

SCREENING AND MANAGEMENT OF MATERNAL HIV INFECTION

IMPLICATIONS FOR MOTHER AND INFANT

Revised Edition, 2008



Screening and Management of Maternal and HIV Infection

IMPLICATIONS FOR MOTHER AND INFANT

Revised Edition, 2008

Pub # 950-145



For persons with disabilities, this document is available
by request in other formats. Please call 1-800-525-0127.
(TDD/TYY 1-800-833-6388)

Please note that blank pages have been added to this document to facilitate book
printing on both sides of a piece of paper.

Screening and Management of Maternal HIV Infection **Implications for Mother and Infant**

Revised Edition, 2008

Editors

Jane E Hitti, MD, MPH (2003/2005/2008)

Ann J Melvin, MD (1998/ 2003/ 2005/2008)

Polly Taylor, CNM, MPH, ARNP (2000/2003/2005/2008)

Deborah C Goldman, ARNP, MPH (2000)

Nancy O'Brien-Abel, MN, RNC (1998)

Preface

Jane E. Hitti, MD, MPH

Layout and Design

Rebecca Ross (2003/2005/2008)

Marilyn Hanna (2008)

Information about HIV medications for pregnant and postpartum women and newborns outdates quickly. For current recommendations, contact:

- An infectious disease specialist knowledgeable about perinatal HIV
- Go to <http://aidsinfo.nih.gov/>
- Call the CDC Hotline 1-800-342-AIDS
- Call Maternal Infant Care Clinic 206-598-4070

Screening and Management of Maternal HIV Infection **Implications for Mother and Infant**

Revised Edition, 2008

©1998, 2000, 2003 Northwest Regional Perinatal Program; University of Washington School of Medicine; Department of Obstetrics and Gynecology; Division of Perinatal Medicine; Box 356460; Seattle, WA 98195-6460. (206) 543-3729

Originally produced by

Northwest Regional Perinatal Program; Department of Obstetrics and Gynecology; Division of Perinatal Medicine; University of Washington,

Department of Pediatrics; Division of Neonatology; Children's Hospital and Regional Medical Center; University of Washington; Seattle, Washington, and

Washington State Department of Health; Olympia, Washington

2003/2005/2008 Editors

Jane E. Hitti, MD, MPH, Associate Professor, Department of Obstetrics and Gynecology; Adjunct Associate Professor, Department of Epidemiology; University of Washington School of Medicine; Obstetrical Medical Director Public Health Seattle and King County

Ann J. Melvin, MD, Associate Professor, Department of Pediatrics; Division of Infectious Diseases; Children's Hospital and Regional Medical Center; University of Washington; Seattle, Washington

Polly Taylor, CNM, MPH, ARNP, Public Health Nurse Consultant; Maternal and Infant Health; Washington State Department of Health; Olympia, Washington

Reviewers

Nancy O'Brien-Abel, MN, RNC (1998/2000/2003); Perinatal Clinical Nurse Specialist, NW Regional Perinatal Program; Department of Obstetrics and Gynecology; Division of Perinatal Medicine; University of Washington; Seattle, Washington

Jeanette Zaichkin, MN, RNC (2000/2003/2005); Public Health Nurse Consultant, Maternal and Infant Health; Washington State Department of Health; Olympia, Washington

John Peppert (2000/2003/2005); Office Director, Infectious Disease and Reproductive Health; Washington State Department of Health; Olympia, Washington

Brown McDonald (2008), Manager, HIV/AIDS Prevention and Education Services; Washington State Department of Health; Olympia, Washington

Michelle Burton (2000/2003/2005/2008); Public Health Nurse Coordinator for Statewide Services; Northwest Family Center at Madison Clinic; Seattle, Washington

Contents

Preface	1
HIV Testing During Pregnancy	3
HIV Diagnostic Tests.....	5
Post Test Counseling	8
Indeterminate Results.....	8
Positive Results	10
Perinatal HIV Transmission.....	13
Risk.....	13
Timing.....	13
Consultation and Referral of HIV-infected Pregnant Women	14
Laboratory Tests for Positive Women.....	17
Laboratory Monitors of HIV Infection	17
Laboratory Tests for HIV-Infected Pregnant Women	18
Schedule of Laboratory Tests	19
CDC HIV Classification of Disease and Reporting	20
Medications/Treatment During Pregnancy, Labor and Delivery	21
Medications Available.....	21
Treatment Recommendations	22
Antiretroviral Pregnancy Registry	24
History and Physical of HIV-Infected Pregnant Women	25
Medication During Labor.....	26
Labor & Birth Tool	27
Cesarean Birth	27
Avoiding Risk of Transmission	28
Postpartum Management	31
Treatment	31
Postpartum Care.....	31
Contraception	31
Patient Education	32
The HIV Exposed Infant.....	35
Laboratory Tests	35
Medications	35
Follow-up Testing	36
Diagnosis.....	37
Appendix A - Resource Directory	39
Appendix B - Washington State Local Health Jurisdictions	45
Appendix C - Free Regional and National Telephone Consultation	49
Appendix D - Web sites.....	51
References.....	53

Preface

The past fifteen years have brought tremendous advances in the prevention of HIV transmission from mother to infant. Before Zidovudine (ZDV) therapy was available, approximately 25–30% of HIV-positive women in the U.S. transmitted HIV to their infants. With ZDV alone, the rate of infection fell to 5–8%. Most recently, studies have shown that HIV-positive pregnant women who have a good response to combination HIV therapy (viral load <1000 copies/ml) have a 2% or lower rate of transmitting HIV to their infants. This same low rate can also be achieved for women with higher viral loads by performing a cesarean delivery prior to the onset of labor or ruptured membranes.

As health care providers for the pregnant woman, we have an obligation to care for both the mother and her fetus. Prevention of infant HIV transmission is a critical aspect of HIV care for the pregnant woman. However, we must also be certain that HIV treatment in pregnancy does not adversely affect a woman's health or compromise her choices for treatment in the future. Current treatment guidelines recommend offering comprehensive antiretroviral therapy to all HIV-positive pregnant women, even if they do not meet criteria for treatment outside of pregnancy. Optimizing maternal health will also increase chances of having a healthy infant, since maternal HIV viral load is the most important predictor of infant HIV infection.

With the current spectrum of anti-HIV drugs, the outlook for adults with HIV infection has brightened considerably. Compared to 12 years ago, HIV-positive women can now expect to feel better and live longer. For many HIV-positive women, having children is an important part of their life plan. The approach to these women should be similar to that for women with other chronic illnesses, such as diabetes or hypertension, who become pregnant.

Prevention remains the key to eradicating HIV disease. By screening for HIV in pregnancy, we can identify HIV-infected women and greatly decrease the risk of perinatal HIV transmission while improving maternal health. In addition, HIV testing in pregnancy provides the opportunity to counsel HIV-negative women about reducing their risk of HIV acquisition. The information in this handbook is intended to help us all with the continuing effort to prevent HIV infection in women and infants.

Jane E Hitti, MD, MPH
Associate Professor, Department of Obstetrics and Gynecology
Adjunct Associate Professor, Department of Epidemiology
University of Washington School of Medicine, and
Obstetric Medical Director, Public Health Seattle-King County

HIV Testing During Pregnancy

Should all women be tested for human immunodeficiency virus (HIV) during pregnancy?

All pregnant women should be tested for HIV prior to pregnancy or as early in pregnancy as possible. Dramatic declines in reported pediatric AIDS cases have been observed due to major advances in the treatment of HIV infection and prevention of perinatal transmission.

The Washington State Board of Health adopted revised rules for AIDS counseling for pregnant women. Effective July 6, 2002, these rules are designed to reduce barriers to routine HIV testing of pregnant women, consistent with the recommendations of the Centers for Disease Control and Prevention, the Institute of Medicine, the American College of Obstetricians and Gynecologists, and other national and state organizations.

In part, the amended rules require health care providers to:

1. Encourage all pregnant women to have a test for HIV, regardless of identified risk.
2. Obtain the verbal or written consent of the pregnant woman prior to testing.
The consent may be part of the general consent for other tests provided that the woman is informed a test for HIV is included. If the test is refused, refusal must be documented in the patient's medical record.
3. Provide information, either verbally or in writing, addressing:
 - ⇒ All pregnant women are recommended to have an HIV test;
 - ⇒ HIV is the cause of AIDS and how HIV is transmitted;
 - ⇒ A woman may be at risk for HIV infection, and not know it;
 - ⇒ The efficacy of treatments to reduce vertical transmission;
 - ⇒ Anonymous testing is available, and why confidential testing is recommended;
 - ⇒ The need to report HIV infection;
 - ⇒ Public funds are available to assist eligible infected women to receive HIV care;
and

- ⇒ Women who decline testing will not be denied care for themselves or their infants.
- ⇒ Provide counseling to those women who identify a behavioral risk for HIV, based on the risk assessment

The Washington State Department of Health has developed a patient brochure that meets the requirement to provide certain information to the pregnant woman. For copies, contact Barbara Schuler at 360-236-3487 or by email to barbara.schuler@doh.wa.gov, or it can be downloaded from the DOH web site - http://www3.doh.wa.gov/here/materials/HERE_CRAListing.aspx?ID=80&Cnt=3&NAME=HIV/AIDS

In Washington State, for almost two-thirds of the HIV-infected women, heterosexual sex was identified as the exposure risk. Sex partners of three-quarters of these women were identified as HIV-infected or at high risk of HIV infection, although infection status or risk behavior of these partners may not have been known to these women until they were diagnosed with HIV.

