

The AIDS Epidemic: An Issue for Maternal and Child Health and Nutrition

Kathleen Rasmussen, PhD
Professor, Division of Nutritional Sciences
Cornell University

February 5, 2008

The AIDS Epidemic: An Issue for Maternal and Child Health and Nutrition



Photo: Richard O'Connell, DC/As, Harvard Public Health Review, 2007/Spring/Summer, 27.

A mother with full-blown AIDS cradles her 2-year-old, who has been given just a few months to live. This child will be the third she has lost to AIDS-related illnesses. Three-quarters of young Africans infected with HIV are women ages 15 to 24.



Global summary of the AIDS epidemic, December 2007

Number of people living with HIV in 2007	Total	33.2 million [30.6 – 36.1 million]
	Adults	30.8 million [28.2 – 33.6 million]
	Women	15.4 million [13.9 – 16.6 million]
	Children under 15 years	2.5 million [2.2 – 2.6 million]
People newly infected with HIV in 2007	Total	2.5 million [1.8 – 4.1 million]
	Adults	2.1 million [1.4 – 3.6 million]
	Children under 15 years	420 000 [350 000 – 640 000]
AIDS deaths in 2007	Total	2.1 million [1.9 – 2.4 million]
	Adults	1.7 million [1.6 – 2.1 million]
	Children under 15 years	330 000 [310 000 – 380 000]

December 2007

What will happen to these children?



Left: Richard O'Connell, DC/As, Harvard Public Health Review, 2007/Spring/Summer, 27.
Right: UNICEF, 2007. A 7-year-old boy, dead of AIDS, is buried in rural Zambia. Some 3 million children in Africa are HIV orphans.

They die at 6 times the rate of uninfected children

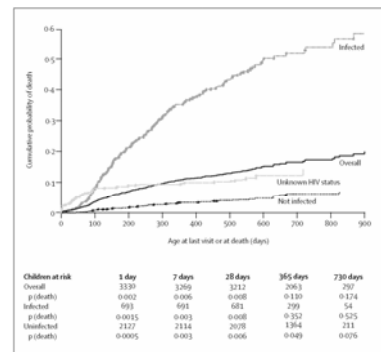
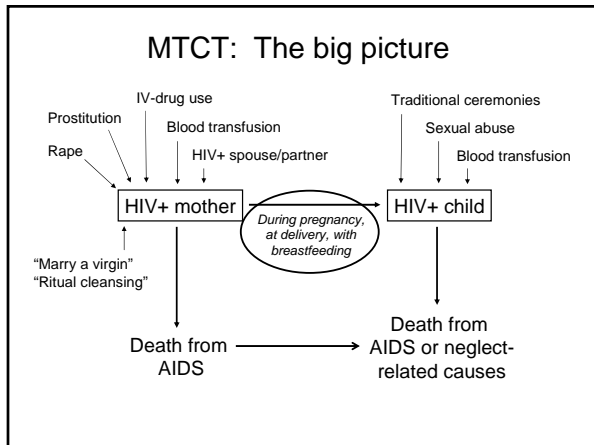
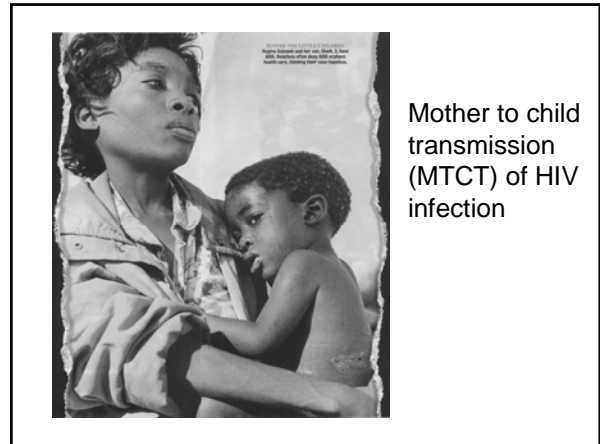
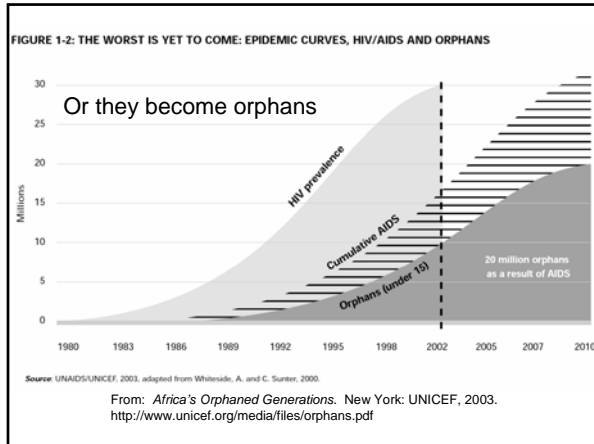


