



HIV/AIDS—Pediatric Guidelines (Follow-up for Infants Born to HIV+ Mothers)

1. Chart #1 Treatment Guidelines for Infants Born to HIV+ Mothers
2. Chart #2 Presumptive Exclusion of HIV in Non-breastfed Babies
3. Chart #3 Definitive Exclusion of HIV in Non-breastfed Babies
4. Chart #4 Diagnostic Tests Used in Screening Infants for HIV
5. Follow-up for Infants Born to HIV+ Mothers
 - a. Goals
 - b. Labs at birth
 - c. Feeding
 - d. 6 - 12 hours after birth
 - e. 14 - 21 days after birth
 - f. 4 - 6 weeks after birth
 - g. 4 – 6 months after birth
 - h. *Varicella zoster* vaccine recommendations
 - i. 12 – 18 months
 - j. Any age
6. Definitions
7. References

This guideline is designed for general use for most adult patients, but may need to be adapted to meet the special needs of a specific patient as determined by the patient's provider.

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July 2006
PIC Approval Date: 8/3/2006
Modified: 5/15/2008

1. Chart #1: Treatment Guidelines for Infants Born to HIV+ Mothers

TIME	LABS	TREATMENT	NOTES
Birth	<p><u>Optional</u></p> <p><u>1: If mother on HAART at time of delivery:</u></p> <p>CBC with differential, HIV-1 DNA by PCR</p> <p><u>2. If mother not on HAART at time of delivery:</u></p> <p>CBC with differential, HIV-1 RNA QN, BDNA (viral load) may be ordered in place of PCR</p>	<ul style="list-style-type: none"> Wash infant before any invasive procedures (shots or lab draws). If resuscitation required, take all possible precautions to protect infant from infection. ZDV (Zidovudine, AZT) for 6 weeks if HIV-1 DNA PCR negative at birth (see Section 2D* of guidelines for dosing information); No breastfeeding for infants born to HIV positive mothers; If initial HIV-1 DNA PCR is positive, repeat PCR & consult with Pediatric HIV Specialist (call x2907) 	<ul style="list-style-type: none"> After resuscitation, contact the EIS program (x2907) or the Perinatal Hotline (1-888-448-8765) for medication recommendations. Draw labs before 48 hours of age (do not use cord blood as it may contain maternal HIV antibodies) Begin ZDV within 6-12 hours of birth (see Section 5D* of guidelines for dosing information) Formula feed only. Do not breast feed. Do not give expressed maternal milk.
14 – 21 Days	CBC with differential HIV-1 DNA by PCR (see definition, section 6)		<ul style="list-style-type: none"> May detect acute intrapartum HIV infection Anemia is the primary complication of ZDV therapy
4-6 weeks		<ul style="list-style-type: none"> Start PCP prophylaxis in all infants with indeterminate HIV infection status or who have documented HIV infection 	<ul style="list-style-type: none"> See Section 5F (part 5a)** of guidelines for dosing information
6 weeks		<ul style="list-style-type: none"> Discontinue ZDV if presumptive exclusion of HIV (see chart 2) 	
1-2 months	CBC with differential HIV-1 DNA by PCR (see definition, section 6)		<ul style="list-style-type: none"> Routine immunization If anemia is noted, repeat CBC at 12 weeks
4 to 6 months	CBC with differential HIV-1 DNA by PCR (see definition, section 6)	<ul style="list-style-type: none"> Discontinue PCP prophylaxis at any time presumptive exclusion of HIV is attained (see chart 2) 	Routine immunization
12 -18 months	HIV serology with EIA and Western Blot to confirm clearance of maternal antibodies		<ul style="list-style-type: none"> Routine immunizations. Varicella vaccine contraindicated if immunosuppressed or symptomatic HIV (see Section 5H*** for guidelines)
Any age			<ul style="list-style-type: none"> Any infant or child with HIV exposure should be screened any time they show signs or symptoms of immunosuppression

2. Chart #2: Presumptive Exclusion of HIV in Non-breast Fed Babies

<u>PRESUMPTIVE</u> EXCLUSION OF HIV IN NON-BREAST FED BABIES		
1.	Two negative tests	<ul style="list-style-type: none"> • One at age ≥ 14 days of age and • One at ≥ 1 month of age
2.	One negative test	<ul style="list-style-type: none"> • At ≥ 2 months of age
3.	One negative test	<ul style="list-style-type: none"> • At \geq six months of age

3. Chart #3: Definitive Exclusion of HIV in Non-breast Fed Babies

<u>DEFINITIVE</u> EXCLUSION OF HIV IN NON-BREAST FED BABIES		
1.	Two or more negative tests	<ul style="list-style-type: none"> • One at age ≥ 1 month of age and • One at ≥ 4 months of age
2.	Two negative tests from separate specimens	<ul style="list-style-type: none"> • At ≥ 6 months of age
<ul style="list-style-type: none"> • Negative EIS antibody screen at 12-18 months still recommended for confirmation 		

