Bringing the Test to the Patient: Diagnosing and treating more infants, faster

Evaluating point-of-care (POC) testing for pediatric HIV in Eight sub-Saharan African Countries

Flavia Bianchi

AIDS
Amsterdam, NL
July 24, 2018
Overview

• Background
  • Why POC EID?
  • Optimizing EID through strategic placement: EGPAF’s programmatic approach

• Methods: a pre-and post-analysis comparing conventional and POC EID

• Results
  • Key outcomes
  • Hub-and-spoke
  • High-yield entry points
  • Cost per test result returned

• Conclusions
Why POC EID? Challenges with the EID Cascade

Turnaround time from blood sample collection to return of results to caregiver: 30-90 days

Implementing POC EID in Routine Clinical Care: EGPAFs’ Approach

- Bringing the test closer to the client in nine project countries
- Pragmatic placement of POC platforms and implementation based on current resources and human resources
- Phased approach – started with a 6 month pilot period
- Maximize access to POC EID testing through hub-and-spoke models and multiple entry points
Strategies Used to Increase Access to Testing

**Stand-Alone Sites**
Receive samples directly from clients and perform POC EID tests on site.

**Hub-and-Spoke Networks**
Hub sites provide testing for patients at that site and for spoke sites. Nearby spoke sites send samples to the hub sites for testing.

**Multiple-Entry-Point Sites**
Stand-alone or hub testing sites receive samples from different units or wards within the same health facility.
**EGPAF POC EID Project: Evaluation Methods**

*Pre-intervention data – Conventional EID*
- Retrospectively collected for 30 consecutive HIV-exposed infants who had a sample collected in 8 project countries
- Data collected from facility registers from a subset of intervention sites
- Purposive sampling of sites (up to 20 sites per country)
- **Sample: 2,899 tests from 2,875 HIV-exposed infants from 96 sites**

*Post-intervention data – POC EID*
- Collected prospectively in all POC EID sites in 8 project countries
- **Sample: 19,071 tests from 18,220 HIV-exposed infants**
- Presenting data collected until December 31, 2017 from 339 sites, including 106 testing sites and 233 spoke sites.
## Evaluation Results: Conventional vs. POC EID

<table>
<thead>
<tr>
<th>Evaluation Category</th>
<th>Conventional EID</th>
<th>POC EID</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median TAT from blood sample collection to result returned to caregiver (IQR)</td>
<td>55 days (31-77)</td>
<td>0 days (0-1)</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Results received by caregiver within 30 days</td>
<td>18.7% (542/2,899)</td>
<td>98.3% (18,737/19,058)</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Percent of HIV-infected infants started on ART within 60 days of sample collection</td>
<td>43.3% (42/97)</td>
<td>92.3% (639/692)</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Median TAT from blood sample collection to ART initiation for HIV-infected infants</td>
<td>49 days (30-68)</td>
<td>0 days (0-3)</td>
<td>p&lt;0.001</td>
</tr>
</tbody>
</table>
## Evaluation Results: Testing vs. Spoke Sites

<table>
<thead>
<tr>
<th></th>
<th>Testing Sites (n = 106)</th>
<th>Spoke Sites (n = 233 )</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of infants tested</td>
<td>13,070</td>
<td>5,155</td>
<td>---</td>
</tr>
<tr>
<td>Number of EID tests</td>
<td>13,673</td>
<td>5,398</td>
<td>---</td>
</tr>
<tr>
<td>Median TAT from blood sample collection to result returned to caregiver (IQR)</td>
<td>0 days (0-0)</td>
<td>2 days (1-7)</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Results received by caregiver within 30 days</td>
<td>99.4% (13,591/13,667)</td>
<td>95.5% (5,146/5,391)</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Percent of HIV-infected infants started on ART within 60 days</td>
<td>91.9% (488/532)</td>
<td>94.4% (151/160)</td>
<td>p=0.270</td>
</tr>
<tr>
<td>Median TAT from blood sample collection to antiretroviral therapy initiation for HIV-infected infants (IQR)</td>
<td>0 days (0-1)</td>
<td>3 days (1-5)</td>
<td>p&lt;0.001</td>
</tr>
</tbody>
</table>
## Evaluation Results: High-yield Entry Points

