HIV and Infant feeding
Feeding Choices?

Main Entrance to Bisho Hospital, EC, April 2008
Exclusive breastfeeding

Babies need breast milk only, for the first 6 months of life
This Hospital is Baby Friendly because it Promotes Exclusive & Sustained Breastfeeding

Lesisibhedlela Sikhuthaza Ukunceliswa Kwabantwana Ibele

Fighting Disease, Fighting Poverty, Giving Hope
Silwa Nezifo, Silwa Nobubha, Sinika Ithemba

Newcastle Provincial Hospital, KZN, November 2008
WHO breastfeeding recommendations
HIV and infant feeding WHO 2003

• infants should be exclusively BF for first 6 months of life to achieve optimal growth, development and health
• after 6 months, they should receive nutritionally adequate and safe complementary foods while BF continues up to 24 months

Note: These recommendations also apply to women who are HIV negative or who do NOT know their status
WHO breastfeeding recommendations

- infants confirmed early to be HIV-infected (with PCR) who were still BF should continue up to two years (as per the general population)
- home modified animal milk NOT recommended for infant under 6 months age
- after 6 months, can add 200 – 400ml animal milk if other animal source foods, (otherwise 300 – 500 ml of animal milk per day)
Nutritional requirements

• resting energy expenditure is *increased* by ± 10% among asymptomatic children who have HIV

• the energy needs of children ( and adults ) increase an additional 20 – 50% during convalescent catch-up period after a *severe infection*

• children need a balanced diet of which 10 to 15% is protein
Value of Breast feeding

• first 6 months
  – provides all the *fluids* and *nutrients* required
• 6 – 12 months
  – BF provides 60 – 80% of all energy, protein and other nutritional requirements
• up to 2 years
  – provides 35 to 40% of these requirements
• family planning
• psychosocial development
Balance of risk

Risk of HIV transmission

Risk of malnutrition and death
### Estimated risk and timing of MTCT of HIV in the absence of interventions

<table>
<thead>
<tr>
<th>Timing</th>
<th>Transmission rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>During pregnancy</td>
<td>5 – 10%</td>
</tr>
<tr>
<td>During labour and delivery</td>
<td>10 – 15%</td>
</tr>
<tr>
<td>During breast feeding</td>
<td>5 – 20%</td>
</tr>
<tr>
<td>Overall without breast feeding</td>
<td>15 – 25%</td>
</tr>
<tr>
<td>Overall with breast feeding to 6 months</td>
<td>20 – 35%</td>
</tr>
<tr>
<td>Overall with breast feeding to 18 to 24 months</td>
<td>30 – 45%</td>
</tr>
</tbody>
</table>

HIV and infant feeding 2003 WHO  
p.7
PMTCT dual therapy
• **CD4 cells** = T4 or helper cells, key to both humoral and CMI responses; main target for HIV

• **cell associated virus** = HIV which lives inside the cell (measured with HIV-RNA)

• **cell-free virus** = parts of the virus (virions) not associated with a cell, measured as HIV-RNA
Feeding choices?

“Nationally, only about 12% of mothers breast feed exclusively in the first few months, dropping to fewer than 2% after the baby is four months of age. If nothing but breast milk must cross these babies’ lips, then a lot more than lip service should come from communities, their leaders and our health departments acting together “.

Associate Professor A Westwood, School of Child and Adolescent Health, UCT, 13 February 2008 Cape Times
Introduction

• the HIV pandemic has created confusion, misunderstanding and fierce debate about infant feeding

• optimal feeding pattern for overall child survival is EBF for up to two years with complimentary feeding from 6 months age*

• the rate of HIV transmission from mother to child during BF ranges from 5% to 20% depending on:
  – length of time mother breastfeeds
  – degree of mother’s immuno-suppression

*Global Strategy for Infant and Young Child Feeding, WHO 2003
Post-natal transmission of HIV

- *risk factors include*:
  - low maternal CD\textsubscript{4} count
  - high viral load
  - maternal sero-conversion during breast feeding
  - duration of breastfeeding
Figure 1 Rate of Postnatal HIV Infection by Maternal Baseline CD4 Count: Zambia Exclusive Breastfeeding Study (N=958)

ICAP Clinical Unit Technical Update Sept 2007 – HIV and Infants feeding – ICAP approach to improving HIV-free survival
HIV infectivity – more or less?

- A high viral load during needle stick injury is **MORE** likely to lead to sero-conversion afterwards
- A high viral load during rape is **MORE** likely to lead to sero-conversion afterwards
- A high viral load during pregnancy is **MORE** likely to lead to sero-conversion afterwards
- A high viral load during breast-feeding **MORE** likely to lead to sero-conversion afterwards
Recent maternal infection with HIV may raise the risk of transmission through BF to *twice* that of a woman with earlier established infection, owing to high viral load associated with recent infection.
Basic facts and child survival

• malnutrition is the underlying cause of death in about 60% of children < 5 years (50% of children in Africa)

• being underweight was associated with 3.7 million deaths worldwide in 2000, most in children < 5 years

• poor feeding practices (insuff. nutrition or contributing to diarrhoea) is a major cause of low weight, morbidity and mortality in children
BF and risk of HIV transmission

• BF protects infants from:
  – malnutrition, atopic eczema
  – common infections such as diarrhoea, pneumonia, neonatal sepsis, acute otitis media