Figure 1: Estimated unadjusted overall mortality for infected and uninfected children
p=probability of death at that age.

From: Newell M-L, et al. *Lancet* 2004;**364**:1236.



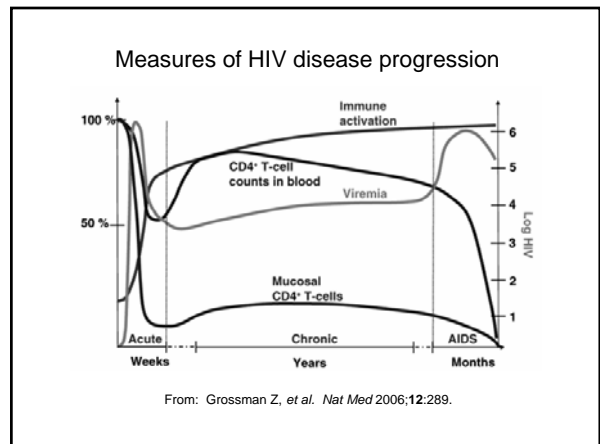
HIV infection is not yet preventable among women (although it should be!)

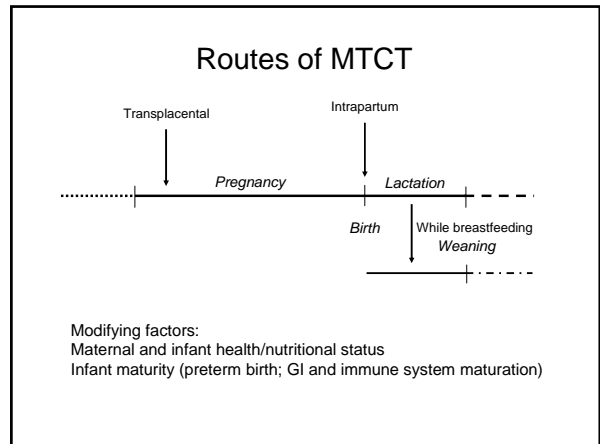
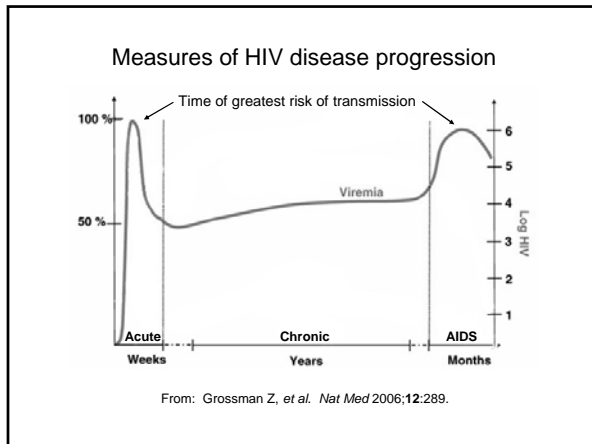
Living with AIDS. A mother and child in a special home for women with AIDS in Addis Ababa, Ethiopia.