<table>
<thead>
<tr>
<th>Entry Point</th>
<th>Infants Tested (% of all infants tested)</th>
<th>HIV-infected infant percent</th>
<th>Percent of HIV-infected infants started on antiretroviral therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMCT</td>
<td>15,493 (85.4%)</td>
<td>3.2% (494/15,493)</td>
<td>95.1% (470/494)</td>
</tr>
<tr>
<td>Maternity</td>
<td>1,078 (5.9%)</td>
<td>1.1% (12/1,078)</td>
<td>66.7% (8/12)</td>
</tr>
<tr>
<td>Pediatric Inpatient</td>
<td>526 (2.9%)</td>
<td>15.2% (80/526)</td>
<td>86.3% (69/80)</td>
</tr>
<tr>
<td>Vaccination</td>
<td>412 (2.3%)</td>
<td>2.9% (12/412)</td>
<td>83.3% (10/12)</td>
</tr>
<tr>
<td>Outpatient</td>
<td>265 (1.5%)</td>
<td>17.7% (47/265)</td>
<td>87.2% (41/47)</td>
</tr>
</tbody>
</table>
Cost Per Test Result Returned

- Price of diagnostic technologies is a key consideration for national programs, implementers, and funders.

- Total cost of ownership includes: reagents, controls and other consumables, costs of equipment, logistics, basic training, and service and maintenance costs.

<table>
<thead>
<tr>
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<th>Conventional</th>
<th>POC (current throughput)</th>
<th>POC (optimal throughput)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost of ownership*</td>
<td>$24.25 ($17.50-31.00)</td>
<td>$37.20 ($31.95-42.47)</td>
<td>$26.75 ($21.00-32.50)</td>
</tr>
<tr>
<td>Cost per result returned in 30 days (range)</td>
<td>$131.02 USD ($96.26-$165.76)</td>
<td>$37.89 USD ($32.54-$43.25)</td>
<td>$27.24 USD ($21.39-$33.10)</td>
</tr>
<tr>
<td>Cost per result returned in 3 months (range)</td>
<td>$38.89 USD ($28.57-$49.21)</td>
<td>$37.51 USD ($32.21-$42.81)</td>
<td>$26.97 USD ($21.17-$32.76)</td>
</tr>
</tbody>
</table>

*https://www.theglobalfund.org/media/5765/psm_viralloadearyinfantdiagnosis_content_en.pdf
Conclusions

• POC resulted in significantly improved EID outcomes when compared with conventional EID:
  • Four times more likely for results to be returned to caregiver within 30 days with POC
  • Twice as likely for HIV-positive infants to be initiated on treatment within 60 days using POC
  • HIV-positive infants more likely to be initiated on treatment on the same day as blood sample collection
• Hub-and-spoke model successfully extends access to POC EID, without compromising care.
• POC EID is cost-effective: a worthy investment

*Important real-world evidence that POC is a critical tool to closing the diagnostic gap in ensuring quality and effective EID.*
Acknowledgements

Authors: Flavia Bianchi, Rhoderick Machekano, Jean-Francois Lemaire, Emma Sacks, Rebecca Bailey, Valery Nzima, Patricia Fassinou, Anafi Mataka, Collins Odhiambo, Addmore Chadambuka, Gcinile Nyoni, Manuel Carlos Sabonete, Gilles Francois Ndayisaba and Jennifer Cohn. *The authors have no conflicts of interest to declare*

*The Elizabeth Glaser Pediatric AIDS Foundation and the POC EID Project Team acknowledge and thank the mothers, fathers and caregivers who brought their infants in for testing at our intervention clinics. Without them, this work would not be possible.*

**Thank You**

For more information visit: [http://www.pedaids.org/pocdashboard](http://www.pedaids.org/pocdashboard)