PEPFAR Watch
Testing in COP23
Introduction
HIV Testing in COP23

Agenda

- Intro - Anna Grimsrud
- Recency Testing and Index Testing - Brian Honermann
- Pediatric Testing - Asia Russell
- Questions and way forward - all
Testing Trends

HIV Tests Conducted with PEPFAR Support

HIV Positive Test Results with PEPFAR Support
**Testing Services:**

- **CXCA_SCRN:** # of women screened for cervical cancer
- **HTS_INDEX:** # of individuals identified and receiving HIV testing through index testing services *(Partially PUBLIC)*
- **HTS_RECENT:** # of newly diagnosed individuals tested with an HIV recency assay
- **HTS_SELF:** # of HIV self-test kits distributed
- **HTS_TST:** # of individuals tested for HIV and receiving their results
- **HTS_TST_POS:** # of individuals newly testing positive for HIV
- **OVC_HIVSTAT:** % of OVC with documented HIV status
- **PMTCT_EID:** # of infants tested for HIV in early infant diagnosis programs
- **PMTCT_FO:** % of infants with documented final HIV status that were part of a birth cohort *(NOT PUBLIC)*
- **PMTCT_HEI_POS:** # of infants (<12 months) diagnosed HIV positive
- **PMTCT_STAT:** # of pregnant women tested for HIV
- **TB_STAT:** % of TB patients tested for HIV
Setting Targets for COP23 / COP24

- Reducing HTS modality targets

Previously:
- Targets set for granular testing modalities with little strategic significance

Problem:
- Highly intensive to set targets for each modality
- The quality of the targets set is very poor as we don’t have data to justify that level of precision

Now:
- Reducing the overall number of modalities
Changing the Culture of Index Testing
Index testing (aka partner notification or contact tracing): is a case-finding approach that focuses on eliciting the sexual or needle sharing partners and biologic children of HIV-positive individuals and offering them HIV testing services.
Index Testing

Become a cornerstone of HIV Testing strategies for PEPFAR over the past few COP cycles.

Of all new HIV diagnoses in 2021:

- Overall: ~23%
- Tanzania: ~56%
- Kenya: ~26%
- Zambia: ~49% of all new HIV diagnoses
Index Testing

How we got here with index testing

- In COP18 and COP19, PEPFAR began aggressively pushing index testing as THE testing modality for identifying new positives.
- High - and unachievable targets - created huge pressure on implementing partners, facilities, and health care workers to get NUMBERS.
- This pressure was pushed onto clients where some facilities were conditioning services on participation in index testing.
- Years of advocacy and documenting harms have now led to changes in the guidance.

![Figure 6.3.4 HIV case finding approaches supported by PEPFAR, based on ART coverage](image)
Where we are with Guidance

COP 2022 Guidance substantially improved the LANGUAGE around index testing. COP 2023 Draft Guidance (now in the Technical Considerations) has not substantially changed.

Most importantly, targets for index testing have been changed to ONLY be about offer of index testing, not proportion of positives identified through index testing over other modalities.

Minimum Standards for Conducting Safe and Ethical Index Testing Services

- **Index testing services should always be voluntary.** Index testing is a completely voluntary service offered to PLHIV to support them in getting their partner(s) and children tested for HIV. Index testing should always be client-centered and focused on the needs and safety of the index client and their sexual partner(s), needle-sharing partner(s), and biological children.

- **Informed consent should be obtained prior to the elicitation interview and before contacting partners.** Informed consent (verbal or written) must be obtained from the index client prior to the elicitation interview and before contacting partners, even when individuals are offered the option of anonymously submitting names and contact information for their sexual and needle sharing partner(s).

- **The confidentiality of the index client and all named contacts should be maintained at all times.** Programs must have confidentiality protections in place prior to the start of index testing services, including safe storage of client-level data. The identity of the index client should never be revealed and no information about partners should be conveyed back to the index client.

- **All index clients should be assessed for intimate partner violence and offered first line support if they disclose violence.** A risk assessment for intimate partner violence (IPV) should be

- **All index testing programs should institute an adverse event monitoring and reporting system.** Index testing programs must institute a robust mechanism for detecting, monitoring, reporting, and following up on any adverse events associated with index testing services. At a minimum,
BUT - Changing the PRACTICE of Index Testing will require more!

Health care workers already have practices in place. Community monitoring has consistently found significant problems in protecting patients rights!

