Success of PMTCT of HIV

TasP Workshop
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Mother to Child Transmission (MTCT) of HIV-1 Globally

- ~1.5 million HIV-infected women deliver annually
- 260,000 children newly infected with HIV-1 in 2012
  - Nearly 90% of new pediatric infections occur in sub-Saharan Africa
  - <200 new perinatal infections in the US annually
Rate and Timing of MTCT, in Absence of Intervention

- **Pregnancy**: 5-10%
- **Labor and Delivery**: 10-15%
- **Breastfeeding**: 5-20%

Infection risk with no intervention:
- 20-25% MTCT without BF, 35-40% with BF, in absence of intervention
Maternal Plasma HIV-1 RNA Level is the Most Important Determinant of Transmission

- Transmission still possible (0.1%) among women taking HAART with HIV-1 RNA <50 cp/mL
- Even with low viral load, lower risk of MTCT when antiretrovirals used (1%) vs. no antiretrovirals (10%)
Most Transmission and Maternal Mortality Occur in Mothers with CD4<350 cells/mm³, With No HAART

*Kuhn, AIDS 2010, Zambia*

92% of maternal deaths
88% of postnatal infections

Percent Transmission

- **In Utero**
- **Intrapartum-Early Postpartum**
- **Postpartum**
More Potent Antiretroviral Regimens Are Associated with Lower Perinatal Transmission

Women & Infants Transmission Study, 1990-1999 (formula feeding!)
Cooper E et al. JAIDS 2002;29:484-94
## Longer Antepartum HAART Associated With Less MTCT

MTCT 2000-2006 in 5,930 HIV+ Women, UK / Ireland

<table>
<thead>
<tr>
<th>Prophylaxis</th>
<th>MTCT</th>
<th>Adjusted Odds Ratio (for mode delivery, sex, viral load)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAART with NNRTI</td>
<td>0.9%</td>
<td>1.31 (0.6-2.8) p=0.48</td>
</tr>
<tr>
<td>HAART with PI</td>
<td>1.1%</td>
<td></td>
</tr>
<tr>
<td>HAART at conception</td>
<td>0.1%</td>
<td>0.18 (.02-1.3) p=0.09</td>
</tr>
<tr>
<td>HAART during pregnancy</td>
<td>1.3%</td>
<td></td>
</tr>
<tr>
<td>HAART Elective CS</td>
<td>0.7%</td>
<td></td>
</tr>
<tr>
<td>HAART Planned vaginal</td>
<td>0.7%</td>
<td>P=0.15</td>
</tr>
<tr>
<td>AZT Elective CS (N=464)</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

- Each additional week of HAART associated with 10% reduction in MTCT risk (adjusted p=0.007)
Antiretroviral Prophylaxis and 4-6 Week MTCT Rates in Clinical Trials, Africa and Thailand

<table>
<thead>
<tr>
<th>Treatment</th>
<th>MTCT Rate</th>
</tr>
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<tbody>
<tr>
<td>None</td>
<td>36.7%</td>
</tr>
<tr>
<td>Short ZDV 100% BF</td>
<td>16.5%</td>
</tr>
<tr>
<td>SD NVP 100% BF</td>
<td>13.1%</td>
</tr>
<tr>
<td>Short ZDV+sdNVP 50% BFCote</td>
<td>6.5%</td>
</tr>
<tr>
<td>Short ZDV+sdNVP 50% BF Bots</td>
<td>3.7%</td>
</tr>
<tr>
<td>Short ZDV+sdNVP NO BF, Thai</td>
<td>1.9%</td>
</tr>
<tr>
<td>HAART, 100% BF Botswana</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

98% reduction in MTCT in BF infants, Botswana
In 2009, UNAIDS called for “virtual elimination” of MTCT by 2015—i.e., >90% reduction in MTCT (<5% transmission to all HIV-exposed infants and <2% to replacement-fed infants), with >90% of pregnant HIV-infected women receiving ARVs.

So how well are we doing in implementing PMTCT?
Cascade of Events Negotiated by HIV-Infected Mothers and Their Infants, 4 African Countries

E. Stringer JAMA 2010

Only 51% of HIV-exposed infants prophylaxed with antiretrovirals

Elimination of MTCT will require near-universal HIV testing and >95% coverage with ARVs
62% of HIV-infected pregnant women received “effective” antiretrovirals during pregnancy (excluding sdNVP alone).
Botswana PMTCT Program—Success Story

- First country in Africa to provide free nationwide PMTCT program in 2000
- Universal ART (option B) introduced in 2011
- In 2013:
  - 99% of pregnant women tested for HIV
  - 96% of HIV-infected received ARVs during pregnancy (55% ART, 36% TAP, 5% AZT)
  - Estimated MTCT rate 2.5% (down from 36%)
35% decline in MTCT since 2009 (from 26% to 17% estimated MTCT); 52% decline in MTCT since 2001
Even if 90% of pregnant HIV+ women receive ART/TAP during pregnancy and BF (40% before pregnancy, 50% starting during pregnancy), MTCT projected to be only 83% lower than in 2009
WHO Guidelines 2013

- Triple ARVs for ALL pregnant/breastfeeding women (option B)
- Lifelong ART regardless of maternal CD4 (Option B+) also recommended (“conditional”, for programmatic, operational, and health reasons)
- >20 countries moving to option B+
  - Rwanda (B)
  - Botswana (B)
  - Malawi (B+)
  - South Africa (A→B)
  - Kenya (A→B+)
  - Uganda (A→B+)
  - Swaziland (A→B+)
  - Haiti (B→B+)
Option B+ Rollout, Malawi

- In 2011, Malawi rolled out B+ -- decentralized, 4839 HCW trained, task shifting in ART start, no labs
- 1 year after implementation, the number of pregnant and breastfeeding women started on ART increased by 748%
- 87% of all known HIV+ women on ART

15% of women declined ART (fears around disclosure/side effects; religious reasons)

Kim CROI 2014

MMWR, March 1, 2013
Women starting ART in Q3 2011: 77% remained on ART at 12 months, 23% lost, stopped or died.

- Retained on ART: 2,267 (77%)
- Other: 682 (23%)
- Lost to follow up: 639 (94%)
  - Stopped ART: 19 (3%)
  - Died: 24 (3%)
PMTCT represents a remarkable biomedical and programmatic success, despite remaining challenges.

Some differences between PMTCT and TasP:

- Women/families highly motivated to protect baby
- Option B does not require lifelong commitment of mother to ART
- However, ART for PMTCT has additional challenges: non-integrated care (often); need to prophylax and test baby

PMTCT can help inform TasP efforts but provides reason for only cautious optimism that TasP can achieve the high coverage rates required.
Thank you!