• mortality from these conditions is common in developed countries, where babies are not BF in first 2 months of life experience a 6-fold increase in death rate

• BF provides optimal nutrition for an infant – it is safe, economical and fulfils the infant’s total nutritional needs for the first 6 months of life
BF and risk of transmission

• an HIV-infected mother who BF has 4 to 16% chance of transmitting the virus to the child (depends of duration and type of feeding)

• in rural KZN, HIV prevalence in newborns ↑ from 14% at 6 weeks to 24% at 3 to 6 months in mixed feeding population

• exclusively BF infants transmission rate of 2 – 4% has been recorded at 6 months
Tuberculosis and Breast-feeding

- A woman who is BF and has TB must receive a full course of TB treatment.
- Correct duration and drugs will ensure prevention of transmission of tubercle bacilli to the baby.
- All drugs are compatible and a woman can safely continue to BF her baby.

*streptomycin - lactation: oral absorption poor, safe*  

SAMF 8th Ed, p.309  

NDOH - Draft National Tuberculosis Policy Guidelines – 2008 p. 53
Tuberculosis and Breast-feeding

- if the mother is infectious (both smear-positive and smear-negative PTB), the child should be given prophylactic isoniazid (INH) 10mg/kg/day for 6 months and continue breastfeeding.
- BCG vaccinations should be postponed until the end of INH prophylaxis as the TB treatment and INH can destroy the vaccine.

NDOH - Draft National Tuberculosis Policy Guidelines – 2008 p. 53

Mode of transmission

- virus is present in cell-associated and cell-free component of breastmilk
- direct viral invasion of the infant’s gastrointestinal cells may alter the permeability of the child’s gastrointestinal tract (Vitamin A deficiency contributes to poor epithelial repair)
- mixed feeds present the immature GIT with a variety of bacterial and food antigens → inflammatory activity promotes viral penetration and HIV entry into the infant’s immune (gastrointestinal lymphatic) system
Breast feeding

- continued BF is common in SSA
- 94% of infants in the world are ever BF
- 79% continue for 1 year
- 52% at two years
- average duration of 21 months
- 41% of infants under 4 months
- 25% of infants under 6 months
- in SSA, 23% of infants < 6 months are exclusively BF

HIV Transmission through breast feeding – A review of clinical evidence – WHO 2004
MTCT in 100 HIV+ Mothers by Timing of Transmission (Estimates)

- # uninfected: 63
- # infected during BF for 2 yrs: 15
- # infected during delivery: 15
- # infants infected during pregnancy: 7
Mixed feeding is also associated with sub-clinical mastitis and with increased viral concentrations in breastmilk.

*EBF* may present the infant GIT with less inflammatory stress and less opportunity for viral transmission.

Exclusive BF reduces the transmission risk compared to mixed feeding by about half.

WHO; HIV & infant feeding technical consultation Oct 2006
3rd SA conference June 2007 – Declaration on HIV / AIDS
Choice - BF or FF?

IMR = Infant Mortality Rate

- Public Health authorities recommendations based on IMR
- IMR different in each SA Province
- IMR < 25 / 1000 live births → FF
- IMR > 25 / 1000 live births → EBF
• *Baby Friendly Hospital Initiative (BFHI)* was launched globally in 1991

• appropriate feeding practices are essential for optimal nutritional status, growth, development and survival of infants and young children

• More than HALF of the deaths amongst CU5 are ass. with malnutrition or lack of optimal BF
THE BABY FRIENDLY PROCESS

In 1999, a joint statement entitled Protecting, Promoting and Supporting Breastfeeding, the special role of maternity services, was published by the World Health Assembly and the United Nations Children Fund. The aim of this statement was to increase awareness of the critical role of health services in the promoting of breastfeeding, and to give guidelines for appropriate information and support to mothers. In this statement, the Ten Steps to Successful Breastfeeding were introduced. The Baby Friendly Hospital Initiative was launched worldwide in 1992 in an effort to encourage the implementation of these Ten Steps.

The Ten Steps To Successful Breastfeeding

1. Have a written breastfeeding policy that is routinely communicated to all health care staff
2. Train all health care staff about the benefits and management of breastfeeding
3. Inform all pregnant women about the benefits and management of breastfeeding
4. Help mothers initiate breastfeeding within half an hour of birth
5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants
6. Give newborn infants no milk feeds or water other than breastmilk, unless indicated for medical reason
7. Allow mothers and infants to remain together 24 hours a day from birth
8. Encourage breastfeeding frequently and on demand
9. Do not give, or encourage, the use of artificial foods or dummies to breastfed infants. Do not encourage the use of nipple shields either

10. Promote the establishment of breastfeeding support groups and refer mothers to these on discharge from the hospital or clinic.

Basic Principle

- The Ten Steps to Successful Breastfeeding are non-negotiable. Together they are the minimum package of hospital and maternity facility practices required to the Baby Friendly.
- The Global Criteria for the WHO/UNICEF BFHI establish a measurable standard for each of the Ten Steps.
- The Guide for Scoring the Global Hospital Assessment Questionnaire specifies the percentage of success required to adequately fulfill each of the ten Steps. To be designated Baby Friendly, a facility must satisfy the requirements of each step.

