ECOLOGICAL FRAMEWORK, SAHARA

WORSENING HIV/AIDS SITUATION

PREVENTION EFFORTS

PREVENT FURTHER SPREAD

MITIGATE IMPACT

Socio-Economic, Cultural and Other Factors

Therapeutic Efforts

SHARING RESEARCH EXPERTISE

SHARING KNOWLEDGE

MULTI-SITE PROJECTS

Social science that makes a difference
Mission statement

To bring together key partners (civil society, donor and international organizations, researchers, policy makers, and people living with HIV and AIDS) to influence policy and responses through the production and dissemination of evidence-based research on the social aspects of HIV/AIDS
African Countries with SAHARA Projects & Networks
CORE FUNCTIONS OF SAHARA

ENABLING MANAGEMENT ENVIRONMENT

- KNOWLEDGE PRODUCTION
- INFLUENCING POLICY
- BUILDING CAPACITY
- NETWORKING PARTNERSHIPS ALLIANCES
- RESEARCH PRIORITIES
- COLLABORATIVE RESEARCH
- INFORMATION DISSEMINATION

Social science that makes a difference
Core Research Areas

- Interventions and care for children, including OVC
- Stigma and disclosure, particularly among pregnant women
- Gender violence and HIV risk reduction
- Alcohol and HIV risk reduction
- Male circumcision as an HIV prevention tool in cultures that do not circumcise their males
- Culture and AIDS
- Social Aspects of HIV vaccines
HIV Infection in Children

- Number of children (less than 15 years of age) living with HIV increased from 1.5 million in 2001 to 2.5 million in 2007.
- Estimated new infections among children declined from 460,000 in 2001 to 420,000 in 2007.
- High HIV prevalence among children 2-9 years in South Africa, Botswana and Zimbabwe – higher than would have been expected based on assumed MTCT rates.
- Substantial number of new infections among children not yet sexually active in South Africa in 2005.
- Concern about children who avoided MTCT, but became positive before their sexual debut.
CRITICAL RESEARCH QUESTIONS

- What are the incidence and prevalence of HIV infection in children in Southern African countries?
- What proportion of new infections in children who are not voluntarily sexually active can be explained on the basis of MTCT (vertical transmission)?
- What proportion can be explained on the basis of non-vertical transmission?
- What are the risk factors and possible transmission mechanisms for non-vertical infection?
- What immediate interventions can be taken to minimize non-vertical transmission?
- What is not known about non-vertical transmission?
- What studies (and methodologies) can be undertaken to generate data and knowledge about non-vertical transmission?
OVERALL AIM

To discuss detailed evidence on why children who are not sexually active are so vulnerable to HIV infection.
SPECIFIC OBJECTIVES

- discuss and interpret available quantitative and qualitative data;
- identify appropriate research methodologies for assessing HIV-associated risk exposures;
- identify suitable research settings for in-depth studies of potential risk environ;
- explore collaborative mechanisms for effective research in the region; and
- examine, and provide advice on, the policy and programmatic implications, beyond the research agenda
Expected Outcomes

- Establishment of incidence and prevalence of HIV infection in Children in Southern Africa
- Consensus on what is known about HIV Infection in Children
  - Proportion of infections explained by vertical transmission
  - Proportion of infections explained by non-vertical transmission
  - Risk Factors and transmission mechanisms
- Consensus on what is not known about HIV Infection in Children (gaps in knowledge)
• Agreement on the way forward:
  ▪ Immediate actions to be taken to minimize non-vertical infections
  ▪ Additional studies or data needed to improve on the knowledge gap
  ▪ Collaborative mechanisms to support effective research and programme interventions
  ▪ Policy implications of such research
Expected Outputs

- Report of the proceedings of the meeting, including all papers presented
- Summary report for wider distribution, including placement in SAHARA’s website
- Publication of the findings of the meeting in the SAHARA Journal
HIV prevalence among children under 15 years of age in Zimbabwe

Presenter: Prof Leickness Chisamu Simbayi
Acting Executive Director, Social Aspects of HIV/AIDS and Health Research (SAHA) Programme
Human Sciences Research Council
Cape Town, South Africa

Presentation to Children & HIV Workshop to be held at Kievets Kroon Country Estate & Spa in Pretoria East on 18 March 2008
Outline

- Background
- Study of HIV among children in Zimbabwe
- HIV prevalence among 2-11 year olds
- HIV prevalence among 12-14 year olds
- Conclusions
The national HIV prevalence rate in Zimbabwe in 2005 was estimated at 18.1% (UNAIDS, 2007). [The estimate a year earlier was 20.1 [13.3 – 27.6%] (UNAIDS, 2006).]

At the end of 2006 the number of people living with HIV/AIDS in Zimbabwe in 2006 was estimated at 1 700 000 [1 100 000 – 2 200 000]

- Of these some 160 000 [54 000 – 340 000] were children aged 0 to 14 years.

Unlike in Botswana, South Africa and Swaziland, no national household HIV prevalence survey in Zimbabwe has included children younger than 15 years of age.
A team of researchers undertook such a study in Zimbabwe in 2005.

The team included the following:
- Prof Exnervia Gomo (UZ, now at UM),
- Prof Simba Rusakaniko (UZ),
- Mr Wilson Mashange (Biomedical Research and Training Institute),
- Ms Junior Mutsvangwa (Biomedical Research and Training Institute),
- Mr Brian Chandidwana (Biomedical Research and Training Institute), and
- Ms Shungu Munyati (National Institute of Health Research (formerly the Blair Research Institute)).
Background (contd)

• The study was part of a 5-year multi-country and multi-site project undertaken by SAHARA which was known as The W.K. Kellogg Foundation’s (WKKF) OVC Care Interventions Project.