Just saying, “safe and ethical index testing” will not make index testing implementation safe and ethical!
BUT - Changing the PRACTICE of Index Testing will require more!

Health care workers already have practices in place. Community monitoring has consistently found significant problems in protecting patients’ rights! Just saying, “safe and ethical index testing” will not make index testing implementation safe and ethical!
BUT... Changing the PRACTICE of Index Testing will require more!

Health care workers already have practices in place. Community monitoring has consistently found significant problems in protecting patients rights! Just saying, "safe and ethical index testing" will not make index testing implementation safe and ethical!
A minimum requirement and part of the process of index testing requires active follow-up and reporting of adverse events from index testing.

Adverse Event Monitoring Systems

All index testing programs should institute an adverse event monitoring and reporting system. Index testing programs must institute a robust mechanism for detecting, monitoring, reporting, and following up on any adverse events associated with index testing services. At a minimum, this adverse event system should include site-level monitoring as well as opportunities for individuals to provide anonymous feedback (e.g., drop boxes, hotlines, etc.). Where resources allow, programs should include CLM activities as part of their adverse event monitoring systems. All reports of serious or severe adverse events (from site monitoring, community monitoring, and/or client feedback) must be investigated and follow-up steps and actions identified and implemented to prevent similar adverse events from occurring in the future. If an adverse event is determined to be a result of a provider’s failure to abide by the minimum standards for index testing, he or she should immediately stop offering services until they have been re-trained, and the issue or issues have been corrected. Providers should not be allowed to conduct index testing if remediation proves unsuccessful.

Get details on:

- Types of AEMS that facilities have implemented and how many
- How many adverse events have been reported through these systems
- Advocate for more robust systems! Comment boxes are insufficient as patients don’t trust them!
PEPFAR’s GBV Quality Assurance Tool

What is it?

- Tool developed in January of 2018 to assess the quality of GBV services being provided at the facility level.
- Elements of the tool are HIGHLY relevant to how index clients should be treated if they screen positive for IPV during contact solicitation.
- Advocate that the tool be implemented in sites that offer index testing to ensure that referral networks and GBV services are of a quality to support index testing programs.

GBV Quality Assurance Tool:
https://static1.squarespace.com/static/5a29b53af9a61e9d04a1cb10/t/5f087452fa4efb0134eafaab/1594389591515/GBV-QA+tool_Jan+2018.pdf
Improving Pediatric HIV Testing
Pediatrics Emergency

Programs are STILL failing children with HIV and their caregivers

- Only 52% of HIV positive kids on treatment vs. 76% of all adults and 85% of pregnant women (2019);
  - 66% of the HIV+ kids without treatment access are more than 5 years old
- Without treatment, about 50% of kids will die before their second birthday
- Only 37% of HIV positive kids are virally suppressed, compared to 60% of adults
- About 160,000 new HIV infections per year and ~100,000 deaths per year (13.7% of deaths but children are only 4.7% of all HIV+ people)
  - Missed global 2020 goal of only 20,000 new perinatal infections
- High rates of seroconversion during pregnancy and BF calls requires
  - Expanded testing and retesting during PBF
- Only 60% of HIV-exposed infants are tested by two months of age
- Game changing treatment and diagnostics (POC EID, PrEP for HIV negative PBFW, pediatric DTG based combinations) are still out of reach, not at scale
Almost all PEPFAR countries are still failing to reach kids with tests by 2 months of age (draft COP23 technical considerations, p 151)
FY21 data showed that nearly 25% of HIV Exposed Infants had an undocumented final outcome. This is concerning given the above-mentioned high rates of mortality among infants living with HIV who do not receive effective treatment, and the high rates of transmission during breastfeeding.
We are also not doing well on Viral load testing

Figure 6.4.5.2.2: Viral Load Testing Outcomes by Fine Age Band Across PEPFAR in FY21Q4
What challenges are mothers are facing?

**COVID and access to facilities and HIV services.** - Mothers are not able to reach facilities in some countries and they are afraid of COVID and they are being denied service when they do not have masks.

**A lack of access to treatment for themselves and their children** - In some countries the testing for children and mothers is unavailable. There are shortages of testing equipment.

