Impact of Option B on mother-to-child HIV transmission in Rwanda: an interrupted time series analysis


29-June-2015
Introduction

- Rwanda’s has a national HIV prevalence of 3%, with higher rates of infection among women of childbearing age.

- In Rwanda’s decentralized health system, PMTCT is delivered by nurses at health centers and is integrated into antenatal care services at nearly all health facilities.
Option B recommends:

- All HIV+ pregnant women start HAART from 14 weeks of gestation through 1 week after cessation of breastfeeding.
- HIV-infected pregnant women with CD4<=350 start HAART for life.
- Infants may take daily NVP or twice-daily AZT from birth until 4 to 6 weeks of age.
Objective

• The impact of WHO PMTCT guideline changes have not been well quantified at the national level

• This study aims to evaluate the impact of adopting Option B on mother-to-child HIV transmission in Rwanda
• TRACNET was established by Rwanda’s Treatment and Research AIDS Centre (TRAC) and had been operating since September 2004 till July 2014.

• Data Managers on the health facility level report aggregated data on monthly basis.

• Indicators collected in TRACNET include those related to HIV prevention (VCT, PTMTCT, Male Circumcision) and Care and treatment (ARV)
Methods: sampling facilities

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of facilities in Rwanda offering PMTCT services in a given year</th>
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<tbody>
<tr>
<td>2002</td>
<td>11</td>
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<tr>
<td>2005</td>
<td>209</td>
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<tr>
<td>2010</td>
<td>382</td>
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<tr>
<td>2011</td>
<td>412</td>
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<tr>
<td>2012</td>
<td>467</td>
</tr>
<tr>
<td>2013</td>
<td>488</td>
</tr>
<tr>
<td>2014</td>
<td>494</td>
</tr>
</tbody>
</table>

- We limited our study population to facilities that were providing PMTCT services over the entire period of interest (August 2010- July 2014).

- Our study population included HIV-exposed children attending 348 of facilities that had complete reporting on PMTCT outcomes in TRACNET from August 2010 to July 2014.
Methods: 
Interrupted Time Series Analysis

- Interrupted time series (ITS) analysis is used for evaluating effects of intervention or policy

- Strengths include the ability to observe changes resulting from an intervention over a number of data points instead of just two (pre v. post), the ability to model a counterfactual, and fewer threats to validity than other study designs

- Key assumption is that only one policy effect is introduced within the period

- Compare the level and trends in the indicator of interest before and after the policy change
Methods: Interrupted Time Series, cont.

- **No change**
  - Before: intervention
  - After: intervention

- **Level change**
  - Before: intervention
  - After: intervention

- **Trend change**
  - Before: intervention
  - After: intervention

- **Level + trend change**
  - Before: intervention
  - After: intervention
Methods: Outcome

- Created cohorts of patients based on tests/HIV-positive children at 18 months
  - Merged back all tests/HIV-positives for number of positive infants (month of birth+18 months), 6 weeks (month of 6 week test+16 months), 9 months (month of 9 months +9 months)

- **Outcome variable: Rate of HIV transmission at 18 months:**

\[
\frac{\text{Positive tests}_{6\text{weeks}} + \text{Positive tests}_{9\text{months}} + \text{Positive tests}_{18\text{months}}}{\text{Tests}_{6\text{weeks}} + \text{Tests}_{9\text{months}} + \text{Tests}_{18\text{months}}} \times 100
\]
Results

18 months after intervention

Level change after intervention

Trend change after intervention
Results

The trend of mother-to-child HIV transmission at 18 months of age increased throughout the period prior to May 2012 (baseline trend 0.019/100, 95%CI: [-0.003, 0.042], p=0.096).

Following the change in PMTCT guidelines, there was a reduction in both the level (-0.72/100, 95%CI: [-1.08, -0.36, p=0.0003) and the trend (-0.031/100, 95%CI: [-0.052, -0.0096], p=0.0066) in the HIV transmission rate.
Limitations

- Cohorts are based on aggregate data, so some birth misclassification is possible (e.g. same babies may not exactly fall in each time period)

- 6-week positive tests results considered were not confirmed at all facilities, so could have overestimate of trends (although is constant throughout period, so will not change interpretation of level/trend shifts)

- We are looking at the subset of facilities that have provided PMTCT care during the whole period, newer facilities may have different results

- Other interventions occurring at similar time to adoption of option B/B+ may also have contributed to decline in MTCT
Conclusion / Recommendations

• Implementation of WHO PMTCT guideline Option B was associated with a decrease in 18-month transmission rates from HIV infected mother to infants in Rwanda.

• The scale-up of PMTCT and ART care and treatment programs as well as other strategies, including improved adherence and earlier initiation of ART, could also have contributed to the decline in transmission.
Acknowledgements

• Patients and clinicians at study sites

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• Rwanda Biomedical Center

• All partners

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Thank you