But it is among children by addressing MCTC

- Improve maternal health
- Interrupt transmission before, during and after birth

"Timing may be everything"

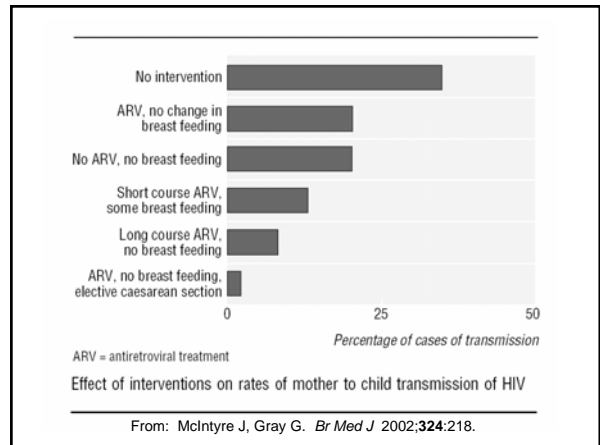




Estimated risk and timing of mother-to-child transmission of HIV in the absence of interventions⁴

Timing	Transmission rate ⁵
During pregnancy	5-10%
During labour and delivery	10-15%
During breastfeeding	5-20%
Overall without breastfeeding	15-25%
Overall with breastfeeding to 6 months	20-35%
Overall with breastfeeding to 18 to 24 months	30-45%

From: *HIV and Infant Feeding: Guidelines for Decision-Makers*. Geneva: WHO, 2003.

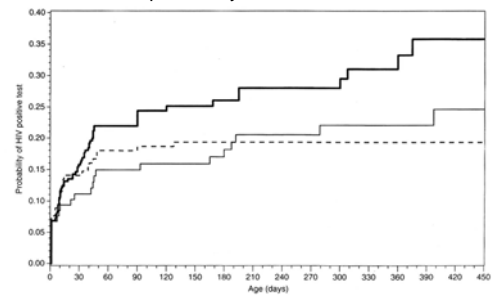


Interruption of transmission during pregnancy and at delivery

- ### Treatment of pregnant women
- From: *Antiretroviral Drugs for Treating Pregnant Women and Preventing HIV Infection in Infants*. Geneva: WHO, 2006.
- Assess the clinical stage of the woman's infection and, where possible, her CD4 cell count (to determine eligibility for ART)
 - Give ART or ARV prophylaxis to prevent MTCT (as appropriate) and cotrimoxazole prophylaxis (if eligible)
 - Screen for and treat tuberculosis
 - Provide counseling and care related to nutrition and psychosocial support

Transmission of HIV by human milk

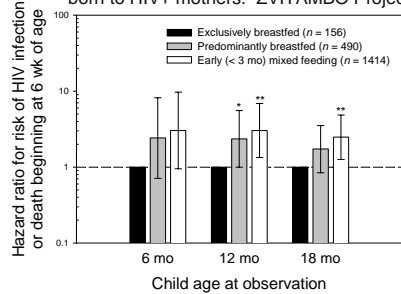
Association between infant feeding pattern and the probability of HIV infection



Cumulative probability of detecting HIV infection over time among 157 children who were never breastfed (---), 118 exclusive breastfeeders (—), and 276 mixed breastfeeders (· · ·).

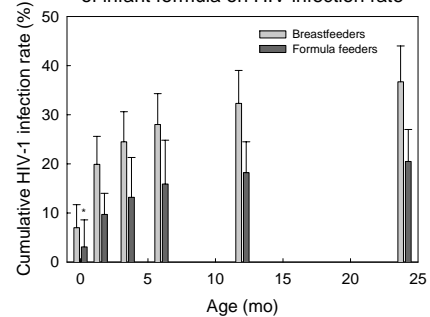
From: Coutousdis A, et al. *AIDS* 2001;15:379.

Association between breastfeeding mode and risk of HIV infection or death among 2060 HIV- infants born to HIV+ mothers: ZVITAMBO Project



* $P < 0.05$, ** $P < 0.01$
From: Iliff PJ, et al. *AIDS* 2005;19:699.

