Risk of HIV positivity in exposed infants associated with different interventions

Paul E. Okello, BSc Hons, MSc Med. Microbiol, Fellow, Cohort 2016
Background of EID programme

- Aims to diagnose HIV in infants as early as possible
- EID & prompt ART intervention can cut infant mortality by 76% & HIV progression by 75%
- Uganda MoH initiated 2006, high HIV burden
  - 80,000 HIV associated deaths in 2005
  - National prevalence in adult population at 6%
Background of HIV EID and EMTCT

- EMTCT by Option B+ guidelines 10/2012, MoH
- 50,000 new infections in children 2014; MTCT rate of 8%
- In 2015, Uganda met WHO Global Plan target of reducing MTCT by 90% btn 2011-2015 (with EID coverage of 45% 2014, 53% in 2015)
- Data presented of infants born to HIV+ve mothers in 2015
Objectives

- Assess relationship between maternal ARV use and HIV positivity in infants
- Assess relationship between infant ARV use and HIV positivity
- Describe relationship between breastfeeding and HIV positivity in infants
2015 EID data source

- Data obtained with permission from CPHL/UNHLS EID program
- HIV test results from dried blood spot (DBS) specimens of infants tested by HIV-1 DNA PCR
- Data extracted from “EID database,” variables: infant identifier, age, sex, region, infant ARV, antenatal ARV, delivery ARV, breastfeeding status, and HIV test results at PCR1 & PCR2
Infant HIV positivity at 1\textsuperscript{st} testing (PCR1)

% positive

Month 2015
Infant HIV-1 positivity rates (%) at 1st testing by PCR1, 2015

West Nile
Mid Western
Mid Northern
Central-2
Central-1
Kampala

North East
Mid Eastern
East Central

HIV EID indices at CPHL/UNHLS 2015
Positivity rates increase with age of child (PCR1 data)

![Graph showing positivity rates increase with age of child](image-url)
PCR1: 50% of EID tested children are <2 months, n=32,456 (female), n=31,824 (male)

% of children

% Female
% male

Age category (months)
The odds of contracting HIV is about 7 for an infant born to a mother not on life long ART (Option B+) antepartum

<table>
<thead>
<tr>
<th>Antenatal ART status</th>
<th>HIV +ve Child</th>
<th>HIV -ve child</th>
<th>HIV +ve child</th>
<th>HIV-ve child</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n)</td>
<td>(n)</td>
<td>(%)</td>
<td>(%)</td>
<td>AOR  Lower   Upper</td>
</tr>
<tr>
<td>No ARV</td>
<td>420</td>
<td>2,358</td>
<td>15</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>ART life long (Option B+)</td>
<td>868</td>
<td>32,044</td>
<td>3</td>
<td>97</td>
<td>6.58  5.81   7.44</td>
</tr>
</tbody>
</table>
During birth the odds of contracting HIV is about 9 for an infant born to a mother not on life long ART

<table>
<thead>
<tr>
<th>ARV status at delivery</th>
<th>HIV +ve Child (n)</th>
<th>HIV -ve Child (n)</th>
<th>HIV –ve Child (%)</th>
<th>95% CI</th>
<th>AOR</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>No ART</td>
<td>428</td>
<td>2,399</td>
<td>15</td>
<td>85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ART life long</td>
<td>846</td>
<td>29,295</td>
<td>3</td>
<td>97</td>
<td><strong>8.81</strong></td>
<td><strong>7.77</strong></td>
<td><strong>9.99</strong></td>
</tr>
</tbody>
</table>
The odds of contracting HIV is about 8 for an infant not on ARV prophylaxis (Option B+) at 6th week from birth.

<table>
<thead>
<tr>
<th>Infant prophylaxis</th>
<th>HIV +ve (n)</th>
<th>HIV -ve (n)</th>
<th>HIV +ve (%)</th>
<th>HIV -ve (%)</th>
<th>AOR</th>
<th>95% CI Lower</th>
<th>95% CI Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>No ARVs at birth</td>
<td>869</td>
<td>6,031</td>
<td>13</td>
<td>87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily NVP from birth to 6 weeks</td>
<td>788</td>
<td>28,758</td>
<td>3</td>
<td>97</td>
<td>7.62</td>
<td>6.89</td>
<td>8.44</td>
</tr>
</tbody>
</table>
## Breast feeding profiles

For all tested children by PCR1 (from 6 weeks) regardless of maternal ART status

<table>
<thead>
<tr>
<th>Category</th>
<th>No. of Children</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast feeding</td>
<td>56,486</td>
<td>88</td>
</tr>
<tr>
<td>Not breastfeeding</td>
<td>5,247</td>
<td>8</td>
</tr>
<tr>
<td>Unknown</td>
<td>2,404</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>64,137</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Breastfeeding profiles by age groups for children tested by PCR1 and PCR2

Number of children breastfeeding
Number of children not breastfeeding
Percent breastfeeding
Percent not breastfeeding

Age group (months)

Number of children

Percent

HIV EID indices at CPHL/UNHLS 2015
Breastfeeding is protective to infants of mothers on Life long ART

<table>
<thead>
<tr>
<th>Breastfeeding status</th>
<th>HIV+ve child (n)</th>
<th>HIV–ve child (n)</th>
<th>HIV+ve child (%)</th>
<th>HIV-ve child (%)</th>
<th>AOR</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastfeeding</td>
<td>646</td>
<td>21,672</td>
<td>3</td>
<td>97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not breastfeeding</td>
<td>137</td>
<td>1,561</td>
<td>8</td>
<td>92</td>
<td>0.34</td>
<td>0.28</td>
<td>0.41</td>
</tr>
</tbody>
</table>

95% CI
Risk of HIV MTCT is high for breastfeeding infants of mothers ARV naive

<table>
<thead>
<tr>
<th>Breastfeeding status</th>
<th>HIV+ve child (n)</th>
<th>HIV-ve child (n)</th>
<th>HIV+ve child (%)</th>
<th>HIV-ve child (%)</th>
<th>AOR</th>
<th>Lower 95% CI</th>
<th>Upper 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastfeeding</td>
<td>1236</td>
<td>24140</td>
<td>5</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not breastfeeding</td>
<td>292</td>
<td>15484</td>
<td>2</td>
<td>98</td>
<td>2.71</td>
<td>2.39</td>
<td>3.09</td>
</tr>
</tbody>
</table>
Limitations

(i) Missing records were noted in various fields, e.g. age, region, ART status, etc

(ii) Adherence data for mothers and infants on ARV missing; useful in assessing risk of MTCT
Strengths

(i) country wide data collected over one year should be fairly representative of the true HIV picture in infants

(ii) Lab test procedures are guided by rigorous internal QC standards
Conclusions

- EMTCT interventions have a positive impact on MTCT in Uganda
- Life-long ART use by HIV+ve mothers is protective in preventing HIV transmission to infants during pregnancy, birth & breastfeeding
- ARV prophylaxis is protective to infants exposed to HIV
Recommendations

- Investigation into why HIV positivity rises with age of child
- Investigation into why PCR1 test involves children much older than 6 weeks
Acknowledgment

- MoH
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