Lighthouse Trust’s Innovations for Client-Centered Care: Community-based ART Retention and Suppression (CARES) App
March 8, 2023: Data Use Community
Acknowledgments

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• International Training and Education Center for Health (I-TECH), University of Washington
• I-TECH Malawi
• Medic (Medic Mobile)
• National Institutes for Health
Presentation Overview

• Brief Intro:
  • Differentiated service delivery (DSD) for antiretroviral therapy (ART) care
  • Lighthouse Trust, Lilongwe Malawi
  • Community Health Toolkit

• CARES - Community-based ART RETention and Suppression (CARES) App

• Challenges

• Q&A
Differentiated service delivery (DSD) reduces care barriers
  • Moves patient from congested ART clinics to communities

DSD settings challenge quality of ART care and rigorous patient monitoring and evaluation (M&E)
  • Lack of integrated care, referral delays and data entry workload

Electronic medical record systems (EMRs) improves care and M&E
  • Large barriers: infrastructure, digital literacy and funding
  • National EMRs only in 15% of low income countries

Mobile health (mHealth) improves individual ART outcomes with reduced cost, M&E workload and data quality benefit
In Malawi: 80% of the population is rural; most clinics lack reliable power; national EMRs scaled only to large and medium ART sites.

LT operates two Ministry of Health (MoH) clinics with over 35,000 patients
- EMRs in its static clinic settings.

LT’s DSD model, the nurse-led community-based ART program (NCAP), delivers ART for >5200 stable patients
- Without EMRs, NCAP nurses lack decision-making support for integrated patient management, reducing quality of patient care.
- Without EMRs, workload for NCAP nurse and M&E is high: NCAP ODK tablet-based data management forms are printed for manual entry into EMRs by LT clerks.

**NEED**
- EMRs-like advantages for NCAP, without need for consistent power or network.
- Real-time advantages for DSD patient M&E to improve individual outcomes
- Direct sync to EMRs to reduce data errors and workload.
The Community Health Toolkit (CHT) Core Framework

CHT is a leading open-source project and community of people advancing global health equity. Medic serves as the technical steward for the CHT. CHT is a highly configurable software platform that makes it easier to build scalable digital health apps. It runs offline, works on multiple devices, supports multiple users in a health system with integrated care workflows, and may be interoperable with other digital health systems such as OpenMRS and DHIS2.
Mobile EMR for Nurse-led Community-based ART (NCAP)

CARES: Community-based ART REtention and Suppression App
CARES Innovations

• CARES is an offline-first, EMRs-like App: mirrors Malawi ART EMRs

• For patients:
  • Provides quality ART Care to PLHIV in DSD: supports continuous integrated care in community setting, improves on-time VL testing

• For providers/M&E team:
  • CARES data elements aligns 1:1 with EMRs data fields
  • Daily CARES and EMRs sync aims to ensure data completeness in the EMRs and access to longitudinal patient data in NCAP, improving continuity of care.

• Human-centered, participatory design with Lighthouse team informs local specification and optimization for HCW buy-in
## Current Advantages of CARES app

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<tr>
<th>Activity</th>
<th>Current NCAP</th>
<th>CARES Value-add</th>
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<tbody>
<tr>
<td><strong>Client verification during follow-up</strong></td>
<td>Nurse enters patient ID into tablet to search for a patient.</td>
<td>Nurse scans patient barcode, confirms patient ID during follow-up visit</td>
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<tr>
<td><strong>Patient treatment history</strong></td>
<td>No previous treatment data available</td>
<td>Previous information on latest VL, TB, side effects, and family planning methods</td>
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<td><strong>Complete client assessment</strong></td>
<td>Abridged assessment, adherence</td>
<td><strong>Integrated</strong> services and alerts on clinic review (e.g., annual VL, hypertension, Family planning, TB)</td>
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<tr>
<td><strong>Daily NCAP drug management</strong></td>
<td>Nurses pull paper files for expected patients. Collect and manually reconcile ARV drugs at ARV pharmacies</td>
<td>Digitized ART collection forms to improve M&amp;E efficiency and reduce data errors</td>
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<td><strong>NCAP ART to EMRS data link</strong></td>
<td>None. Data from tablet is manually entered into EMRS</td>
<td>Offline CARES data synced to site EMRS using patient IDs, smooths referrals and aids retention efforts</td>
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Brief Walk-through the off-line first EMRs (CARES app)
Challenges for CARES
(and for many, many apps)

Or, how to fit a square peg into a round hole?
Challenges

Complexity of integration with a customized EMRs

- Stored CARES medical records
- Process, validate and prepare for syncing
- Convert medical records into what the EMR understands
- Upload converted medical records to EMR

ETL for analytical tables for data analysis

- Copying of recorded data from CARES to the analysis database.
- Converting of CARES data into a consumable format.
- Loading of transformed data into optimized tables.
- Exposure of various dashboards and the raw data where applicable.
<table>
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<tr>
<th>Concern</th>
<th>Solution steps: <strong>Easy, Moderate, Hard</strong></th>
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<tr>
<td>Application User Access Management</td>
<td>Only authorized users use the app/devices.</td>
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<tr>
<td>Mobile Device Management</td>
<td>Passcodes, denying installation of malicious apps, remote wiping of devices, storage encryption etc.</td>
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<td>Patient Data De-identification</td>
<td>Removal of all personally identifiable information</td>
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<td>- How to identify/search for patients and match data?</td>
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<tr>
<td>Encrypted System-to-System Communications</td>
<td>No third parties can see patient data as it moves between study devices/facility devices</td>
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<td>- How to sync from Apps to facility computers?</td>
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<tr>
<td>Local (no cloud) server hosting</td>
<td>MoH assumes responsibility for App hosting</td>
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<td></td>
<td>- How to push for local hosting without clear capacity/no host costs?</td>
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<tr>
<td>Syncing community to clinic data</td>
<td>Offline-first apps create data exchange for low-connectivity facilities</td>
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<td>- Seeking creative solutions and pathways to overcome hurldes</td>
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## Next steps

### Short term (Next 2-3 months)

- Deploy CARES to patients from 2 Lighthouse flagship clinics (LH/MPC)
- Optimize CARES via iterative user feedback, pilot testing, App revision
- Provide CARES benefits to patients for on-time VL testing
- Drugs/commodities management

### Long term (12-24 months)

- Deploy CARES to patients from Lighthouse supported facilities
- Add hypertension module
- Smooth referrals from NCAP to static sites
- Strengthen integration to EMRs for M&E workload reduction
Questions and Answers