HIV/AIDS

Given the possibility of vertical transmission of HIV via breastmilk, the question arises as to whether it is necessary or valid to continue to promote BFHI and breastfeeding. Scientific evidence suggests that breastfeeding increases the risk of mother to child transmission (MTCT) by 12 to 43%. MTCT from breastfeeding can occur anytime during the feeding and the longer the breastfeeding period, the more chance there is of MTCT. The type of feeding also increases the risk of MTCT. Mixed feeding, which involves giving the baby any other food or drink whilst breastfeeding increases the risk of MTCT by 50%. The policy on PMTCT therefore is seen as part of the Ten Steps and is included under Step 6.
Figure 1: Estimated percentage of preventable death for different preventive interventions [12]

*Complementary feeding with continued breastfeeding

Note: If mother opts to breast feed, then Vitamin A supplementation should be given at 6 months, and at 6 weeks if she opts to use formula feed (EC).
HIV and child survival

- recent evidence from a large cohort in KZN
- assesses HIV Tx risks and survival with EBF and other types of infant feeding
- 14 weeks age FF + BF twice as likely to be infected than EBF
- early introduction of solid foods to BF → 11 times risk of acquiring HIV infection

Infant feeding  
Data from National Food Consumption Survey 2000

- offer pregnant women a *full package* of child survival interventions and not only the avoidance of HIV transmission
- *food insecurity* was experienced in 2/3 households, 5/10 individuals and 4/10 children nationally
- need to *standardise* messages about nutrition
- avoid *spill over* (misinformation, unfound fears $\rightarrow \downarrow$ BF)
Under-five mortality rate

Deaths per 1000 live births

Source: UNICEF, 2006
Note: Mastitis and sub-clinical mastitis have been associated with HIV transmission.

Sub-clinical mastitis is more common than mastitis. It is not an infective process. It may occur with milk stasis and engorgement of the breasts. It is more likely to occur:

- when the milk first comes in after birth
- when there is inadequate milk drainage eg mixed feeding
- when there is poor attachment / less vigorous suckling by ill infant
- during rapid weaning

It causes an increase in the ‘leakiness’ in the cell lining the breast duct and therefore an increased in the amount of virus the infant is exposed to.
Timing to postnatal HIV transmission

• highest risk is 1\textsuperscript{st} weeks of life
• by 3 – 6 months risk 4% 0.8 – 1.2 per month
• 75\% of all BF transmission occurred by 6 months
• cumulative probability of becoming infected after:
  – 1.6\% at 4 weeks
  – 4.2\% at 6 months
  – 7\% at 12 months
  – 9.3\% at 18 months

HIV Transmission through breastfeeding
A review of available evidence – WHO 2004
The most appropriate infant feeding option will depend upon the mother's circumstances but ought to consider local health care services, counselling and practical support available to the mother.

Exclusive breastfeeding is recommended for HIV-infected women for the first 6 months of life unless replacement feeding is acceptable, feasible, affordable, sustainable and safe (AFASS criteria).

At 6 months, if replacement feeding still does not satisfy AFASS criteria, breastfeeding must continue with the addition of complementary feeds. The mother and baby must be regularly assessed. All breastfeeding must stop once a nutritionally adequate and safe diet without breastmilk can be provided.

Whatever the decision, health services must continue to follow up and support women and HIV-exposed infants offering counselling and assistance when feeding decisions are being reconsidered.

Breastfeeding mothers and infants who are known to be HIV-positive should be encouraged to continue to breastfeed.

Governments and other stakeholders are encouraged to revitalise breastfeeding protection, promotion and support. They are asked to actively support women who choose to exclusively breastfeed and to ensure that replacement feeding is safer for women who choose that option.

National health programmes are asked to provide all HIV-exposed infants and their mothers with a total package of interventions that will promote survival and the prevention of transmission. Those women in the antenatal clinic who test HIV negative ought also to have access to primary prevention programmes for themselves and their infant.

Governments are urged to ensure that all the above interventions, including those dealing with exclusive breastfeeding, are available before distribution of free commercial infant formula is considered.

Governments and donors are requested to increase their commitment and resources to ensure the implementation of the Global Strategy for Infant and Young Child Feeding and the UN HIV and Infant Feeding Framework for Priority Action in order to prevent postnatal HIV transmission, improve HIV-free survival and achieve relevant UNGASS goals.
Commercial infant formula

- no risk of HIV transmission
- other family members can help her feed
- if mother falls ill, others can feed her infant while she recovers
- contains most of the nutrients needed especially for infants but no protective antibodies
- *cup feeding* should be encouraged
Commercial infant formula

1 scoop = 25 ml

Pellargon NAN

Reconstituted FF and expressed BM are stable for 12 hours in fridge

TABLE 4.IV. AMOUNTS FOR INFANT FEEDING UNTIL 6 MONTHS OF AGE

<table>
<thead>
<tr>
<th>Age of infant</th>
<th>Previously boiled water</th>
<th>No. of scoops</th>
<th>No. of feeds per 24 hours</th>
<th>No. of tins required for 1 infant per month (varies with the individual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2 wks</td>
<td>100 ml</td>
<td>4</td>
<td>6</td>
<td>7 tins</td>
</tr>
<tr>
<td>3 - 4 wks</td>
<td>125 ml</td>
<td>5</td>
<td>5</td>
<td>7 tins</td>
</tr>
<tr>
<td>2nd mo.</td>
<td>150 ml</td>
<td>6</td>
<td>5</td>
<td>9 tins</td>
</tr>
<tr>
<td>3 - 4 mo.</td>
<td>175 ml</td>
<td>7</td>
<td>5</td>
<td>10 tins</td>
</tr>
<tr>
<td>5 - 6 mo.</td>
<td>200 ml</td>
<td>8</td>
<td>4</td>
<td>9 tins</td>
</tr>
</tbody>
</table>

0 - 6 mths needs 20kg
6 - 12 mths needs 16kg

HIV & infant feeding WHO p54

Southern African Journal of HIV Medicine, Summer 2008
Cup Feeding

Breastmilk is always the best food for babies.