• The study involved, among other things, undertaking a household (population-based) HIV prevalence and behavioural risks survey in one district each in South Africa and Zimbabwe as well as in two districts in Botswana.
Study of HIV among children in Zimbabwe

- The study was conducted in 13 randomly selected of the 23 wards of the Chimaninani District in the Manicaland Province in the Eastern Highlands.

- Every ninth household in each ward was selected and up to four people were randomly selected from each household.

- The sample consisted of 2394 individuals of whom 1350 were children.

- The following response rates were obtained:
  - 78.4% (n = 732) out of 934 children aged 2-11 years
  - 69.8% (n = 618) out of 885 children aged 12-14 years
OVC Study Districts: Zimbabwe

Map showing the study districts in Zimbabwe.
Study of HIV among children in Zimbabwe (contd)

- Participants including parents/guardians of children aged 2-11 years of age as proxies were interviewed on behavioural risks.

- All participants provided dry blood spots for HIV testing.

- The presentation will cover the HIV prevalence results from children aged 2 - 14 years of age by sex, age group and locality type.
HIV prevalence among 2-11 year olds by sex (n = 689).

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
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<th>HIV-positive (%)</th>
<th>95% CIs</th>
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<tr>
<td>Female</td>
<td>349</td>
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<td>2.4-7.2</td>
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### HIV prevalence among 2-11 year olds by age and locality type (n = 689).

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<th>95% Cis</th>
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<td>6-8 years</td>
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<td>9-11 years</td>
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<td>166</td>
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<td>Large-scale commercial</td>
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<td>1.1-9.6</td>
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<td>Urban</td>
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## HIV prevalence among 12-14 year olds by sex (n = 601).

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<td>Sex</td>
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<td>Female</td>
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<td>2.1-7.0</td>
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### HIV prevalence among 12-14 year olds by age and locality type (n = 601).

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<th>95% CIs</th>
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<tr>
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<td>12 years</td>
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<td>1.8-7.3</td>
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<tr>
<td>13 years</td>
<td>177</td>
<td>3.4</td>
<td>1.3-7.2</td>
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<tr>
<td>14 years</td>
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<td>1.5</td>
<td>0.3-4.4</td>
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<td><strong>Sector</strong></td>
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<tr>
<td>Communal</td>
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<td>1.3-5.4</td>
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<td>0.2-4.8</td>
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<tr>
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<td>10.2</td>
<td>3.8-20.8</td>
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<tr>
<td>Urban</td>
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<td>10.2</td>
<td>3.8-20.8</td>
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Conclusions

• This study provided some empirical evidence of the existence of a sub-epidemic among children below the age of 15 years of age in one district in Zimbabwe.

• Whilst it is possible that some of the HIV infection was transmitted vertically from mother to child amongst some of the younger children, the prevalence rate among older children suggests either the fact that children living with HIV/AIDS live much longer than was previously thought or there is a possibility that there might be other possible routes of transmission.

• These findings suggest the need for further investigation to determine the routes of HIV transmission involved with a view to prevent any further infection of children.
Reference


Acknowledgements

We wish to thank WK Kellogg Foundation and SAHARA for funding for this project as well as our partners from Zimbabwe who undertook the project.
CURRENT STATE OF HIV INFECTION IN CHILDREN IN BOTSWANA

G.N. TSHEKO
UNIVERSITY OF BOTSWANA
Background

- Botswana has one of the highest HIV prevalence rates in the world
  - 17.1% - BAIS II (2004) – population based
  - 37.4% (2003), 33.4% (2005), 32.4% (2006) - Sentinel surveillance – 15-49 year old pregnant women visiting Ante-natal clinics
## HIV Prevalence by Age-group (BAIS II, 2004)

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<th>Age-group</th>
<th>% (prevalence)</th>
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<td>5-9</td>
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<tr>
<td>10-14</td>
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<td>40-44</td>
<td>30.3</td>
</tr>
<tr>
<td>45-49</td>
<td>29.4</td>
</tr>
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## HIV Prevalence by Age-group (BAIS II, 2004)

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<thead>
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<th>Age-group</th>
<th>%(prevalence)</th>
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<td>50-54</td>
<td>20.9</td>
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<td>60-64</td>
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<td>70-74</td>
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<td>Age-group</td>
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<tr>
<td>75-79</td>
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<td>80-84</td>
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<td>85-89</td>
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HIV Prevalence by sex

[Bar chart showing HIV prevalence by sex and age group, with bars for male and female populations across different age ranges.]
National HIV & AIDS Response Programmes

- Voluntary Counseling & Testing (VCT)
- Routine HIV Counseling & Testing
- Prevention of Mother to Child Transmission (PMTCT)
- MASA (HAART/ARV)
Voluntary HIV Counseling & Testing (VCT)

- TebeloPele
- Botswana Christian AIDS Intervention Programme (BOCAIP)
- Botswana Family Welfare Association (BOFWA)
Figure 7: Number of First-time Testers by Age - TebeloPele (April 2006 to March 2007) - BHRIMS Reports

- Apr - June 2006: 327, 1346, 5434, 3945, 2668, 1725, 1305, 949, 1743
- July - Sept 2006: 258, 1584, 5790, 3946, 2693, 1810, 1463, 1066, 2008
- Oct - Dec 2006: 442, 1446, 5401, 3642, 2400, 1548, 1256, 926, 1908
- Jan - Mar 2007: 352, 1353, 4270, 2613, 1700, 652, 797, 679, 1512
Number of First-time Testers by Age (January 2006 to September 2007 - BOCAIP)-BHRMS Reports