**A lack of knowledge of treatment and treatment literacy** - Most countries stopped providing treatment literacy when COVID re

**No access to point of care infant diagnosis and VL** - most of the labs are far from mothers, the results take a long time to get back to mother and caregivers and some samples are rejected making mothers have to repeat test that have already taken along time

**A lack of access to optimal child friendly ARVs** - pediatric DTG roll out has been slow, with children still not receiving optimal regimens

**Peer support for mothers is minimal** - We need more peer support for mothers at th facilities and at the community to ensure mother remain on treatment.
What we need to advocate for

- Identification of all HIV-infected infants early as possible: Without the initiation of HIV antiretroviral therapy (ART), it is estimated that 35% of HIV-infected infants die within the first year of life, and 52% of untreated infants are estimated to die by their second year.

- A scale up plan for EID testing to ensure at least 95% of HEI are tested by age 2 months.
What we need to advocate for

- Adoption of recommendations from the WHO, published in 2021 that include consideration of a nucleic acid test (NAT) at birth (‘birth testing’) and introduction of point-of-care (POC)/near POC NAT tests. To ensure comprehensive and timely diagnosis in newborns, programs must consider using POC testing to complement laboratory-based platforms in support of EID and VL testing in pregnant and breastfeeding women. This is especially important in countries with long turnaround time (>7 days) for results to caregivers. POC testing for EID and VL could make results available for patient management within hours of specimen collection.
What we need to advocate for

- **Immediate ARV therapy must be available** for infants with positive birth or POC testing. **Rapid policy adoption and procurement of optimal pediatric ART regimens must continue to be a priority for all countries.** Pg 356

DTG is superior due to its high barrier to resistance, higher rates of VL suppression, shortened duration to achieve viral suppression, ability to be used in children on TB treatment, cost-effectiveness, palatability, minimal side effect profile, and allowance for once-daily dosing.

In 2021, WHO released updated pediatric DTG dosing guidelines for pediatric DTG 10 mg formulations, an updated optimal formulary for pediatric ARVs and implementation guidance for transitioning to optimal pediatric HIV regimens.

The guidance encourages **rapid programmatic transition to DTG-based regimens for ALL children (at least 4 weeks old and 3 kg) new to ART and established on ART (first line or second line) irrespective of their current regimen.**

- As stated in WHO’s 2021 guidelines update, **this single switch can and should occur irrespective of the availability of a VL test/result or the value of the latest VL result,** while maintaining or optimizing children on an ABC/3TC backbone.

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**Figure 6.4.1.2.1:** DTG is a component of the preferred first line ARV regimens in WHO guidance.

**Table 1. Summary of preferred and alternative first-line ART for neonates and children**

<table>
<thead>
<tr>
<th></th>
<th>Neonates</th>
<th>Children</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preferred</strong></td>
<td>AZT+3TC+RAL&lt;sup&gt;a&lt;/sup&gt;</td>
<td>ABC + 3TC + DTG</td>
</tr>
<tr>
<td><strong>Alternatives</strong></td>
<td>AZT+3TC+NVP</td>
<td>ABC + 3TC + LPV&lt;sup&gt;r&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>TAF&lt;sup&gt;c&lt;/sup&gt; + 3TC (or FTC) + DTG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ABC + 3TC + RAL&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>Special circumstances&lt;sup&gt;d&lt;/sup&gt;</strong></td>
<td>AZT+3TC+LPV&lt;sup&gt;r&lt;/sup&gt;&lt;sup&gt;b&lt;/sup&gt;</td>
<td>ABC + 3TC + EFV&lt;sup&gt;r&lt;/sup&gt; (or NVP)&lt;sup&gt;r&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AZT + 3TC + EFV&lt;sup&gt;r&lt;/sup&gt; (or NVP)&lt;sup&gt;r&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AZT + 3TC + LPV&lt;sup&gt;r&lt;/sup&gt; (or RAL)</td>
</tr>
</tbody>
</table>

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<sup>a</sup> RAL, Rilpivirine; <sup>b</sup> LPV<sub>r</sub>, Lopinavir; <sup>c</sup> TAF, tenofovir alafenamide; <sup>d</sup> For children with severe adverse events on ART backbone.
Recency Testing
Recency Testing:

- Tests whether an individual acquired HIV “recently”.
- Depending on test, could be within the past 6-months or past 12-months
- Result is Yes/No - Nothing more specific than yes or no.
Four Potential Testing Outcomes:

1. **True Recent**: Individual infected <6mo/1yr **correctly identified** as recent
2. **False long-term**: Individual infected <6mo/1yr **incorrectly identified** as long-term
3. **True Long-term**: Individual infected >6mo/1yr **correctly identified** as long-term
4. **False Long-term**: Individual infected >6mo/1yr **incorrectly identified** as recent

Source: Modified from CEPHIA AsantéTM HIV-1 Rapid Recency® Assay Evaluation Report
At 6 months, ~50% of individuals with truly recent infections will be identified as “recent”.

