HIV / AIDS - Basics

Theory, challenges and balance

April 2008
“I didn’t know that I had AIDS until my baby was born with it.”
HIV / AIDS Basics

- scope of HIV / AIDS pandemic ( adults and children )
- knowledge of natural history and transmission of HIV
- HIV testing ( Elisa and PCR )
- Clinical Staging
- Opportunistic Infections
- ARV drugs
- CD₄ counts and HIV viral loads
Abbreviations and terms

- **PMTCT** = *Prevention* of Mother to Child Transmission
- **ARV** = antiretroviral
- **ART** = Antiretroviral therapy
- **HAART** = Highly Active Antiretroviral Therapy (always 3 drugs)
- **NVP** = nevirapine
- **sdNVP** = *single dose* nevirapine
Abbreviations and terms

- EBF = exclusive breast feeding
- EFF = exclusive formula feeding
- UNICEF = United Nations Children’s Fund
- WHO = World Health Organisation
Pregnancy stages

- 1\textsuperscript{st} trimester = first 12 weeks of unborn child (foetus) life; period during which baby’s development takes place
- 2\textsuperscript{nd} trimester = 13 to 24 weeks
- 3\textsuperscript{rd} trimester = 26 to 36 weeks
- term delivery usually at 38 to 42 weeks
- teratogenic effects dependent on gestational age (highest 4 – 14 weeks)

Organogenesis = 1\textsuperscript{st} trimester
HIV testing – DoH Policy

• "promoting the acceptability " of testing services……………
• “ it is the duty and responsibility of ALL health care personnel to identify HIV-positive women and their partners, HIV-exposed infants and HIV-positive infants”..
• “HIV test is a necessary step for enrollment onto the PMTCT programme”...
• “Testing must be seen as a key entry point “……
• “ each woman should be informed of the routine voluntary HIV testing procedure”…….
There are some key interventions that form part of the PMTCT strategy, namely; The routinely offered voluntary counselling and testing, otherwise known as the provider initiated counselling and testing (PICT). This intervention is designed to ensure that all pregnant women are offered VCT and are encouraged to test at all visits. This is an...
Testing* - a (missed) opportunity

- an HIV test is recommended for all patients whose clinical presentation may result from underlying HIV infection
- as a standard part of medical care for all patients attending health facilities in generalised HIV epidemics
- additional discussions about declining HIV testing, of risks and benefits required in vulnerable groups

* accompanied by a package of HIV prevention, treatment, care and support
Reasons for undergoing an HIV test

Reasons for undergoing testing for HIV varied. Table 3.57 shows that most respondents aged 15–24 years were tested either because they wanted to know their status (42.7%), or because they were pregnant (34.1%). Applying for an insurance policy or loan was an important reason for older respondents, and this was also an important reason for the majority of whites (59.5%) and Indians (59.2%).
CHOICE?

Patient = vulnerable

Medical staff = “powerful position”

Mandatory HIV testing

Voluntary HIV testing

PIT

VCT

ETHICS
ETHICS

• Do only good

• Do not harm

• Patient has the right to choose (patient autonomy – respect)

• Public health consideration (look at society at large)
VCT in 2008

• Policy guidelines for HIV voluntary counselling and testing recently published released from National Department of Health (NDoH) on 23 June 2008 supports National Strategic Plan (NSP) 2007 to 2011

• VCT established in SA in 1999 (53 sites after first year; one in each district)

• currently > 4100 VCT points in SA

• in 2007, there are 7000 lay counsellors providing counselling services (3000 in 2005)
VCT

• from 2004 to 2006, ± 5 million people utilised VCT, while 4 million were tested (20% declined ? )
• approximately 20% of the South African population have received HIV testing*
• NSP aims for an increase in the number of people in South Africa to know their status to 70%

HSRC July 2008 ( personal communication )
Definitions

• child = all individuals under the age of 12 years
• VCT = voluntary counselling and testing
• PITC = provider initiated testing and counselling
• PICT = provider initiated counselling and testing
Definitions

• neonate (newborn) = birth to 28 days of age
• infant = 28 days to 1 year of age
• HIV exposed = an infant born to an HIV positive mother (or mother of unknown status)
Types of HIV testing

HIV test

VCT

Client initiated counselling and testing

PIT

Routine offer of VCT to HIGH risk patient

Patient must agree to the test

OPT - IN

OPT - OUT

Patient must decline after pre-test counselling

TEST ALL

Family planning

STIs

OIs

ANC

PEP

TB
Age of HIV testing

• a child may be tested if he/she has sufficient maturity to understand and parent/caregiver has knowledge of the test

• otherwise, a parent/Provincial Head of Social Development/designated Child Protection Unit/Superintendent of a hospital or Children’s Court
“Opt-in” or “opt-out” – two approaches to HIV testing

**OPT-IN (VCT)**
- after pt. given info about HIV testing, she is given the choice of refusing or consenting
- informed consent established (written or verbal)
- requires an *active* step by women

**OPT-OUT (PITC)**
- offered as a *routine* part of standard package of care
- woman has the chance to decline
- emphasize HIV testing
- is an expected part of ANC
- has right to refuse

Provider should always identify the problem and solve issues that are preventing a woman from accepting a test.
PITC

Provider initiated testing and counselling

Negligence?
PCR blotting paper card

Rapid ELISA HIV test

Note: PCR = polymerase chain reaction; a qualitative or quantitative lab method in which the genetic material (DNA or RNA) of the HIV virus is detected and amplified.
WHICH HIV TEST?