Data has shown that nationwide, even in areas of high HIV prevalence, half of the HIV-infected women were not aware of having HIV risk factors. The following cases are illustrative.

Case #1: A 32-year-old woman with 3 children from a previous marriage acquired a new partner. Neither she nor her new partner had any HIV risk factors. He was HIV negative. She had a lifetime history of less than 5 heterosexual partners, none of whom, to her knowledge, exhibited high risk behavior. During the fourth pregnancy, she tested HIV positive and received antiviral chemotherapy. This child has remained HIV negative and is currently 1 year of age. Unfortunately, her other children, ages 6, 4, and 2 are HIV-infected. Too late, she learned that her former husband had HIV. She had been unaware of his risk taking behaviors. Had she been tested during previous pregnancies, she may have known her HIV status early enough to possibly prevent her older children from becoming infected.

Case #2: A 27-year-old single woman was a regular blood donor. The last time she donated (before her pregnancy), she was informed that she was HIV positive. She had no risk factors other than approximately 10 lifetime sex partners, none of whom, to her knowledge, exhibited high-risk behavior. Too late, she learned that one of her partners was HIV-infected. He was aware of his HIV status during their relationship, but did not reveal this information to her.

Factors conveying increased risk for HIV infection in pregnant women include:

- ⇒ Injection drug use (IDU)
- ⇒ Multiple sex partners

- ⇒ History of sexually transmitted diseases
- ⇒ Blood transfusions or artificial insemination prior to 1985
- ⇒ Sexual partners (current or past) who are:
 - HIV infected
 - Injection drug users
 - Men who have sex with other men
 - Having unprotected sex with multiple partners
 - Diagnosed or have history of sexually transmitted diseases, and/or
 - Recipients of blood transfusions prior to 1985
 - Immigrants from geographic region with high HIV seroprevalence

What are the laboratory HIV diagnostic tests?

- ⇒ Screening Antibody Test: Enzyme Immunoassay (EIA or ELISA)*
 - Sensitivity and specificity >99%
 - Positive predictive value of a reactive EIA ranges from 20% to over 95%, with lower values in low HIV prevalence populations
 - Based on sensitivity of the EIA, as well as prevalence of HIV in the population tested
 - Specificity of <100% necessitates use of a confirmatory assay to ensure that the antibody reaction is specific for HIV

Test Interpretation: Reactive or Non-Reactive

* This test alone cannot be used to provide a positive result as per Washington State law and CDC (Centers for Disease Control and Prevention) guidelines.

- ⇒ Rapid testing during labor:

Timely rapid HIV test results may allow providers to initiate antiretroviral therapy to decrease the risk of mother-to-child HIV transmission. If rapid HIV test results are available before delivery, antiretroviral therapy can be provided to the mother intrapartum. Antiretroviral prophylaxis should also be provided to the infant as soon as possible after delivery. Rapid HIV test results may also allow providers to avoid some common obstetric practices that may increase the risk of HIV transmission (e.g., artificial rupture of membranes, and fetal scalp electrode placement). In addition, knowledge of a positive rapid HIV result allows the prenatal provider time to advise the mother to avoid breastfeeding her infant and to initiate other counseling regarding her new HIV diagnosis while awaiting confirmation of the rapid test results.

Routinely offering rapid HIV testing to women whose HIV status is unknown during labor and delivery provides the opportunity to reduce transmission even among women who do not seek care until labor begins. The rapid HIV test kits now licensed in the United States make test results available in 20 minutes or less. Findings from the CDC-sponsored Mother-Infant Rapid Intervention at Delivery (MIRIAD) study indicate that offering voluntary HIV testing during labor is feasible in obstetric settings and that the OraQuick Rapid HIV-1 Antibody Test, used on whole blood specimens, delivers accurate and timely test results. However, a positive rapid HIV test must be confirmed using a conventional HIV testing algorithm including enzyme immunoassay and Western blot confirmation.

The CDC recommends that hospitals adopt a policy of routine, rapid HIV testing using an opt-out approach for women who have undocumented HIV test results when presenting to labor and delivery. ACOG recommends rapid testing for women with undocumented HIV test results. (Committee Opinion #304, November 2004).

For more information on developing and implementing an HIV rapid testing during labor and delivery protocol, go to the following web address to get a copy of "Rapid HIV Testing During Labor and Delivery for Women of Unknown HIV Status: A Practical Guide and Model Protocol" at <http://www.cdc.gov/hiv/topics/testing/resources/guidelines/pdf/Labor&DeliveryRapidTesting.pdf>

⇒ Confirmatory Antibody Test: HIV Western blot

- Most commonly used confirmatory test
- Detects serum antibodies directed against specific HIV-1 proteins of various parts of the virus:
 - Core protein (gag) (p17/18, p24, p55)
 - Polymerase protein (pol) (p31, p51, p66)
 - Envelope protein (env) (gp41, gp120/160)
- The CDC has defined a positive HIV-1 Western blot as the presence of antibody bands against at least two or more of the following HIV-1 proteins:
 - p24
 - gp41
 - gp120/160

Test Interpretation: Positive, Negative, or Indeterminate

⇒ Indeterminate Western blot

- A Western blot is interpreted as indeterminate when one or more of the antibodies directed against specific HIV-1 proteins are present, but CDC criteria for a positive Western blot, as defined above, are not met (e.g., the patient has p24 and p17/18 bands, but not gp41 or gp120/160)
- Among blood donors, approximately 10 out of every 10,000 individuals (0.1%) without known risk factors for HIV-1 will have a repeatedly reactive HIV-1 EIA test
 - Among these 10 low-risk individuals, 8 will have a negative and 2 will have an indeterminate Western blot
- Overall risk of seroconversion among a population including both low- and high-risk persons with an indeterminate Western blot is approximately 3.0%
 - Risk of seroconversion is determined by an individual's risk history and band(s) present on the Western blot
 - With high-risk behavior and a p24 band, risk of seroconversion is 18%
 - p24 is the most common band associated with possible early seroconversion; it is also a common "non-specific" indeterminate result that does not indicate seroconversion
 - With no identifiable risk and an indeterminate Western blot, seroconversion is rare
- Confirmation or exclusion of HIV infection should be made on the basis of the patient's antibody test results, as well as consideration of her
 - Medical and behavioral history
 - Additional virologic and immunologic tests (i.e., HIV-1 DNA PCR, quantitative RNA PCR HIV-1 (viral load), when performed
 - Partner's HIV status
 - Clinical follow-up

See page 9 for follow-up details of an indeterminate Western blot

⇒ Tests for Virus

- HIV antibodies may not be detected for a "window period" of weeks or up to several months following infection window period
- Two commonly used tests can detect HIV infection before the appearance of a complete antibody pattern:
 1. HIV – 1 Proviral DNA polymerase chain reaction (HIV DNA PCR)

- Enzymatically amplifies and detects specific DNA sequences
 - Highly sensitive and specific methodology used to detect HIV-1 proviral DNA in infected cells
 - Blood must be collected in EDTA or ACD tubes (heparin anticoagulant is not acceptable because it interferes with PCR assays)
 - Useful as a supplement to sort out indeterminate serology results and to determine infection status of infants born to HIV-infected women
2. HIV – 1 RNA (Viral Load)
- HIV-1 RNA copies by either bDNA or RTPCR methodology. Viral load can be used to confirm a reactive EIA with an indeterminate or negative Western blot. The viral load may have false positive results, and should not be the sole basis for diagnosing HIV.

What are the points to cover in post test counseling for women with a negative test result?

- ⇒ Review the purpose of the test and explain that it detects antibodies to HIV
- ⇒ Give test results
- ⇒ Reinforce the need for retesting if the woman has had recent risks or if new risks occur

What if my patient has an indeterminate result?

- ⇒ Review purpose of the test, explaining that it detects antibodies to HIV
- ⇒ Give test results
- ⇒ Discuss various circumstances that can cause a reactive EIA (other than HIV):
 - Autoimmune diseases
 - Liver disease
 - Vaccines (e.g., flu vaccine)
 - Being a multiparous female
 - Rh negative person who has received Rh immunoglobulin
 - Having recently had influenza
 - Having received immunoglobulins
 - Others
- ⇒ Discuss various circumstances that can cause an indeterminate Western blot:
 - Antibodies cross-react with HIV proteins, but patient does not have HIV

- Recently infected with HIV and has not yet developed all the usual antibodies (this may take up to 6 months)
- Immune system damaged by HIV and no longer making antibodies, which occurs only in advanced stages of HIV/AIDS
- Infection with HIV-2 (rare in the U.S. but common in West Africa)

⇒ When an indeterminate Western blot result is obtained:

- **Counsel the woman about the result, emphasizing the low probability of HIV infection if test does not show p24 band and there is no known HIV risk**
- Explore potential exposures within the past 3 months (needle-sharing, sexual exposure to known HIV-positive or high-risk partner)
- Recommend partner testing
- Repeat EIA and Western blot

⇒ If the repeat test is negative, reassure the woman that she is negative

⇒ If the repeat test is indeterminate:

- Western blot has same isolated reactive band
- Patient has no risk factors
- All sexual partners within the last three months are HIV-negative

Then, reassure the woman that she is not HIV-positive. Repeat testing every three months during pregnancy. Explain that she will be excluded from blood donation and that she may have to explain the results to obtain life insurance.