At 12 months, ~30% of individuals with truly recent infections will be identified as “recent”.

Source: Modified from CEPHIA AsantéTM HIV-1 Rapid Recency® Assay Evaluation Report
RITA: Recent Infection Testing Algorithm

Sequential testing to confirm recent infection

- VL Testing: Generally <=1,000 copies
- CD4 Count: Generally <= 200
- Clinical Records: Prior ART use
- ARV Testing: Blood metabolites
- AIDS Defining Illness: Indicative of long-term infections

**Figure 2. Recent Infection Testing Algorithm (RITA) Typical Sequence**

1. HIV Positive Testing Pool
2. LAg Tested
3. LAg Recent (ODn < 1.5)
   - RITA-1 Recent (VL > 1,000)
   - RITA-1 Long-term (VL < 1,000)
4. RITA-2 Recent (Varies)
   - RITA-2 Long-term (Varies)

RITA-1: RITA consisting of LAg (EIA or RTRI) + viral load confirmation; RITA-2: RITA consisting of RITA-1 + any additional RITA confirmatory testing or verification.
Performance Characteristics of LAg

Different RITA methodologies find different re-classification rates post viral load testing.

Reclassification rates likely to be highly variable based on testing behaviors (re-testing, re-engagement in care, testing recruitment strategies).

Broadly, range of reclassification based on RITA beyond VL is 4 - 27%.

<table>
<thead>
<tr>
<th>COUNTRIES INCLUDED IN STUDY</th>
<th>RECENT ASSAY</th>
<th>RITA-2 ALGORITHM</th>
<th>LAg TESTED</th>
<th>LAg RECENT POSITIVE</th>
<th>RITA-1 POSITIVE (VL ONLY)</th>
<th>RITA-2 POSITIVE</th>
<th>LAg FRR (RITA-1)</th>
<th>RITA-1 FRR</th>
<th>LAg FRR (RITA-2)</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameroon, Cote d’Ivoire, Eswatini, Ethiopia,</td>
<td>HIV-1 LAg-Avidity EIA (plasma)</td>
<td>RITA-2: RITA-1+</td>
<td>23,887</td>
<td>2,450</td>
<td>357</td>
<td>301</td>
<td>85.4%</td>
<td>15.7%</td>
<td>87.71%</td>
<td>Voetsch, et. al. (AIDS)</td>
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<tr>
<td>Kenya</td>
<td>Maxim HIV-1 LAg DBS EIA (DBS)</td>
<td>ARV speutonary</td>
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<tr>
<td>Zimbabwe</td>
<td>Maxim HIV-1 LAg-Avidity EIA</td>
<td>NA</td>
<td>313</td>
<td>49</td>
<td>33</td>
<td>32.7%</td>
<td></td>
<td></td>
<td></td>
<td>Rice, et. al. (IJAS)</td>
</tr>
<tr>
<td>China</td>
<td>Beijing Kinghawk LAg- EIA (DBS)</td>
<td>RITA-2: RITA-1+</td>
<td>1,152</td>
<td>205</td>
<td>174</td>
<td>145</td>
<td>15.1%</td>
<td>16.7%</td>
<td>29.27%</td>
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<td></td>
<td></td>
<td>CD4 &gt; 200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zhu, et. al. (IJID)</td>
</tr>
<tr>
<td>Ireland</td>
<td>Sedia HIV-1 LAg-Avidity EIA</td>
<td>RITA-2: RITA-1+</td>
<td>508</td>
<td>128</td>
<td>66</td>
<td>48</td>
<td>48.4%</td>
<td>27.3%</td>
<td>62.50%</td>
<td>HSE Health Protection</td>
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<td></td>
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<td>Clinical records,</td>
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<td></td>
<td>Surveillance Centre</td>
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<tr>
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<td>CD4 &gt; 200,</td>
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<td>illness, PEP use</td>
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<tr>
<td>Malawi</td>
<td>Asanté HIV-1 Rapid Recency</td>
<td>NA</td>
<td>9,162</td>
<td>556</td>
<td>304</td>
<td>NA</td>
<td>45.3%</td>
<td></td>
<td></td>
<td>Telford, et. al. (MMWR)</td>
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<td>Rwanda</td>
<td>Assent HIV-1 Rapid Recency</td>
<td>NA</td>
<td>7,919*</td>
<td>753</td>
<td>479</td>
<td>NA</td>
<td>36.4%</td>
<td></td>
<td></td>
<td>RWibasra, et. al. (PLoS One)</td>
</tr>
</tbody>
</table>
Visual reading of the Asante LT line has been shown to be inconsistent in the field.