DIRECT test

• P.C.R
• for infants 6 weeks to 18 months
• tests for the virus itself
• expensive
• very accurate
• sensitive and specific
• harder to perform

small infant, gloves

INDIRECT test

• rapid E.L.I.S.A.
• for children older than 18 months
• tests for antibodies made to the virus
• affected by maternal antibodies (passively acquired by unborn baby)
• can produce false positives
• easy to perform

10 minutes

weeks for a result
disappear by 18 months
HIV testing in the infant

• maternal HIV Ab is passively transferred to the infant during pregnancy, and may persist for the first year and even beyond
• therefore HIV most reliably diagnosed by detecting components of the HIV virus itself, usually nucleic acid - HIV DNA – which is a virological test
• **Amplicor®** test is used for DBS testing

Qualitative assay that detects HIV-1 by using PCR technology
PCR blotting paper card

For all infants 6 weeks to 18 months of age

Rapid ELISA HIV test

For all pregnant women and children older than 18 months
<table>
<thead>
<tr>
<th>KZN PROVINCIAL LABORATORY SERVICES</th>
<th>PMTCT BARCODE</th>
<th>FACILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMTCT VIROLOGY REQUEST FORM</td>
<td></td>
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</tr>
</tbody>
</table>

**PATIENT DETAILS**

<table>
<thead>
<tr>
<th>MOTHER’S SURNAME</th>
<th>MOTHER’S FIRSTNAME</th>
<th>INFANT SURNAME</th>
<th>INFANT FIRSTNAME</th>
<th>INFANT DATE OF BIRTH</th>
<th>INFANT ID#</th>
</tr>
</thead>
<tbody>
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**DATE BREAST FEEDING STOPPED**

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</table>

**TESTS REQUIRED** (PLEASE TICK APPROPRIATE BOX)

- HIV ELISA (CHILDREN OLDER THAN 15 MONTHS IF RAPID TEST POSITIVE)
- HIV DNA PCR (CHILDREN 6 WEEKS TO 15 MONTHS ONLY)

**NURSE/DOCTOR DETAILS**

<table>
<thead>
<tr>
<th>NAME</th>
<th>SIGNATURE</th>
<th>TEL#</th>
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<tbody>
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</tbody>
</table>

**FACILITY TO WHICH RESULT TO BE POSTED**

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</tbody>
</table>

**SAMPLES WILL NOT BE PROCESSED IF ANY INFORMATION IS MISSING.**
Specific NHLS form for CD4’s and VL, PCR

<table>
<thead>
<tr>
<th>Bar code sticker</th>
</tr>
</thead>
</table>

### CLINICAL INFORMATION

#### COMPREHENSIVE CARE, TREATMENT AND MANAGEMENT PROGRAMME SPECIFIC TESTS:

- [ ] CD4 (FLD)
- [X] HIV PCR
- [ ] HIV 1&2 (ELISA)
- [X] U & E
- [ ] AST
- [ ] Hepatitis B Ag
- [ ] Lactate (on ice)
- [ ] TB Direct (AFB)
- [ ] TB Culture
- [ ] TB Sputum
- [ ] Pyeosalpinx (m)ax

### THE FOLLOWING DETAILS MUST BE COMPLETED

- [ ] Please note that this form must be used in compliance with your provincial treatment guidelines and financial protocols.
Testing

• Pretest counselling
  - reasons for the test
  - clinical and prevention benefits
  - services
  - confidentiality
  - right to decline → not affect access
  - disclose
  - opportunity for questions

• Pregnant / may become pregnant:
  - risks of transmission
  - measures to ↓ transmission
  - benefits of early infant diagnosis
Testing

• Post test counselling if pregnant:
  - child birth plans
  - use of ARVs for her own health and to reduce transmission
  - adequate maternal nutrition (Fe, folate)
  - infant feeding options
  - HIV testing of infant and follow-up
  - partner testing
  - repeat testing in late pregnancy if HIV-
HIV epidemic types

- **low level HIV epidemic** = HIV prevalence has not exceeded 5% in any defined sub-population; never spread to high levels and confined to high risk individuals eg IDUs, sex workers (routine HIV testing NOT recommended)

- **concentrated epidemics** = not established in general population, prevalence < 1% in pregnant women and > 5% in at least one sub-population

- **generalised HIV epidemics** = prevalence consistently over 1% in pregnant women; sex in general population enough to sustain the disease
7 ‘Hyper-endemic countries’

- adult HIV prevalence rates are more than 15%:
  - Botswana
  - Lesotho
  - Namibia
  - South Africa
  - Swaziland
  - Zambia
  - Zimbabwe

Eastern and Southern Africa group

28% of pregnant women received an HIV test in 2007

53% of facilities provide ANC and HIV testing

7 ‘Hyper-endemic countries’

- in 2004, 33% of pregnant women had HIV counselling and testing
- in 2005 37%
- in 2006 51%
- in 2007 60% (average percentage of facilities providing ANC and HIV testing was 72%)

countries with a high HIV burden are defined as HIV prevalence in antenatal care setting exceeding 5% (vs. low-burden countries)
Figure 1: National HIV prevalence trends among antenatal clinic attendees, South Africa, 1990 to 2007.
Risk factors for HIV transmission

- viral, maternal, obstetric, foetal and infant-related factors all influence the risk of MTCT
- the *most* important risk factor for MTCT is the amount of HIV virus in the mother’s blood known as the *viral load*
- low CD4 count associated with increased risk of MTCT

HIVNET 012, DITRAME PLUS

[Image of a ribbon and a flag]
Studies & Trials

• **PACTG 076** – Paediatric AIDS Clinical Trial Group – major break through in PMTCT AZT regime 1994 (iv AZT in 2nd and 3rd trimester + 6 wks to infant)

• **HIV NET012** – Uganda sdNVP, recommended by WHO 1997 – 1999

• **MASHI** – Botswana 2006 BF and Petra 2002 – resistance studies to NRTIs

• **SAINT** - South African NVP Trial in 2002/3

• **PHPT 1** – Thailand HIV Perinatal Prevention trial (AZT) 2000, **PHPT – 2** 2004

