

# Screening and Prevention of Transmission of HIV-1 in Neonates Born to Mothers with HIV

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## Abstract

Human immunodeficiency virus (HIV) infection remains a significant public health problem in the developing and developed world alike. Infants born to mother who are infected with HIV are at risk of acquiring the infection, and vertical transmission is the main method by which infants are infected. For these reasons it is of vital importance that these infants at risk are identified at earliest and appropriate prophylaxis commenced. We explore the current guidelines for prevention of transmission in neonates born to HIV-1 positive mother.

**Keywords:** HIV; Vertical transmission; Prophylaxis

## Introduction

There is a high associated morbidity and mortality from Human immunodeficiency virus (HIV) when left untreated. Vertical transmission is the main method by which infants are infected. It is therefore vital to give identify infants at risk and give appropriate prophylaxis in the neonatal period. Serology tests in neonates are ineffective as maternal transmission of HIV antibody occurs which can persist for up to 18 months of age [1].

The gold standard for testing of infants born to seropositive mothers is HIV 1 proviral DNA. This detects the virus in peripheral blood mononuclear cells. The test has a high specificity; however the sensitivity of the test increases with age. A study of 1657 infants of seropositive mothers receiving ART (anti-retroviral treatment) tested for HIV-1 DNA at birth, 1 month, 3 months and 6 months showed a specificity of 98% at birth then 100% from 1 month. Sensitivity was 55% at birth, increasing to 100% at 3 months [2].

The British HIV Association recommends that non-breast fed infants are tested on the following schedule:

- 1) In the first 48 hours of life.
- 2) At 6 weeks of age (2 weeks after stopping prophylaxis).
- 3) At 12 weeks of age.

If these tests are negative HIV infection in the baby can be excluded, however it is recommended that HIV antibody testing should also be performed at 18 months of age [3]. There has been cases of late post-natal infection despite negative PCR tests in early infancy so follow up antibody testing is important [4]. If infants are breast fed, additional monthly testing is required from 3 months of age [3].

## Prophylaxis for infants

Infants should be commenced on zidovudine if the transmission risk is low- i.e., maternal viral load <50 HIV RNA copies/ml. Further therapy depends on the maternal viral load and the dosing schedule varies. In the Paediatric AIDS Clinical Trials Group Protocol 076 Study trial of the efficacy of zidovudine, neonates received 2 mg/kg QDS for 6 weeks. The study showed a 67.5% relative risk reduction in transmission in the zidovudine group where there was antenatal, intrapartum and neonatal administration of zidovudine [5].

In the UK Zidovudine twice daily is recommended for 4 weeks post-natally for ease of use and reduction of side-effects [3]. Triple therapy

should be initiated where the maternal viral load is high at the time of delivery (>50 HIV RNA copies/ml) or the mother is found to be HIV positive after delivery. Ideally therapy should be started within 48 hours of birth. A study by Wade et al. looked at 939 HIV exposed infants. They showed that the transmission rate was higher if prophylaxis was started 72 hours or later after birth (18.4% compared to 9.3% if given within 48 hours) [6].

One randomised trial looked at the efficacy of different ART drug combinations on neonates born to untreated HIV 1 infected mothers. 1684 infants were randomised to either single drug (zidovudine only for 6 weeks), two-drug (zidovudine for 6 weeks+ three doses of nevirapine in first 8 days of life) or three-drug (zidovudine for 6 weeks plus lamivudine and nelfinavir for 2 weeks). The overall transmission rate was 8.5%. There was significantly higher intrapartum transmission in the single drug group (p=0.03). However, there were higher rates of neutropenia in the three-drug group [7]. Commonly used combination drugs are zidovudine, lamivudine and nevirapine if there is no concern regarding drug resistance [3]. In preterm infants where enteral feeding has yet to be established IV zidovudine can be given and converted to oral when feeding established.

## Feeding

In concordance with WHO recommendations, in the UK it is recommended that infants should be formula fed to reduce risk of transmission as long as it is "acceptable, feasible, affordable sustainable and safe" [8].

## Conclusion

Post exposure prophylaxis (PEP) is being used widely in the UK, Data from The National Study of HIV in Pregnancy and Childhood in the UK and Ireland between 2002-2008 showed that 99% of infants

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born to HIV positive mothers received PEP. The majority, 85.6%, received single drug, with 11.4% receiving three or more. 1% (72/7286) of infants who received PEP were infected compared to 14.7% (5/34) who received no prophylaxis ( $p < 0.001$ ) [9].

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