4. Chart #4: Diagnostic Tests Used in Screening Infants for HIV

DIAGNOSTIC TESTS USED IN SCREENING INFANTS FOR HIV		
Test	CPT Code	Discussion
HIV DNA PCR Qualitative	87535	<ul style="list-style-type: none"> • At < 48 hours of age, sensitivity is $< 40\%$ • By 2-4 weeks of age sensitivity is $> 90\%$
HIV RNA Assay	87536	<ul style="list-style-type: none"> • 25-40% in first week of age • 90-100% sensitivity by 2-3 months • Unknown whether maternal use of HAART affects viral load of infant so may give false negative results. • For mothers not on HAART, are as accurate and may be less expensive
HIV Antibody Screen	86703	<ul style="list-style-type: none"> • EIA screen at 12-18 months still recommended for confirmation of seroreversion of HIV negative antibody status

5. Follow-up for Infants Born to HIV+ Mothers

For continuously updated guidelines, refer to Pediatric Guidelines at:
<http://www.aidsinfo.nih.gov> (current data abstracted from:
<http://aidsinfo.nih.gov/contentfiles/PediatricGuidelines.pdf>)

A. Goals:

1. Prevent intrapartum and postpartum vertical transmission of HIV.
 2. Assure best practice scheduling of laboratory data surveillance of infants exposed to HIV.
 3. Early identification of infected infants.
 4. Assure best practice treatment of infants at risk.
 5. Assure best practice treatment of infants infected.
- B. Wash infant before any invasive procedures (Vitamin K shot, Hepatitis B vaccine, lab draw, etc.). If resuscitation required, take all possible precautions to protect infant from infection during resuscitation. After resuscitation, contact the EIS program at 729-2907 or the National Perinatal HIV Consultation and Referral Service Hotline at 1-888-448-8765 for medication recommendations.

Optional Labs at birth: CBC and HIV-1 DNA, QUAL, PCR

- Testing at birth is considered optional to diagnose *in utero* infection. Some experts perform virologic diagnostic testing at birth since 30-40% of infants with HIV can be identified by 48 hours of age. (At <48 hours of age, PCR sensitivity is <40%). The issue is that the sensitivity is so low that false negatives would be of concern. Benefits would be that if a positive is determined, therapy could be rapidly instituted.
- To order, select HIV-1 DNA, QUAL, PCR from Peds Immunology list in LIS/Softweb (4th option on list)
- Do not use cord blood as this may be contaminated with maternal blood.
- Labs must be drawn prior to 48 hours of age.
- If HIV DNA PCR is positive, this must be confirmed by a second HIV DNA PCR at 14 days.
- If HIV DNA PCR is negative, retest at 14 days.

C. Feeding: Formula feed only. Do not breast feed. Do not give expressed maternal milk.

*D. 6-12 hours after birth: Initiate treatment of infant with ZDV (Zidovudine, AZT) syrup 2 mg/kg every 6 hours. Dosing at 4 mg/kg every 12 hours is being investigated but is not currently a recommendation. If unable to tolerate oral medication, dosing is 1.5 mg/kg IV every 6 hours. Therapy to be given until infant is 6 weeks of age.

1. ZDV dosing for infants <35 weeks gestation at birth is 1.5 mg/kg/dose IV or 2 mg/kg/dose orally, every 12 hours.

- a. If 30 weeks gestation or greater at birth, advance dose to every 8 hours at 2 weeks of age.
 - b. If less than 30 weeks gestation at birth, advance dose to every 8 hours at 4 weeks of age.
2. Treatment should be changed from ZDV alone to Highly Active Antiretroviral Therapy (HAART) in infants testing positive for HIV and can be considered in infants born to mothers with significant HAART exposure histories.

E. 14-21 days after birth:

1. Repeat HIV DNA PCR to assess for Primary HIV Infection. If initial HIV DNA PCR is negative, but the second at 7-90 days is positive and confirmed with a repeat screen, the infant is considered positive by intrapartum transmission. (At 14-21 days, PCR sensitivity is >90% allowing for early identification and treatment).
 - a. Determine maternal HIV/AIDS medications or HAART history and consult with an HIV/AIDS expert (contact EIS Program at 729-2907) to develop an appropriate antiretroviral treatment plan.
2. CBC to determine possibility of bone marrow suppression due to ZDV.

**F. 4-6 weeks after birth:

1. An infant is considered to have a **presumptive exclusion** of HIV if non-breastfed and it has two negative tests; one at ≥ 14 days of age and one at ≥ 1 month of age.
2. ZDV should be continued for the full 6 week course regardless of presumptive negative status.
3. Check CBC to assess ZDV effects.
4. If an infant has not received testing for a presumptive negative status, begin PCP prophylaxis with Trimethoprim-Sulfamethoxazole (TMP-SMX or Septra) at age 4-6 weeks of age and continue until presumptive negative testing is completed. For all HIV infected or HIV indeterminate infants begin PCP prophylaxis at 4-6 weeks.
5. If a presumptive negative status is obtained, and infant is ≤ 6 weeks, PCP prophylaxis does not need to be initiated. If presumptive negative and infant has already started TMP/SMX, it may be discontinued.

