From Efficacy to Effectiveness: Scaling Up PMTCT Programs Using a Quality Improvement Model

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Antiretroviral Drugs in the Cupboard Are Not Enough: The Impact of Health Systems’ Performance on Mother-to-Child Transmission of HIV

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Efficacy: perinatal HIV transmission in an unselected population

Efficacy: perinatal HIV transmission using 2-tier regimes (including HAART)

- Single tier regime
- 2-tier (including HAART)
Clinical trial conditions imply close to 100% performance of delivery system across PMTCT cascade

...but what happens in “real life”
Effectiveness: challenge of delivering complex interventions over time and places

3,244 HIV positive pregnant women at health centres offering PMTCT services in Cameroon, Côte d’Ivoire, South Africa and Zambia

Low uptake of HIV testing & ARV prophylaxis in low & middle income countries

<table>
<thead>
<tr>
<th>Year</th>
<th>% pregnant women receiving HIV test</th>
<th>% HIV+ women receiving ARV prophylaxis</th>
<th>% HIV-exposed infants receiving ARV prophylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>5%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>2005</td>
<td>10%</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>2006</td>
<td>20%</td>
<td>25%</td>
<td>20%</td>
</tr>
<tr>
<td>2007</td>
<td>25%</td>
<td>30%</td>
<td>25%</td>
</tr>
<tr>
<td>2008</td>
<td>30%</td>
<td>35%</td>
<td>30%</td>
</tr>
<tr>
<td>2009</td>
<td>35%</td>
<td>53%</td>
<td>35%</td>
</tr>
</tbody>
</table>

Adapted from UNICEF, Fifth Stocktaking Report 2010
“Real Life” Issues: Perinatal PMTCT Transmission

Access issues

- Attend ANC clinic
- Attend facility based delivery

Counseled and tested for HIV, CD4

PMTCT Program delivery issues

- Referred for HAART
- Start on HAART

- CD4 result
- Started on AZT
- AZT/sdNVP in labour
PMTCT System Performance in multi-step process (95% reliability)
PMTCT System Performance in multi-step process (90% reliability)
PMTCT System Performance in multi-step process (80% reliability)
Applying this model to KZN Province

PMTCT Program Efficiency using 2007 Data (sdNVP- 2 tiered)

100 HIV+ mothers

Mothers retained in PMTCT programme

34 infants protected:
- 34 infants infected
  (8% transmission)

Loss of mothers from PMTCT programme

66 infants exposed:
- 24 infected
- 34 infected
  (25% transmission)

- Attend ANC clinic 92%
- Counseled and tested for HIV, CD4 75%
- Get ARVs (pre- and perinatal) 50%

Barker PM. JAIDS. 2011 56(2):e45-8
KZN Province 2007: **sNVP/AZT**, 2-tier prophylaxis

100 HIV+ mothers

Mothers retained in PMTCT programme

- Attend ANC clinic 92%
- Counseled and tested for HIV, CD4 75%
- Get ARVs (pre- and perinatal) 50%

- 92 mothers
- 68 mothers
- 34 mothers

Loss of mothers from PMTCT programme

- 8 mothers
- 24 mothers
- 34 mothers

34 infants protected: 1 infant infected (2.9% transmission)

66 infants exposed: 16.5 infants infected (25% transmission)

17.5 infected (17.5% transmission)

Barker PM. JAIDS. 2011 56(2):e45-8
KZN Province 2007: **sNVP/AZT, 2-tier prophylaxis**

With 95% efficiency

- **100 HIV+ mothers**
- **Mothers retained in PMTCT programme**
  - Attend ANC clinic 95%
  - 95 mothers attended ANC
  - Counseled and tested for HIV, CD4 95%
    - 90 tested
  - Get ARVs (pre-and perinatal) 95%
    - 86 received ARVs
- **Loss of mothers from PMTCT programme**
  - 5 mothers lost
  - 14 infants exposed
    - 3.5 infected (25% transmission)
  - 86 infants protected
    - 2.5 infected (2.9% transmission)

- **6.0 infected (6% transmission)**

Barker PM. JAIDS. 2011 56(2):e45-8
How do we use system/quality improvement strategies to improve PMTCT outcomes at scale?

1. A simple framework for Improving effectiveness

   - Define the performance gap
   - Measure each step in the system
   - Method for harvesting and testing local ideas

   - PDSA cycles
   - Rapid test cycles

2. A District-level learning system for improving effectiveness

   - LS 1
   - LS 2
   - LS 3
   - Intensive support

3. A strategy for rapid scale up and spread

   - 3º care
   - District Hospital / CHC
South Africa Results: 20000+ Partnership
3 Districts, pop 5.5 million, 202 clinics, 18 hospitals
Importance of Integrated Care for Comprehensive MNCH-HIV Services

Integrated Care

Antenatal care
HIV testing
Maternal ARV Prophylaxis
Maternity
Newborn Prophylaxis
Immunizations

Maternal Child Health

HIV care & support
CD4 cell count testing
Antiretroviral therapy
Long term follow-up

ART Care & Treatment
SUMMARY: effect of delivery system performance on different drug regimens for PMTCT

<table>
<thead>
<tr>
<th>System Efficiency (%)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No intervention (%)</td>
<td>sdNVP (%)</td>
<td>AZT/sdNVP (%)</td>
<td>2-Tier sdNVP or ART (%)</td>
<td>2-Tier AZT/sdNVP or ART (%)</td>
<td>2-Tier Triple ARV + ART (%)</td>
</tr>
<tr>
<td>100</td>
<td>25</td>
<td>11.5</td>
<td>4.1</td>
<td>8.7</td>
<td>2.9</td>
<td>1</td>
</tr>
<tr>
<td>95</td>
<td>25</td>
<td>12.8</td>
<td>6.1</td>
<td>9.4</td>
<td>4.1</td>
<td>3.8</td>
</tr>
<tr>
<td>90</td>
<td>25</td>
<td>14.1</td>
<td>8.1</td>
<td>10.3</td>
<td>5.3</td>
<td>4.8</td>
</tr>
<tr>
<td>80</td>
<td>25</td>
<td>16.4</td>
<td>11.6</td>
<td>12.1</td>
<td>8.0</td>
<td>6.8</td>
</tr>
<tr>
<td>60</td>
<td>25</td>
<td>20.1</td>
<td>17.5</td>
<td>16.4</td>
<td>14.0</td>
<td>11.2</td>
</tr>
</tbody>
</table>

This model assumes 100% ANC attendance and ART initiated when CD4 count <200 cells per milliliter.

To achieve < 5% MTCT
Bridging the Divide between the Trial and Real-life Setting

- Every existing / new drug
- Every model for prevention or treatment

….is “hostage” to our limited ability to implement and scale up what we know will work
Thank You

Pierre Barker
Wendy Mphatswe

Nigel Rollins

Wafaa El-Sadr
Elaine Abrams