



LAST
MILE
HEALTH

Integrated Community Health Information System (iCHIS):

A pathway to improved community health through integrated services at the point of care

Background | Introduction to Malawi's commitment to digital health

Although Malawi has had a community health program since the 1970s and has made major strides toward improving access to and quality of care with a paid, professionalized community health workforce, employing **over 11,500 community health workers**, today one health worker is tasked with serving almost 2,000 people.

One in five Malawians remains out of reach of high-quality essential health services—a gap felt most strongly in rural and remote communities. The Ministry of Health has made a clear commitment to transform access to care by expanding the national community health program and investing in digital health systems to improve health outcomes, guided by the [Health Sector Strategic Plan III](#) and the [National Community Health Framework \(2023-2030\)](#).

In tandem with policy development, the Ministry initiated Malawi Healthcare Information Systems, a comprehensive digital framework aimed at streamlining and maximizing digital health investments. This framework operationalizes all

systems, structures, and processes required to successfully implement digital health solutions across Malawi.

A key component of the framework is **the Integrated Community Health Information Systems (iCHIS)**. iCHIS manages and aggregates community-level data collected by community health workers and outreach programs. Alongside other information systems, iCHIS facilitates a cohesive and integrated approach to extending quality healthcare in Malawi's rural and remote communities.



1. Community health workers being trained during iCHIS end-user deployment in Mchinji district, Malawi. Photo credit: Last Mile Health.

Systemic challenges for Malawi's community health workforce

Malawi's community health workers (known nationally as health surveillance assistants) provide essential primary healthcare services to community members in their catchment areas. These services include malaria testing and treatment, under-five immunization, and case tracing. When adequately skilled, supplied, salaried, and supervised, community health workers are a powerful tool in improving health outcomes—but systemic challenges impact their performance and the quality of care they deliver to patients:

+ Limited proficiency in core training materials

+ Numerous vertical, organization-specific interventions that lead to parallel data collection

+ Lack of validation of data across fragmented systems and procedures

+ Laborious manual data entry, which introduces the risk of human error and reduces time spent on patient service delivery



2. A community health worker standing outside Mkanda training center during iCHIS end-user deployment in Mchinji district. Photo credit: Last Mile Health.

+ Limited opportunities for mentorship and upskilling

+ Restricted access to and use of data for point-of-care decision-making or community health advocacy

+ Lack of technical capacity building to support and sustain current systems

+ Limited integration of community-level data into national health systems

+ Lack of accurate or timely reporting of service delivery data

The integrated community health information system: iCHIS

Together, the Ministry of Health, University of Malawi, Last Mile Health, and other implementing partners launched iCHIS to address these challenges. The information system digitizes essential community-level service delivery systems: community health registers, non-communicable and communicable disease management, immunization, child case management, supervision, reporting protocols, surveillance, and supply chain systems.

iCHIS is a point-of-care application developed on an open-source architecture called the District Health Information Software 2 (DHIS2). The solution replaces the paper-based system with digital forms by utilizing the DHIS2 companion mobile application, DHIS Tracker, which is loaded onto community health workers' mobile devices.

Built on the [principles of digital development](#), iCHIS represents an opportunity to improve the quality of service delivery provided by community health workers across Malawi. In addition to the digitization of delivery systems, iCHIS will:

- + Be the **single source of reliable household data** that supports community health delivery at all levels
- + Harmonize and integrate community health programs and services into a **single platform for reporting**
- + Provide **real-time access** to community-specific health information for decision-makers



3. Community health workers and facilitators using the application during a supervision exercise in Kasungu District. Photo credit: Last Mile Health

- + Seamlessly **integrate digital health solutions** and logistics management systems to track commodities and resources in the essential medications supply chain
- + **Standardize implementation** and input across stakeholders, partners, and donors
- + Facilitate **disease surveillance** (including contact tracing and sharing data on disease spread and mobility patterns) before and during outbreaks
- + Provide **real-time treatment and diagnosis decision-making** by community health workers at the point of care, fostering immediate responsiveness to patient needs
- + Engage district and community stakeholders in **data use for community advocacy**
- + Inform **training, upskilling, supervision, and mentorship of community health workers** and their supervisors



iCHIS

iCHIS not only promotes the interoperability of digital health solutions but also enables seamless information sharing, integrating existing data systems with specific point-of-care guidance for the array of services provided by community health workers. This allows for individual-level tracking of services rendered, aggregation of commodities across multiple supply chains, and identification of gaps in care administration.

