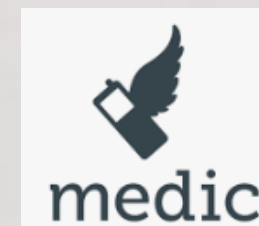# Lighthouse Trust's Innovations for Client-Centered Care: Community-based ART REtention and Suppression (CARES) App

March 8, 2023: Data Use Community

Acknowledgments

- Lighthouse Trust, Malawi
- 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

Situation analysis

- 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

Lighthouse Trust (LT) Background

- 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.

Community health workers

Nurses & health facility staff

Managers

Mobile EMR for Nurse-led Community-based ART (NCAP)

CARES: Community-based ART REtention and Suppression App

CARES Innovations

- CARES is <u>an offline-first, EMRs-like App:</u> 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

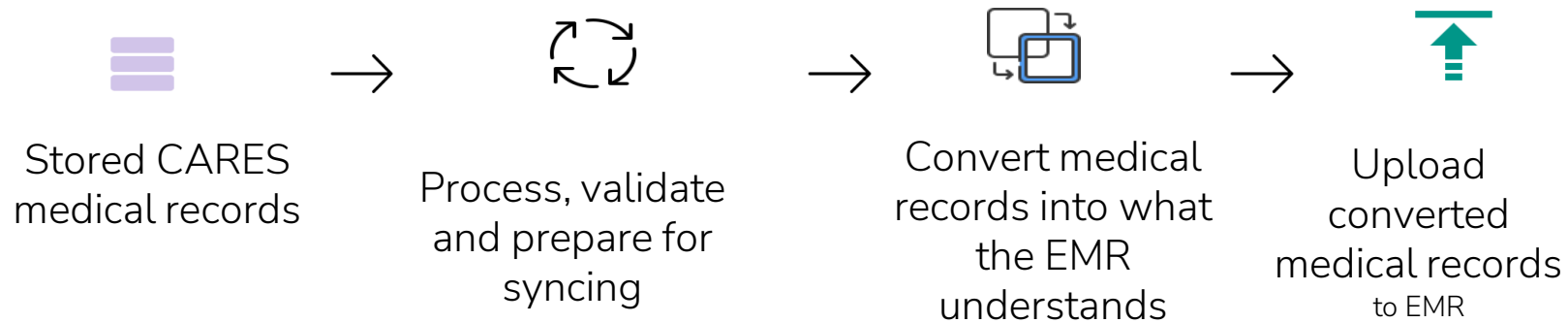| Activity	Current NCAP	CARES Value-add
		NCAP patients from LH/MPC, only
Client verification during follow-up	Nurse enters patient ID into tablet to search for a patient.	Nurse scans patient barcode, confirms patient ID during follow-up visit
Patient treatment history	No previous treatment data available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

Brief Walk-through the off-line first EMRs (CARES app)

Challenges for CARES
(and for many, many apps)

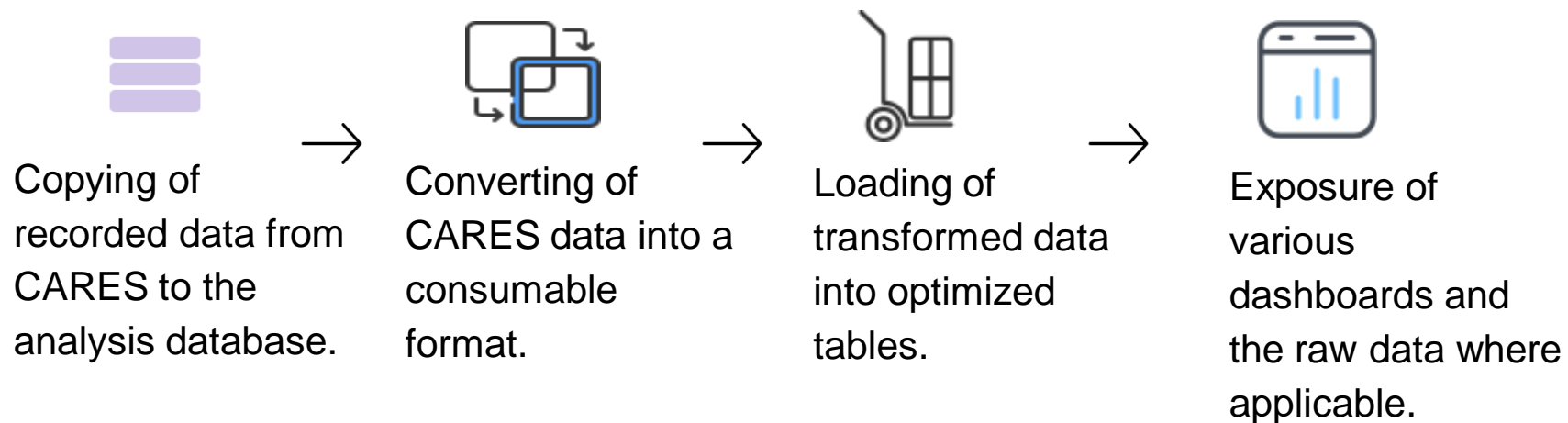Or, how to fit a square peg into a round hole?

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.

Security and sustainability: progress, pitfalls, and possibilities

Concern	Solution steps: **Easy, Moderate, Hard**
Application User Access Management	Only authorized users use the app/devices.
Mobile Device Management	Passcodes, denying installation of malicious apps, remote wiping of devices, storage encryption etc.
Patient Data De-identification	Removal of all personally identifiable information ➤ How to identify/search for patients and match data?
Encrypted System-to-System Communications	No third parties can see patient data as it moves between study devices/facility devices ➤ How to sync from Apps to facility computers?
Local (no cloud) server hosting	MoH assumes responsibility for App hosting ➤ How to push for local hosting without clear capacity/no host costs?
Syncing community to clinic data	Offline-first apps create data exchange for low-connectivity facilities ➤ Seeking creative solutions and pathways to overcome hurldes

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

LIGHTHOUSE