• **Ditrame, Ditrame Plus** – Cote d’Ivoire BF vs. FF

• **SIMBA trial** 2003

• **CHER** – children < 1 years at risk; need ARVs early 2007

Africa – SA, Cote d’Ivoire, Botswana, Malawi, Zimbabwe; North America, Thailand, France

PACTG = Paediatric AIDS Cohort Trial Group
**ZDV = AZT = zidovudine**

**1994 ACTG 076 ZDV**
67% decrease transmission

**1998 Thai AP/IP ZDV trial**
50% decrease transmission

**1998 Cote d’Ivore short AP/IP ZDV**
37% decrease, breastfeeding

**1999 Petra ZDV/3TC AP/IP/PP (6 wk)**
50% decrease in longest arm
38% decrease in IP/PP arm

**1999 HIVNET 012 Uganda SD-NVP**
47% decrease, breastfeeding

**2000 Thai long/ Thai short ZDV**
4% transmission rate, long arm, no breastfeeding

**2002 Cote d’Ivore DITRAME +1**
6.2% transmission, ZDV + IP/PP NVP

**2003 DITRAME +1.1**
5% Tr. ZDV/3TC + IP/PP NVP

**2004 Thai PHPT – 2**
< 2% Tr. ZVD/NVP

**2004**
Estimated Number of Perinatally Acquired AIDS Cases, by Year of Diagnosis, 1985-2003—United States

PACTG 076
USPHS AZT Recommendations
80% decline

Year of diagnosis
Note: Data adjusted for reporting delays and for estimated proportional redistribution of cases in persons initially reported without an identified risk factor.

Prof James McIntyre  Perinatal Research Unit, Bara
The need for effective PMTCT Regimens for Resource-Poor Countries

- MTCT has been reduced to <2% in countries which bear 0.6% of the global paediatric HIV burden

- 1900 new infections in children each day –
  - 1 per day in Europe
  - 1 per day in the United States
  - 1898 per day in resource-poor countries
Trends in reduction of MTCT: trial results over time

Transmission (%)


USA & Europe  Thailand  Africa

Prof James McIntyre  Perinatal Research Unit, Bara
Children and AIDS fact sheet: South Africa

Estimated adult HIV prevalence rate
Source: UNAIDS/WHO, 2007
16.2%

PREVENT MOTHER-TO-CHILD TRANSMISSION OF HIV

Antenatal care coverage
Source: DHS, 2003
92%

Estimated number of births per year
Source: UN Population Division, 2006
1,102,000

Estimated number of HIV+ pregnant women
222,415
[186,658 - 258,165]*

Number and % of HIV+ pregnant women receiving ARVs for PMTCT
Source: MOH, 2006
111,357
50.1%
[43.1% - 59.7%]*

Number of HIV+ pregnant women receiving ARVs for PMTCT

Children and AIDS; Country Facts sheets
UNAIDS / unicef / WHO - 2007
<table>
<thead>
<tr>
<th>Route</th>
<th>Breastfed/ partially breastfed</th>
<th>Exclusive formula fed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrauterine</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>Intrapartum</td>
<td>45-50%</td>
<td>70%</td>
</tr>
<tr>
<td>Postpartum by breastfeeding</td>
<td>30-35%</td>
<td>0</td>
</tr>
</tbody>
</table>

HIV Outcomes of infants born to women infected with HIV
( HIV exposed )

100 infants born to HIV-infected women who breast fed without any interventions

60 to 75 infants will not be HIV-infected

5 – 10 infants infected during Pregnancy

About 15 infants infected during labour and delivery

5 – 15 infants infected during breast feeding

25 to 40 infants will be HIV-infected
<table>
<thead>
<tr>
<th></th>
<th>Pregnancy</th>
<th>Labour</th>
<th>After birth: mother</th>
<th>After birth: infant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended</strong></td>
<td>AZT after 28 weeks</td>
<td>sdNVP; AZT+3TC</td>
<td>AZT+3TC for 7 days</td>
<td>sdNVP; AZT for 7 days</td>
</tr>
<tr>
<td><strong>Alternative</strong></td>
<td>AZT after 28 weeks</td>
<td>sdNVP</td>
<td>-</td>
<td>sdNVP; AZT for 7 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sdNVP; AZT+3TC</td>
<td>AZT+3TC for 7 days</td>
<td></td>
</tr>
<tr>
<td><strong>Minimum (less effective)</strong></td>
<td>-</td>
<td>sdNVP; AZT+3TC</td>
<td></td>
<td>sdNVP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sdNVP</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

sdNVP = single dose nevirapine
Children becoming infected with HIV

- pMTCT 90% (majority)
  - During pregnancy
  - Delivery
  - Breast feeding
- Medical settings < 1%
  - Needles, blood transfusion
- SEX 5%
  - Sexual intercourse, Rape
  - Sexual abuse
Paediatrics - route of infection

• Mother To Child Transmission (MTCT) - most important route and accounts for 95% of HIV infected children
  - trans-placental (*in-utero*) 10%  
  - peri-partum 60%  
  - breast-feeding 25% - 30%  

Other routes (5%) include:
  - blood transfusion (very rare - ? window period)
  - sexual abuse
  - unexplained: mother is HIV negative
“Unexplained” route of transmission

- Possible causes include:
  - not the genetic offspring
  - occult sexual abuse
  - surrogate breast-feeding
  - nosocomial infection through re-use of contaminated equipment eg disposable razor blades, breast milk pumps or unlabelled breast milk
  - use of contaminated equipment during immunization
  - scarification
Routes of Transmission

- choice of feed important
- liquid + liquid << solids + liquids (BF / FF)
- *premasticating* food (chewing >> kissing)
- advise mother AND any other care giver eg grandmother
- mash food prior to administration
Finding the right balance
The Right Therapy?

