6,21,27</sup> Pending results of supplemental maternal testing, infants should receive an ARV regimen that is appropriate for infants who are at high risk of perinatal HIV transmission as soon as possible (see [Antiretroviral Management of Newborns with Perinatal HIV Exposure or Perinatal HIV](#) or contact the [National Perinatal HIV Hotline](#)). No further testing is required for specimens that are nonreactive (negative) on the initial immunoassay, unless acute HIV infection is suspected (see [Acute HIV Infection](#)).<sup>24</sup>

## **HIV Testing During the Postpartum Period**

Women who have not been tested for HIV before or during labor should be offered expedited testing during the immediate postpartum period. Maternal testing should be done using the antigen/antibody combination immunoassay to screen for established and acute HIV; results should be obtained in <1 hour. If acute HIV infection is a possibility, then a plasma HIV RNA test should be sent, as well. When mothers are unavailable for testing, their newborns should undergo expedited HIV testing.<sup>2,21,27</sup> Postnatal ARV drugs need to be initiated as soon as possible—ideally ≤6 hours after birth—to be effective in preventing perinatal transmission. When an initial HIV test is positive in mothers or infants, it is strongly recommended that clinicians initiate an ARV regimen that is appropriate for infants who are at high risk of perinatal HIV transmission and counsel the mothers against breastfeeding. Both actions can be taken before the results of supplemental maternal HIV tests have confirmed the presence of HIV (see [Antiretroviral Management of Newborns with Perinatal HIV Exposure or Perinatal HIV](#)). Breast milk can be expressed while supplemental HIV diagnostic testing is being completed, but it should not be given to the infant until testing confirms that the mother is HIV negative. If supplemental test results are negative and acute HIV is excluded, infant ARV drugs can be discontinued. In the absence of ongoing maternal HIV exposure, breastfeeding can be initiated.

### ***Infant HIV Testing When Maternal HIV Test Results Are Unavailable***

When maternal HIV test results are unavailable (e.g., for infants and children who are in foster care) or their accuracy cannot be evaluated (e.g., for infants and children who were adopted from countries where results are not reported in English), HIV testing is indicated to identify HIV exposure and possible infection in these infants or children.<sup>2</sup> The choice of test will vary based on the age of the child (see [Diagnosis of HIV Infection in Infants and Children](#)). Mechanisms should be developed to facilitate prompt HIV screening for infants who have been abandoned and who are in the custody of the state.

### ***Acute Maternal HIV Infection During Pregnancy or Breastfeeding***

Women are more susceptible to HIV infection during pregnancy and the early postpartum period.<sup>9</sup> Risk of HIV exposure should be assessed in all women who are considering becoming pregnant, as well as in all pregnant and postpartum women who previously tested negative for HIV, including women who are breastfeeding. Women with risk factors for HIV acquisition should receive prevention counseling and appropriate interventions, including pre-exposure prophylaxis if indicated (see [Preconception Counseling and Care for Women of Childbearing Age Living with HIV](#) and [Pre-exposure Prophylaxis \(PrEP\) to Reduce the Risk of Acquiring HIV During Periconception, Antepartum, and Postpartum Periods](#)). Women who have acute HIV during pregnancy or lactation have an increased risk of perinatal transmission and secondary sexual transmission of HIV (see [Acute HIV Infection](#)).<sup>25,34–37</sup> The antigen/antibody combination immunoassay will detect acute HIV infection earlier than other immunoassays, within approximately 15 days of acquisition. When acute HIV infection is suspected, a plasma HIV RNA test should be sent as well, because virologic tests can detect the presence of HIV approximately 5 days earlier than the antigen/antibody combination immunoassay. Women with possible acute HIV infection who are breastfeeding should cease breastfeeding immediately until HIV infection is confirmed or excluded.<sup>20</sup> Breast milk can be expressed while HIV diagnostic testing is completed. Breastfeeding can resume

if HIV infection is excluded and there is no ongoing risk. Care of pregnant or breastfeeding women with acute or early HIV, and their infants, should follow the recommendations in the Perinatal Guidelines (see [Acute HIV Infection](#) and [Guidance for Counseling and Managing Women with HIV in the United States Who Desire to Breastfeed](#)).

### ***Other Issues***

Clinicians should be aware of public health surveillance systems and regulations that may exist in their jurisdictions for reporting infants who have been exposed to HIV; this is in addition to mandatory reporting of persons with HIV, including infants. Reporting infants who have been exposed to HIV allows the appropriate public health functions to be accomplished.

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