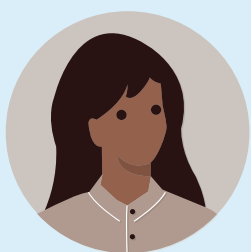
- + For health workers, this means **workflow tools are customized to the services they provide**, and real-time decision-making is tailored to their patients' needs.
- + For health supervisors and managers, this means **data-on-demand** to support more targeted mentorship as well as better resource allocation to communities according to need.

Through its advanced features, robust support structures, and efficient implementation mechanisms, iCHIS will catalyze improved community health outcomes. It goes beyond conventional data management, actively enhancing the quality of patient care by providing treatment guidance support for community health workers directly in the field.



4. A community health worker conducts household visits in Salima District. Photo credit: Last Mile Health

iCHIS serves as a critical tool in extending healthcare provision to all communities, especially in underserved rural and remote communities, and will lead to timely referral, accurate diagnosis, and accurate treatment for patients. iCHIS strengthens the capacity of community health providers and policy leaders, empowering them to take ownership of their data and facilitating more seamless use of data to advocate more effectively for necessary resources, ensuring patients can access the care they need. It enhances the service delivered by health workers and elevates the overall quality of care for communities at the last mile.



"iCHIS is helping us store data more effectively. We travel to so many homes—I am responsible for 2,025 people in my catchment area, so it's so easy for the paper-based registers to get worn out as I travel from one household to another, sifting through so many papers. On top of that, it was very difficult to carry the registers around. These tablets allow us to work better and more professionally!"

— **Pamela Chisasa**, health counselor, Kamwendo 1 catchment area, Mchinji District, Malawi

Realizing a sustainable community health system

The Government of Malawi has strategically positioned iCHIS as a central digital health platform for the Ministry of Health, reorienting priorities to modernize the country's digital health landscape. This aims to propel Malawi to the forefront of digital transformation in healthcare, ultimately reducing the structural and systemic challenges that impact care provision and data use across the country.