<table>
<thead>
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<tr>
<td>&lt; 15 Yrs</td>
<td>31</td>
<td>41</td>
<td>14</td>
<td>2</td>
<td>36</td>
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<td>51</td>
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<tr>
<td>15-19</td>
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<td>16</td>
<td>122</td>
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<td>20-24</td>
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<td>30-34</td>
<td>195</td>
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<td>40-44</td>
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<td>94</td>
<td>59</td>
<td>77</td>
<td>64</td>
<td>127</td>
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<tr>
<td>45-49</td>
<td>90</td>
<td>50</td>
<td>75</td>
<td>29</td>
<td>65</td>
<td>44</td>
<td>78</td>
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<tr>
<td>50+</td>
<td>113</td>
<td>93</td>
<td>121</td>
<td>60</td>
<td>141</td>
<td>82</td>
<td>217</td>
</tr>
</tbody>
</table>
Routine HIV Counseling & Testing
Proportion of RHT Clients Testing HIV+ (January 2006 - March 2007) - BHRIMS Reports

- Jan - Mar 2006: 4.4, 16.9, 30.8, 14.9, 27, 42.8, 37.1, 31.5, 21.4
- Jul - Sep 2006: 2.6, 7.8, 21.7, 13, 21.5, 35.2, 30.3, 22.9, 15.7
- Oct - Dec 2006: 2.1, 12, 20.2, 10.3, 21.5, 36.7, 32.1, 23.5, 15.8
- Jan - Mar 2007: 1.5, 7.2, 19.4, 11.7, 19.9, 35, 27.7, 22.6, 13.6
Prevention of Mother To Child Transmission (PMTCT)

- Women who present for antenatal care are offered HIV testing and those HIV positive are advised to enroll in this programme.
- For mothers whose CD4 counts are still over 200 and present no clinical signs of AIDS, prophylaxis (AZT) is administered at 28 weeks of pregnancy through to delivery. This group stops treatment at delivery, depending on results of tests carried out at that stage.
- For those whose CD4 count is below 200; treatment (HAART) is administered. This group stays on treatment even after delivery.
Number of Deliveries by HIV Status & Treatment Type
(April 2005 to March 2007)-BHRIMS Reports

<table>
<thead>
<tr>
<th>PMTCT Clients</th>
<th>Total Deliveries</th>
<th>HIV+ Deliveries</th>
<th>No. on AZT at Delivery</th>
<th>No. on HAART at Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr - Jun 2005</td>
<td>11394</td>
<td>3694</td>
<td>2830</td>
<td>342</td>
</tr>
<tr>
<td>Jul - Sept 2005</td>
<td>10052</td>
<td>3271</td>
<td>2247</td>
<td>314</td>
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<tr>
<td>Oct - Dec 2005</td>
<td>10054</td>
<td>3377</td>
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<tr>
<td>Jan - Mar 2006</td>
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<td>Jan - Mar 2007</td>
<td>10057</td>
<td>3236</td>
<td>2005</td>
<td>700</td>
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Treatment

The primary goal of ARV Therapy (ART) is to improve the quality of life of people living with HIV infection by slowing progression of the disease through the provision of effective highly active antiretroviral treatment (HAART).

- By end of January, there were 75,742 patients on treatment
  - 61% females (46,155)
  - 39% males (29,587)
HAART/ARV

ARV Uptake in Government Masa Sites (April 2005 to March 2007) - BHRIMS Reports

<table>
<thead>
<tr>
<th></th>
<th>Adults on HAART</th>
<th>Children (0 to 12 Years) on HAART</th>
<th>Total on HAART</th>
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<tbody>
<tr>
<td>April - Jun 2005</td>
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<td>3876</td>
<td>40228</td>
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<tr>
<td>July - Sept 2005</td>
<td>40972</td>
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<td>45554</td>
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<tr>
<td>Oct - Dec 2005</td>
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<td>4997</td>
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<tr>
<td>Jan - Mar 2006</td>
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</tr>
<tr>
<td>Apr - Jun 2006</td>
<td>50443</td>
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<tr>
<td>Oct - Dec 2006</td>
<td>59228</td>
<td>6831</td>
<td>66059</td>
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<tr>
<td>Jan - Mar 2007</td>
<td>63376</td>
<td>6730</td>
<td>70106</td>
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Female children aged 5-14 on HAART Nov 2007 (Masa Report)
Male children aged 5-14 on HAART Nov 2007 (Masa Report)
### HAART Patients 12 years and below by site (Masa Report)

<table>
<thead>
<tr>
<th>ART Site</th>
<th>Number</th>
<th>% of site HAART patients</th>
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<tbody>
<tr>
<td>Gaborone</td>
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<td>6</td>
</tr>
<tr>
<td>Francistown</td>
<td>928</td>
<td>11</td>
</tr>
<tr>
<td>Serowe</td>
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<td>14</td>
</tr>
<tr>
<td>Maun</td>
<td>346</td>
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<td>Tutume</td>
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<td>ART Site</td>
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<td>% of site HAART patients</td>
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<td>Bobonong</td>
<td>139</td>
<td>7</td>
</tr>
<tr>
<td>Kasane</td>
<td>73</td>
<td>6</td>
</tr>
<tr>
<td>Selibe-Phikwe</td>
<td>236</td>
<td>7</td>
</tr>
<tr>
<td>Gumare</td>
<td>167</td>
<td>8</td>
</tr>
<tr>
<td>Thamaga</td>
<td>65</td>
<td>4</td>
</tr>
<tr>
<td>Tsabong</td>
<td>91</td>
<td>8</td>
</tr>
<tr>
<td>ART Site</td>
<td>Number</td>
<td>11</td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
<td>----</td>
</tr>
<tr>
<td>Sefhare</td>
<td>158</td>
<td></td>
</tr>
<tr>
<td>Ghanzi</td>
<td>78</td>
<td>7</td>
</tr>
<tr>
<td>Mochudi</td>
<td>171</td>
<td>7</td>
</tr>
<tr>
<td>Gweta</td>
<td>80</td>
<td>7</td>
</tr>
<tr>
<td>Letlhakane</td>
<td>86</td>
<td>9</td>
</tr>
<tr>
<td>Goodhope</td>
<td>90</td>
<td>9</td>
</tr>
<tr>
<td>Rakops</td>
<td>50</td>
<td>9</td>
</tr>
<tr>
<td>Ramotswa</td>
<td>111</td>
<td>7</td>
</tr>
<tr>
<td>Palapye</td>
<td>249</td>
<td></td>
</tr>
</tbody>
</table>
Conclusion