Babies do not need other food until they are about six months old.

Breastfeeding is the best way to feed your baby.

Cup Feeding the best alternative!
If you are unable to breastfeed your baby, cup feeding is the best alternative because:

- Even small premature babies can cup feed
- It uses up very little of the baby’s energy
- It is easy for anyone to learn how to do it
- It’s hygienic as cups are easily cleaned.
- Mothers' milk can be easily expressed into the cup.
- It’s safer as the baby is being held and watched while drinking
- It involves the same tongue movement as breastfeeding so when the time is right, baby can easily start breastfeeding.
- Baby drinks at his/her own pace and controls his/her own milk intake
- It is affordable - you can use any cup (a small one is best).

### Why is Cup feeding better than bottle feeding?

<table>
<thead>
<tr>
<th>HYGIENE</th>
<th>Bottle and teats are difficult to clean and sterilise.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The simple shape of a cup is easy to clean with soap and water.</td>
<td>Feeding bottles are a major cause of infant diarrhoea. If bottles are prepared in advance and stored incorrectly it may increase the chance of a baby becoming ill.</td>
</tr>
<tr>
<td>Cups do not encourage left overs to be stored.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUCKLING</th>
<th>Bottle may teach a baby to suck in a way that makes them unwilling to breastfeed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A cup does not interfere with the way a baby attaches to and suckles at the breast.</td>
<td>The baby is often propped up with a bottle and left alone during feeds.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONTACT WITH MOTHER</th>
<th>Bottle feeding is usually slower.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The baby has to be awake and is held in the mother's arms during feeds.</td>
<td>Many babies are left alone with their bottles - this can lead to choking.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SAFETY</th>
<th>Bottle feeding is usually slower.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The baby is constantly watched.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TIME</th>
<th>Bottle feeding is usually slower.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Although the baby feeds at his own pace, it is usually quicker.</td>
<td></td>
</tr>
</tbody>
</table>

**Cup Feeding**

Babies do not need other food until they are about six months old.

Breastfeeding is the best way to feed your baby.

DoH Integrated Nutrition Programme
How to feed your baby with a cup

All babies can be fed with a cup, even babies that are born too small or too soon.

- Your baby must be awake
- Sit your baby on your lap if necessary wrap the arms so that your baby cannot bump the cup
- Support your baby's head
- The cup must be at least half filled with milk

Cup feeding is much safer than bottle feeding

- Bring the cup to your baby's lips
- When baby opens the mouth, tilt the cup
- The cup must rest lightly on the lower lip
- DO NOT POUR the milk into baby's mouth
- Your baby will sip the milk from the cup

- Your baby needs to rest between sips
- When your baby has had enough baby will refuse to drink any more
- Take note of how much breastmilk your baby drinks in a whole day and not at one feed.

IMPORTANT
Ideally breastfeeding is best for babies, but at times when it is not possible Cup feeding is the best and safest alternative.

DoH Integrated Nutrition Programme
Infant growth

- advise women that FF will only be provided for 6 months grow
- volume of infant’s feeds increase as their weight increases
- infants grow fastest in the *first two years* of life
- on average, double their birth weight by 5 months and triple it by one year of age
Birth weight 2.5 to 3.5 kg

Double birth weight by 5 months

Triple weight by one year (10Kg)
A guide to the provision of Nan Perlagon (400g) to PMTCT programme participants for 6 months only

<table>
<thead>
<tr>
<th>Age in months</th>
<th>For infants who will be exclusively breast fed from birth to 6 months</th>
<th>For infants who will be exclusively Formula fed from birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>5 tins</td>
</tr>
<tr>
<td>2</td>
<td>EXCLUSIVE</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>BREASTFEEDING</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>8 tins</td>
<td>Participant to purchase</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>formula</td>
</tr>
<tr>
<td>9</td>
<td>8</td>
<td>formula</td>
</tr>
<tr>
<td>10</td>
<td>8</td>
<td>formula</td>
</tr>
<tr>
<td>11</td>
<td>8</td>
<td>formula</td>
</tr>
<tr>
<td>12</td>
<td>8</td>
<td>formula</td>
</tr>
<tr>
<td>Total provision for child</td>
<td>48 tins</td>
<td>51 tins</td>
</tr>
</tbody>
</table>

Provincial HIV/AIDS Action Unit Guidelines, KZN
“Spillover” effect

- feeding behaviour of new mothers who either know that they are HIV negative or unaware of their status
- they choose not to breast feed or breast feed for a short time because of unfounded fears about HIV or ready availability of breast-milk substitutes
Feeding choice: follow-up

- there may be some mothers whose circumstances change during the first 6 months of their babies’ lives such that they can safely change to FF if replacement feeding becomes AFASS or mother has insufficient milk.
- regular REVIEW and SUPPORT of mother after deliver essential.

