The Cumulative Incidence of HIV Infection in HIVexposed Infants with a Birth Weight of ≤1500g Receiving Breast Milk and Daily Nevirapine

A retrospective, descriptive study conducted at Kalafong hospital, Gauteng

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## Background

- VLBW infants = immature gastrointestinal tract with increased risk of HIV transmission through breastfeeding → pasteurisation of EBM to decrease MTCT of HIV.
- National PMTCT guideline (2010) → daily infant NVP for the duration of breastfeeding → fewer institutions practising pasteurisation of EBM.
- Raw breast milk has **not** been investigated in these vulnerable infants.



## Introduction

HIV transmission = maternal transmittability + infant susceptibility.<sup>1,2,3</sup>

- Maternal transmittability
  - ARV use, HIV viral load, CD4 count and the presence of HIV-related comorbidities
- Infant susceptibility
  - Prematurity, birth weight, and the mucosal barrier function of the gastrointestinal tract
  - 1. Newell ML. Trans R Soc Trop Med Hyg 2006;100:1-5.
  - 2. Kourtis AP, Bulterys M. Clin Perinat 2010;37:721-37.
  - 3. Prestes-Carneiro LE, Spir PRN, Ribeiro AA, Goncalves VLMA. Rev Inst Med Trop Sao Paulo 2012;(54)1:25-9.



#### MTCT in South Africa in different cohorts of weight

Year	Method	Weight (n)	MTCT Rate
2006/2007	Pretoria Pasteurised EBM		10% by 6 weeks
Kalafong <sup>4</sup>	Maternal sdNVP = 37%	≤1500g (n=83)	(8/83)
	Lifelong HAART = 13%		
	Infant sdNVP within 72 hours		
March 2010 – Feb 2011	Pretoria Pasteurised EBM / Donor EBM		2.7% by 6 weeks
Groote Schuur <sup>5</sup>	26/36 (72%) mothers received ARVs prior to delivery	≤1000g (n=37)	(1/37)
	37 (100%) infants received appropriate PMTCT		(95% CI: 0.7 – 14.1)
2011	35.5% exclusive BF		
National <sup>6</sup>	47.1% exclusive FF	≥2500g (n=10 106)*	2.7% by 4-8 weeks
	17.4% mixed feeding	* 12% of infants <2500g	(95% CI: 2.1 – 3.2%)
	HIV-exposure prevalence 32.2%		
	93.9% maternal HAART or mother/baby ARV		
	prophylaxis		
Dec 2012 – Sept 2014	Nationally representative cross-sectional survey of		2.6% by 4-8 weeks
National <sup>7</sup>	580 randomly selected public health facilities	? (n=9120)	(95% CI: 2.0-3.2%)
	HIV-exposure prevalence 33.1%		

4. Delport SD. Unpublished data.

5. Tooke L, Horn AR, Harrison MC. Pediatr Infect Dis J 2013;(32)1:36-38.

6. Goga AE, Dinh TH, Jackson DJ for the SAPMTCTE study group. Early (4-8 weeks post-delivery) Population-level Effectiveness of WHO PMTCT Option A, South Africa, 2011.

 Goga, et al. Postnatal Mother-to-Child-Transmission of HIV and HIV-free survival in an HIV-exposed national cohort, South Africa, December 2012 – September 2014. Presented at the 34<sup>th</sup> Conference on Priorities in Perinatal Care in South Africa, 2015.

#### **Objectives**



- Primary
  - To determine the cumulative incidence of peripartum HIV infection by 4 weeks of age in infants ≤1500g at birth that received raw breast milk and NVP prophylaxis.
- Secondary
  - To describe the maternal and infant characteristics.



#### **Patients and Methods**

- Study Design
  - Retrospective, descriptive study conducted on consecutive HIV-exposed infants ≤1500g at birth.
- Period
  - 3 years
- Method
  - Infants identified using ward statistics sheet that document birth weight and HIV-exposure.
  - Hospital files retrieved to collect the appropriate data.
  - HIV DNA-PCR test results were acquired from the National Health Laboratory Service (NHLS) database.
- Ethical approval was obtained prior to data collection



#### **Patients and Methods**

#### Inclusion criteria:

HIV-exposed infants ≤1500g admitted to the neonatal unit within 72 hours of birth.

#### Exclusion criteria:

- No record of any HIV DNA-PCR test at any age.
- Demised prior to 4 weeks age.
- Received AZT as PMTCT.
- Received exclusive donor expressed breast milk (DEBM) or formula milk.
- Confirmed intrauterine HIV transmission.