- Children infected with HIV are mainly captured by the national survey, VCT outlets, RCT, PMTCT and the treatment programme.
- There are children who are infected and possibly missed by these programmes.
- Reasons for infection of children not addressed.
- A need to extend methodologies to get a clearer picture.
HIV Infection Among Swazi Children Age 5-14 years

‘evidence from the SDHS’

presented by

Rachel Masuku
HIV Testing Protocol

- Population age 2 and older targeted for testing
- Testing anonymous and results not returned to subjects
- Informed consent procedures were followed
- Brochure provided explaining testing
- Subjects advised they would not receive results and provided information on VCT sites if they wanted to know status
DBS Collection and Testing

- At least three blood spots collected from same prick as blood drops used for anaemia testing and dried on filter paper card
- DBS sample labeled with unique bar code and no other identifiers
- DBS sent to National Referral Laboratory for testing with screening and confirmatory ELISAs
- Using the bar code labels, limited information on age, sex and residence linked at laboratory to produce preliminary report results
HIV Prevalence Rates, Selected Countries

Percent HIV positive among population age 15-49
HIV Prevalence among Population Age 2 and Older by Age and Sex

Percentage HIV positive

Swaziland DHS 2006-07
This chart examines the age pattern of infection.

- The HIV rate which is around 5 percent among children under 10 years drops gradually to around 3 percent in the 10-14 cohort.
- For women, HIV prevalence then rises extremely rapidly from at a level of 10 percent in the 15-19 age cohort to a peak at 49 percent in the 25-29 age group.
- For men, prevalence remains at a low level in the 15-19 age cohort before rising to a peak of 45 percent in the 35-39 age group.
- It is in the 35-39 age cohort that the HIV rate among men first exceeds the rate among women. From that point on, the rate among men is consistently higher than the rate among women.
- This chart also shows that a considerable proportion of older adults in Swaziland are HIV infected. Among the age group 60 and older, for example, the HIV rate is 13 percent among men and 7 percent among women. The rate among men in this age group is higher than among men under age 25.
HIV Prevalence among population age 5 to 14 years

- 5 to 9 years:
  - Girls: 3.6%
  - Boys: 4.8%
  - Both sexes: 4.2%

- 10 to 14 years:
  - Girls: 3.3%
  - Boys: 1.9%
  - Both sexes: 2.6%
HIV Prevalence among children age 5 to 14 years

<table>
<thead>
<tr>
<th>Age Group</th>
<th>girls</th>
<th>boys</th>
<th>both sexes</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 9</td>
<td>3.6 (670)</td>
<td>4.8 (697)</td>
<td>(4.2) 1,367</td>
</tr>
<tr>
<td>10 to 14</td>
<td>3.3 (744)</td>
<td>1.9 (657)</td>
<td>(2.6) 1,402</td>
</tr>
</tbody>
</table>
HIV among South African Children

Dr. Olive Shisana

Human Sciences Research Council, (HSRC), South Africa
An expert meeting on HIV infection in children aged 5 – 14 YEARS
Pretoria, South Africa
18-19 March 2008
Nelson Mandela/HSRC Study of HIV/AIDS

A collaborative effort of

- The Human Sciences Research Council (HSRC)
- Medical Research Council (MRC)
- Centre for AIDS Development, Research and Evaluation (CADRE)
- Agence Nationale de Recherches sur le Sida (ANRS)
Research Objectives

- determine the HIV prevalence in the general population;
- identify risk factors that increase vulnerability of South Africans to HIV infection;
- determine the level of exposure to current prevention, education and awareness programs and campaigns; and
- assess public perceptions of the government’s policy
Research Design

- Complex (multi-stage stratified cluster) probability sampling

- The research design is a cross-sectional survey anonymously linking the HIV test results with questionnaire data
A sample of the aerial photography used in the study
The steps in the drawing of the sample

1. Selection of PSUs – 1000 EAs out of 86 000
2. Produce aerial photos and data kits of EAs
3. Selection of SSUs – 11 visiting points per EA
4. Selection of USUs – 3 people per VP
HIV testing

- The OraSure® HIV-1 Oral Specimen Collection Device was used to collect oral mucosa transudate (oral fluid) specimens.
- Vironostika test kits were utilised for conducting antibody tests.
- Approved by FDA for all HIV clades.
- Studies on sensitivity and specificity show high correlations with blood results (98%-100%)
Age and sex distribution of HIV infection, 2002

[Bar chart showing age and sex distribution of HIV infection by percentage for different age groups.]

- Male and female percentages are indicated for each age group (2-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55+).