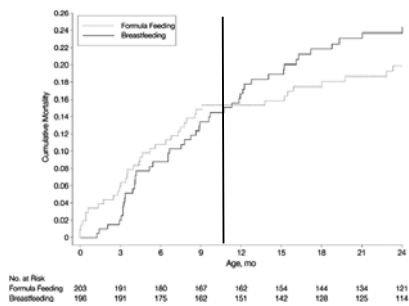
Effect of feeding advice and provision of infant formula on HIV infection rate



Nduati R, et al. *JAMA* 2000;283:1167.

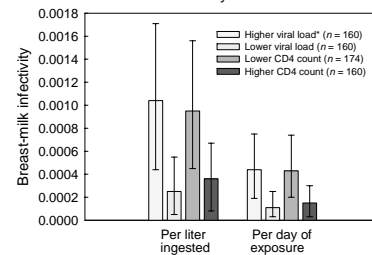
* Significantly different ($P < 0.001$) at all times except this one.

Effect of infant feeding advice and provision of infant formula on mortality



From: Mbori-Ngacha D, et al. *JAMA* 2001;286:2413.

Association of indicators of HIV disease severity with breast-milk infectivity among 425 Kenyan women



*Divided at the median: viral load, 43,120 copies/mL of HIV RNA; CD4 count, $400 \times 10^6/L$ in maternal plasma, measured prenatally

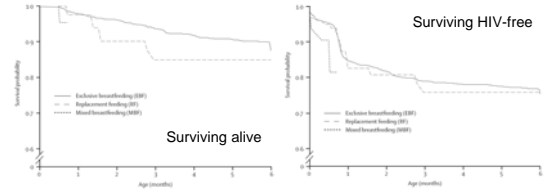
From: Richardson BA, et al. *J Infect Dis* 2003;187:737.



Lydia Tsebetse of Soweto, South Africa, who has the AIDS virus, is taking part in a study on HIV transmission that urges her to use formula for her daughter, whose HIV status is not yet known.

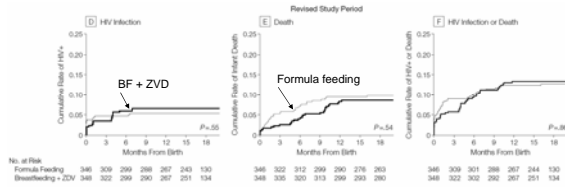
From: New York Times, 6/8/97

Association of nevirapine treatment, counseling and available infant formula with death or HIV infection: KwaZulu Natal, n = 1132



From: Coovadia HM, et al. Lancet 2007;369:1007.

Breastfeeding plus zidovudine (6 mo) v. formula feeding plus zidovudine (1 mo): A randomized comparison, the Mashu Study



Cumulative event rate intervention consisting of active, open-label nevirapine to all infants and availability of HAART to qualifying mothers and infants:
 348 assigned to formula feeding (including 172 to single-dose placebo to mother) and 346 assigned to BF + zidovudine (including 177 to single-dose placebo to mother)

From: Thior I, et al. JAMA 2006;296:794.

HIV and infant feeding

From: HIV and Infant Feeding: A Guide for Health Care Managers and Supervisors. Geneva: WHO, 2001.



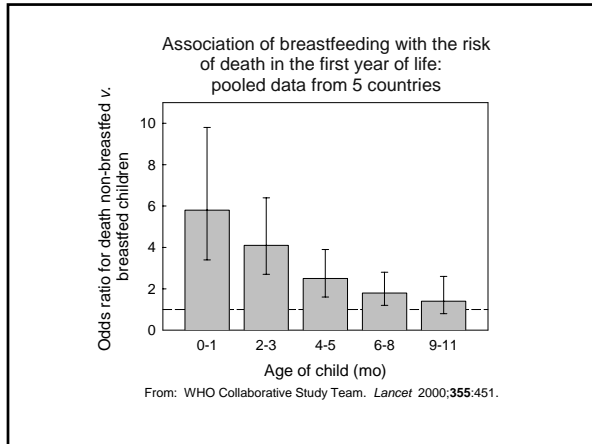
If you are HIV-positive What is the best infant feeding option for your baby?