Note: An HIV infected mother whose infant tests HIV negative at 6 weeks may want to STOP BF – carefully check her AFASS criteria.
Breast milk pasteurisation

• Golden standard – hospital milk bank – heats breast milk to 65° C for 30 minutes and allow to cool

OR

• *Pretoria Pasteurisation* – home use

( Flash heat treatment the breast milk )

CONSIDER heat treated BM if newborn hospitalised or immediately after normal birth if mother undecided or during transition from BM to FF
University of Pretoria, Uitenhage
EC "Breastfeeding & HIV"
Pretoria Pasteurisation
Institutional Guidelines for the Procedure

• 12 steps for mother’s milk for own infant feeding

• ensure jar sterile (water and Jik®)

• stand expressed breastmilk in a jar for 25 to 30 mins in boiled water, until the water is comfortable to the touch

• care must be taken to prevent the jar from tipping over

• can be stored in the fridge for 12 hours

University of Pretoria - B Jeffrey et al.
Dispensing formula feed

- ensure *uninterrupted* supply
- ensure mixed *correctly*
- ensure *enough* supplied each month
- ensure *SIX* month supply
- ensure stock *ordered* timeously
- ensure secure & safe *storage* areas at clinic
Definitions

• *Exclusive breastfeeding* (EBF) = the mother breastfeeds her infant and NO other food or drink including water is provided (exception drops or syrups of vits, minerals, supplements or medications)

• *Replacement feeding* ("artificial feeding" is sometimes used as a synonym) = the mother does not breastfeed her infant; the child must receive appropriate breastmilk substitutes eg infant formula
Definitions

- **Mixed feeding** = the mother breastfeeds while also giving her infant water, tea, formula, animal milk or semi-solid food eg yoghurt, purees and/or solid food (includes partial and predominant BF)
  - also called predominant or partial breast feeding, associated with 3-4 fold ↑ risk vs. EBF

- **Early cessation of breastfeeding** = mother completely stops BF including suckling when infant 4 - 6 months age (early weaning is sometimes used as a synonym)
Definitions

• **Weaning** = transition after which all breastmilk is replaced by breast milk substitutes

• abrupt or rapid cessation is not recommended; has negative effects on infant and mother (breast pain and engorgement)

• duration 2-3 days up to 2 to 3 weeks
Abrupt cessation of breast feeding

Breast feeding

Formula feeding

NO MIXED FEEDING

Time ( months )

Birth

6 months
Weaning from breast

Breast feeding

Mixed feeding (weaning)

Formula feeding

Time (months)

Birth

6 months
History of HIV and infant feeding

• 1985 – Australian doctors report the first case of an infant who became infected through breast milk
• 1987 – WHO advises BF where no safe alternative available
• 1989 – PCR becomes available to diagnose HIV in infants; transmission risk through BF reported to be “low”
• 1992 – WHO advises transmission rate ±14% from mothers infected before delivery and 29% from mothers infected after delivery
History of HIV and infant feeding

- 1997/8 – WHO publishes new feeding guidelines which advised all mothers to be counselled about feeding options; UNICEF begins PMTCT support and FF
- 1999 Dr Anna Coutsoudis (SA study) suggests EBF in first 3 months = FF; highest rate in mixed diet
- 2001 – WHO introduces “AFASS” criteria
- 2002 – UNICEF stops FF distribution
- 2005 Zimbabwe study confirms risks of mixed feeding
History of HIV and infant feeding

• 2007 – a study of nearly 3000 mothers in SA confirmed that mixed feeding carries a higher risk of HIV infection the EBF; suggest to WHO that infant feeding be revised in favour of EBF
AFAAS

• Acceptable: BF is the norm in most cultures, and is generally encouraged by health workers. By choosing not to BF, a mother risks revealing she is HIV+, and becoming a target for stigma and discrimination from her community. She must be able to cope with this problem and resist pressure from friends and relatives to BF. Mother sees NO barrier to BF and have no fear of repercussions.
AFAAS

- **Feasible** = a mother who chooses FF must have adequate *time, knowledge* (be able to follow instructions), *skills* and other *resources* to prepare the FF and feed her baby up to 8 or more times in 24 hours. Boiling water over a charcoal stove, for instance, can take ± 15 minutes per feed (? constraints of her work and family schedule). Unless refrigerated, prepared FF becomes unsafe after 2 hours.
• *Affordable* = someone has to pay for ingredients, fuel, water and other equipment needed for the FF. An uninterrupted supply of FF is also needed to be collected from the clinic at regular intervals; she must be supported by the health system. FF must not compromise the family’s finances with regard to nutrition and medical needs.
Sustainable = feeding an infant for the first 6 months of life requires around 20kg of FF and regular access to water. Even a brief disruption in supplies can have serious health implications. Where the mother is absent, the caregiver must be able to prepare FF reliably.

www.avert.org
• Safe = FF should be nutritionally sound and free from bacteria. The water it is mixed with should be boiled, and utensils should be cleaned (preferably boiled) before each use. This means the mother must have access to storage facility, a reliable supply of safe water and fuel.