- The chart clearly shows the distribution with age groups and gender, with some age groups having more male cases than female cases, and vice versa.
### HIV Prevalence among SA children, 2002

<table>
<thead>
<tr>
<th></th>
<th>2 to 9 years old</th>
<th>10 to 14 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>No</strong></td>
<td>1377</td>
<td>973</td>
</tr>
<tr>
<td><strong>Ratio</strong></td>
<td>6.2</td>
<td>4.7</td>
</tr>
<tr>
<td><strong>SE</strong></td>
<td>1.199</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>CI</strong></td>
<td>[4.19, 8.98]</td>
<td>[2.52, 8.67]</td>
</tr>
</tbody>
</table>
## HIV prevalence among SA children, 2002

<table>
<thead>
<tr>
<th></th>
<th>2 to 9 years old</th>
<th>10 to 14 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>714</td>
<td>474</td>
</tr>
<tr>
<td>Ratio</td>
<td>6.5</td>
<td>3.5</td>
</tr>
<tr>
<td>SE</td>
<td>1.6</td>
<td>1.1</td>
</tr>
<tr>
<td>CI</td>
<td>[3.94, 10.59]</td>
<td>[1.92, 6.44]</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>663</td>
<td>499</td>
</tr>
<tr>
<td>Ratio</td>
<td>5.8</td>
<td>5.9</td>
</tr>
<tr>
<td>SE</td>
<td>1.745</td>
<td>2.753</td>
</tr>
<tr>
<td>CI</td>
<td>[3.20, 10.35]</td>
<td>[2.31, 14.23]</td>
</tr>
</tbody>
</table>
• 5.6% HIV prevalence among children aged 2-14 years was unexpected (CI: 3.7%-7.4%)

• Mr. Mandela, upon the release of the report, indicated that we investigate this further as a matter of urgency.

• The Nelson Mandela/HSRC study was presented to the Free State Provincial Executive Council, which recommended that we undertake the study in this province to understand why children were infected.
HIV Risk exposure
among young children
A study of 3-9 year olds
served by public health facilities in the Free State, South Africa
AIM OF THE STUDY

This study was aimed at looking at other possible routes of HIV transmission having taken into account the mother to child transmission route.
<table>
<thead>
<tr>
<th>Study component</th>
<th>Objective</th>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross sectional study of children served by the FS public health sector and their mothers with nested case-control study</td>
<td>Estimate the prevalence of discordant mother / child pairs among children served in the FS public health sector Determine the risk factors for HIV infection in those children.</td>
<td>VCT of children and their mothers</td>
</tr>
<tr>
<td>Investigation of cases of HIV-positive children whose biological mother was HIV negative</td>
<td>Identify potential sources of infection among HIV-positive children who have a biological mother who is HIV negative</td>
<td>Compare HIV infected children with discordant mother / child status with (a) HIV infected children with concordant mother / child status and with (b) HIV negative children</td>
</tr>
<tr>
<td>A quantitative assessment of infection control practices in formal health care facilities</td>
<td>Estimate the proportion of health care facilities that have full implementation of universal / standard precautions</td>
<td>Interviews and structured observations in health care facilities</td>
</tr>
<tr>
<td>A qualitative assessment of infection control practices among traditional healers</td>
<td>Identify selected traditional practices that may expose children to blood-borne pathogens</td>
<td>Focus groups with traditional healers</td>
</tr>
</tbody>
</table>
Sample and Response rate

- 25 hospitals, 58 PHC clinics and 3 Community Health Centers
- 3510 mother-child pairs and 4113 children aged 2 to 9 participated
- 543 caregivers were interviewed but not tested for HIV.
Abbot “Determine” HIV 1 & 2 ‘Screening’

“Unigold” by Trinity Biotech for ‘confirmation’

ELISA for Indeterminate

DNA If mother-child Pair is discordant
Findings

Cross-sectional study

(Study A)

• HIV prevalence
• Prevalence of discordant mother-child pairs
• HIV Risk Exposure in these children
HIV Prevalence

- The overall HIV prevalence of the 4113 children sampled was 14.8%.
- Hospitalised patients (21.5%) vs. Non Hospitalized patients (13.7%).
- Just over 29% of mothers who agreed to be tested were HIV positive.
- When analysing the HIV prevalence by actual ages there was no trend.
- The majority (98.6%) of HIV positive children had HIV positive mothers.
- Only 1.4% (7) of HIV positive children had HIV negative mothers.
The association between maternal HIV status and child HIV status

<table>
<thead>
<tr>
<th>Mothers HIV status</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>477</td>
<td>537</td>
<td>1014</td>
</tr>
<tr>
<td>Negative</td>
<td>7</td>
<td>2450</td>
<td>2457</td>
</tr>
<tr>
<td>Total</td>
<td>484</td>
<td>2987</td>
<td>3471</td>
</tr>
</tbody>
</table>
This indicates that at least 1.4% of the children could have been infected through non-vertical transmission.

The question was HOW and therefore we undertook Study B.
Findings
Investigation of cases of HIV positive children with an HIV negative mother
(Study B)

Objective
• To identify potential sources of infection among discordant mother-child pairs

Method
• In-depth questionnaires investigating exposure to health care settings and traditional healers
• Investigation of multiple factors of potential infection
Findings of study B

- 4113 mother-child pairs from 88 Health care facilities
- 488 of the 3510 children (13.9%) were HIV positive
- 92.3% of HIV positive mothers breastfed their babies – 60% for longer than a year
Findings of study B (cont)

• Prolonged breastfeeding increases exposure to HIV
• Small sample of 7 discordant cases (1.4%)
• Breastfeeding by a non-biological caregiver with HIV is the single most important factor associated with HIV infection in children besides the most obvious route of mother-to-child-transmission of HIV
• This was a new finding, namely that the practice of shared breastfeeding, where babies are fed by a non-biological mother, the odds of infection were 17 times greater than when babies were fed by an non-HIV positive mother. Even when all the other risk factors such as age, sex, hospital admission, dental injections, visit to traditional healers, vaccination, scarifications and being fed with milk from the milk room were controlled for, being breastfed by a non-biological mother remained as an independent risk factor. This mode of transmission of HIV has not previously been reported in South Africa.
Findings of study B (cont)

- We then asked ourselves what other routes, besides breast-feeding, could contribute to transmission of HIV from HIV negative mothers to their babies. Therefore, we undertook Study C
Findings