TRIPLE THERAPY

Benefits

+

Constraints

- Costs
  Health systems
  Feasibility

EFFICIENCY

EFFECTIVENESS
  systems
  EFFICACY
  action of HAART
Best proven standard of care

What is feasible on a large scale in resource-constrained settings

- scarce human resources
- limited financial resources
- simplified clinical and laboratory regimes
- sustainable programmes

Expansion of programmes
Optimal ART in pregnancy

- Use optimal ARV for the individual woman in her specific circumstances.
- Optimal ARV may vary considerably, from triple drug combinations in pregnancy to single nevirapine dosage to the mother and baby.
- It depends on the human resources and infrastructure available.
- Guidelines change as new information come to light and infrastructure is strengthened.
- Women who are in the first trimester of pregnancy should consider delaying initiation of ARV therapy until after 10-12 weeks of gestation.
### Revision of pMTCT

<table>
<thead>
<tr>
<th>Medal</th>
<th>Therapy</th>
<th>Transmission Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold medal</td>
<td>Triple therapy</td>
<td>&lt; 2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2008</td>
</tr>
<tr>
<td>Silver medal</td>
<td>Dual therapy</td>
<td>5 - 6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2004</td>
</tr>
<tr>
<td>Bronze medal</td>
<td>sdNVP</td>
<td>14 - 16%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>↓ by 40% alone</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2002</td>
</tr>
<tr>
<td>“Out of the race” - no VCT or unbooked</td>
<td>Cannot offer ARVs</td>
<td>20 - 40%</td>
</tr>
</tbody>
</table>

Note: sdNVP of no help for in-utero acquired infections
Which regime?

- AZT serial monotherapy
- Dual therapy (2 drugs in parallel)
Which regime?

- sdNVP is the *simplest*
- *combination* regime more efficacious than single drug regimes
- longer regimes more effective than shorter
- *triple* (industrialised countries) have risks about toxicity; shorter have few mild and transient side effects
Which regime?

- Industrialised countries (US, Europe)
  - long ARV regimes (triple)
  - high levels of ANC service
  - early initiation
  - high C/S rates
  - AVOID BF

- Africa
  - short course regimes
  - ANC inadequate (not booked or book late)
  - some birth unattended by skilled practitioner
  - elective C/S rare
  - many BF (6-12 or longer)
NVP reduces HIV+ births US, Europe

14th International Aids Conference

• the number of infants born in US has declined by 80% during the last decade → a success story

• progress due to ↑ HIV counselling and testing, and subsequent anti-AIDS therapy \( \text{CDC} \)

• a study estimated that about 325 American infants were born infected with HIV in 2000, compared with about 1760 babies born in 1991

• in 2000, only 6% of the infants were born HIV+ to HIV infected women
in USA, the number of babies born infected with HIV at birth has dropped dramatically from its peak of > 1600 in 1991 to < 50 in 2004 thanks to AZT regimes [Time 5 Feb 2007]

• treatment is far from perfect and an estimated 130 infants would be infected each year in USA
South Africa HIV / AIDS

- South African* population makes up 0.75% of the world’s population, but the number of HIV positive constitutes 15%# of the world’s estimated HIV / AIDS population

*SA population ± 48 million  # estimated 5.5 million
33,034 pregnant women had an unlinked anonymous survey (16,510 in 2005) – bigger sample so more accurate, sample size expanded to include districts as well as Provinces.
Figure 1: National HIV prevalence trends among antenatal clinic attendees, South Africa, 1990 to 2007.

<table>
<thead>
<tr>
<th>Province</th>
<th>HIV pos. 95% CI 2005</th>
<th>HIV pos. 95% CI 2006</th>
<th>HIV pos. 95% CI 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>KwaZulu-Natal</td>
<td>39.1 (36.8 - 41.4)</td>
<td>39.1 (37.5 - 40.7)</td>
<td>37.4 (35.0 - 39.8)</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>34.8 (31.0 - 38.5)</td>
<td>32.1 (29.8 - 34.4)</td>
<td>32.0 (29.2 – 34.9)</td>
</tr>
<tr>
<td>Free State</td>
<td>30.3 (26.9 - 33.6)</td>
<td>31.1 (29.2 - 33.1)</td>
<td>33.5 (28.3 - 39.1)</td>
</tr>
<tr>
<td>Gauteng</td>
<td>32.4 (30.6 - 34.3)</td>
<td>30.8 (29.6 - 32.1)</td>
<td>30.3 (29.9 – 32.8)</td>
</tr>
<tr>
<td>North West</td>
<td>31.8 (28.4 - 35.2)</td>
<td>29.0 (26.9 - 31.1)</td>
<td>29.0 (24.8 – 33.5)</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>29.5 (26.4 - 32.5)</td>
<td>28.6 (26.8 - 30.4)</td>
<td>26.0 (24.0 – 28.1)</td>
</tr>
<tr>
<td>Limpopo</td>
<td>21.5 (18.5 - 24.6)</td>
<td>20.6 (18.9 - 22.3)</td>
<td>18.5 (16.7 - 20.4)</td>
</tr>
<tr>
<td>Northern Cape</td>
<td>18.5 (14.6 - 22.4)</td>
<td>15.6 (12.7 - 18.5)</td>
<td>16.1 (13.9 – 18.7)</td>
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<tr>
<td>Western Cape</td>
<td>15.7 (11.3 - 20.1)</td>
<td>15.1 (11.6 - 18.7)</td>
<td>12.6 (10.1 – 15.6)</td>
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<tr>
<td>National</td>
<td>30.2 (29.1 - 31.2)</td>
<td>29.1 (28.3 - 29.9)</td>
<td>28.0 (26.9 – 29.1)</td>
</tr>
</tbody>
</table>