• of the 5, safety is the most critical.
REDDING and MONITORING POSTNATAL HIV TRANSMISSION

Counsel on infant feeding options

ALL AFASS criteria met

EFF

EBF

Early infant testing At 6 weeks

If infant HIV negative, follow AFASS criteria to determine most appropriate feeding method

ALL AFASS criteria met

ALL AFASS criteria NOT met

If infant HIV positive, prompt referral according to guidelines

EBF for 6 months with continued EBF for at least 2 years
REducing and monitoring postnatal HIV transmission

Avoid all EBF - EFF for 6 months, with continued formula feeding after 6 months. Start CF at 6-months.

EBF for 6 months
6 weeks post breastfeeding cessation, infants should be re-tested for HIV and review AFASS criteria are met

ALL AFASS criteria met

ALL AFASS criteria NOT met or safety criterion NOT met

Test infant around 5-6 months: If HIV-positive, continue EBF; If HIV-negative: Stop all EBF and switch completely to formula milk. Re-test negative infants for HIV 6 weeks after EBF has stopped. Start CF at 6-months.

Test infant around 5-6 months. If HIV-positive, continue EBF for at least 2 yrs.
If HIV-negative: Continue EBF if no food security until AFASS criteria are met or age 1 yr – whichever comes first; if AFASS criteria are met any time between 6-months and 1 yr, stop EBF - switch to EFF; If not met stop EBF at 1 yr – switch to cows milk. Re-test negative infants for HIV 6 weeks after EBF has stopped. Start CF at 6-months.

National Guidelines February 2008 PMTCT
<table>
<thead>
<tr>
<th>Question</th>
<th>Breastfeeding</th>
<th>Unclear</th>
<th>Replacement feeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where do you get your drinking water?</td>
<td>River/stream/pond or well</td>
<td>Public standpipe</td>
<td>Piped water at home</td>
</tr>
<tr>
<td>What kind of toilet do you have?</td>
<td>None or pit latrine</td>
<td>Ventilated improved pit latrine</td>
<td>Water borne latrine or flush toilet</td>
</tr>
<tr>
<td>Do you have money for transport to get formula?</td>
<td>No</td>
<td>Usually</td>
<td>Yes</td>
</tr>
<tr>
<td>Do you have a working refrigerator?</td>
<td>No</td>
<td>Yes usually</td>
<td>Yes</td>
</tr>
<tr>
<td>Can you prepare each feed with boiled water and clean utensils?</td>
<td>No</td>
<td>Yes but may be difficult</td>
<td>Yes</td>
</tr>
<tr>
<td>Does your family know you are HIV positive?</td>
<td>No</td>
<td>Some family members know</td>
<td>Yes</td>
</tr>
<tr>
<td>Do you have an additional R450 per month to buy formula if the facility does not have any</td>
<td>No</td>
<td>Sometimes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: Policy and guidelines for the implementation of the PMTCT Programme, NDoH 2008
AFASS criteria for Infant Feeding Choices

If most of the responses fall on the LEFT side, then FF may be best option.

Discuss

If most of the responses fall on the RIGHT side, then BF may be best option.

Site Manual KZN March 2008
PMTCT
• *simplified* the counselling process into:
  – replacement feeding or
  – exclusive breast feeding
• *other* options that are only covered if the mother expresses interest are:
  – expression with heat treatment
  – breast-milk banks
  – wet-nursing

Note: Consistent messages needed and frequent, high quality counselling. Inaccurate, insufficient or non-existent counselling → wrong feeding choices
Counselling

- HIV infected mothers should ALL receive counselling about feeding choices
- good quality of counsellors essential to providing a good service
- adequate numbers of people who can counsel should be trained
- ? include ALL allied medical staff to support this programme

inclusion in PMTCT workshop & integrated approach
Summary

Between 50-80% of postnatal transmission of HIV occurs in infants born to women with advanced disease (CD4<350).\textsuperscript{11, 12,30,33}

In resource-limited settings, use of replacement feeding has resulted in high rates of diarrheal diseases, malnutrition and increased mortality.\textsuperscript{12,23,24}

HIV-free survival is not improved by early weaning.\textsuperscript{12,23,27,28,29}
Summary

Exclusive breastfeeding reduces HIV transmission compared to mixed feeding. 12,30,31,32,33,34

Counseling and support improves adherence to EBF. 12,42,43,44

Appropriate care should be provided to all postpartum mothers since neither breastfeeding or avoiding breastfeeding will protect them from disease progression. 46,47,48,49,50
The ICAP approach to improving HIV-free survival

| S | Screen pregnant and lactating HIV-infected women for treatment eligibility |
| T | Treat pregnant and lactating HIV-infected women with advanced disease and low CD4 |
| A | Actively support EBF for as long as possible until 6 months of life |
| C | Complementary feeds should be introduced at 6 months with continued breastfeeding |
| K | Keep mothers and infants engaged in care |
Gaps in PMTCT

• HIV testing of newborns when the biological mother’s status unknown or she declined PIT?

• VCT counsellors must ensure HIV negative pregnant mothers STAY negative after PIT.

• Partners and in-laws awareness of HIV can support exclusive breast feeding practices.

administration of post-exposure prophylaxis without consent?

very important to avoid HIV infection DURING pregnancy.

disclosure
Questions to be answered?

• Can ARVs *reduce* the risk of postnatal HIV transmission through BF?

• Should these drugs be given to the *mother* or the *infant* or both?