An assessment of infection control (IC) practices in health care facilities (Study C)

- Dental services
- Maternity services (milk preparation rooms)
- Paediatric services
Findings

Study C (cont)

Objective

• To estimate the proportion of health care facilities that have full implementation of universal/standard Infection Control (IC) precautions

Method

• Interviews and structured observations in health care facilities and dental practices
Findings:

Study C (cont)

- Poor cleaning techniques and protective policies
- Poor sterilisation
- 24.6% of dental instruments and 24% of maternity and paediatric instruments were contaminated with invisible blood or visible blood.
Provision for Standard Precautions in Dental Units

- Gloves: 83.3%
- Separate Areas: 20.8%
- Single use syringe: 75%
- Sterilize between patient: 62.5%
- Autoclave present: 79%
- Sharps box: 79.1%
Findings

Study C (cont)

Flawed milk preparation procedures

- 29.7% of sample of expressed breast milk tested HIV positive
- 6 milk samples had high viral load
Replies to critical steps in milk preparation to prevent HIV transmission in a high-care facility

<table>
<thead>
<tr>
<th>Replies</th>
<th>Yes (n)</th>
<th>% of Total N = 215</th>
<th>% Nurses N = 181</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean and sterile milk bottles</td>
<td>54</td>
<td>25.1</td>
<td>30</td>
</tr>
<tr>
<td>Correct labelling of milk bottles</td>
<td>22</td>
<td>10.2</td>
<td>12.1</td>
</tr>
<tr>
<td>Pasteurizing pooled milk</td>
<td>3</td>
<td>1.4</td>
<td>1.65</td>
</tr>
</tbody>
</table>
We then asked ourselves what other possible routes of HIV transmission might remain. Therefore, we undertook Study D.
Findings
A qualitative assessment of IC practices among traditional healers
(Study D)

Objective

• To identify selected traditional practices that may expose children to blood-borne pathogens

Method

• Focus groups with traditional healers and Traditional Birth Attendants
Findings

Study D (cont)

Factors associated with being HIV positive were:

• Prior hospital admission
• Having seen a traditional healer
• Being scarified

• However, the relationship between these factors is not clear
The Research Team

- Dr. Olive Shisana (Co-PI) (HSRC)
- Professor Shaheen Mehtar (Co-PI) (US)
- Dr. Thabang Mosala, PhD (Project Manager, HSRC)
- Ms. Mpumi Zungu-Dirwayi, Co-Inv (HSRC)
- Dr. Pelisa Dana (Data Manager) HSRC
- Dr. Mark Colvin (Co-PI, CADRE)
- Ms. Cathy Connolly (Biostatistician) MRC

WITH PARTICIPATION OF

- Dr. David Gisselquist (consultant)
- Dr. Yvan Hutin (WHO consultant)
- Dr. David Schmid (WHO)
- Dr. Thomas Rehle (Independent Consultant)
HIV prevalence, incidence, behaviour and communication survey 2005

Funded by
The Nelson Mandela Foundation
The Swiss Agency for Development and Cooperation
Centers for Disease Control and Prevention
Objectives

• Estimate HIV prevalence and incidence in South Africa
• Identify HIV-related risk behaviours
• Examine social, behavioural & cultural determinants
• Explore reach of HIV/AIDS communication
• Assess the association between HIV/AIDS and mental health
HIV prevalence among South African children 2-14 years, 2005

HIV prevalence

Age of children

2-4 yrs 5-9 yrs 10-14 yrs 2-14 yrs

4.9 4.2 1.6 5.3 4.8 1.8 3.2 3.5

male female
### HIV incidence % and number of new infections by age group, South Africa 2005

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Weighted sample (n)</th>
<th>HIV incidence % per year [95%CI]</th>
<th>Estimated number of new infections per year (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 2</td>
<td>44 513 000</td>
<td>1.4 [1.0 - 1.8]</td>
<td>571 000</td>
</tr>
<tr>
<td>2-14</td>
<td>13 253 000</td>
<td>0.5 [0.0 - 1.2]</td>
<td>69 000</td>
</tr>
<tr>
<td>15-24</td>
<td>9 616 000</td>
<td>2.2 [1.3 - 3.1]</td>
<td>192 000</td>
</tr>
<tr>
<td>≥25</td>
<td>21 645 000</td>
<td>1.7 [1.1 – 2.3]</td>
<td>310 000</td>
</tr>
<tr>
<td>15-49</td>
<td>24 572 000</td>
<td>2.4 [1.7 – 3.2]</td>
<td>500 000</td>
</tr>
</tbody>
</table>

Possible determinants

- Sexual abuse
  - High rates of child sexual abuse
- Nosocomial infection
- Breast-feeding by non-biological mother
HIV infection among children in Southern Africa

Eleanor Gouws
UNAIDS, Geneva
Objective

- To review HIV prevalence estimates among children from population based surveys in Southern Africa
  - Botswana – AIDS Indicator Survey 2004
  - South Africa – HSRC Survey 2005
  - Swaziland – DHS 2006

- To estimate prevalence of child infections from mathematical models, with the assumption that children only get infected from their mothers

- To compare model estimates to survey data
HIV prevalence among children (2-14 years) from national population based surveys
Botswana, 2004

Botswana, 2004

South Africa, 2005

South Africa, 2005

Swaziland, 2006

Swaziland, 2006

Southern Africa

Potential limitations of measuring HIV prevalence in population based surveys

- Non-response (refusal to participate or absence from household)
- Measurement error
- Sensitivity / Specificity of laboratory test
  - WHO estimates that most HIV antibody tests that are currently used for surveillance have specificity of 98% or higher, but the actual sensitivity and specificity of the tests when conducted in the field may vary (WHO Guidelines for HIV Testing Technologies, 2007)
Estimating the number of child infections through mother to child transmission using mathematical models

- UNAIDS Spectrum (Developed by John Stover from Futures Institute)
- Williams model, WHO
Modelling assumptions

- **Demographic (obtained from UN Population Division)**
  - Population by sex and age over time
  - Birth rate
  - Mortality rate

- **Epidemiological**
  - HIV prevalence among pregnant women (obtained from ANC surveillance)
  - Number of HIV positive pregnant women having access to PMTCT services
  - Probability of infection from mother to child
  - Survival distribution from infection with HIV to death among children
Proportion of children surviving to different ages. Data from Rakai, blue (no error bars); Kampala, red; Abidjan, green; Nairobi, brown; Durban, black; Kigali, pink. The fitted line is the sum of an exponential for the fast progressors and a Weibull for the slow progressors.