N.B. The 95% CI was used because statistically the true estimated value falls within the two confidence limits and therefore assures us that there is 95% certainty that the estimated value is not by chance.
### Figure 3:

Khayelitsha 32.7%  Knysna 20 – 24%

<table>
<thead>
<tr>
<th>Province</th>
<th>2006</th>
<th>2007</th>
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<tr>
<td>KZN</td>
<td>39.1</td>
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<td>29</td>
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<td>EC</td>
<td>28.6</td>
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<td>LP</td>
<td>20.6</td>
<td>18.5</td>
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<tr>
<td>NC</td>
<td>15.6</td>
<td>16.1</td>
</tr>
<tr>
<td>WC</td>
<td>15.1</td>
<td>12.6</td>
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</tbody>
</table>
Figure 3: Provincial HIV prevalence trends among antenatal clinic attendees in South Africa, 1997-2006.
Figure 5: Provinicial HIV prevalence trends among antenatal clinic attendees, South Africa, 2003 – 2007.
Figure 4: HIV prevalence by age group among antenatal clinic attendees in South Africa, 1992-2006.
Figure 5: HIV Prevalence among antenatal clinic attendees in South Africa by District, 2006
APPENDIX I A: HIV PREVALENCE BY DISTRICT

HIV prevalence estimates by district among pregnant women aged 15 – 49 years, HIV prevalence range 7.3% - 41.6%. South Africa, 2007.

39.4% Amajuba
40.8% uMgungundlovu
41.5% Ilembe

National HIV Prevalence Survey 2007

<table>
<thead>
<tr>
<th>KwaZulu-Natal Province</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Prev (%)</td>
</tr>
<tr>
<td>KwaZulu-Natal</td>
<td>6,814</td>
<td>39.1</td>
</tr>
<tr>
<td>Amajuba</td>
<td>400</td>
<td>46.0</td>
</tr>
<tr>
<td>Sisonke</td>
<td>229</td>
<td>31.9</td>
</tr>
<tr>
<td>Ugu</td>
<td>504</td>
<td>38.9</td>
</tr>
<tr>
<td>Umkanyakude</td>
<td>410</td>
<td>36.3</td>
</tr>
<tr>
<td>Umzinyathi</td>
<td>319</td>
<td>27.9</td>
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<tr>
<td>Uthukela</td>
<td>459</td>
<td>35.1</td>
</tr>
<tr>
<td>Uthungulu</td>
<td>566</td>
<td>34.6</td>
</tr>
<tr>
<td>Zululand</td>
<td>582</td>
<td>36.9</td>
</tr>
<tr>
<td>Ethekwini</td>
<td>2,230</td>
<td>41.6</td>
</tr>
<tr>
<td>iLembe</td>
<td>419</td>
<td>39.1</td>
</tr>
<tr>
<td>UMgungundlovu</td>
<td>696</td>
<td>44.4</td>
</tr>
</tbody>
</table>
2006 HIV Antenatal Survey Prevalence by District: Eastern Cape

Map key
EC = PREVALENCE (28.6%)

EC DISTRICTS_region
NAME_SHORT
Alfred Nzo
Amatole
Casadu
Chris Hani
Nelson Mandela
O.R.Tambo
Ukahlamba

0 30 60 90 120 180 240 Kilometers
<table>
<thead>
<tr>
<th>Province</th>
<th>N</th>
<th>Prevalence (%)</th>
<th>CI (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Cape</td>
<td>4074</td>
<td>28.6</td>
<td>26.8 - 30.4</td>
</tr>
<tr>
<td>Alfred Ndzo</td>
<td>374</td>
<td>25.1</td>
<td>20.7 - 29.5</td>
</tr>
<tr>
<td>Amatole</td>
<td>1,061</td>
<td>28.7</td>
<td>26.0 - 31.5</td>
</tr>
<tr>
<td>Cacadu</td>
<td>254</td>
<td>22.8</td>
<td>17.7 - 28.0</td>
</tr>
<tr>
<td>Chris Hani</td>
<td>450</td>
<td>27.1</td>
<td>23.0 - 31.2</td>
</tr>
<tr>
<td>Nelson Mandela Metro</td>
<td>748</td>
<td>31.9</td>
<td>28.6 - 35.3</td>
</tr>
<tr>
<td>O R Tambo</td>
<td>983</td>
<td>29.7</td>
<td>26.8 - 32.6</td>
</tr>
<tr>
<td>Ukhahlamba</td>
<td>204</td>
<td>27.9</td>
<td>21.8 - 34.1</td>
</tr>
</tbody>
</table>
2006 HIV Antenatal Survey Prevalence by District: Mpumalanga
<table>
<thead>
<tr>
<th>Province</th>
<th>N</th>
<th>Prevalence (%)</th>
<th>CI (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mpumalanga</td>
<td>2,212</td>
<td>32.1</td>
<td>29.8 – 34.4</td>
</tr>
<tr>
<td>Ehlanzeni</td>
<td>1,040</td>
<td>31.9</td>
<td>29.1 – 34.8</td>
</tr>
<tr>
<td>Gert Sibande</td>
<td>530</td>
<td>38.9</td>
<td>34.7 – 43.0</td>
</tr>
<tr>
<td>Nkangala</td>
<td>642</td>
<td>26.8</td>
<td>23.4 – 30.2</td>
</tr>
</tbody>
</table>
2006 HIV Antenatal Survey Prevalence by District:
Mpumalanga

- Gert Sibande: 38.9%
- Ehlanzeni: 31.9%
- Nkangala: 26.8%

Mpumalanga (Prevalence=32.1%)
SOUTH AFRICA: HIV POSITIVE PREGNANT WOMEN:
IMPLICATIONS FOR TREATMENT NEEDS