Benefits of breastfeeding


From: Anonymous. J Am Diet Assoc 2005;105:810.

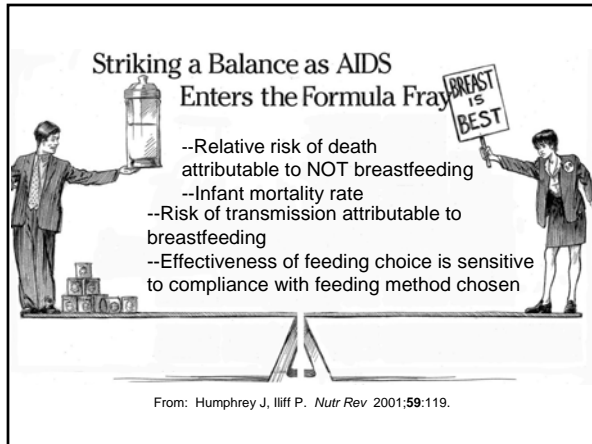
Benefits for infant	Benefits for mother
<ul style="list-style-type: none"> Provides optimal nutrition for infant Guarantees safe, fresh milk Enhances immune system Protects against infectious and non-infectious diseases Protects against allergies and intolerances Decreases risk of diarrhea and respiratory infections Promotes correct development of jaws, teeth, and speech patterns Decreases risk of childhood obesity Increases cognitive function Reduces risk for heart disease Increases bonding with mother 	<ul style="list-style-type: none"> Promotes faster shrinking of the uterus Reduces postpartum bleeding Decreases risk of breast and ovarian cancer Delays resumption of the menstrual cycle Improves bone density Decreases risk for hip fracture Improves glucose profile in gestational diabetics Strengthens bond with the infant Enhances self-esteem in the maternal role Eliminates the need for preparing and mixing formula Saves money not spent on formula



- ### Recommended infant feeding practices (American Academy of Pediatrics, 1997)
- Exclusive breastfeeding is ideal nutrition and sufficient to support optimal growth and development for approximately the first 6 mo after birth.
 - In the first 6 mo, water, juice, and other foods are generally unnecessary for breastfed infants. Vitamin D and iron may need to be given before 6 mo of age in selected groups of infants.



- ### The conflict
- 
- Breastfeeding prevents mortality from many infectious diseases
 - Breastfeeding may transmit HIV
 - Breastfeeding is the cultural norm and is affordable
 - Infant formula is expensive and may not be prepared properly
 - Use of infant formula
 - May reveal a woman's HIV status
 - Is a tacit endorsement of the use of infant formula, which may undermine breastfeeding
 - Exposes the mother to engorgement, mastitis and increased risk of pregnancy
 - Exposes the baby to malnutrition, loss of closeness with its mother and increased risk of neglect
- From: From: Piwoz E, et al. SARA Project, undated.



Exclusive breastfeeding is recommended for the infants of HIV-infected women for the first 6 mo of their lives unless replacement feeding is acceptable, feasible, affordable, sustainable and safe before that time.

From: WHO. *Consensus Statement*. 2006. http://www.who.int/child-adolescent-health/New_Publications/NUTRITION/consensus_statement.pdf

AFASS

When replacement feeding is acceptable, feasible, affordable, sustainable and safe, avoidance of all breastfeeding by HIV-infected women is recommended.

All breastfeeding should stop once a nutritionally adequate and safe diet without breast milk can be provided.

From: WHO. *Consensus Statement*. 2006.
http://www.who.int/child-adolescent-health/New_Publications/NUTRITION/consensus_statement.pdf

The most appropriate infant feeding option for an HIV-infected mother should depend on her individual circumstances, but should consider the health services available and the counseling and support she is likely to receive.

Breastfeeding mothers of infants and young children who are known to be HIV-infected should be strongly encouraged to continue breastfeeding.