⇒ If the repeat test detects additional bands, then the woman may be seroconverting to HIV and needs aggressive antiretroviral therapy for her own health and to try and reduce perinatal transmission. (See page 10 for counseling for a positive result)

⇒ If the repeat test meets criteria for positive result (see page 10), the woman has seroconverted

⇒ Consider adding an HIV DNA PCR or quantitative RNA PCR test to the repeat antibody testing if counseling and risk assessment reveals that the:

- Woman has had high-risk exposure within the last 3 months, or
- Sexual partners are not available for testing, or
- Woman has symptoms suggestive of an HIV seroconversion illness (e.g., fever, sore throat, malaise, weight loss, disseminated lymphadenopathy), or

- Woman is in the third trimester of pregnancy
- ⇒ Counsel the woman to practice risk reduction/safer sex behaviors
- ⇒ Assess the woman's psychological state and need for support, providing referrals as needed

What do I do if my patient has a positive result?

- ⇒ Give test results, allowing for the woman to absorb information
 - Assess her psychological well-being and need for support
- ⇒ Discuss the meaning of seropositive results. A positive test does not mean AIDS; it does mean that the patient is infected and can transmit HIV by sex and needle sharing. Pregnant women can pass HIV to their offspring during pregnancy, at birth, and by breastfeeding.
- ⇒ Stress to the woman the need to protect others from infection by:
 - Practicing abstinence or safer sex practices
 - Not sharing personal items that might contain blood or vaginal fluids (e.g. razors, toothbrushes, sex toys)
- ⇒ Assess clinical signs and symptoms, CD4 lymphocyte count, and viral load
 - Discuss treatment options
- ⇒ Reiterate that successful treatment of HIV in pregnancy reduces the risk of perinatal transmission from 25% to 2% or less. Scheduled Cesarean delivery may also reduce the risk of transmission if the viral load is not suppressed (see page 27). The woman's decision should be supported regardless of whether or not she accepts or refuses antiretroviral therapy (ART). Refusal of ART should not result in denial of care or punitive action.
- ⇒ Assist the woman in identifying needs for further support or referral
 - To help the woman pay for HIV care and treatment,
 - For referral to Community Case Management call HIV Client Services toll free number: 877-376-9316
- ⇒ When the woman is ready, the following should be addressed:
 - Discuss the relationship between immune system functioning and the development of AIDS
 - If the woman discloses current substance use, discuss benefits of treatment and assist with referrals
 - Stress the need to promote optimal immune system functioning by avoiding cigarettes, non-prescription drugs and excess alcohol, and by eating healthy foods

⇒ Partner Notification

- Strongly advise the woman of the importance of notifying sexual and/or needle sharing partners from the period of possible exposure. Federal legislation requires spousal notification if it can be determined that the spouse could have been infected up to 10 years ago. Exposure times depend on the information that the client gives providing evidence of possible exposure to HIV.
- Provide assistance to women in notifying partners, including spouses; confirm those partners have been notified and/or
- Arrange for the local health department to provide assistance in notifying partners
- Offer to help refer partners for counseling and testing
- Confidentiality must be maintained at all times. A system must be in place to avoid documenting the names of referred partners in the permanent record of the woman being counseled

If the woman has partners that she is unwilling or unable to notify, the health care provider must report the information and identity of exposed partner(s) to the Washington State Department of Health Office of HIV/AIDS at 1-800-272-2437. In King County, providers should contact Edith Allen at 206-744-4377 or Michelle Perry at 206-744-2726 (Partner Notification Services at Public Health of Seattle and King County).

Perinatal HIV Transmission

If the pregnant woman is HIV positive, what are the chances of infant infection?

- ⇒ There is a 20–30% risk of infant infection with no treatment. ACTG Study 076 was a randomized, double-blind trial of maternal oral Zidovudine (ZDV) for a mean of 12 weeks antepartum, IV ZDV during the intrapartum period, and oral ZDV treatment of the infant during the first 6 weeks of life. This study showed a reduction of infant infection from 25% to 8% in the ZDV-treated group. Women included in ACTG 076 had CD4 lymphocyte counts above 200/mm³, and few had previous treatment with ZDV.
- ⇒ Subsequent observational studies have confirmed the benefits of ZDV treatment during pregnancy, even for women with a CD4 count <200/mm³ and prior ZDV therapy. These studies have shown infant HIV transmission rates of 5–8% among ZDV-treated groups.
- ⇒ More recent observational studies suggest that women on highly active antiretroviral therapy (HAART) consisting of at least three drugs, and with a plasma viral load of <1,000 copies/ml, have ≤2% risk of perinatal HIV transmission. It is not known whether cesarean delivery will further reduce this risk (Mofenson et al., 1999; Garcia et al., 1999).
- ⇒ Early published data suggest that ZDV plus scheduled cesarean delivery done prior to the onset of labor or rupture of membranes reduces the risk of perinatal transmission to approximately 2%, even in women not on HAART or whose plasma viral load is >1,000 copies/ml (see page 27).
- ⇒ No combination of therapies can guarantee that a newborn will not become infected.

When are babies infected with HIV?

Antepartum

- ⇒ 30–50% of infections probably occur before labor
- ⇒ Risk factors may include:
 - Advanced maternal HIV disease
 - High viral load in pregnancy
 - Anything that would introduce maternal blood into the amniotic fluid

- Amniocentesis
- Fetomaternal hemorrhage
- Abruptio placenta

Intrapartum

⇒ Approximately 50–70% of infected infants acquire the infection at the time of delivery

⇒ Factors that seem to increase the risk of infection include:

- Viral load above 500-1,000 copies/mL; risk increases progressively with viral load
- Rupture of membranes (ROM) for >4 hours
- Maternal smoking
- Clinical or histologic chorioamnionitis

⇒ Other concerns include:

- Use of fetal scalp electrode
- Anything that might break the integrity of the skin or mucus membranes of the infant (e.g., forceps/vacuum extractor)
- Anything that would increase the presence of maternal blood in the birth canal (e.g., early episiotomy)

Postpartum

⇒ Infection occurs by breastfeeding

⇒ Additional transmission risk estimates vary from 16–35% in different studies

⇒ In the U.S., breastfeeding is not recommended

If I identify an HIV-infected pregnant woman, what resources are available for care and/or consultation?

For care and/or consultation for mother and baby, refer to:

Maternal Infant Care Clinic

University of Washington Medical Center, Seattle
206-598-4070 (clinic appointments/medical)

Pediatric Infectious Disease Division

Seattle Children's, Seattle 206-987-2073
206-987-2535 (office number)

Local, State, and County Health Departments

See Appendix B for list of all Washington State Health Departments

Laboratory Tests for Pregnant Women

What are the commonly used laboratory monitors of HIV infection?

⇒ Lymphocyte subsets (CD4 lymphocyte cell counts)

- CD4 lymphocytes are the major cell type infected by HIV
 - These cells play a critical role in the immune system
 - Measured by T-cell subsets, may need to be ordered along with a CBC with differential and platelets
 - Check with your lab for test requirements

⇒ CD4 lymphocyte counts are measured in two different ways:

- Absolute CD4 cell count
- CD4 percentage of total lymphocyte count

⇒ Clinically, CD4 cell counts are used for three major purposes:

- Staging disease, such as assigning a CDC class
- Assisting providers in determining when to initiate or change antiretroviral therapy
- Determining when to start opportunistic infection prophylaxis

⇒ HIV-1 RNA Quantitation by PCR (viral load)

- Integral part of managing patients on antiretroviral therapy
- Patients should be monitored over the course of disease
 - Use the same assay each time, if possible
- Blood must be collected in EDTA or ACD tubes (heparin anticoagulant is not acceptable because it interferes with PCR assays)
- For patients who are likely to have acquired HIV outside of North or South America or Europe, notify lab that she may have “non-B clade HIV” so that the appropriate primers are used to determine viral load.
- Multiple studies have shown that HIV RNA levels predict clinical outcome
 - In general, long-term survivors have lower levels of HIV RNA (usually

<10,000 copies/ml of plasma)

- Higher levels correlate with:
 - A more rapid decline in CD4 cell counts
 - More rapid progression to AIDS
 - Decreased survival
 - Increased risk of perinatal HIV transmission (in pregnancy)

- Normal 2X–3X fluctuations in HIV RNA occur
- Therefore, sustained changes of >3X (or >0.5 log) are required to define a significant change in HIV RNA burden

⇒ HIV – 1 Genotype (Resistance Testing)

- Recommended prior to initiating ART for all pregnant women
- Identifies mutations in HIV virus that are associated with resistance to specific antiretroviral medications
- Requires expert interpretation
- May not reliably detect mutation if the patient has been off medications for several months.