Across the country, approximately:
- 1,000 pregnant women per week
- 200 pregnant women per day

need to start (and continue) ARV therapy for their own health

Prof James McIntyre
Perinatal Research Unit, Bara
Perinatal HIV transmission

- Objective to evaluate the impact of different antiretroviral regimes on perinatal HIV-1 transmission at the population level
- Transmission varied depending on factors: ARV’s

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.0%</td>
<td>Mother on NO ARV’s</td>
</tr>
<tr>
<td>10.4%</td>
<td>AZT monotherapy</td>
</tr>
<tr>
<td>3.8%</td>
<td>Dual therapy (non BF)</td>
</tr>
<tr>
<td>1.2%</td>
<td>HAART</td>
</tr>
</tbody>
</table>

NEJM/J Acq Imm Def Syn - April 2002
Transmission also depends in Viral Load (Copies / mL)

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Viral Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
<td>&lt; 400</td>
</tr>
<tr>
<td>5.3%</td>
<td>400 – 3499</td>
</tr>
<tr>
<td>9.3%</td>
<td>3500 – 9999</td>
</tr>
<tr>
<td>14.7%</td>
<td>10 000 – 29 999</td>
</tr>
<tr>
<td>23.4%</td>
<td>&gt; 30 000 copies/mL</td>
</tr>
</tbody>
</table>

NEJM/J Acq Imm Def Syn - April 2002

Riley LE., et al  *N Engl J Med* 005;353:1725-
# Management of Opportunistic Infections

<table>
<thead>
<tr>
<th>Opportunistic Infection</th>
<th>Treatment</th>
<th>Prophylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary Tract Infection</td>
<td>Uncomplicated cystitis: Amoxicillin/clavulanic acid, oral, 375 mg 8 hourly for 7 days.</td>
<td></td>
</tr>
<tr>
<td>Pneumocystic jiroveci Pneumonia (PCP)</td>
<td>Trimethoprim/sulfamethoxazole 80/400, oral, 6 hourly for 21 days: &lt; 60kg three tablets; &gt; 60kg four tablets</td>
<td><strong>SECONDARY PROPHYLAXIS</strong> Continue for at least 6 months and until CD4 count increases to &gt;200 on HAART or life long if patient is not on HAART.</td>
</tr>
<tr>
<td>Cervicitis</td>
<td>Ceftriaxone 250mg intravit and Erythromycin 500mg 4 times a day and Metronidazole 400mg BD, 500 mg Ampidilin four times a day and 400mg Metronidazole three times a day over 5 days. This will be managed as part of the syndromic management of STI (vaginal discharge syndrome) with:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- <strong>Cefixime</strong>, oral, 400 mg single dose AND</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- <strong>Amoxicillin</strong>, oral 500 mg 8 hourly for 7 days AND</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- <strong>Metronidazole</strong> 2 g immediately as a single dose</td>
<td></td>
</tr>
<tr>
<td>Vaginal or vulva candidiasis</td>
<td>Clotrimazole vaginal pessary 500 mg inserted immediately as a single dose AND if vulval irritation: Clotrimazole vaginal creams applied thinly to vulva twice daily and continue for 3 days after symptoms resolve. (Maximum 2 weeks).</td>
<td></td>
</tr>
</tbody>
</table>
Management of Opportunistic infections

| Systemic Candidiasis | Ketoconazole 200-400 mg orally daily for 5-7 days, and Clotrimazole 100 mg pessaries every night for 7-10 days (or longer for severely immune-compromised women)

- Fluconazole, IV/oral, 200 mg daily for 14 days
  The usual route is oral, but give IV if patient unable to swallow.
  An early relapse should be treated with a 4-week course of fluconazole as above.

  **Note:**
  Fluconazole prophylaxis is discouraged. |

| Diarrhoea | If infective, give cotrimoxazole orally twice a day for 5 days.

**For cryptosporidiosis**
Rehydration
Antimotility agents are partially effective, e.g.
- Loperamide, oral, 4 mg initially, followed by 2 mg as required up to four times daily
There is no specific antimicrobial therapy for cryptosporidiosis. As with other opportunistic diseases it responds well to HAART. |

| For Isosporiasis: | 
- Trimethoprim/sulfamethoxazole 80/400, 2 tablets daily |

For Isosporiasis:
Secondary prophylaxis
Continue for at least 6 months and until CD4 count increases to >200 on HAART or life long if patient is not on HAART:
Efficiency of PMTCT services

- preventing PMTCT might seem simple – just hand out a lot of pills
- but there is much more to it than that
- to start with, the vast majority of women in the developing world have never been tested
- at each subsequent step some women drop out
Problems

• women visit a clinic for testing and work-up but frequently deliver at another Facility

• majority of care happens at a primary health clinic (PHC) but women deliver in hospitals → lack of communication and access to medical records

• NSP* excluded routine provider-initiated testing of all 6 week old infants - people’s rights fulfilled?

*National Strategic Plan 2007 - 2011
Maternal Denial

• maternal denial and sero-conversion in late pregnancy (resulting in very high viral load) aggravates the high MTCT rates
• if a mother died, the relative risk of her child dying was 4 times higher
• approximately 40% of the deaths of children in hospitals are due to AIDS*

### FIGURE 29a

Percent Coverage of Antiretrovirals for Prevention of Mother to Child Transmission Breakdown by Quartiles (N=113)