Recommended survival distribution

Cumulative proportion progressing to AIDS death

## Probability of mother-to-child transmission of HIV (%)

<table>
<thead>
<tr>
<th>Duration of breastfeeding</th>
<th>Treatment</th>
<th>Mixed BF</th>
<th>Replacement</th>
<th>Exclusive BF</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 6 months</td>
<td>None</td>
<td>26.0</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Single dose nevirapine</td>
<td>17.0</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Dual prevention ARV</td>
<td>10.0</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Triple Prevention ARV</td>
<td>4.0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7-17 months</td>
<td>None</td>
<td>30.5</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Single dose nevirapine</td>
<td>21.5</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Dual prevention ARV</td>
<td>14.5</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Triple Prevention ARV</td>
<td>5</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>18+ months</td>
<td>None</td>
<td>35.0</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Single dose nevirapine</td>
<td>26.0</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Dual prevention ARV</td>
<td>19.0</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Triple Prevention ARV</td>
<td>6.0</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Modelling child infections as a result of MTCT

Prevalence estimates for 2005 (Williams model)
Comparison of model estimates and survey prevalence

- Specificity adjusted to get best fit
South Africa, 2005

HIV prevalence

Age (years)

Specificity 100%
South Africa, 2005

Specificity 100%
South Africa, 2005

Specificity 99%
Botswana, 2004

HIV prevalence

Specificity 100%

Age (years)
Botswana, 2004

Specificity 98%

HIV prevalence

Age (years)
Specificity 99.5%
Natural history of child infections over time in South Africa in the absence of PMTCT services.
Estimation of incidence

No direct data available on incidence in children

Modelling

- Depends on good prevalence data among children

Laboratory assays

BED

- May overestimate adult incidence by factor 2-3
- Correction factor (CDC, Hargrove et al.) gives good results for adults
- Currently being further validated among adults
- No information on performance among children
Conclusions

Prevalence

- Infections among girls and boys about the same up to the age of 14 years.
- Survey prevalence over age follows the same pattern as expected from MTCT
- From comparison between survey and modelling estimates, the majority of child infections occur as a result of MTCT
- Not clear whether differences are related to test specificity or other potential risk factors
- Specificity needs to be measured very precisely
- More studies / data are needed to accurately determine the number of infections that occur among children that are not related to MTCT

Incidence

- No good estimates of incidence available for children
- Data on post-partum incidence from breastfeeding and other risk factors need to be investigated
Thank you
Weibull survival curves fitted to the Cascade data

Collaborative Mechanisms for Effective Research on HIV in Children

Expert Meeting on HIV Infection in Children Aged 5 – 14 Years
Pretoria, March 19th, 2008
Outline

• Inter-institutional collaboration
  – Coordination
• Institutionally-led research/service partnerships
• Branded affiliations
• Other Models
Inter-Institutional Collaboration

The Joint Learning Initiative on Children and HIV/AIDS (JLICA)

Timebound:
• Established 2006 & work to be completed by end 2008

Funding:
• Bernard van Leer Foundation, Governments of UK, Netherlands, Francois-Xavier Bagnoud International, UNAIDS, UNICEF

Partners:
• Cross-sectoral, interdisciplinary
• Practitioners, policymakers, scholars

Focus on:
• Collaborative problem-solving,
• Research around knowledge gaps,
• Analysis of existing research

Outputs:
• Research papers: child survival, the role of families and communities, service provision, governance issues, and costing of adequate response
• Practical recommendations to address the needs of children living in the context of HIV/AIDS.
Inter-Institutional Collaboration - Coordination

Stated goal:
• To protect and fulfill the rights of children affected by HIV/AIDS by mobilizing the scientific evidence base and producing actionable recommendations for policy and practice.

Objectives:
• Mobilizing & generating evidence
• Expanding space for new thinking
• Advancing action
• Facilitating linkages

Organization:
• Headed by 2 Co-Chairs (1 institutional – Mr Peter Bell, Senior Research Fellow Harvard University, 1 Government – Dr. Agnes Binagwaho, Executive Secretary NAC – Rwanda)
• Four thematic “Learning Groups”, each led by 2 Co-Chairs
  – Group 1: Strengthening Families – Prof. Linda Richter, HSRC, Dr. Angela Wakhweya, FHI
  – Group 2: Community Action – Dr. Geoff Foster, Family AIDS Caring Trust (FACT), Madhu Deshmukh, CARE USA
  – Group 3: Access to Services and Protection of Human Rights – Prof. Jim Yong Kim, Harvard University, Dr. Lydia Mungherera, TASO Uganda
  – Group 4: Social and Economic Policies – Alex de Waal, Social Science Research Council, Masuma Mamdani, Research on Poverty Alleviation
Institutionally-Led Technical Assistance to Implementers

Elizabeth Glaser Pediatric AIDS Foundation - International Family AIDS Initiative

Focus:
• Increasing access to services for prevention of mother-to-child transmission (PMTCT);
• Increasing access to care and treatment for children and families, including antiretroviral therapy (ART);
• Linking PMTCT services to care and treatment in order to provide a continuum of care;
• Researching and identifying better technologies and interventions in PMTCT and care and treatment;
• Documenting replicable models in PMTCT and care and treatment; and
• Training research and program leaders to advance all of the above.