• What are the long term and short term consequences for the health of the baby of ARV use by either mother or baby?

• What is the *long* term health impact for the mother of ARV use for PMTCT?
Drug monitoring

Drugs contraindicated in pregnancy
• Efavirenz for congenital abnormality.

Monitor for side effect of ARVs
• Stavudine for lactic acidosis.
• Didanosine for lactic acidosis
• Nevirapine for liver toxicity and rash
• Zidovudine for anaemia

Never combine
Care of the Pregnant HIV-infected Woman and her Baby

Ante-partum Care:

**Medication**

Start from 28-32 weeks or earlier if indicated for maternal reasons

Drugs that can be used:

- **NRTI:** zidovudine (ZDV, AZT)
  - lamivudine (3TC)
- **NNRTI:** nevirapine (NVP)
- **PI’s:** ritonavir, nelfinavir, saquinavir, lopinavir (Kaletra)

http://www.hivatis.org
SAFETY of EFV in pregnancy

• 4 ( 2.8% ) birth defects of 142 live births following exposure to EFV based regimes in first trimester among pregnancies reported prospectively to an ARV pregnancy registry in US

• prevalence of birth defects = 3.1% based on surveillance data from CDC

• 3 retrospective case reports of NTDs
SAFETY of ARVs in pregnancy

- PIs do not provide prophylaxis to the foetus unlike AZT and NVP
- the major short term toxicity among infants exposed to prophylactic AZT is anaemia; usually mild and reversible after AZT stopped but more severe with longer exposure > 1 month; no congenital malformations with AZT reported
- in-utero exposure to tenofovir may result in abnormal bone development
- PI drugs do not cross the placenta
Safety – what and when?

- Concerns:
  - health of HIV-infected women
  - side effects in mother
  - drugs harming baby

- if ARVs need to be stopped for any reason, ALL must be stopped simultaneously; do not reduce dosage or remove the one offending drug

- NVP and EFV have a longer half life than NRTI drugs → sub-therapeutic level of NVP detected up to 3 weeks after cessation - need to cover “tail”
Resistance

- occurs more frequently with single and dual regimes

- a short course ARV prophylaxis may be associated with a single point mutation which can confer drug resistance eg NVP

- AZT requires multiple sequential mutations
- partly suppressive regimes favour replication of resistant virus over wild-type virus
- amount of virus containing mutations rises
Nevirapine resistance

• in a SA study, NVP resistance seen in only 25% one year after delivery
• but HIV DNA in the women's leucocytes did not show any evidence of NVP resistance
• this suggests archiving of NVP resistance mutations may be a rare event and re-emergence of (R) virus occurs infrequently
NVP and selection of NNRTI resistance

No drug

+ NVP

Prof James McIntyre  Perinatal Research Unit, Bara
Response to ARV after a single dose of NVP*

• women who received a single dose of NVP to prevent perinatal transmission of HIV had higher rates of virological failure with subsequent NVP-based ARV’s than women without prior exposure to NVP

• HOWEVER, this only applied when NVP-based ARV’s was initiated within 6 months after receipt of a single pertipartum dose of NVP

*NEJM 11 January 2007
NVP and “fading” of NNRTI resistance

+ NVP

Stop NVP

Prof James McIntyre  Perinatal Research Unit, Bara
Resistance

- after a drug is discontinued, the selective pressure is no longer present, the wild-type again becomes the predominant strain & resistant virus is no longer detectable
- a mother can receive triple therapy (HAART) provided it is started SIX months after cessation of PMTCT drugs

*NEJM, January 2007*
Adherance to ARVs during pregnancy

- morning sickness
- nausea
- fears of harm to foetus

- gastro-intestinal upset

Note:

In South Africa, the subtype C virus is predominant.

Most rapid tests detect HIV-1 and HIV-2.

Risk of vertical MTCT for HIV-2 is much lower than HIV-1.

Rates of MTCT of HIV-2 are between 0 – 4% among BF infants with no Intervention (NNRTI’s are ineffective against HIV-2)
# Malaria in HIV-infected women

## Table I. The impact of HIV infection on clinical presentation, severity and adverse outcomes of malaria in adults, children and pregnant women in areas of stable and unstable malaria transmission

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Unstable transmission (non-immune)*</th>
<th>Stable transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-pregnant adults</td>
<td>• Increased risk of severe malaria</td>
<td>• Increased risk of clinical malaria (including fever)</td>
</tr>
<tr>
<td></td>
<td>• Increased risk of death in rural areas</td>
<td>• Increased parasite density</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased risk of clinical treatment failure (re-infection)</td>
</tr>
<tr>
<td>Children</td>
<td>• Increased risk of severe malaria</td>
<td>• Increased risk of death and re-admission for malaria</td>
</tr>
<tr>
<td></td>
<td>• No data but increased risk of severe malaria likely</td>
<td>• Increased risk of malaria infection</td>
</tr>
<tr>
<td>Pregnant women</td>
<td></td>
<td>• Increased risk of placental malaria</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Higher parasite density</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased risk of anaemia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Decreased response to antimalarial therapy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Loss of gravidity-dependent immunity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased risk of low birthweight, preterm birth, intrauterine growth retardation and higher postnatal infant mortality rate</td>
</tr>
</tbody>
</table>