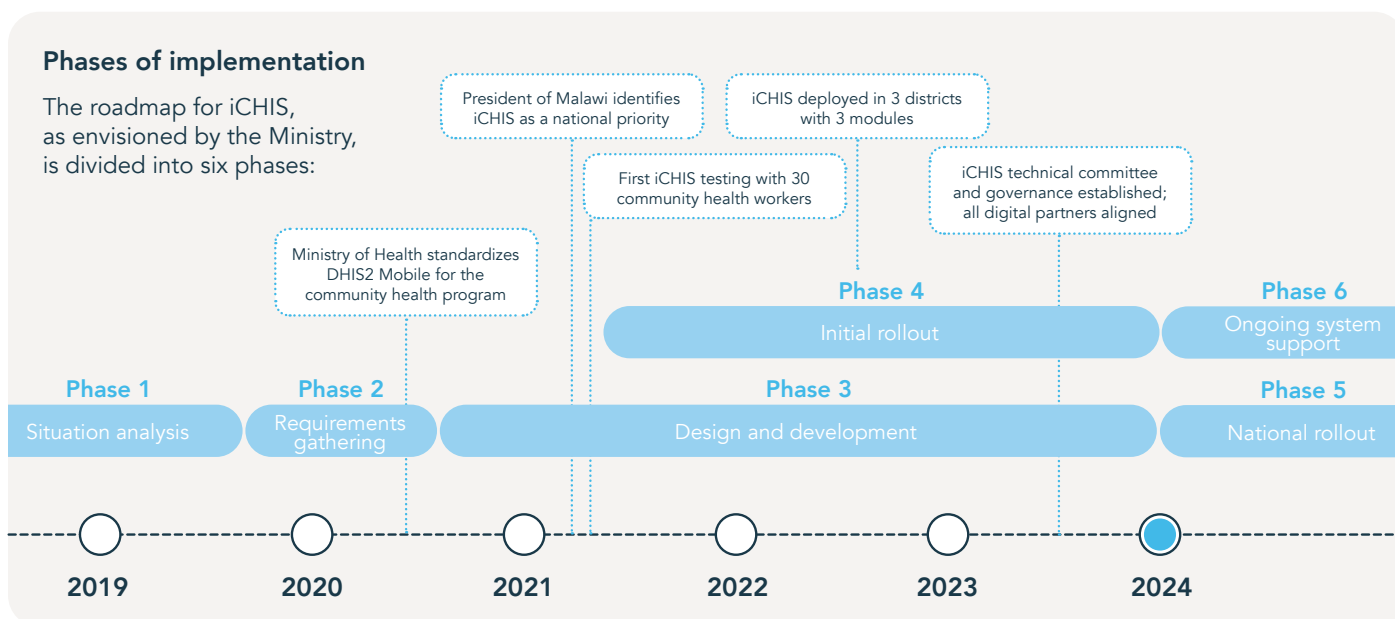


5. An iCHIS training exercise in Salima District. Photo credit: Last Mile Health

The national scale-up of iCHIS to all community health workers is a country priority. The Government of Malawi underscores this commitment by allocating **\$75,000 annually** (2022 - 2023) to facilitate the design and development of iCHIS. This will support the expansion of the community health workforce from 11,500 to **24,850 community health workers, all of whom will integrate iCHIS into their work to bring primary healthcare to Malawi's rural and remote communities.**

"Entering data onto the paper-based registers was an extremely cumbersome task. With iCHIS and the power of its software, it is now so easy to input data. I am also extremely happy that the data is also easily retrievable, as I am responsible for 2,008 people in my catchment area."

— **Karidi Mumba**, community health worker, Chaferanthengo catchment area, Mchinji District, Malawi



Realizing a sustainable community health system

As of 2024, iCHIS is in phase 3 and 4 of implementation. These phases are characterized by ongoing module design and development, development and implementation of comprehensive technical and end-user manuals, development of a monitoring and evaluation plan for iCHIS and standardization of tools, and ongoing deployment of the system.

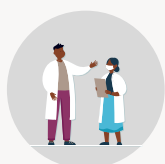
iCHIS is structured into modules. Each module is a digital adaptation of an existing physical data collection form used by health departments and programs in the Ministry to gather patient information at the community level.

During module design and development, paper forms are transformed into an electronic form for use during health workers' routine patient visits. iCHIS dynamically receives, interprets, and adapts the form based on the information the

health worker enters, producing real-time referral and treatment support. This process is guided by technical sprints that leverage the collaboration of technical and programmatic stakeholders to ensure modules reflect the realities of community health workers' needs.

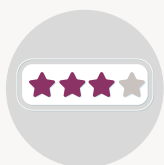
During roll-out, government representatives are trained as master facilitators (training of trainers). District teams and community health workers are oriented on using smart devices (digital literacy training), and trained to use iCHIS to enter essential household and individual-level information during home visits. iCHIS roll-out also includes practical exercises, field practice, and pre- and post- assessment as well as hands-on skills assessments to ensure health workers are equipped with the skills to use iCHIS during their routine visits.

iCHIS roll-out process



Inception meeting with district teams

Introduce iCHIS to district leadership teams



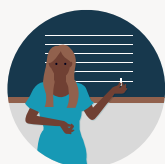
Readiness assessment exercise

Assess iCHIS users to inform the training plan



Digital literacy training

Conduct prerequisite training before orientation on iCHIS, using a blended approach



iCHIS training of trainers

Train supervisors to serve as facilitators during iCHIS roll out



iCHIS roll-out training

- Adopt adult learning principles, practical field sessions, and knowledge and skills assessments
- Cluster grouping with 4 facilitators and up to 30 learners
- Promote peer-to-peer learning
- 10+ days of training



iCHIS district user support training

Equip district supervisors with skills to provide firstline support to iCHIS end-users

Realizing a sustainable community health system

Government ownership

iCHIS is entirely owned by the Malawi Government, which aligns with global best practice in ensuring health systems can be nationally led and sustainably managed. This means all core aspects of system design, development, and implementation are championed by the Ministry of Health, executed by three agencies: Community Health Services Section, Digital Health Division, and Central Monitoring and Evaluation Division.



The **Community Health Services Section** is the owner of iCHIS.

They provide strategic direction, ensure all community-level interventions are incorporated, and mobilize resources toward systems implementation.



The **Digital Health Division** is the custodian of iCHIS. They provide input and oversight toward system design and manage systems development processes alongside the University of Malawi, ensuring development aligns with Malawi and global digital health policies.



