Early Adherence Patterns Predict Retention Rates in Large ART Cohort in Nigeria

Seema Meloni, PhD, MPH
Harvard School of Public Health
Boston, MA

4 June 2012
Harvard/APIN Program in Nigeria

- Through Bill & Melinda Gates Foundation funding, Harvard has been working with multiple hospitals and prevention programs in Nigeria since 2000

- Established AIDS Prevention Initiative in Nigeria (APIN) as part of Gates Foundation activities

- Track 1.0 PEPFAR funding awarded in early 2004
  - Program enrollment started in mid-2004
  - Years 1-5: Rapid scale-up of HIV prevention, care & treatment activities; built capacity of sites and local partner
  - Years 6-8: Transition to local partner
Started PEPFAR ART activities at 6 tertiary hospitals in 2004 and expanded to a total of 32 ART sites and 64 PMTCT sites

- University of Ibadan College of Medicine
  - 3 Satellites under UCH
  - Adeoylo Maternity Hospital
  - 43 Oyo DOTS Centres

- Sacred Heart Catholic Hospital Lantoro

- Ahmadu Bello University Teaching Hospital

- University of Nigeria Teaching Hospital

- University of Maiduguri Teaching Hospital
  - State Specialist Hospital Maiduguri
  - Nursing Home Maiduguri

- Our Lady of Apostles, Jos
  - Jos University Teaching Hospital
  - 8 Satellite Hospitals, 44 PHCs

- Federal Medical Centre Nguru

- Federal Medical Centre Makurdi

- 68 Nigerian Military Hospital
  - Creek Hospital

- Nigerian Institute for Medical Research
- University of Lagos, College of Medicine
- PHC-Iru Victoria Island

- Lagos University Teaching Hospital
- Mushin General Hospital
- Onikan Women’s Hospital

- Widowcare Abakiliki Ebonyi

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Clinical Program Areas

- Prevention
- HCT
- Adult ART and palliative care services
- Pediatric ART and palliative care services
- PMTCT services
- OVC services
- HIV/TB care
Snapshot: Program Scale-Up

- Cumulative in HIV Care
- Current in HIV Care
- Cumulative on ART
- Current on ART

Graph showing the increase in HIV care and ART from 2004 to 2011.
# Laboratory Infrastructure

<table>
<thead>
<tr>
<th></th>
<th>HIV rapid tests &amp; immunoblot</th>
<th>CBC</th>
<th>Chemistry</th>
<th>CD4-flow</th>
<th>Viral load</th>
<th>Infant PCR</th>
<th>Viral Genotyping</th>
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<tr>
<td>PMTCT satellites</td>
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<td>X</td>
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<td>X</td>
<td>ongoing</td>
<td>ongoing</td>
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</tbody>
</table>
Electronic Medical Records System

- VCT
- Pre-assessment
- Palliative Care
- Visit
- Lab
- Pharmacy

- ARV naïve
- ART ineligible
- ART eligible

- ARV experienced
- ART ineligible
- ART eligible

- Discontinue
- Failure
- Toxicity

- Entry

Harvard PEPFAR Nigeria
Evaluation Overview

- Used EMR data to examine overall discontinue rates in program, with specific focus on loss to follow-up (LTFU)
  - LTFU: ≥60 days since last scheduled pick-up date

- Predictors of LTFU examined using univariate statistics and multivariable modeling
  - Adherence measured using pill refill
As of December 2011, 32.3% were LTFU

Lower rate of loss for experienced vs. naïve patients
Evaluation Cohort

75,750 enrolled on ART 2004-2010

60,082 with no previous ARV treatment history

47,609 with ≥1 year since enrollment on ART
Discontinuation Patterns by Time on Treatment

Overall retention at M6 was 82% and M12 was 75%

Discontinue Category

- Died
- Withdrew
- Transferred
- LTFU

% Patients Discontinued

- M6
- M12
- M18
## Baseline & Demographic Characteristics

<table>
<thead>
<tr>
<th>Predictor</th>
<th>LTFU</th>
<th>Not LTFU</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
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<td>&lt;0.001</td>
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<tr>
<td>Female</td>
<td>33.9%</td>
<td>66.1%</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>40.3%</td>
<td>59.7%</td>
<td></td>
</tr>
<tr>
<td>Median age (years)</td>
<td>34</td>
<td>35</td>
<td>&lt;0.0001</td>
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<tr>
<td>Level of Education</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
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<tr>
<td>None/Primary</td>
<td>28%</td>
<td>72%</td>
<td></td>
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<tr>
<td>Tertiary/Secondary</td>
<td>24%</td>
<td>76%</td>
<td>&lt;0.001</td>
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<tr>
<td>WHO stage</td>
<td></td>
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<td>&lt;0.001</td>
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<tr>
<td>1-2</td>
<td>22%</td>
<td>78%</td>
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<tr>
<td>3-4</td>
<td>27%</td>
<td>73%</td>
<td></td>
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<tr>
<td>Median CD4 count (cells/mL)</td>
<td>125</td>
<td>149</td>
<td>0.0001</td>
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<tr>
<td>Median log viral load (cp/mL)</td>
<td>4.9</td>
<td>4.1</td>
<td>0.0001</td>
</tr>
</tbody>
</table>
Early Adherence Patterns Associated with LTFU by Month 12

- 68% of cohort had ≥95% adherence
- P<0.001

Average Percent Adherence Months 0-3

≥95%  90%-94%  80%-89%  50%-79%  <50%

% LTFU by M12
Factors Associated with LTFU

Model adjusted for age, sex, education level, ART enrollment year, WHO stage and baseline CD4 count, adherence in Months 0-3 remains a significant predictor of LTFU by M12.

<table>
<thead>
<tr>
<th>Early (M0-3) Adherence Rate</th>
<th>Hazard Ratio*</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥95%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>50%-95%</td>
<td>1.46</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>&lt;50%</td>
<td>1.94</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*adjusted model
Conclusions

- Program retention is critical for ART success

- LTFU rates are concerning, particularly in settings where patient loads are high and resources are limited for extra counseling and tracking lost patients

- Easy tools for targeting patients at risk for loss are useful

- We confirmed that early adherence patterns are strong predictors of retention
Acknowledgements

This work was funded, in part, by the U.S. Department of Health and Human Services, Health Resources and Services Administration.

P. Kanki (PI)
J-L. Sankalé
D. Hamel
B. Chaplin
H. Rawizza
A. Dieng-Sarr
G. Eisen
C. Smith
M. O’ Malley
C. Chang
H. Reyes
N. Ulenga
L. Dinic
J. Hosseini
U. Ijeoma
E. Koch
C. Wen
A. Weiss

P. Okonkwo
T. Jolayemi
J. Samuels
E. Ofuche
B. Banigbe
S. Ochigbo
R. Olaitan
P. Akande
T. Oyebode
B. Akinyemi
O. Eberendu
C. O’ Martins
J. Adeola
I. Abbas
A. Obakeye
I. Adewole
D. Olaleye
J. Idoko
S. Sagay
O. Agbaji
O. Idigbe
D. Onwujekwe
C. Okany
R. Nkado
W. Gashau
H. Muktar
J. Abah
C. Chukwuka
S. Akanmu
F. Ogunsola

All our colleagues at the APIN PEPFAR sites in Nigeria

And, most importantly, the patients

This work was funded, in part, by the U.S. Department of Health and Human Services, Health Resources and Services Administration.