The Contribution of Family Planning towards the Prevention of HIV Mother-to-Child Transmission (PMTCT) in Uganda

Wolfgang Hladik
CDC Uganda

The findings and conclusions in this presentation are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention

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HIV transmission from mother to child (MTCT)

- 2\textsuperscript{nd} largest transmission mode worldwide
- Four PMTCTCT pillars:
  1. HIV prevention in women
  2. Family planning
  3. Anti-retroviral prophylaxis (ARVs)
  4. Care & treatment of HIV+ mothers, children
Pediatric HIV in Uganda

- 120,000-150,000 HIV+ children*
- Pediatric HIV incidence determined by:
  - HIV prevalence in females: 7.5%
  - ARV uptake in pregnant women, newborns (37%, 18%, MOH 2007)
  - Contraceptive prevalence rate (~20%)

*) UNAIDS, 2007
Fertility in Uganda: Among the highest worldwide

Uganda: Annual population growth ~3.5%
Population doubling time ~20 years
Objectives

To estimate effect of
- ARV prophylaxis
- Contraceptive use
- Unwanted fertility
on pediatric HIV disease burden in Uganda

- For the year 2007 (program data)
- For 2008-12 (program and projected data)
Methods – baseline projection

- Mathematical projection using SPECTRUM
  - Demographic software
  - In-built AIDS module
- Baseline projection: estimate burden of pediatric HIV disease (1980-2012)
  - Vertical infections
  - Anti-retroviral treatment (ART) needs
  - Pediatric AIDS deaths
  - AIDS orphans
Key input parameters

Total fertility rate

- 2007: 6.7
- 2008: 6.7
- 2012: 6.5

Perinatal MTCT probability

- No ARVs: 20%
- Nevirapine: 11%
- Dual ARVs: 4%
- Triple ARVs: 2%

MTCT risk by breastfeeding, per month

- Excl., 1-6 mth: 0.8%
- Mixed, 1-6 mth: 1.5%
- Mixed, 6-36 mth: 0.8%

ARV uptake for PMTCT:

- Increases from 33% to 57%

HIV prevalence curve adopted from MoH

- Held stable from 2005-12

- 2007
- 2008
- 2012
Key data sources

- Ministry of Health
  - (PMTCT, cotrimoxazole, ART coverage, HIV prevalence)
- Uganda HIV Sero-Behavioral Survey (2005)
  - (HIV prevalence by age and sex)
- Demographic and Health Survey (2006)
  - (fertility rates, breastfeeding pattern)
- Uganda AIDS Commission
  - (PMTCT data)
- UN Population Division
  - (key demographics)
- In-built Spectrum assumptions
  - (e.g., MTCT probabilities, literature based)
Hypothetical projections

- Used baseline projection to create three hypothetical projections
- Same as baseline except:
  - Projection 1: No ARV-PMTCT
  - Projection 2: No contraceptives (FP)
  - Projection 3: W/o unwanted fertility
- Changes effective from 2007 onwards
Three fertility scenarios

- **No contraceptives**
  - Total fertility: 6.7
  - Year: 2001
  - Total fertility: 8.6
  - Year: 2007
  - Total fertility: 8.3
  - Year: 2011

- **Baseline**
  - Total fertility: 6.7
  - Year: 2005

- **No unwanted fertility**
  - Total fertility: 5.1
  - Year: 2007
  - Total fertility: 6.5
  - Year: 2011

“No ARV-PMTCT” projection: Same TFR as baseline
Data analysis

Compared baseline and hypothetical projections to estimate:

Effect of
- ARV prophylaxis
- Family planning
- Unwanted fertility

- Vertical HIV infections
- ART needs
- Pediatric AIDS deaths
- AIDS orphans
Results
Effects of ARV-PMTCT, FP, unwanted fertility (UF) - 2007

Vertical infections averted / added

Pediatric ART need averted / added

Combined effect of FP and UF (100% access to FP)
Effects of ARV-PMTCT, FP, unwanted fertility (UF) - 2007

AIDS Deaths
averted / added

- ARV: 1,600
- FP: 2,600
- UF: 2,300
- FP+UF: 4,900

AIDS orphans
averted / added

- ARV: -1,800
- FP: 1,000
- UF: 600
- FP+UF: 1,600

ARV-prophylaxis affords HIV-exposed infants survival benefit over their HIV-infected mothers.
Effects of ARV-PMTCT, FP, UF, 2008-2012

**Vertical infections averted / added**

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<thead>
<tr>
<th>ARV</th>
<th>FP</th>
<th>UF</th>
<th>FP+UF</th>
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<tr>
<td>29</td>
<td>36</td>
<td>32</td>
<td>68</td>
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**Pediatric ART need averted / added**

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ARV-PMTCT uptake projected to increase from 33% to 57% by 2012

Note: Values denote 1000s
Effects of ARV-PMTCT, FP, UF, 2008-2012

AIDS deaths
averted / added

ARV-FP-UF-ARV

23 16 14 30

AIDS orphan years
averted / added

ARV-FP-UF-ARV

-55 81 67 148

ARV-PMTCT uptake projected to increase from 33% to 57% by 2012
Note: Values denote 1000s

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Discussion
Study limitations

• ARV-PMTCT uptake for 2009-2012 projections only
  – Larger/smaller uptake >> larger/smaller ARV-related effects

• MTCT probabilities assume both mothers and babies take ARVs
  – Program data suggest half as many newborns take ARVs compared to mothers
Study considerations

- HIV prevalence kept stable 2005-2012
  - *Relative* effect sizes would change little
- Assumption: No difference in FP use and fertility preference by HIV status
  - Literature: HIV+ women have greater FP use, want fewer children
  - FP estimates may be conservative
Conclusion

• Existing FP use prevents as much or more HIV than ARV-PMTCT
  – Every day, FP prevents 20 vertical HIV infections, 9 pediatric AIDS deaths

• Unmet need for FP accounts for approx. 25% of pediatric HIV (2008-12)
Recommendation

• Provide funding for FP services within HIV programs
• Offer FP services to all HIV+ women of reproductive age and partners
• Report FP uptake in PMTCT and other HIV programs
• Measure FP use, preference by HIV status in surveys
Thank you

Paper available at:
www.plosone.org
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Co-authors
John Stover
Godfrey Esiru
Malayah Harper
Jordan Tappero

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