- Uganda Validation Study: 72% concurrence

**Table 2: Results from Testing of the ≤6 Months Seroconverter Samples**

<table>
<thead>
<tr>
<th>Axante test strip result</th>
<th>RHSP</th>
<th>UVRI</th>
<th>p^a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent (sensitivity)</td>
<td>27/85 (31.8)</td>
<td>42/85 (49.4)</td>
<td>.048</td>
</tr>
<tr>
<td>Long-term infected</td>
<td>55/85 (64.7)</td>
<td>39/85 (45.9)</td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>3/85 (3.5)</td>
<td>4/85 (4.7)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>85</td>
<td></td>
</tr>
</tbody>
</table>

^aFisher exact p-value for comparison of recency results between laboratories.

Source: Galiwango, etc al., *Short Communication: Validation of the Asante HIV-1 Rapid Recency Assay for Detection of Recent HIV-1 Infections in Uganda*, AIDS RESEARCH AND HUMAN RETROVIRUSES Volume 37, Number 12, 2021
Visual reading of the Asante LT line has been shown to be inconsistent in the field.

- Uganda Validation Study: 72% concurrence
- Malawi DREAMS ANC Assessment: Between 70 - 80% concurrence

Two Important notes:

- Importantly, RITA utilizing viral load <1,000 to detect re-testing does NOT require the recency assay.
- Likely detects only a small subset of retesters - those testing while actively on ART. Will not pick up those cycling in and out of care, etc.
Applying Sample Sizes in Context - Geographic Analyses

Stats on Eswatini’s HIV testing program
- Total new HIV diagnoses (HTS_POS):
  - 2019: 21,730
  - 2020: 17,113
  - 2021: 11,926
  - 2022: 4,375 (through Q2. Target of 8,111)

- Number of Sites reporting any HTS_POS over past 4 quarters:
  - 208 Sites*
  - Average HTS_POS per quarter: 16
  - Median HTS_POS per quarter: 7

- Average RTRI Recency Rate (2020Q4 - 2022Q2): 7.28%

### Facility level New HIV Diagnoses (2021 Q2 - 2022 Q2)

<table>
<thead>
<tr>
<th>Facility</th>
<th>HTS_POS</th>
<th>Avg Quarter</th>
<th>RTRI Recent</th>
<th>RTRI LT</th>
<th>Recency Rate</th>
<th>Difference from Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hhohho</td>
<td>5,263</td>
<td>752</td>
<td>485</td>
<td>512</td>
<td>9.46%</td>
<td>+2.18%</td>
</tr>
<tr>
<td>Lubombo</td>
<td>3,269</td>
<td>467</td>
<td>248</td>
<td>3,446</td>
<td>7.20%</td>
<td>-0.09%</td>
</tr>
<tr>
<td>Manzini</td>
<td>3,771</td>
<td>539</td>
<td>188</td>
<td>2,182</td>
<td>8.62%</td>
<td>+1.33%</td>
</tr>
<tr>
<td>Shiselweni</td>
<td>8,706</td>
<td>1,243</td>
<td>524</td>
<td>9,076</td>
<td>5.77%</td>
<td>-1.51%</td>
</tr>
</tbody>
</table>

### Hhohho (2020Q4 - 2022Q2):
- HTS_POS: 5,263
- Avg Quarter: 752
- RTRI Recent: 485
- RTRI LT: 5,125
- Recency Rate: 9.46%
- Difference from Base: +2.18%

### Lubombo (2020Q4 - 2022Q2):
- HTS_POS: 3,269
- Average Quarter: 467
- RTRI Recent: 248
- RTRI LT: 3,446
- Recency Rate: 7.20%
- Difference from Base: -0.09%

### Manzini (2020Q4 - 2022Q2):
- HTS_POS: 8,706
- Avg Quarter: 1,243
- RTRI Recent: 524
- RTRI LT: 9,076
- Recency Rate: 5.77%
- Difference from Base: -1.51%

### Shiselweni (2020Q4 - 2022Q2):
- HTS_POS: 3,771
- Avg Quarter: 539
- RTRI Recent: 188
- RTRI LT: 2,182
- Recency Rate: 8.62%
- Difference from Base: +1.33%

### Source:
Pepfar Panorama Spotlight
Applying Sample Sizes in Context - Age / Sex

Quarterly Analysis of Age / Sex Data:

- Doing Age / Sex / Geographic grouping analysis cuts data even smaller
Modeling Recency Data - Standard Power Analysis

Additional factors that are not accounted for here:

- Intra-reliability of field implementation of RTRI
- Programmatic biases resulting from different testing programs, recruitment strategies, etc
- Potentially different rates of re-testing in different localities.