What laboratory tests need to be obtained for a pregnant woman with HIV?

⇒ CBC with differential and platelet count

⇒ T-cell subsets

⇒ Quantitative HIV RNA, “viral load”

⇒ HIV genotype, prior to initiating ART in pregnancy, and in the setting of virologic failure

⇒ If not done as part of routine prenatal care, then also draw:

- Toxoplasmosis IgG
- CMV IgG
- ALT, AST
- Hepatitis A IgG
- Hepatitis B s Ag, surface Ab and core Ab
- Hepatitis C IgG
- Herpes simplex virus (HSV) type-specific serology.

⇒ In addition, women newly diagnosed with HIV during pregnancy should have a repeat HIV EIA and Western blot to confirm the diagnosis.

What other laboratory tests are to be drawn before deciding on treatment for the HIV-infected pregnant woman?

Lab Schedule for HIV-Infected Pregnant Women

	After Treatment Began			
	Prior to treatment	At 1 month	Monthly thereafter to evaluate for toxicity	Every 2-3 months during pregnancy
CBC with differential and platelets*	✓	✓	✓	
T-cell subsets†	✓	✓		✓*
Quantitative HIV RNA†	✓	✓		✓
ALT, AST, total bilirubin**	✓	✓	✓	
Creatinine	✓	✓	✓	
Genotype***	✓			

* CBC with differential and platelets may need to be drawn with T-cell subsets; check with your lab for test results.

** Total bilirubin should be monitored for patients on atazanavir. ALT and AST should be monitored more frequently for patients on nevirapine.

*** Obtain genotype if viral load plateaus or rebound occurs after suppression.

† Some experts would follow T Cell subsets and HIV RNA every 4 weeks until HIV RNA is undetectable.

Please consult HIV/AIDS treatment guidelines for additional details (www.aidsinfo.nih.gov).

CDC Classification of Disease and Reporting

What are the CDC HIV classifications of disease?

CD4 Count	Category A Asymptomatic (Previous Class I, II, III*)	Category B Symptomatic (Previous Class IV*) Non-AIDS	Category C Symptomatic (Previous Class IV*) AIDS
>500 and/or 28%	A1	B1	C1
200-499 and/or 14-28%	A2	B2	C2
<200 and/or <14%	A3	B3	C3

*1987 CDC Classifications

Symptomatic Non-AIDS (B1, B2)

AIDS

(A3, B3 = Immunological AIDS)

(C1, C2, C3 = Clinical AIDS)

Category B Symptoms

Any which the health care provider feels are HIV-related and which are NOT included in the list of Category C Symptoms. Examples of specific Category B conditions for women include: cervical dysplasia, recurrent vaginal candidiasis, recurrent genital herpes, and pelvic inflammatory disease.

Category C Conditions (not a complete list)

Esophageal Candidiasis

Cervical cancer, invasive

Cytomegalovirus retinitis (with loss of vision) or other invasive CMV disease

Herpes simplex chronic ulcers; or bronchitis, pneumonitis, or esophagitis

HIV encephalopathy

Kaposi's sarcoma

Lymphoma

M. tuberculosis — pulmonary or disseminated

Mycobacterium avium complex

Pneumocystis carinii pneumonia

Pneumonia, recurrent (2 or more events in a 12-month period)

Progressive, multifocal leukoencephalopathy

Toxoplasmosis of brain

Wasting syndrome due to HIV

Reporting

As of September 1, 1999, asymptomatic HIV infection became reportable in Washington State. If you are a King County provider, please report HIV cases of any classification to the Public Health—Seattle and King County HIV/AIDS Epidemiology Program at 206-296-4645. If you are a provider working outside King County, please contact your local health department or the Washington State Department of Health at 888-367-5555 or 253-395-6731 to report HIV cases.

Medications and Treatment During Pregnancy, Labor, and Delivery

What are the currently licensed medications used to treat HIV?

⇒ Nucleoside/Nucleotide Reverse Transcriptase Inhibitors (NRTI)

- Zidovudine (ZDV, AZT)
- Lamivudine (3TC)
- Emtricitabine (FTC)
- Didanosine (ddI)
- Stavudine (d4T)
- Zalcitibine (ddC)
- Abacavir (ABC)
- Tenofovir (TDF)

⇒ Non-nucleoside Reverse Transcriptase Inhibitors (NNRTI)

- Nevirapine
- Efavirenz (possibly teratogenic; avoid in first trimester of pregnancy)
- Delavirdine
- Etravirine

⇒ Protease Inhibitors (PI)

- Indinavir
- Ritonavir
- Saquinavir
- Nelfinavir
- Amprenavir
- Lopinavir/ritonavir
- Fosamprenavir

- Atazanavir
 - Darunavir
 - Tipranavir
- ⇒ Fusion Inhibitors
- Enfuvirtide (T-20)
- ⇒ CCR5 Co-Receptor Inhibitor
- Maraviroc
- ⇒ Integrase Inhibitors
- Raltegravir
- ⇒ Fixed dose combinations:
- Combivir (ZDV, 3TC)
 - Truvada (TDF, FTC)
 - Epzicom (3TC, ABC)
 - Trizivir (3TC, ABC, ZDV)
 - Atripla (TDF, FTC, Efavirenz)

What are the current treatment recommendations for HIV-positive pregnant women?

- ⇒ Antiretroviral treatment is recommended for maternal health under the following conditions:
- Nadir CD4 count < 350/mm³ and/or symptomatic HIV disease
- In this case,
- Potent antiretroviral therapy consistent with standard of care for non-pregnant adults (presently 2 NRTI plus a PI or other potent agent)
 - Continue ART postpartum
- ⇒ If pregnant woman does not require antiretroviral therapy for her own health:
- Potent antiretroviral therapy should be still be offered regardless of maternal CD4 count and viral load, to prevent HIV maternal-to-child transmission (Perinatal Guidelines, 2007)
 - The decision to continue or stop ART after delivery should be individualized (see page 31).
 - Zidovudine (ZDV) is the only agent shown to reduce perinatal transmission when taken as a 3-part regimen (based on ACTG study 076 data):

- During pregnancy
- During labor
- Administered to the newborn for 6 weeks
- Therefore, any pregnancy treatment regimen should include ZDV if possible.

Antiretroviral Medications for HIV-Positive

- WomenPotent antiretroviral therapy (3-4 drugs) with the goal of complete viral suppression.
- Ideally, choose ART for which there are data regarding maternal and infant safety, and pharmacokinetics in pregnancy.
- Include ZDV in regimen whenever possible.
- Efavirenz is contraindicated in first trimester of pregnancy due to significant concern for teratogenicity in animal studies and human case reports.
- The decision to continue or stop ART after delivery should be individualized (see page 31).

⇒ HIV-positive women who become pregnant while on antiretroviral therapy:

- Continue the pre-pregnancy regimen if successful and well-tolerated
- If the woman is taking efavirenz, switch to another drug and counsel the woman about potential fetal effects of the medication
- With regard to ART in the first trimester: balance the risk of viral rebound and developing viral resistance, potentially increasing transmission or causing disease progression, against uncertain risks of drug toxicity and teratogenicity in pregnancy
- If ART is stopped in the first trimester, all drugs should be stopped and restarted simultaneously, which may decrease risk of the virus developing resistance to the drugs.

⇒ Prevention of opportunistic infections during pregnancy

- All pregnant women with a CD4 count <200 should receive Pneumocystis carinii pneumonia (PCP) prophylaxis with TMP-SMX, 1 DS or 1 SS PO qd or Dapsone, 100 mg PO qd

Are there any concerns about treating pregnant women with the same medications that are used to treat HIV-infected men and non-pregnant women?

- ⇒ The most studied ART drug in pregnancy is zidovudine (ZDV), which thus far has not been associated with birth defects, differences in growth, neurodevelopment or immunologic status or increased risk of other adverse outcomes.
- ⇒ Accumulating data suggest that use of lamivudine (3TC), emtricitabine (FTC), stavudine (d4T), abacavir (ABC), tenofovir (TDF), nevirapine, nelfinavir, indinavir, ritonavir, saquinavir, and lopinavir in pregnancy appears not to increase risk of birth defects above the expected rate (Antiretroviral Pregnancy Registry, July 2007)
 - Efavirenz may be associated with birth defects in animal studies and human case reports and should be avoided in the first trimester (FDA Category D) (Efavirenz drug label)
- ⇒ Nevirapine has been associated with hepatic toxicity in women with CD4 counts ≥ 250 cell/m and should not be used in this group. If nevirapine is used in women with CD4 counts < 250 , intensive laboratory plus clinical monitoring is recommended. (Hitti, 2004) (See product insert for details).
 - The combination of ddl and d4T may be associated with maternal lactic acidosis in late pregnancy. For this reason, ddl/d4T should be avoided.
- ⇒ Protease inhibitor (PI) use in pregnancy appears safe:
 - Both pregnancy and PI therapy increase the risk of hyperglycemia, however there is no evidence that PIs increase the risk of glucose intolerance or gestational diabetes in pregnancy (Hitti 2007);
 - Adverse effects of indinavir and atazanavir in non-pregnant individuals include and hyperbilirubinemia. Hypothetical concern for development of neonatal jaundice in the exposed fetus has not been observed (Brocklehurst & French, 1998).
 - In general, many PIs appear to have less than the expected drug levels in the third trimester of pregnancy. The clinical significance of this and possible requirement for dose escalation is unclear.
- ⇒ The **Antiretroviral Pregnancy Registry** is an epidemiologic project to collect observational data on antiretroviral exposure during pregnancy with the intention of defining risks for antiretroviral therapy. The registry is maintained by antiretroviral manufacturers and the CDC. Send anonymized prospective reports of HIV-infected pregnant women who are receiving antiretrovirals to:

Registrar Antiretroviral Pregnancy Registry
115 North 3rd Street, Suite 306
Wilmington, NC 28401
Phone: 1-800-258-4263 FAX: 1-800-800-1052 <http://www.apregistry.com>

Because of the complexities of antiretroviral therapy and rapidly changing information about HIV medications in pregnancy, consultation with an infectious disease specialist knowledgeable about HIV and pregnancy is strongly recommended.