The **Central Monitoring and Evaluation Division** is the custodian of data collected through iCHIS. They coordinate data collection, analysis, and review in all implementing districts, ensuring access to data is in accordance with Malawi data access policy and providing guidance on methods of data collection, analysis, and use.

The Government is working with the following partners in the implementation of iCHIS:

- + **University of Malawi's Chancellor College** is the technical lead for iCHIS. The University has a specialized software development team that develops and manages all aspects of iCHIS system development. Development by a public institution in Malawi ensures national ownership of the process and product. The university supports the Ministry to **build the capacity of next-generation developers and engineers** who are equipped with the skills and expertise to manage and maintain the system locally. The University's close collaboration with the University of Oslo, the developers of DHIS2, ensures iCHIS architecture is up-to-date with new, relevant developments made on DHIS2.
- + **Last Mile Health** is the product manager for iCHIS. Seconded to the Digital Health Division and the University of Malawi, Last Mile Health serves as a core implementation and advocacy partner, representing the Ministry's vision for iCHIS and digital health in Malawi. Last Mile Health leads partner engagement and resource mobilization; promotes continued digitization of associated community health worker systems in the iCHIS ecosystem; supports training for community health workers; and manages overall strategy, systems development, and sustainability of the platform.
- + **A growing consortium of national and international partners** such as UNICEF, AMREF, USAID, Palladium, Wandikweza, GIZ, Save the Children, Luke International, D-tree, Partners in Health, and Diabetes Campus support resource mobilization and systems implementation across the country.

Realizing a sustainable community health system

Last Mile Health as a core partner

The Ministry of Health identified key building blocks to guide the design and implementation of iCHIS. Last Mile Health's support is aligned to the following building blocks:

+ Leadership, governance, and stakeholder management

Last Mile Health supports the Digital Health Division and Community Health Services Section to manage all aspects of work planning as well as resource mobilization, fundraising, and partner mobilization. To date, Last Mile Health has **engaged six partners who are successfully embedded into the iCHIS ecosystem** and are now supporting the Ministry to meet its goal of scaling the system across the country.

+ Systems development

Last Mile Health partners with the University of Malawi to **develop iCHIS modules** using user-centric design and emphasizing interoperability and integration of related community health worker systems and programs. **Ten modules*** have been developed to date, with quality ensured by incorporating expert feedback, conducting rigorous testing, and collecting user feedback throughout the development process. The result is better developed, more user-friendly modules that effectively replace paper-based health forms and integrate all care provided by the community health worker.

+ Capacity-building and scale

Last Mile Health partners with the Ministry to promote the scale-up of iCHIS through capacity-building initiatives and institutional changes that foster future sustainability of the system. This includes incorporating the system into health worker training curricula and supporting the development of iCHIS-specific course content for future health workers at public institutions.

+ Implementation and user support

As of November 2023, Last Mile Health leads iCHIS training and deployment in **four districts**, achieving full community health worker training coverage in Salima and Balaka and partial coverage in Mchinji and Machinga. In addition, Last Mile Health supports partner implementation across **six districts**, providing strategy and training resources. Core aspects of iCHIS implementation involves readiness assessment, training of trainers, assets procurement, resources development, systems orientation, digital literacy training, supervision systems development, and health worker supervision and mentorship.

+ Data management, community-led monitoring, and system strengthening

Last Mile Health partners with the Central Monitoring and Evaluation Division of the Ministry and other implementing partners to lead data review sessions and support district management teams to use the systems dashboard for health and performance tracking. Last Mile Health has conducted and participated in **six data review sessions with more than 120 district and health facility leaders engaged**. With support, district teams will be able to identify community health indicators, set targets, and track metrics according to communities' needs. Last Mile Health is also partnering with the division to develop a comprehensive data quality assurance process to improve the quality of data entered on iCHIS.

* Modules developed include: Registers (foundational modules: Community Register, Household Register, and Person Register), electronic Integrated Disease Surveillance and Response system (eIDSR), Community Based Maternal and Neonatal Care, Integrated Community Case Management, Expanded Programme on Immunization, Family Planning, and Reporting.

Results: Data snapshot

In partnership with the Ministry and partners, Last Mile Health has deployed iCHIS in **10 districts** as of February 2024.