### Table 3: Sub-population/Geographic Sample Size to Detect Recency Rate Increases Adjusted for Assay Sensitivity/Specificity

<table>
<thead>
<tr>
<th>P-Value</th>
<th>RTRI Recency Rate Increase</th>
<th>25% (1.8%)</th>
<th>50% (3.6%)</th>
<th>75% (5.5%)</th>
<th>100% (7.3%)</th>
<th>125% (9.1%)</th>
<th>150% (10.1%)</th>
<th>175% (12.7%)</th>
<th>200% (14.6%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.05</td>
<td></td>
<td>10,574</td>
<td>2,644</td>
<td>1,175</td>
<td>661</td>
<td>423</td>
<td>294</td>
<td>216</td>
<td>166</td>
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<tr>
<td>.10</td>
<td></td>
<td>8,618</td>
<td>2,155</td>
<td>958</td>
<td>539</td>
<td>345</td>
<td>240</td>
<td>176</td>
<td>135</td>
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<tr>
<td>.15</td>
<td></td>
<td>7,452</td>
<td>1,863</td>
<td>828</td>
<td>466</td>
<td>299</td>
<td>207</td>
<td>153</td>
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<td>.20</td>
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<td>6,612</td>
<td>1,653</td>
<td>735</td>
<td>414</td>
<td>265</td>
<td>184</td>
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</tbody>
</table>

### Table 4: Sub-population/Geographic Sample Size to Detect Recency Rate Increases Adjusted for Assay Sensitivity/Specificity and Reclassification Rate

<table>
<thead>
<tr>
<th>P-Value</th>
<th>RTRI Recency Rate Increase</th>
<th>25% (1.1%)</th>
<th>50% (2.1%)</th>
<th>75% (3.2%)</th>
<th>100% (4.3%)</th>
<th>125% (5.4%)</th>
<th>150% (6.4%)</th>
<th>175% (7.5%)</th>
<th>200% (8.6%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.05</td>
<td></td>
<td>14,999</td>
<td>4,625</td>
<td>2,056</td>
<td>1,157</td>
<td>740</td>
<td>514</td>
<td>378</td>
<td>290</td>
</tr>
<tr>
<td>.10</td>
<td></td>
<td>15,077</td>
<td>3,770</td>
<td>1,676</td>
<td>943</td>
<td>604</td>
<td>419</td>
<td>308</td>
<td>236</td>
</tr>
<tr>
<td>.15</td>
<td></td>
<td>13,036</td>
<td>3,259</td>
<td>1,449</td>
<td>815</td>
<td>522</td>
<td>363</td>
<td>267</td>
<td>204</td>
</tr>
<tr>
<td>.20</td>
<td></td>
<td>11,566</td>
<td>2,892</td>
<td>1,286</td>
<td>723</td>
<td>463</td>
<td>322</td>
<td>237</td>
<td>181</td>
</tr>
</tbody>
</table>
Cluster Sizes in Generalized Epidemics
Cluster Sizes in Generalized Epidemics

We do not find large clusters

Zambia – PopART Phylogenetics

Botswana – Ya Tsie

See symposium: ‘HIV cluster sizes in sub-Saharan Africa SA040’ (Recording)

Source: Fraser, C, New Data and Findings Including Phylogenetic Analysis, AIDS 2022
Evidence from genomic analysis of HIV Transmissions

80% of transmissions within the same community

75% of transmitters infected >1 year

Highest transmission age group: men 25-39 years

Typical transmission clusters: ~2-3 individuals

“Transmission is driven by many who infect few, not by few who infect many” (Prof Christophe Fraser, Principal Investigator, PANGEA-HIV)

Source: Eaton, J, Precision public health and infectious diseases, AIDS 2022
Blinded by Our Own Data — Recency Testing in PEPFAR

Questions