History and Physical

Should there be added routines in the history and physical exam of the HIV-positive pregnant woman?

⇒ History

- A woman who tests HIV positive in pregnancy should be asked about previous deliveries. She should be encouraged to have her other children tested for HIV, unless she was known to be HIV negative throughout those pregnancies.
- At every visit, the health care provider should inquire about constitutional signs and symptoms:
 - Fevers
 - Night sweats
 - Respiratory problems
 - Nausea/vomiting
 - Diarrhea

⇒ Physical exam

- At least once each trimester, inspect the patient's mouth for thrush and oral hairy leukoplakia
- Palpate all lymph nodes, because a swollen, tender lymph node may be a harbinger of a more serious infection or malignancy
- Palpate the abdomen for liver/spleen enlargement
- Observe the skin for rash, seborrheic dermatitis
- Conduct a neurologic exam, including DTRs, for neuropathies
- For women newly diagnosed with HIV:

- Do a Pap smear
 - If normal, repeat every 6 months x 2, then annually
 - If abnormal, refer for colposcopy and directed biopsies as indicated
- If CD4 count $<100/\text{mm}^3$, refer to an ophthalmologist for baseline funduscopic exam to rule out CMV retinitis.

Medication During Labor and Delivery

What medications should be used for the HIV-positive pregnant women in labor?

⇒ The standard of care for all known HIV-positive pregnant women is as follows:

- Administer intravenous Zidovudine (ZDV) at the onset of labor or ruptured membranes, or beginning 3-4 hours prior to planned Cesarean delivery, at the following doses:

IV ZDV 2 mg/kg over 1 hour as a loading dose

- Once the loading dose is completed, administer:

Continuous IV infusion of 1 mg/kg/hour until delivery

Stop IV ZDV after the umbilical cord has been cut

Continue other antiretroviral medications orally, on schedule, during labor or prior to a scheduled Cesarean. However, if the woman is on oral zidovudine in combination with other medications (Combivir or Trizivir), be sure not to give ZDV both orally and IV.

- If taking Combivir: give lamivudine orally, plus IV ZDV
- If taking Trizivir: give lamivudine plus abacavir orally, plus IV ZDV

⇒ For HIV-infected pregnant women presenting intrapartum not on antiretroviral therapy, the most strongly recommended regimen is:

Mother: Same ZDV regimen as in box above

Consider Cesarean delivery if not in active labor

Newborn: ZDV 2 mg/kg PO q 6 hrs for 6 weeks

Consider additional newborn ART in consultation with a pediatric HIV specialist.

Note: For an update of HIV treatment guidelines for pregnant women, go to the following website: www.aidsinfo.nih.gov

Information about HIV medications for pregnant and postpartum women and

newborns outdates quickly. For current recommendations, contact

⇒ An infectious disease specialist knowledgeable about perinatal HIV

⇒ Go to <http://aidsinfo.nih.gov>

⇒ Call the CDC Hotline: 1-800-232-4636

⇒ Call Northwest Family Center Madison Clinic: 206-744-5100

Labor and Birth Checklists

Guidelines for labor and birth management of HIV positive pregnant women have been developed by Department of Health, Northwest Family Center, University of Washington School of Medicine, Children's Hospital and Regional Medical Center, and the Northwest Regional Perinatal Program. These checklists for hospitals and prenatal providers outline appropriate in-hospital care including lab tests and medications for laboring mothers and their newborns. These checklists are available for posting and also as Word documents that can be individualized and placed in the medical record.

Contact: Polly Taylor, 360- 236-3563 or go to <http://www.doh.wa.gov/cfh/mch/HIV.htm> to obtain a copy.

Cesarean Birth

Does a Cesarean birth decrease the risk of infant HIV infection?

Early studies indicate a significant relationship between the mode of delivery and vertical transmission of HIV. This body of evidence, accumulated mostly before the use of fully suppressive ART and without any data regarding maternal viral load, showed that scheduled Cesarean delivery (performed before the onset of labor and/or rupture of membranes) reduces the risk of vertical transmission of HIV compared with either unscheduled Cesarean or vaginal deliveries. This finding holds true whether or not the woman received ZDV therapy. Whether Cesarean delivery offers any benefit to women on HAART or to women with a low or undetectable viral load is unknown, but appears unlikely.

Maternal morbidity is greater with Cesarean delivery than with vaginal delivery in HIV-infected women, especially among women who have a low CD4 count (ACOG Committee Opinion, 2000; Grubert et al., 1999; Stringer et al., 1999; The European Mode of Delivery Collaboration, 1999; The International Perinatal HIV Group, 1999).

Although many issues remain unresolved because of insufficient data, the American College of Obstetricians and Gynecologists (ACOG Bulletin #234, May 2000) makes the following recommendations:

- ⇒ HIV-infected pregnant women should be appropriately counseled regarding
- Risk of vertical transmission:
 - Probability of transmission from an untreated mother to fetus/infant is about 25%
 - With ZDV treatment, risk of transmission is reduced to 5–8%
 - With highly active antiretroviral treatment (HAART) consisting of 3 or more drugs, and suppression of plasma HIV to a low level (viral load <1,000 copies /ml), transmission is reduced to about 2%
 - Without HAART, or with a viral load >1,000 copies, ZDV plus a scheduled
• Cesarean delivery at 38 weeks gestation can also reduce the risk of transmission to about 2% or less.
 - No combination of therapies and/or scheduled Cesarean delivery can guarantee that a newborn will not become infected
 - Maternal risks associated with Cesarean delivery for HIV-infected women:
 - Postoperative fever
 - Endometritis
 - Wound infection
 - Urinary tract infection
- ⇒ Scheduled Cesarean delivery should be offered to women with a viral load >1,000 copies/ml, whether or not they are taking antiretroviral therapy
- ⇒ Risks of Cesarean delivery—which are greater for the mother—must be balanced with the benefits expected for the neonate, and the choice of delivery must be individualized
- ⇒ The woman’s autonomy should be respected in making her own informed decision regarding route of delivery

Avoiding Risk of Transmission

What can be done in labor to minimize the risk of newborn infection?

Intravenous ZDV should be provided (see page 26) and the pregnancy ART regimen continued. In addition, whenever possible:

AVOID

- ⇒ Amniocentesis
- ⇒ Fetal scalp electrode and intrauterine pressure catheter (IUPC)

- ⇒ Forceps and vacuum extractor
- ⇒ Artificial rupture of membranes
 - Studies show an increased risk of infection with rupture of membranes over 4 hours
 - If membranes rupture before labor, begin oxytocin augmentation as soon as possible
- ⇒ Episiotomy

What can be done to try to minimize infection in the newborn immediately after birth?

- ⇒ At birth, avoid vigorous suctioning of the mouth and nose
- ⇒ Handle the newborn carefully to avoid trauma
- ⇒ Wash the newborn with soap (per hospital procedure) before giving injections or drawing blood
- ⇒ Start oral ZDV within the first 6–12 hours, ideally after the first infant blood draw, or start other regimen according to current guidelines (see page 35)

Postpartum Management

Should the woman continue to be treated after delivery?

It depends on her health, current drug regimen, and HIV disease status

- ⇒ Women with a nadir CD4 count >350 prior to therapy, and no current or past HIV-associated symptoms, do not have strong clinical indications to continue treatment after delivery. Some experts are concerned that stopping ART after delivery might affect the woman's health in the future, although at present there is no clear evidence to support or refute this concern. The decision to continue or stop antiretroviral therapy should be individualized, and will depend on these considerations, patient and provider preference and other factors.
- ⇒ If a woman continues antiretroviral treatment after delivery, the provider should help her develop strategies that will promote adherence to her regimen during the postpartum period.
- ⇒ All women should have a repeat CD4 count and viral load 6 weeks after delivery and then approximately every 3-4 months thereafter, regardless of whether they stay on antiretroviral therapy.

What is the postpartum care for an HIV-infected woman?