*Risks to travellers are thought to be similar to those described in individuals from areas of unstable malaria transmission.
<table>
<thead>
<tr>
<th>Factor</th>
<th>Melfloquine</th>
<th>Doxycycline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaria risk area</td>
<td>Resistance in some areas of SE Asia</td>
<td>Recommended for all areas</td>
</tr>
<tr>
<td>Length of time</td>
<td>Best evidence for long-term use; has been used safely for 3 years±</td>
<td>Has been used safely for up to 2 years±</td>
</tr>
<tr>
<td>Children</td>
<td>Use from 3 months of age (&gt;5 kg)</td>
<td>Contraindicated in children &lt;8 years of age‡</td>
</tr>
<tr>
<td>Pregnant women (should preferably avoid travel to malaria areas)</td>
<td>Recommended by the WHO from the second trimester¹</td>
<td>Contraindicated</td>
</tr>
<tr>
<td>Concurrent medication</td>
<td>See article on drug interactions</td>
<td>Breastfeeding</td>
</tr>
<tr>
<td>Other contraindications</td>
<td>Depression, epilepsy, neuropsychiatric illness, or any history thereof</td>
<td></td>
</tr>
<tr>
<td>Dosage interval</td>
<td>Once weekly</td>
<td>Daily dose 24 - 48 hours</td>
</tr>
<tr>
<td>Time needed before entering malaria area</td>
<td>At least 1 week; for first-time use: 2 - 3 weeks±</td>
<td>Continue while in and for 4 weeks after leaving malaria area</td>
</tr>
<tr>
<td>Duration of prophylaxis</td>
<td>Continue while in and for 4 weeks after leaving malaria area</td>
<td>Continue while in and for 7 days after leaving malaria area</td>
</tr>
<tr>
<td>Special precautions</td>
<td>Use with caution in travellers requiring fine motor coordination±</td>
<td>Avoid excessive exposure to the sun. Take after a meal with a full glass of water and do not lie down for 1 hour thereafter</td>
</tr>
<tr>
<td>Most common side-effects</td>
<td>Nausea, strange dreams, dizziness, mood changes, insomnia, headache and diarrhoea</td>
<td>Skin photosensitivity, oesophageal ulceration, gastrointestinal symptoms, candidias</td>
</tr>
</tbody>
</table>

Atovaquone-proguanil

Recommended for all areas

Best used for short-term travel, but no evidence of harm from long-term use

Not to be used in children weighing <40 kg

Contraindicated because of lack of data

Breastfeeding, severe renal impairment (creatinine clearance of <30 ml/min)³ ¹²

Daily dose 24 - 48 hours

Continue while in and for 7 days after leaving malaria area

Take with milk or food for better absorption

Well tolerated. Headache and abdominal pain most frequent adverse effects³ ¹²

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¹ Paediatric tablets of atovaquone-proguanil (for children weighing 11 - 39 kg) are not yet registered in South Africa.

² To ensure that protective levels have been reached and to give enough time to change to a different drug if adverse reactions have developed.
Monitoring and Evaluation (M & E)

Figure 5: Basic overview of information flow

DHIS = District Health Information Systems

National Guidelines February 2008 PMTCT p.62 - 68
PMTCT indicators

- HIV testing
- PMTCT prophylaxis (mother & infant)
- feeding choice
- follow-up of mother and child

Numerous CORE INDICATORS will need to be collected.

3 key service points:
- ANC
- Labour Ward & Post-natal Ward
  - Infant follow-up at post-natal or EPI services
Core indicators

• when a *programme* is set in place, we need to know if we are on the right pathway → watch these indicators eg number of women testing from a pooled register; ensure we reach the right targets

• *targets* are reached by achieving what we set out to do eg reduce HIV transmission by 5%
Core indicators

• *planning* is needed to ensure adequate staff and space are made available in the future

• *control* of the programme is also important to ensure feedback *quality* of service is maintained

• Facility information officers (FIO) and district information officers (DIO) responsible for data collection in registers etc

• NHLS have a valuable role
1. Goal

The goal of this guidance for global scale up of PMTCT is to improve maternal and child survival by achieving universal access to comprehensive PMTCT services to pave the way towards an HIV-free and AIDS-free generation by 2015.
CONCLUSION

- Closing the treatment gap

Comprehensive and widely available PMTCT programmes could substantially improve the quality and duration of life among women and children worldwide. Implementing the strategies and actions presented in this guidance will contribute to rapidly expanding services to achieve the goal of universal access to HIV prevention, treatment, care and support by 2010 and will make progress towards eliminating HIV infections among infants and young children by 2015. This will require the concerted efforts of governments and their partners to maximize the utilization of limited expertise and resources towards a common national goal.
ANTIRETROVIRAL DRUGS FOR TREATING PREGNANT WOMEN AND PREVENTING HIV INFECTION IN INFANTS: TOWARDS UNIVERSAL ACCESS

Recommendations for a public health approach

World Health Organization

2006 version

WHO 2006 www.who.int
References

• Policy and guidelines for the implementation of the PMTCT programme [www.doh.gov.za](http://www.doh.gov.za)
• Infant and Young Child Feeding Policy - DoH February 2008  [www.doh.gov.za](http://www.doh.gov.za)
• [www.who.inl](http://www.who.inl)
• SAMJ ( SAMA ), CME
Thank you
Ngiyabonga
Enkosi
Dankie