Programme Components:
• PMTCT:
• Care and Treatment (Project HEART)

Funding:
• USAID, CDC (through PEPFAR)

Partners:
• Host Governments (Cameroon, Cote d'Ivoire, DRC, Kenya, Lesotho, Malawi, Mozambique, Rwanda, South Africa, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe)
• Existing health and care facilities

Support provided:
• Technical support, guidance and financial support to national care and treatment programmes (facility and community-based)
Branded Affiliations

Baylor International Paediatric AIDS Initiative (BIPAI)

**Stated goal:**
- To conduct a program of high quality, high impact, highly ethical pediatric and family HIV/AIDS care and treatment, health professional training, and clinical research.

**Partners:**
- 10 clinical centers of excellence (Botswana, Kenya, Uganda, Swaziland, Lesotho, Tanzania, Malawi, Burkina Faso, Mexico, Romania)
- Earliest Center of Excellence in Africa (Botswana) established in 2003.
- Funded by Baylor College of Medicine, Bristol-Myers Squibb, Abbot Fund and host Governments

**Focus on:**
- Supporting government roll-out plans for access to paediatric treatment
- Strengthening quality of care for paediatric HIV patients,
- Strengthening capacity of health professionals through training
- Research

**Outputs:**
- Centers of Excellence
- Increased number of trained professionals in host countries
Branded Affiliations – Applied Models

Baylor International Paediatric AIDS Initiative (BIPAI) funded through CDC

Government, Baylor, Bristol-Myers Partnership:
• Construction of clinical center
• Training of staff and provision of faculty by Baylor
• Financing by host Government (including support from GFATM)
• Focal center for roll-out of paediatric care
• Botswana, Lesotho, Swaziland, Kenya, Uganda, Burkina Faso, Malawi

Project Support:
• Technical support and training on paediatric care within comprehensive project or service programme
• Tanzania (Elizabeth Glaser Paediatric AIDS Foundation – Project HEART, Mexico)

Specific research initiatives:
• Botswana:
  – Community based outreach – documenting care needs of children; influencing treatment and access programmes.
  – Clinical trials – impact of structured interrupted treatment on long-term treatment outcomes in children
Other Models of Collaboration

SAHARA:

• Technical support through HSRC towards social research implemented by partners across Africa

Others:

• UNICEF – LSHTM (Roeland Monasch)
• UNICEF – CDC (Child Abuse – Jama Gulaid)
• Others…
Surveillance

• Particularly in countries with a very high HIV prevalence (Hyperendemic countries), there is a need for active surveillance on HIV in children.

• Such data is needed for planning, prevention and policy formulation.

• Data on HIV prevalence is now available from representative household surveys in South Africa, Botswana and Swaziland.
Surveillance

• Available data confirms the assumption that a ‘large majority’ of children aged under 15 years living with HIV infection in Southern Africa acquired their infection from infected mothers. However we must establish mechanisms to monitor the validity of this assumption, and to be vigilant to other causes of infection.
Surveillance - recommendations

• Recent household surveys carried out in Southern Africa have confirmed the feasibility of determining HIV prevalence in young children, and of linking child data with maternal data.
• It is recommended that all household surveys of the DHS+ type in high prevalence countries in E and Southern Africa should include children – from birth onwards.
• Analysis of such surveys will allow some quantification of the proportion of child infections which are NOT due to vertical transmission. The first opportunity for this will be from the Swaziland data already collected.
• More work to determine prevalence and incidence in school age children – perhaps school based surveys.
Implications – recommendations.

1. Plan to cope with high burden of pediatric infection

• The burden of HIV infection in ‘older’ children – children between the age of 5 to 14 years – in Southern Africa is high – around 3%. Infected children have a range of special needs – but at present the majority of these children neither know their HIV status – nor have access to treatment, other services, or support.

• National AIDS Plans and strategies need to be retrofitted to pay more attention to the needs of these children
Implications – recommendations.

2. Prevent pediatric infection through PMTCT.

• All efforts to increase ‘PMTCT’ coverage, uptake and efficiency need to be given the highest possible support. The large number of older children currently living with HIV is a direct result of the slow scale up and low efficiency of past PMTCT programmes. Greater efforts need to be made to ensure political leaders are accountable for assuring quality PMTCT services.
Implications – recommendations.

3. Prevent of HIV infections in young women – future mothers, pregnant women, breastfeeding women

- More of the same will not do. Must support much more effective prevention.
- Participatory research – participatory monitoring.
- Randomised controlled trials – much more rigour.
Recommendations 4

• We must not assume that vertical transmission is sole source of infection in young children.
• Potential priorities:-
  – Re-inforce, re-invigorate Universal Precautions in health care, including dentistry.
  – Much more awareness of dangers of sloppy management of expressed breastmilk in health care settings.
  – Re-invigorate safe blood supplies
  – Active discouragement of ‘wet nursing’ – need for more research on prevalence and reasons – but clear already from SA it is a problem.
  – Prevent child sexual abuse – because of HIV risk and many other reasons – but look for opportunities of linking legal efforts to greater awareness of HIV risk and its prevention, through, eg PEP.
Recommendations 5

• Clear(er) guidance to countries on ways of measuring HIV incidence – in adults and in children. Support for innovative approaches as well as technical solutions.

• Better understanding of longer term natural history of HIV related disease in children in this sub-region. How do children do with aggressive, light and no management.

• Clarity on issues of sensitivity of HIV tests used in child related surveillance.