- ⇒ Advise not to breastfeed
 - Transmission of HIV via breast milk has been well documented
- ⇒ Give routine postpartum care, including contraception
 - Provide family planning education, method, or referral services
- ⇒ Assess needs for psychological support
 - Address maternal fears of infant infection
 - Provide support services as needed (e.g., case management, mental health services)

What contraception should be used for the HIV-positive woman?

- ⇒ Condoms: always recommended, even if her partner is HIV-positive. However, the unintended pregnancy rate is still 10-15% even with consistent condom

use. Condoms are not the most effective birth control method. Providers should encourage use of dual method contraception.

⇒ Hormonal: recent research indicates that hormones in birth control pills do not influence drug levels or effectiveness of most ART (one exception is fosamprenavir). However, PIs and NNRTI may interact with the estrogen component of oral contraceptive pills which may affect these hormone levels and potential contraceptive tolerability and efficacy. (Contraceptive Technology Update, July 2005).

- Depo-provera—does not interact with efavirenz, nevirapine, or nelfinavir (Cohn, 2007)
- Oral contraceptives (OCs)
 - Must consider concomitant medications for effects on metabolism, toxicity, and efficacy
 - Two drugs used for mycobacterium avian complex (MAC) prophylaxis decrease efficacy of oral contraceptives:
 - Rifabutin (Mycobutin)
 - Rifampin (Rimactane, Rifadin)

* An additional method of contraception, such as condoms, is recommended.

⇒ Transdermal patch containing ethinyl estradiol and norelgestromin

⇒ Vaginal ring containing ethinyl estradiol and Etonorgestrel

- The transdermal patch, and the vaginal ring may have decreased efficacy with some antiretroviral drugs (see list above).
- Implant containing progestin etonogestrel, 60 mcg daily.

⇒ Diaphragm with spermicide

⇒ IUD can be considered for a monogamous couple who is not at high risk of acquiring other STDs.

⇒ Provide emergency contraception information and supply.

⇒ Provide information on permanent sterilization as appropriate.

What education should be provided to the HIV-infected woman before she is discharged from the hospital?

The mother should:

⇒ Hold, hug, and kiss her baby

- She does not need to wear gloves to touch her baby or change diapers

- Stress good hand washing
- ⇒ Encourage friends and family to hold the baby.
 - An infected baby will not transmit the virus by holding or hugging
- ⇒ Continue giving her baby oral ZDV syrup every 6 hours for the first 6 weeks of life, or other regimen according to clinician

The mother should not:

- ⇒ Breastfeed
- ⇒ Bite off the baby's fingernails or toenails
- ⇒ Pre-chew food for infant
- ⇒ Hold the baby's pacifier in the mother's mouth
- ⇒ Share a toothbrush with anyone, especially children
- ⇒ Expose others to blood or exudate from her wounds or lesions

The HIV-Exposed Infant

What laboratory tests should be done on the HIV-exposed newborn, ideally within the first 24 hours of life?

⇒ CBC with differential and platelets

⇒ ALT/AST

⇒ HIV DNA PCR to test for viral infection

- Do not use cord blood because of potential maternal contamination leading to a false positive result .

Note: Maternal zidovudine (AZT, ZDV) use can cause anemia and elevated liver enzymes in the newborn. Infant ZDV treatment can cause anemia and neutropenia. Repeat measurement of CBC with differential and ALT/AST at 1-2 and 4-6 weeks of age is recommended.

Data are limited concerning potential toxicities in infants whose mothers received HAART. More intensive monitoring of hematologic and serum chemistry during the first few weeks of life is advised in these infants. Contact a Pediatric HIV specialist at 206-987-2073 or 206-987-2000 for recommendations.

Are HIV-exposed neonates treated with any medications?

⇒ On the basis of ACTG 076 study, neonates are treated with:

Zidovudine syrup 2 mg/kg/dose PO every 6 hrs (for a total of 8 mg/kg/day) for the first 6 weeks of life

⇒ If the neonate cannot take zidovudine orally and needs IV treatment

1.5 mg/kg/dose IV every 6 hours, for a total of 6 mg/kg/day

⇒ Ideally, infant labs are drawn before starting zidovudine; however, the goal is to start the drug within the first 6–12 hours of life, even if labs have not been drawn.

⇒ See Medications During Labor section on page 26 for new antiretroviral

treatment options for infants born to mothers who have received no antiretroviral therapy prior to labor. Treatment for the infant would depend on what treatment the mother received during labor. Expert consultation is advised.

- ⇒ Consultation with an HIV specialist is recommended for infants born to women with known antiretroviral resistance mutations during pregnancy or for women with high viral loads (HIV RNA PCR) prior to delivery.
- ⇒ For infants born to mothers who have received no antiretroviral therapy during pregnancy or intrapartum, the 6 week neonatal zidovudine regimen as described above should be initiated as soon as possible after delivery. Consultation with an HIV specialist is highly recommended.
- ⇒ The current pediatric standard of care is to begin all HIV-exposed infants on Pneumocystis carinii pneumonia (PCP) prophylaxis with TMP-SMX 150 mg TMP/m2 in divided doses 2X/day, 3 days/week beginning at 4–6 weeks of age and continuing until two definitive HIV-negative tests are obtained, one of which is drawn after one month of age and the other draw after 4 months of age.

What are the options for follow-up testing of the HIV-exposed infant?

For testing and consultation, refer to:

Maternal Infant Care Clinic
University of Washington Medical Center
Seattle
206-598-4070

Pediatric Infectious Disease Group
Seattle Children's
Seattle
206-987-2073
206-987-2535 (office number)

Local State and County Health Departments or Community Clinics (see Appendix B)

What is the schedule for HIV testing of the infant born to an HIV-positive mother?

For early diagnosis, specific viral tests should be done on a regular basis.

Recommended Schedule of Tests for the Diagnosis of HIV-1 Exposed Infants

Age	HIV serology EIA	CBC with differential	HIV DNA-PCR*	PCP prophylaxis
cord blood		X+SGPT		
At birth			X	start ZDV 2mg/kg q 6 hrs x 6 wks
2-4 weeks		X	X	start TMP-SMX at 4-6 weeks
8 weeks		X	X	cont. TMP-SMX
4 months			X	stop TMP-SMX if uninfected
18 months	X			

How is HIV infection diagnosed in a child <18 months of age who is known to be born to an HIV-positive mother?

- ⇒ A child <18 months is tested by using specific viral HIV detection tests. These tests include:
 - Proviral DNA polymerase chain reaction (HIV DNA PCR)
 - Quantitative HIV RNA may be used, but this test is not approved as an HIV diagnostic test and results should be interpreted with assistance of an HIV specialist
- ⇒ A child is infected if there are two separate positive specific viral HIV detection tests from two different dates excluding cord blood.
- ⇒ A child is not infected under age 18 months if there are two negative tests, one at least over one month of age and the other over four months.
- ⇒ A positive HIV antibody test (serology) indicates exposure but not HIV infection in child <18 months because:
 - Passive transfer of maternal antibody from the pregnant woman to her fetus occurs during pregnancy
 - A child under 18 months of age is expected to be antibody positive for HIV, reflecting maternal antibody
- ⇒ By 18 months of age the maternal HIV antibody should be gone, so an antibody test is appropriate for screening

Appendix A: Resource Directory

University of Washington Medical Center

Maternal Infant Care Clinic

1959 NE Pacific Street

Seattle, WA 98195

206-598-4070

<http://uwmedicine.washington.edu/PatientCare/MedicalSpecialtyCare/>

UWMEDICALCENTER

⇒ Obstetric, gynecologic, and medical care

⇒ Consultation on management of HIV-infected pregnant women

⇒ Information on clinical trials for HIV-positive women and information about maternal and pediatric HIV clinical trials

⇒ access to Maternity Support Services

BABES Network—YWCA

1118 Fifth Avenue

Seattle, WA 98101

(206) 720-5566 or 1-888-292-1912

the_staff@babesnetwork.org

<http://www.babesnetwork.org/>

Spanish resources and bilingual staff available

⇒ Peer Counseling

⇒ Support Groups

⇒ Gatherings

⇒ Advocacy

⇒ Self-Advocacy Training

⇒ Educational Forums

⇒ Retreats

⇒ Monthly Bi-lingual Newsletter

Seattle Children's

Pediatric Infectious Disease Group
4800 Sandpoint Way N.E., R-5441
Seattle, WA 98105

206-987-2073 or 206-987-5250 Children's Resource Line or 206-987-2535 (office)

⇒ Information and medical care for HIV-infected and exposed children

⇒ Information about and access to maternal and pediatric HIV clinical trials

All Washington State and Local Health Jurisdictions (See Appendix B)

⇒ HIV and STD information, testing, and counseling referrals

⇒ Partner notification

⇒ HIV/AIDS reporting

Public Health (Seattle and King County)

HIV/AIDS Program 400 Yesler Way, 3rd floor
Seattle, WA 98104

206-296-4649 (main number)

www.metrokc.gov/health/apu

⇒ HIV/AIDS Epidemiology 206-296-4645

- For health care providers in King County to report HIV/AIDS cases

⇒ Partner Counseling and Referral Services 206-744-4377 or 206-744-2726

- For health care providers in King County

⇒ HIV/AIDS and STD Hotline 206-205-7837

- For information and testing referrals:

Outside Seattle 1-800-272-AIDS

In Seattle 1-800-678-1595

Alcohol/Drug Hotline (24-hour)

1-800-562-1240

⇒ Provides statewide referral information about treatment, counseling, and support services by county/city for teens and adults

Washington State Department of Health

HIV/AIDS Prevention and Education Service

P.O. Box 47840

Olympia, WA 98504-7840

1-800-272-2437

http://www.doh.wa.gov/cfh/HIV_AIDS/Client_Svcs/default.htm

⇒ Waiting room pamphlets for health care provider offices

⇒ Literature requests

⇒ Referrals to other state offices and resources

HIV Client Services

1-877-376-9316

⇒ To help pay for HIV care and treatment

⇒ For referral to Community Case Management

Northwest AIDS Education & Training Center

Cabrini Medical Tower

901 Boren Avenue, Suite 1100

Seattle, WA 98104-3508

206-221-4944

<http://depts.washington.edu/nwaetc/>

⇒ Clinical training and educational support for health care professionals

AIDS Clinical Trials Unit

206-731-3184

HIV/AIDS ACTG clinical trials and treatment for adult residents (age 13 and over) of Washington State

AIDS Information—Guidelines, Drugs, Vaccines and Clinical Trials

1-800-874-2572

⇒ National information hotline for clinical trials

⇒ ATIS and AIDS Clinical Trials Information Services have been merged into <http://www.aidsinfo.nih.gov>

⇒ A service of DHHS

⇒ Central resource for federally-approved treatment guidelines for HIV & AIDS

CDC HIV/AIDS Resources

1-800-CDC-INFO (232-4636) CDC HIV/AIDS hotline (24 hour)

<http://www.cdc.gov/hiv/>

⇒ Ordering client or professional education materials

Starting Point: Resources for Children with Special Health Care Needs in Washington State

206-987-2500, option 4 to order copies, or download from <http://www.cshcn.org>

⇒ Developed by Children's Hospital and Regional Medical Center, WA State Department of Health, and Healthy Mothers, Healthy Babies Program

⇒ List of statewide health and social service resources for children and families

American College of Obstetricians and Gynecologists (ACOG)

202-638-5577 www.acog.org

⇒ Patient and clinician educational materials on HIV testing and pregnancy

POCAAN : Spanish resources and bilingual staff available

Seattle (Main Office)

2200 Rainier Avenue South

Seattle, WA 98144

www.pocaaan.org

206-322-7061

206-322-7204 fax

Tacoma

919 South 9th Street

Tacoma, WA 98405

253-272-2577

253-272-2709 fax

Yakima

15 N. Naches Avenue

Yakima, WA 98901

509-249-8725

509-249-8736 fax

Washington State HIV/AIDS Hotline

1-800-272-2437

Lifelong AIDS Alliance

1002 East Seneca

Seattle, WA 98122

www.lifelongaidsalliance.org

206-328-8979 (Main)

206-957-1717 (information and referral line)

TDD 206-323-2685

206-325-2689 fax

U.S. Office of Civil Rights

Region X: Seattle (Alaska, Idaho, Oregon, Washington)

Linda Yuu Connor, Regional Manager

Office of Civil Rights

U.S. Department of Health and Human Services

2201 Sixth Avenue (MS: RX-11)

Seattle, WA 98121-1831

Voice Phone: 206-615-2290

FAX: 206-615-2297

TDD: 206-615-2296

1-800-368-1919

Appendix B: Washington State Local Health Jurisdictions

Adams County Health Department
108 West Main
Ritzville, WA 99169-1407
509-659-3315

Asotin County Health District
431 Elm Street
Clarkston, WA 99403
509-758-3344

Benton-Franklin Health District
7102 West Okanogan Place
Kennewick, WA 99336
509-460-4200

Chelan-Douglas Co. Health District
200 Valley Mall Parkway
East Wenatchee, WA 98802
509-886-6400; 1-800-336-5306

Clallam County Health Department
223 East 4th Street, Suite 14
Port Angeles, WA 98362-3098
360-417-2274

Clark County Health Department
1601 East Forth Plain Blvd
Vancouver, WA 98661
360-397-8215

Columbia County Public Health District
1010 South 3rd
Dayton, WA 99328
509-382-2181

Cowlitz County Health Department
1952 Ninth Avenue
Longview, WA 98632-4045
360-414-5599

Garfield County Health District
121 South 10th (P.O. Box 130)
Pomeroy, WA 99347
509-843-3412

Grant County Health District
1038 West Ivy Street
Moses Lake, WA 98837
509-766-7960
Ephrata 509-754-6060

Grays Harbor County Health Department
2109 Sumner Avenue
Aberdeen, WA 98520
360-532-8665

Island County Health Department
6th and Main
PO Box 5000
Coupeville, WA 98239-5000
360-679-7351
Camano Island 360-387-0184
Oak Harbor 360-240-5554 ext 7676
Langley 360-221-8880

Jefferson County Health
Department Castle Hill
Center 615 Sheridan Street
Port Townsend, WA 98368-2439
360-385-9400

Kitsap County Health Department
345 6th Street, Suite 300
Bremerton, WA 98337
360-337-5235; 1-800-874-2437

Kittitas County Health Department
507 Nanum Street Suite 102
Ellensburg, WA 98926
509-962-7515
Cle Elum 509-674-5513

Klickitat County Health Department
228 West Main Street
MS: CH-14
Goldendale, WA 98620
509-773-4565
White Salmon 509-493-1558

Lewis County Health Department
Health Services Building
360 N.W. North Street
Chehalis, WA 98532-1900
360-740-1223; 1-800-562-6130 (X-1368)

Lincoln County Health Department
90 Nichols Street (P.O. Box 1207)
Davenport, WA 99122
509-725-1001

Mason County Health Department
303 North 4th
Shelton, WA 98584
360-427-9670

NE Tri-County Health District
240 East Dominion (P.O. Box 270)
Colville, WA 99114
509-684-1301
Republic 509-775-3111
Newport 509-447-3131

Okanogan County Health District
1234 South 2nd Avenue (PO Box 231)
Administration Building
Okanogan, WA 98840
509-422-7140

Pacific County Health Department
1216 West Robert Bush Drive
P.O. Box 26 South Bend, WA 98586
360-875-9343
Long Beach 360-642-9349

Public Health-Seattle and King County
HIV/AIDS Program
400 Yesler Way, 3rd floor
Seattle, WA 98104
206-296-4649 (HIV/AIDS)
HIV/STD Hotline: 1-800-678-1595
Main number 206-296-4600

San Juan County Health Department
145 Rhone Street (P.O. Box 607)
Friday Harbor, WA 98250-0607
360-378-4474

Skagit County Health Department
Courthouse Administration Building
700 South 2nd Street, Room 301
Mt. Vernon, WA 98273-3864
360-336-9380

Skamania County Health Department
683 SW Rock Creek Drive
Stevenson, WA 98648
509-427-3870
1-800-996-2526

Snohomish Health District
3020 Rucker Avenue, #206
Everett, WA 98201-3971
425-339-5210
HIV/AIDS 339-5251

Spokane Regional Health District
1101 West College Avenue
Spokane, WA 99201-2095
509-324-1500

Yakima County Health District
1210 Ahtanum Ridge Drive
Union Gap, WA 98903
Main number 509-575-4040
509-249-6518 (HIV/AIDS); 1-800-535-5016

Tacoma/Pierce County Health
Department 3629 South "D" Street,
CHD-059
Tacoma, WA 98408-6897
253-798-6500

Thurston County Health Department
412 Lilly Road NE
Olympia, WA 98506-5132
360-786-5581

Wahkiakum Health Department
64 Main Street
Cathlamet, WA 98612
360-795-6207

Walla Walla County/City Health
Department
310 West Poplar (P.O. Box 1753)
Walla Walla, WA 99362-0346
509-524-2650

Whatcom County Health Department
509 Girard Street
Bellingham, WA 98227-0935
360-676-6724 main
360-676-4593 (HIV/AIDS)

Whitman County Health Department
Public Services Building
North 310 Main Street
Colfax, WA 99111
509-397-6280
Pullman 509-332-6752

Appendix C: Free Regional and National Telephone Consultation

Medcon (24 hours)

206-543-5300, or 1-800-326-5300

- ⇒ University of Washington medical consultation
- ⇒ For medical providers in Washington, Alaska, Montana, and Idaho, linking providers with medical school faculty

The Perinatal Hotline

888-448-8765

- ⇒ National Perinatal HIV Consultation and Referral Service. This service provides 24-hour advice from HIV experts on indications and interpretations of HIV testing in pregnancy and consultation on treating HIV-infected pregnant women and their infants.
- ⇒ Perinatal Hotline answers callers' immediate questions, solve urgent perinatal HIV issues, and assists clinicians in linking HIV-infected pregnant women and HIV-exposed infants to the most appropriate care. Callers are referred to a national network of education, training and consultation services available from regional AIDS Education and Training Centers (AETCs). The Perinatal Hotline (888-448-8765) and the PEpline (888-448-4911) are both available 24 hours, seven days per week. The Warmline (800-933-3413) is available 8 a.m. to 8 p.m. (EST) Monday through Friday.