<table>
<thead>
<tr>
<th>Less than 25% Coverage (61 Countries)</th>
<th>25% to 49% Coverage (27 Countries)</th>
<th>50% to 75% Coverage (14 Countries)</th>
<th>Greater than 75% Coverage (11 Countries)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>Armenia</td>
<td>Brazil</td>
<td>Argentina</td>
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<tr>
<td>Algeria</td>
<td>Benin</td>
<td>Ecuador</td>
<td>Bahamas</td>
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<tr>
<td>Angola</td>
<td>Cambodia</td>
<td>Fiji</td>
<td>Barbados</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>Central African Republic</td>
<td>Jamaica</td>
<td>Belarus</td>
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<td>Bolivia</td>
<td>Chile</td>
<td>Kazakhstan</td>
<td>Botswana</td>
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<tr>
<td>Bosnia and Herzegovina</td>
<td>Dominican Republic</td>
<td>Kenya</td>
<td>Cambodia</td>
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<tr>
<td>Burkina Faso</td>
<td>Gambia</td>
<td>Latvia</td>
<td>Cuba</td>
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<td>Burundi</td>
<td>Guyana</td>
<td>Lithuania</td>
<td>Czech Republic</td>
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<td>Cameroon</td>
<td>Honduras</td>
<td>Lithuania</td>
<td>Georgia</td>
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<tr>
<td>Chad</td>
<td>Lesotho</td>
<td>Namibia</td>
<td>Moldova</td>
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<td>China</td>
<td>Malawi</td>
<td>Rwanda</td>
<td>Russian Federation</td>
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<tr>
<td>Colombia</td>
<td>Mozambique</td>
<td>South Africa</td>
<td>Thailand</td>
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<td>Comoros</td>
<td>Myanmar</td>
<td>Swaziland</td>
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<tr>
<td>Congo, Republic of the</td>
<td>Nicaragua</td>
<td>Trinidad and Tobago</td>
<td></td>
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<tr>
<td>Costa Rica</td>
<td>Paraguay</td>
<td>Ukraine</td>
<td></td>
</tr>
<tr>
<td>Côte d’Ivoire</td>
<td>Peru</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Democratic Republic of the Congo</td>
<td>Poland</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Djibouti</td>
<td>Romania</td>
<td></td>
<td></td>
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<tr>
<td>Egypt</td>
<td>Singapore</td>
<td></td>
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<td>El Salvador</td>
<td>Suriname</td>
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<td>Equatorial Guinea</td>
<td>Uganda</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>United Republic of Tanzania</td>
<td></td>
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<td>Ethiopia</td>
<td>Uruguay</td>
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<td>Gabon</td>
<td>Uzbekistan</td>
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<td>Ghana</td>
<td>Zambia</td>
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<tr>
<td>Guatemala</td>
<td>Zimbabwe</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Guinea</th>
<th>Nepal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guinea-Bissau</td>
<td>Niger</td>
</tr>
<tr>
<td>Haiti</td>
<td>Nigeria</td>
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<tr>
<td>Hungary</td>
<td>Pakistan</td>
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<tr>
<td>India</td>
<td>Panama</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Papua New Guinea</td>
</tr>
<tr>
<td>Iran, Islamic Republic of</td>
<td>Philippines</td>
</tr>
<tr>
<td>Kyrgyzstan</td>
<td>Senegal</td>
</tr>
<tr>
<td>Lao People's Democratic Republic</td>
<td>Serbia</td>
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<tr>
<td>Liberia</td>
<td>Sierra Leone</td>
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<tr>
<td>Madagascar</td>
<td>Somalia</td>
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<td>Malaysia</td>
<td>Sri Lanka</td>
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<td>Mali</td>
<td>Tajikistan</td>
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<tr>
<td>Mauritius</td>
<td>Tunisia</td>
</tr>
<tr>
<td>Mexico</td>
<td>Venezuala</td>
</tr>
<tr>
<td>Mongolia</td>
<td>Viet Nam</td>
</tr>
<tr>
<td>Morocco</td>
<td></td>
</tr>
</tbody>
</table>
History of Paediatric HIV / AIDS

- born HIV positive 4 February 1989
- age 2 – given 9 months to live
- age 8 – school rejects him due to HIV, causes outrage at highest Constitutional level
- age 8 – death of mother
- captures international media attention
History of Paediatric HIV / AIDS

- the school reverses its decision
- community responds and open “The Haven”
- age 11 – 13th International world AIDS conference, July 2000, Durban
- “Do all you can with what you have in the time you have in the place you are”
- dies age 12, 1 June 2001
Attend clinic

Offered test
(counselling)

Agree to test

Get results

Offered drugs

Accept drugs

Take drugs

Drugs to baby

Safer feeding

(1989 - 2001)
Intergrated PMTCT into primary health care: What works?

• presented at 14th National Practitioners’ Conference, Rustenburg August 2008

• provides us with list of weaknesses and potential solutions

Journal of College Medicine of SA, October 2008
68 countries = 97% of all maternal, neonatal and child deaths under 5 years of age

One is South Africa.

In SSA, 12 countries have an INCREASING under 5 mortality

South Africa is one of these.

Journal of College Medicine of SA, October 2008
Under 5 mortality rates

- 69 per 1000 live births (UN Interagency group as presented in UICEF, State of the world’s children, 2008)

- 76 per 1000 live births (Actuarial Society of South Africa ASSA)

Journal of College Medicine of SA, October 2008
The PMTCT process

• The major steps are:
  – Counselling and testing
  – Staging
  – Treating with dual therapy or HAART
  – Provision of ANC and counselling on infant feeding
  – Management during labour
  – Post-natal follow-up of mother and neonate
PMTCT Steps

• at each of these steps there are barriers which affect the process
• to be effective, rates over 95% have to be achieved
• at each step there is “leakage”
• the following model uses 80% compliance at each step

Journal of College Medicine of SA, October 2008
Effect of 80% coverage of each step for 100 HIV infected mothers