\* Weight not recorded for 16 infants



#### 219

#### HIV-exposed infants ≤1500g

Excluded (n=72): 39 (17.8%) demised <4 weeks of age 23 received AZT as PMTCT 7 received DEBM/FF 2 transferred to Kalafong >72 hours after birth 1 confirmed intrauterine HIV transmission

#### Additional exclusions (n=67):

13 files could not be retrieved or had incomplete data

54 infants had no HIV DNA-PCR test result ≥4 weeks of age

#### 80 eligible infants



#### Deaths prior to 4 weeks (39/219)





< 72 Hours</li>
72 Hours to 7 Days
> 7 Days

## Maternal Characteristics (n=72)\*

Category	Variable	Number (%)
Maternal	No ANC	11/72 (15.3)
characteristics	Tuberculosis	7/72 (9.7)
	ROM ≥24 hours**	11/72 (15.3)
	Not recorded	28/72 (38.9)
	CD4 count (median)	272 cells/mm <sup>3</sup> (8-1097)
	CD4 <350 cells/mm <sup>3</sup>	42/71*** (59)
	HIV VL (median)	7191 (log 3.84)****

\* 8 twin pregnancies.

\*\* Although prolonged ROM is defined as ROM >18 hours, the results of this study cannot be reported as such as ROM data was collected according to available information on the infant admission statistic form (intact, <24 hours, ≥24 hours).

\*\*\* CD4 count not recorded for 1 mother

\*\*\*\* HIV viral load done on 12 mothers



## **Maternal Characteristics**

Category	Variable	Number (%)
Antiretroviral	Dual therapy	23/71* (32)
regime	HAART	34/71* (48)
	None	14/71* (20)
	Average duration from	12 weeks**
	initiation to birth	

\* Antiretroviral regime not recorded for 1 mother

\*\* 57 mothers used PMTCT, but duration not recorded for 12 mothers (number used to calculate duration = 45).



## **Characteristics of Infants (n=80)**

Category	Variable	Number (%)
Infant	Median birth weight	1130g
characteristics		(range 510-1500g)
	sdNVP documented	74/80 (92.5)
	Discordant HIV results for	0/8 (0)
	multiple pregnancy	





### **Peripartum MTCT rate by 4 weeks**

0 – 2.5% (95% CI: 0 – 6%)



# Characteristics of the 2 mothers and infants with positive HIV DNA-PCR tests

	Infant 1	Infant 2
1 <sup>st</sup> positive HIV DNA-PCR	Day 9 of life	Day 20 of life
Birth weight	1120g	1400g
Antenatal care	No	No
Maternal PMTCT <sup>*</sup>	None	None
Maternal CD <sub>4</sub> count	1097 cells/mm <sup>3</sup>	124 cells/mm <sup>3</sup>
Maternal HIV viral load	68952 (log 4.8)	Not done
Maternal Tuberculosis	No	Νο
Rupture of membranes	Not documented	Not documented
Method of delivery	NVD	Not recorded
sdNVP (infant)	Yes	Not documented <sup>**</sup>

\*Absence of maternal PMTCT (2/15, 13.3%) vs. maternal PMTCT (0/64, 0%) is a risk factor for MTCT (p=0.034).

\*\* sdNVP not recorded, but as this is standard of care it is assumed to have been administered.



#### **Discussion**

Year	Method	Weight (n)	MTCT Rate
2006/2007	Pretoria Pasteurised EBM	≤1500g (n=83)	10% by 6 weeks
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March 2010 – Feb 2011	Pretoria Pasteurised EBM / Donor EBM	≤1000g (n=37)	2.7% by 6 weeks
Groote Schuur	26/36 (72%) mothers received ARVs prior to delivery		(1/37)
	37 (100%) infants received appropriate PMTCT		(95% Cl: 0.7 – 14.1)
2011	HIV-exposure prevalence 32.2%	≥2500g (n=10 106)*	2.7% by 4-8 weeks
National	93.9% maternal HAART or mother/baby ARV prophylaxis	* 12% of infants <2500g	(95% CI: 2.1 – 3.2%)
2012-2014	HIV-exposure prevalence 33.1%	? (n=9120)	2.6% by 4-8 weeks
National			(95% Cl: 2.0-3.2%)
March 2010 – Feb 2013	Raw breast milk	≤1500g (n=80)	0 – 2.5% by 4 weeks
Kalafong	Maternal PMTCT = 57/71 (80%)		(2/80)
	Infant sdNVP = 74/80 (92.5%)		(95% CI: 0 – 6%)
	All infants received daily NVP for study period		

#### Conclusion

Raw breast milk seems a safe feeding option in HIV-exposed infants ≤1500g at birth in the presence of daily NVP prophylaxis.

Absence of maternal PMTCT is a risk factor for peripartum MTCT of HIV in these infants (p=0.03).



#### Limitations

- Retrospective study:
  - Small patient numbers
  - Missing data from patient files
  - Untraceable files
  - Unavailability of HIV DNA-PCR tests by 4 weeks of age
- Viral suppression due to PMTCT = confounder in the definitive diagnosis of HIV by 4-6 weeks of age.



## Thank you