1,916

community health workers have been trained in iCHIS

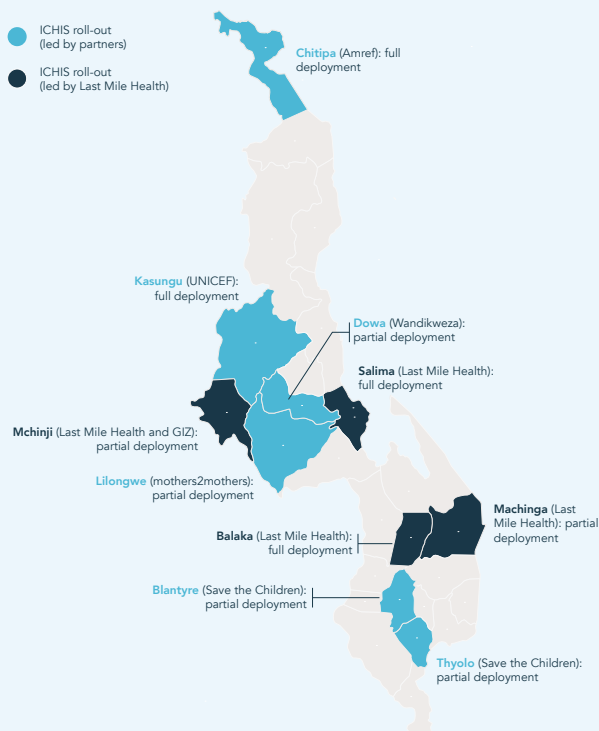
Serving more than **3 million** individuals*

Reaching approximately **17%** of all community health workers in Malawi

56% of community health workers are trained and assessed by Last Mile Health

*Total individuals served is based on the average ratio of 1 community health worker to 1,000 people.

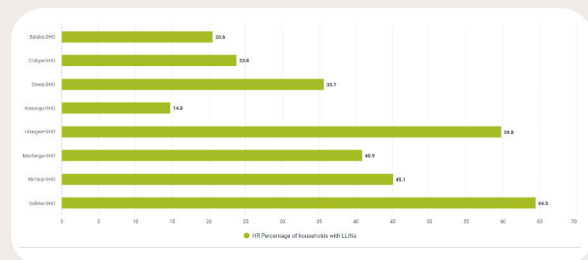
10 districts with partial or full iCHIS deployment*:



*Full deployment means all community health workers in the district were trained on iCHIS and partial deployment means not all community health workers in the district were trained.

An interactive dashboard powered by DHIS2 ensures district and community stakeholders have access to community-level data that support tailored, needs-driven decision-making.

Percentage of households with LLINs - 2023*



*Total percentage of households with long-lasting insecticidal nets in 2023

Data aggregated on the iCHIS dashboard allows community and district leads to view relevant community metrics (e.g. number of people, reach of a public health campaign). As of 16 February 2024:

+ 155,791 households are currently registered in iCHIS

+ 562,253 persons are currently registered in iCHIS

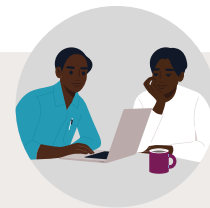
iCHIS deployments have produced valuable insights and learnings that will inform future deployments and continued enhancement of the system.



LEARNING #1

In general, **younger community health workers (<35 years) score better on knowledge assessment** than older community health workers.

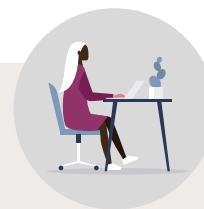
- + Incorporate adult learning principles to training content and assessment questions to better support older health workers, who are a majority of health workers
- + Provide comprehensive learner performance reports to supervisors, highlighting areas for improvement and support



LEARNING #2

Generally, **male community health workers are more likely than females to have used digital tools to collect data** in their line of work (in Mchinji, 54% versus 36%, respectively)

- + Incorporate gender mainstreaming principles in digital literacy and all relevant iCHIS training to enable all to participate in and benefit equally from training



LEARNING #3

Digital literacy training and hands-on skills assessment may have contributed to improved average score for knowledge assessments for iCHIS (scores in Mchinji [70%] when compared to Salima [50%])

- + Digital literacy training and assessment is an integral part of iCHIS deployment to support health worker uptake and use of the application

The Ministry's goal is that through the Malawi Health Information System framework, iCHIS will revolutionize community health delivery, address key challenges in data use for decision-making, and enhance community health outcomes.