From: WHO. *Consensus Statement*. 2006.
http://www.who.int/child-adolescent-health/New_Publications/NUTRITION/consensus_statement.pdf

The cautionary tale of rains in Botswana

http://www.bismeedings.net/Implementhiv2006/TracyCreek_files/frame.htm

- When there is a disease outbreak, formula-fed infants are undefended and die at many times the usual rate!
- Formula feeding cannot be assumed to be "safe"
 - Clean water and adequate, reliable supplies of formula are required
- Running a formula program for HIV+ women is complex and expensive and results in lower breastfeeding among HIV- women

The reality of breastfeeding in Africa

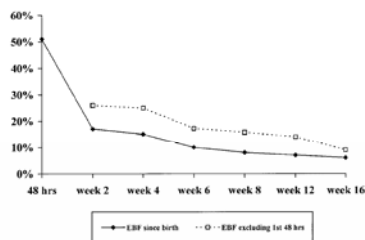


Fig. 2. Maintained exclusive breastfeeding (EBF) rate: longitudinal breastfeeding study. The x-axis represents the intervals from birth through which EBF was maintained. The weeks represent completed weeks of life, i.e. 2 wk = 14 completed days of life. The y-axis represents the proportion of children who were exclusively breastfed over these designated periods.

From: Bland RM, et al. *Acta Paediatr* 2002;91:704.

How on earth can I prevent my baby catching HIV?

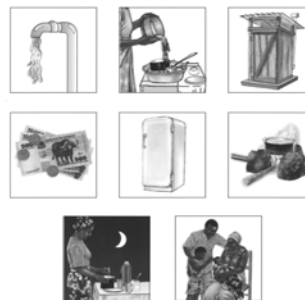


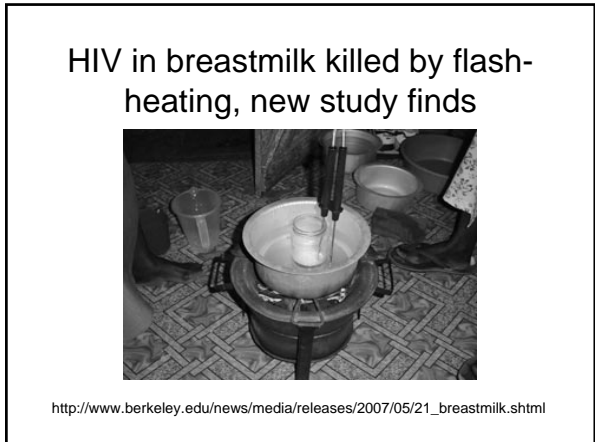
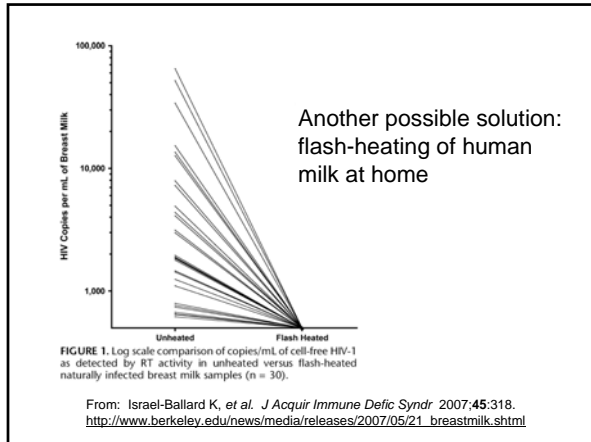
Infant feeding when the mother is HIV+

From: *Preventing mother-to-child transmission of HIV: A training manual for healthcare providers*. London: Reproductive Health Alliance and Perinatal HIV Research Unit, 2001.

If you are HIV-positive

Is using infant formula or modified cow's milk a safe and secure option for you and your baby?





UN's strategic approach

- Prevent HIV infection in general, especially among young women and pregnant women
- Prevent unintended pregnancies among HIV+ women
- Prevent MTCT
- Provide care, treatment and support to HIV+ women, their infants and family

"We know what works but we don't know how to implement it in the real world."

Philippe van de Perre, ISRHML, Tucson, AZ, September 2000.

What are some of the things that we could do now?