Warmline

1-800-933-3413 <http://www.ucsf.edu/hivcntr>

- ⇒ National HIV telephone consultation service for health care providers
- ⇒ 7:30 am to 5:00 pm PST, Monday through Friday (voice mail available 24-hours/day, 7days/week)

Pepline

1-888-HIV-4911 <http://www.ucsf.edu/hivcntr>

- ⇒ National clinicians' post-exposure prophylaxis hotline

National AIDS Hotlines

1-800-232-4630 (English)

1-800-344-SIDA (Spanish)

1-800-AIDS-TTY (Deaf/Hearing Impaired)

National STD Hotline

1-800-227-8922

1-800-243-7889 TDD

National AIDS Information Clearinghouse

1-800-458-5231

Appendix D: Websites

HIV/AIDS Treatment Information Service (ATIS)

www.aidsinfo.nih.gov

- ⇒ Central resource for federally-approved treatment guidelines for HIV and AIDS
- ⇒ Link to fact sheets: HIV During Pregnancy, Labor and Delivery, and After Birth: Health Information for HIV Positive Women, January 2008.
- ⇒ Link to Public Health Service Task Force Recommendations for use of Antiretroviral Drugs in pregnant HIV-infected women in Maternal Health and Interventions to Reduce Perinatal HIV Transmission in U.S., November 2, 2007.
- ⇒ Link to A Guide to the Care of Women with HIV/AIDS, 2005 edition.

AIDS Education Global Information Service (AEGIS)

www.aegis.com

- ⇒ HIV daily briefing, updated hourly

Johns Hopkins AIDS Service

www.hopkins-aids.edu

- ⇒ Expert Q&A, publications, medical education, resources, managed care, epidemiology, prevention, treatment

HIV InSite (sponsored by UCSF)

<http://hivinsite.ucsf.edu/>

- ⇒ Medical information, prevention and education, social issues and policy, statistics and epidemiology

Northwest AIDS ETC

<http://depts.washington.edu/nwaetc/>

- ⇒ What's new, courses and services, provider resources, associated centers

National AIDS Education and Training Centers – National Resource Center website

<http://www.AIDSetc.org>

⇒ What Women Need to Know: The HIV Treatment Guidelines for Pregnant Women, 2004

⇒ Health education booklet for HIV positive pregnant women

HIV/AIDS Bureau

United States Department of Health and Human Services

Health Resources and Services Administration

www.hab.hrsa.gov

Washington State Department of Health

HIV Client Services and Early Intervention Program

http://www.doh.wa.gov/cfh/HIV_AIDS/Client_Svcs/default.htm

⇒ To help pay for HIV care and treatment

⇒ For referral to Community Case Management

References

- ACOG Committee Opinion. Scheduled cesarean section delivery and the prevention of vertical transmission of HIV infection. May 2000;234:1–5.
- ACOG Committee Opinion. Prenatal and Perinatal human immunodeficiency virus testing: expanded recommendations. *Obstetrics and Gynecology*. 2004;104(5): 1119-1124.
- ACOG Committee Opinion. Human immunodeficiency virus: ethical guidelines for obstetricians and gynecologists. Number 255, April 2001.
- Breese P, Burman W, Shlay, J and Guinn, D. The effectiveness of a verbal opt-out system for human immunodeficiency virus screening during pregnancy. *Obstetrics and Gynecology* 2004, 204: 134-137.
- Chen K, Sell R, and Tuomala R. Cost effectiveness of elective cesarean delivery in human immunodeficiency virus-infected women. *Obstetrics and Gynecology* 2001;97:161-168.
- Cohn SE, Park JG, Watts DH, Stek A, Hitti J, Clax PA, Albrecht M, Yu S, Lertora JLL. Depo-medroxyprogesterone in women on antiretroviral therapy: lack of interactions. *Clin Pharmacol Therapeutics* 2007;81:222-7.
- Culnane M, Fowler MG, Lee SS, et al. Lack of long-term effects of in utero exposure to zidovudine among uninfected children born to HIV-infected women. *JAMA* 1999;281:151–157.
- Department of Health and Human Services. Guidelines for the use of antiretroviral agents in HIV-infected adults and adolescents. December 1, 2007.
- Department of Health and Human Services. Recommendations for Use of Antiretroviral Drugs in Pregnant HIV Infected Women for Maternal Health and Interventions to Reduce Perinatal Transmission in US, November 2, 2007. <http://www.aidsinfo.nih.gov/contentfiles/PerinatalGL.pdf>
- Department of Health and Human Services. Perinatal HIV Guidelines Working Group. Public Health Service Task Force Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health and Interventions to Reduce Perinatal HIV-1 Transmission in the United States - November 2, 2007. <http://www.aidsinfo.nih.gov/contentfiles/PerinatalGL.pdf>

- Department of Health and Human Services. Perinatal HIV Guidelines Working Group. Safety and Toxicity of Individual Antiretroviral Agents in Pregnancy. Dube M. Metabolic complications of antiretroviral therapies. *AIDS Clinical Care* 1998;10:41–48.
- Eastman PS, Shapiro DE, Coombs RW, et al. Maternal viral genotypic zidovudine resistance and infrequent failure of zidovudine therapy to prevent perinatal transmission of human immunodeficiency virus type 1 in Pediatric AIDS Clinical Trial Group Protocol 076. *Journal of Infectious Disease* 1998;177:557–564.
- Elliot V. Routine prenatal care should include HIV screening. *American Medical News* 2000;43:19. *Lancet* 1999;354:795–802.
- Garcia PM, Kalish LA, Pitt J, et al. Maternal levels of human immunodeficiency virus type 1 RNA and the risk of perinatal transmission. *New England Journal of Medicine* 1999;341:394–402.
- Grubert TA, Reindell D, Kastner R, et al. Complications after caesarean section in HIV-1 infected women not taking antiretroviral treatment. *Lancet* 1999;354:1612–3.
- Hanson IC, Antonelli TA, Sperling RS, et al. Lack of tumors in infants with perinatal HIV-1 exposure and fetal/neonatal exposure to zidovudine. *Journal of Acquired Immunodeficiency Syndrome* 1999; 20:463–467.
- Hitti J, Frenkel L, Stek A, Nachman S, Baker D, Gonzalez-Garcia A, et al. Maternal toxicity with continuous nevirapine in pregnancy: results from PACTG 1022. *J Acquir Immun Defic Syndr* 2004;36:772–6.
- Hitti J, Andersen J, McComsey G, Liu T, Melvin AJ, SMith L, Stek A, Aberg J, Hull AD, Alston-Smith B, Watts DH, Livingston E. Protease inhibitor-based antiretriviral therapy and glucose tolerance in pregnancy: AIDS Clinical Trials Group A5084. *Am J Obstet Gynecol* 2007; 196:e1-7.
- Institute of Medicine. Committee on Perinatal Transmission of HIV. Reducing the odds: Preventing perinatal transmission of HIV in the United States. National Academy Press 1999:1–20.
- Kass N, Taylor H, Anderson J. Treatment of human immunodeficiency virus during pregnancy: The shift away from an exclusive focus on fetal protection to a more balanced approach. *American Journal of Obstetrics & Gynecology* 2000;182:856–859.
- Minkoff H. Human immunodeficiency virus infection in pregnancy. *Obstetrics and Gynecology* 2003; 101: 797-809.

- Mofenson LM, Lambert JS, Stiehn ER, et al. Risk factors for perinatal transmission of human immunodeficiency virus type 1 in women treated with zidovudine. *New England Journal of Medicine* 1999;341:385–393.
- Morris AAM, Carr A. HIV nucleoside analogues: new adverse effects on mitochondria? *Lancet* 1999;354:1046–1047.
- Nduati R, John G, Mbori-Ngacha D, et al. Effects of breastfeeding and formula feeding on transmission of HIV-1: A randomized clinical trial. *JAMA* 2000;283:1167–1174.
- The European Mode of Delivery Collaboration. Elective cesarean section versus vaginal delivery in prevention of vertical HIV-1 transmission: a randomized clinical trial. *Lancet* 1999;353:1034–1039.
- The International Perinatal HIV Group. The mode of delivery and the risk of vertical transmission of human immunodeficiency virus type 1: a meta-analysis of 15 prospective cohort studies. *New England Journal of Medicine* 1999;340:977–987.
- Tuomala R, Shapiro D, Mofenson L, et al. Antiretroviral therapy during pregnancy and the risk of an adverse outcome. *New England Journal of Medicine* 2002; 346:1863-1870.
- Watts H, Lambert J, Stiehm R, et al. Complications according to mode of delivery among human immunodeficiency virus-infected women with CD4 lymphocyte counts of $\leq 500/\mu\text{L}$. *American Journal of Obstetrics and Gynecology* 2000; 183: 100-107.
- Watts H. Management of human immunodeficiency virus infection in pregnancy. *New England Journal of Medicine* 2002; 346: 1879-1891.