<table>
<thead>
<tr>
<th>START</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% counselling</td>
<td>80</td>
</tr>
<tr>
<td>80% tested</td>
<td>64</td>
</tr>
<tr>
<td>80% Staged</td>
<td>51</td>
</tr>
<tr>
<td>80% receive dual therapy or HAART</td>
<td>41</td>
</tr>
<tr>
<td>80% received NVP intra-partum</td>
<td>33</td>
</tr>
<tr>
<td>80% neonates received NVP/AZT</td>
<td>26</td>
</tr>
<tr>
<td>80% neonates get PCR testing</td>
<td>21</td>
</tr>
<tr>
<td>80% neonates receive co-trimoxazole</td>
<td>17</td>
</tr>
<tr>
<td>80% of neonates referred for ART</td>
<td>13</td>
</tr>
<tr>
<td>NET EFFECT</td>
<td>13% receive appropriate treatment</td>
</tr>
</tbody>
</table>

Journal of College Medicine of SA, October 2008
Results of “leakage”

- assuming 30% transmission rate (30 out of 100 newborns will be HIV infected)
- NET EFFECT would be that only 4 out of 30 (13%) newborns would be treated appropriately and referred for ART
- thus even 80% compliance with the protocol is not good enough
Improve efficiency – 8 issues

• 1. Accessibility
• 2. Clinic resources
• 3. Testing methods
• 4. Fear and distrust
• 5. Disclosure and discrimination
• 6. Drug effectiveness
• 7. Treatment for mothers
• 8. Feasibility of replacement feeding (FF)
Accessibility

- women have to care for children
- housework - collect & prepare food & water
- live a long way from clinics “rural sprawl” and little access to transport
- one third of world’s pregnant women do not attend ANC
- clinics closed on weekends
- give birth at home? → give NVP but no guarantee that patient takes tablet
- single mothers
Clinic resources

- shortage of tests kits and drugs
- shortages of skills and staff
- pMTCT creates “additional work”
- recruit lay counsellors
Testing methods

“ I didn’t know that I had AIDS until my baby was born with it “

• voluntary ( V.C.T. ) or routine ( “opt-out”) 
• Botswana routine since 2004, increased VCT from 75% to 90%
• some women do not return
• after testing
• retest ?
• P.I.T.
Fear and distrust

• afraid?
• perceive few benefits, effects are invisible
• distrust staff, dissatisfaction with counselling, disbelief in test results, fear of hostile staff*
  • if a woman is assured that she will receive adequate treatment and care for herself, her children and her partner, she is more likely to accept HIV testing and counselling and, if HIV-positive, interventions to reduce MTCT

* Clinic staff should try to be approachable and supportive
Disclosure and discrimination

• “an infant does not only need to be born HIV negative; it needs food and shelter……..”
• choose to tell partners
• afraid of abandonment or violence
• men blame their partners (even if they have HIV too)
• non-disclosure affects adherance

Involves male partners in pMTCT programmes, support groups and anti-stigma campaigns
Drug effectiveness & adherance

- one dose of NVP to mom and baby easiest but only reduces risk of transmission by 50%
- more money and resources required to supply extra drugs for longer pMTCT courses
- women need additional clinic visits to collect their medication
- drugs have side effects eg AZT causes anaemia
- taking pills and storing them at home are much less able to AVOID disclosure
- adherance becomes an issue for daily pills
Feasibility of replacement feeding

• only certain way to avoid transmission is to abstain from BF and provide FF
• this may increase the risk of illnesses eg malnutrition and diarrhoea
• need reliable safe water and fuel
• a number of studies have shown that the protective effects of ARV drugs decreases when babies continue to be BF
Standard Operating Procedures for Procurement, Dispensing and Prescribing of Antiretrovirals for the PMTCT programme

*Registers – ANC & Labour ward
*Stock control – orders & storage
*Dispensing (check quantities – syrups & tablets)
THE FOUR STAGES OF PMTCT INTERVENTION OUTLINED IN THE GUIDELINE ARE AS FOLLOWS:

Figure 1: Four stages of PMTCT

Primary prevention of HIV → Antenatal → Labour and delivery → Post-natal

AZT + NVP

PMTCT Policy & Guidelines 2008
Barriers to effective PMTCT

• there are many barriers to achieving complete compliance to PMTCT

• they can be divided into:
  – those that are within the health system
  – those that are mainly within the community
Barriers in the health system

1. Counselling and testing
2. Staging
3. Treatment with dual therapy or HAART
4. Counselling regarding infant feeding and appropriate antenatal care
5. Labour
6. Post-natal follow-up
Barriers experienced by mothers

1. lack of patient participation in the health system
2. Stigma
3. poverty
Patient participation

- PMTCT programmes function in a hierarchical manner from “top down”
- programme objectives and programme managers “at the TOP” driving the programme
- PMTCT in rural areas is complicated with high levels of mistrust in the community
• as a result, patients may come away from contact with the PMTCT programme with the following experiences:
  – patients are left to deal with complex personal, family and community issues
  – interaction with health services remains technical and/or insensitive towards these issues
• interaction is mostly about instructions and knowledge transfer ("info overload"")
• interaction often leaves little room for patient participation and patient empowerment
• patients are left too feel that staff are "all knowing", with less time spent on functional interpersonal relationships or opportunities to be involved or participate in the process
• as a result, experiences after interacting with staff at different the various departments (ARV clinic, Maternity, Paediatrics etc) may make the patient feel:
  – confused
  – disempowered
Stigma

• personal level
• community level
  – both can prevent disclosure or make it very difficult for a woman to disclose to her partner, close relatives or friends
• it also impacts on:
  – her use of dual therapy or HAART
  – Infant feeding choice
  – follow up of herself and her infant
Pilot pMTCT programmes UNICEF
2000 – 2002, 12 countries

• 71% women received counselling
• of those counselled, 70% took the test
• of those who tested HIV+, only 49% received preventative drugs
• fewer than 1:4 HIV infected women who attended a clinic went on to receive the ARV drugs that they needed
• → HIGH drop out rate