- a. The regimen of choice is TMP/SMX 150/750 mg/m²/day in 2 divided doses by mouth three times weekly (i.e. Sun, Mon, Tues).
- b. Consult an EIS provider at 729-2907 or Pharmacy for alternative regimens.
- c. If the infant is found to be positive at any time, therapy continues indefinitely. Consult with and EIS provider for ongoing treatment (729-2907).

4. Routine immunizations.

G. 4-6 months after birth:

1. **Definitive negative/exclusion** of HIV in non-breastfed babies:
 - a. TWO or more negative tests with one obtained at ≥ 1 month and one at ≥ 4 months of age, or
 - b. TWO negative tests from separate specimens at ≥ 6 months of age, or
2. CBC with differential.
3. Routine immunizations.
4. If PCP prophylaxis was initiated, it may be discontinued if either a presumptive or definitive exclusion of HIV has been attained.

***H. Varicella Vaccine:

1. Varicella-Zoster Vaccine: HIV-infected children who are *asymptomatic and not immunosuppressed* should receive live-attenuated varicella vaccine at age greater than or equal to 12-15 months.
2. Varicella vaccine should not be administered to symptomatic or immunosuppressed HIV-infected children because of the potential for disseminated viral infection. Retrieved June 29, 2006 from (pgs. 19-20): <http://www.aidsinfo.nih.gov/ContentFiles/OIpreventionGL.pdf>

Consult with Pediatric Infectious Disease Specialist prior to administering Varicella Vaccine (call EIS Provider at 729-2907 for contact information).

I. 12 - 18 months of age:

1. By 12 to 18 months, most infants have cleared maternal antibodies and an HIV screen with EIA and Western blot confirmation should be performed.
2. Many experts confirm the absence of HIV infection in infants with negative virologic tests by obtaining an EIA antibody test at 12-18 months to document seroreversion to HIV antibody negative status.

J. Any age:

1. An infant or child with HIV exposure should be screened any time they show signs or symptoms of immunosuppression.

6. **DEFINITIONS:**

1. HIV DNA PCR - Viral load testing done by the PCR method is incredibly sensitive. Viral load tests are reported as the number of HIV copies in a milliliter of blood. If the viral load measurement is high, it indicates that HIV is reproducing and that the disease will likely progress faster than if the viral load is low. A high viral load can be anywhere from 5,000 to 10,000 copies and can range as high as one million or more. A low viral load is usually between 200 to 500 copies, depending on the type of test used. (*Retrieved June 19, 2006 from:*

http://www.labtestsonline.org/understanding/analytes/viral_load/test.html)

- a. At <48 hours of age, sensitivity is <40%
- b. At 2-4 months of age, sensitivity is >90%

2. HIV RNA Assays— HIV RNA assays detect extracellular viral RNA in the plasma and are as sensitive as HIV DNA PCR for early diagnosis of HIV infection in HIV-exposed infants. Some clinicians choose to use an HIV RNA assay as the confirmatory test for infants who have an initial positive HIV DNA PCR test. In addition to providing virologic confirmation of infection status, the expense of repeat HIV DNA PCR testing is spared and an HIV RNA measurement is available to guide treatment decisions.

HIV RNA Assay:

- a. At 1 week of age, sensitivity is 25-40%
- b. At 2-3 months of age, sensitivity is 90-100%
- c. *It is unknown whether maternal use of HAART affects viral load of infant. HIV RNA may give false negative results in the infant if the mother is on prenatal HAART.*

3. Intrauterine (early) infection—Positive HIV DNA PCR at or before 48 hours of life.
4. Intrapartum (late) infection – Negative HIV DNA PCR during first week of life, then subsequent positive PCRs in non-breast fed infant. Approximately 60-80% of infections are intrapartum.

7. References

The Working Group on Antiretroviral Therapy and Medical Management of HIV-Infected Children, *Guidelines for the Use of Antiretroviral Agents in Pediatric HIV Infection*, Retrieved April 28, 2008 from <http://aidsinfo.nih.gov/contentfiles/PediatricGuidelines.pdf>

United States Public Health Services/IDSA (2002), *Guidelines for the Prevention of Opportunistic Infections in Persons Infected with Human Immunodeficiency Virus*, Table 11, Retrieved April 28, 2008 from <http://www.aidsinfo.nih.gov/ContentFiles/OIpreventionGL.pdf>

Zeichner, S.L. & Read, J.S. (Eds.) (2005). *Textbook of Pediatric HIV Care*. New York: Cambridge University Press.