Poster #802

HIV-exposed Children Account for More than Half of 24-Month Mortality in Botswana

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Background

- In Botswana, child mortality almost doubled between 1990-2000 due to HIV
  - HIV infected children accounted for much of the initial increased mortality, but fewer children are now infected because of the successful PMTCT program
  - HIV-exposed but uninfected (HEU) children have higher mortality than HIV-unexposed (HU) children, and this may be compounded by the shift from breastfeeding to formula feeding as a PMTCT strategy in Botswana
  - The contribution of HIV infection, HIV exposure, and feeding method to 24-month mortality is unknown

Objective

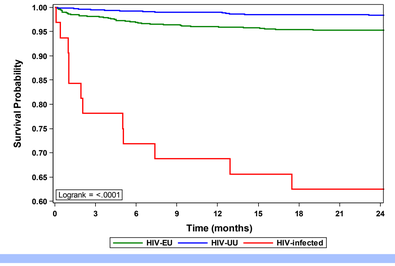
- To evaluate the impact of HIV infection and HIV exposure on 24-month child mortality in a programmatic setting with widespread availability of 3-drug ART for PMTCT and pediatric HIV

Methods

- From Jan 2012-March 2014, 3000 mothers (1499 HIV-infected) and their 3033 children (1515 HIV-exposed) were enrolled in 5 government-run post-natal wards in Botswana
- Study participants received routine care through Botswana government providers, and HIV-infected mothers and children were eligible to receive ART and PMTCT according to Botswana national HIV guidelines
- HIV-exposed children were tested for HIV in the government system at six weeks by PCR and 18 months by ELISA
- Participants were interviewed every 1-3 months by phone or home visit to assess infant HIV status and mortality
- Risk factors for 24-month survival were assessed by Cox proportional hazards modeling

Results: 24-month Child Mortality

- 3033 Infants enrolled
  - 15 (0.5%) LTFU at 24-months
  - 106 (3.5%) deaths
- 12 (38%) HIV-infected children died
  - 300 deaths per 1000 child-yrs
- 70 (4.5%) HEU children died
  - 24 deaths per 1000 child-yrs
- 24 (1.6%) HU children died
  - 8 deaths per 1000 child-yrs



Risk Factors for Child Mortality in Botswana

	All Children (N=3033)		HIV-exposed Uninfected Children (N=1483)	
Selected risk factors for child mortality	Univariate HR (95% CI)	Adjusted HR (95% CI)	Univariate HR (95% CI)	Adjusted HR (95% CI)
Infant HIV-infected	30.0 (15.0, 60.0)	21.7 (10.3, 46)	--	--
Infant HIV-exposed	3.5 (2.2, 5.5)	2.7 (1.6, 4.5)	--	--
Never Breastfed	2.5 (1.7, 3.8)	2.3 (1.5,3.5)[$]	1.0 (0.5,1.9)	1.4 (0.5, 3.7)
Maternal Death	9.0 (2.2, 36.7)	8.9 (2.1,37.1)	--^	--^
Congenital Abnormality	2.5 (0.9 ,6.8)	1.9 (0.7, 5.4)	4.6 (1.7, 12.5)	5.5 (1.3, 23.8)
Season of Birth (Jan-Mar)	1.9 (1.3, 2.7)	1.8 (1.2, 2.6)	1.6 (1.0, 2.5)	1.4 (0.8, 2.8)
Infant Birth Injury	1.3 (0.6, 2.7)	--	1.8 (0.7, 4.5)	2.7 (0.8, 9.0)
Infant Preterm (<37weeks)	1.4 (0.9, 2.3)	1.1 (0.7, 1.8)	1.4 (0.8, 2.4)	1.4 (0.7, 2.9)
Water not piped directly into home	2.4 (1.2, 4.7)	1.8 (0.8, 2.6)	2.1 (0.9, 5.1)	1.6 (0.5, 5.5)
Maternal Education: None/Primary	2.1 (1.1, 4.4)	1.5 (0.8, 2.6)	1.8 (1.0, 3.2)	2.7 (1.2, 6.3)
Mother Primiparous	0.6 (0.1,1.0)	0.9 (0.5,1.5)	1.2 (1.7, 2.2)	0.8 (0.3, 2.1)
Mother Married	0.6 (0.3,1.4)	--	0.5 (0.2,1.6)	0.6 (0.1, 2.5)
Maternal CD4 <250	--	--	0.9 (0.4, 2.1)	--
Maternal ZDV-monotherapy in pregnancy (vs. 3-drug ART)	--	--	1.3 (0.8, 2.1)	1.1 (0.6, 2.1)

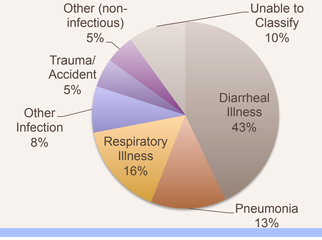
$ Due to collinearity between HIV-exposure status and feeding choice (breast vs. formula feeding), feeding was unable to be added to the multivariate model, the aHR represents a separate model without HIV-exposure.

^Among all HEU infants who died, there were no maternal deaths. Therefore, maternal deaths could not be included as a covariate in the HEU model.

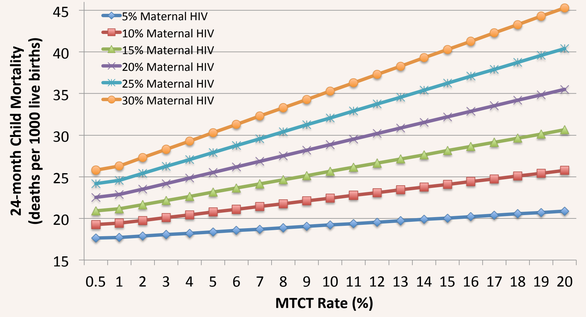
Mother to Child Transmission

- 2.1% of children HIV-infected
  - 6% of infections not found until 18-m ELISA
- 120 (8%) with unknown HIV-infection status
  - 44 (2.9%) died before testing
  - 42 (2.8%) FF children were never tested
  - 34 (2.2%) BF children were never tested after weaning

Cause of Death



Projected Impact of Maternal HIV and MTCT on Child Mortality



In Botswana, where 26% of pregnant women are HIV-infected, our data suggest **54% of all 24-month child mortality is among HIV-exposed children**

- 46% HEU and 8% HIV-infected

Limitations

- We likely underestimated early neonatal mortality because women with sick infants were less likely to enroll
- We could not untangle the effect of formula feeding from HIV-exposure because feeding and HIV-exposure status were co-linear
  - 99.7% of HIV-unexposed but only 13% of HIV-exposed children breastfed

Conclusions

- In a programmatic setting with widespread maternal and child ART availability, HIV-exposed children contribute more than half the overall deaths at 24 months