Last Mile Health's priorities include reaching more community health workers and patients through iCHIS as well as mobilizing partners to support the initiative. 2024 plans include:

- + Orienting iCHIS implementation to aligned building blocks across partners and districts
- + Achieving full community health worker training coverage in Last Mile Health-supported districts and expanding iCHIS to new districts
- + Conducting data review and analysis led by district, health facility, and community stakeholders and initiating community-led monitoring informed by data from iCHIS
- + Continuing to coordinate with the Ministry and partners to develop, finalize, and deploy all modules
- + Initiating plans to measure the impact of iCHIS and its use on overall service delivery and patient care

Together with the Ministry of Health and implementing partners, Last Mile Health will continue to demonstrate iCHIS as a decision-making tool and benchmark for integration across the country and the region.



6. Community health workers exploring the application during iCHIS end-user deployment in Mchinji district. Photo credit: Last Mile Health.



"iCHIS is an important tool for monitoring community data and performance from the national level. I can view and compare health data across different zones, and thereafter note the differences or trends which will assist in decision-making. With iCHIS, I can ably advise on distribution of commodities so that there is fair and equitable distribution."

— **Jessie Salamba Chirwa**, Family Planning Programme Officer, Reproductive Health Directorate, Malawi Ministry of Health

Modules of the Integrated Community Health Information System

iCHIS consists of four cross-cutting modules and ten program-level modules. To date, ten modules have been developed and four modules are pending development.

- Developed
- Under development
- Not developed

Registers

(Foundational modules: Community Register, Household Register, and Person Register)

Registers modules:

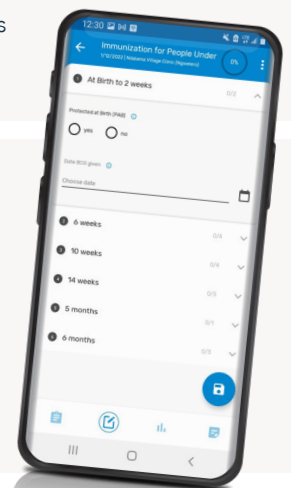
- + Records and registers individual, household, and community-level information that supports district microplanning, public health campaigns, and population census
- + Gathers individual-level service delivery data that enables health workers to tailor care to patient needs
- + Central point of registration for environmental health in communities

The electronic Integrated Disease Surveillance and Response system (eIDSR) Register

(Sub-modules: Case-Based Surveillance, Event-Based Surveillance)

Surveillance modules:

- + Register disease during an emergency or as part of a routine visit
- + Track emergent public health occurrences and manage conditions
- + Alert and Event signaling supports case management in disease surveillance



Family Planning

Program modules:

- + Point-of-care tool for assessment and treatment of illnesses
- + Track and record immunization statistics in catchment area
- + Support village clinics and small health facilities that offer specialized support to rural communities
- + Support and inform resource and commodity allocation in the district
- + Foster good practices across focus areas for care (maternal, neonatal, malaria, etc.)

Supervision

Reporting and Supervision modules:

- + Aggregate reporting forms across community-level indicators
- + Track supervision metrics for health workers and visualize core indicators for supervisors and community leaders
- + Provide feedback and mentorship on use of iCHIS to improve service provision by health workers

Reporting

Community-Based Maternal and Neonatal Care

Integrated Community Case Management

Expanded Programme on Immunization

Non-Communicable Diseases

HIV

Tuberculosis

Supply Chain

Nutrition

Malaria

Key functionalities and features of the Integrated Community Health Information System

iCHIS is designed to be simple to navigate and is optimized for users with low technology experience and connectivity.

Key features and functionalities of the system include:

Seamless integration with various systems deployed in community health in Malawi (surveillance, logistics, and supply chain systems)

Geographic information system enables mapping of remote communities, estimating reach to facilities, and outlining case distribution and contact tracing for disease surveillance

Decision-making support for treatment and diagnosis with key treatment procedures and recommended actions for individuals given input by community health workers

Supervision checklist to guide tailored feedback and mentorship to community health workers

Report generation for triaging, tracking community-level indicators, and tracking performance metrics across health facilities and community health workers to support data use for decision-making

Developed on an **open-source learning platform** (DHIS2 Tracker) and architecture

Suitable for and deployed on android **smartphones and tablets**

Supports **cross-device updating** when new modules are deployed (when internet is available)

Offline application and app backup means community health workers can access all modules and offer services in remote areas

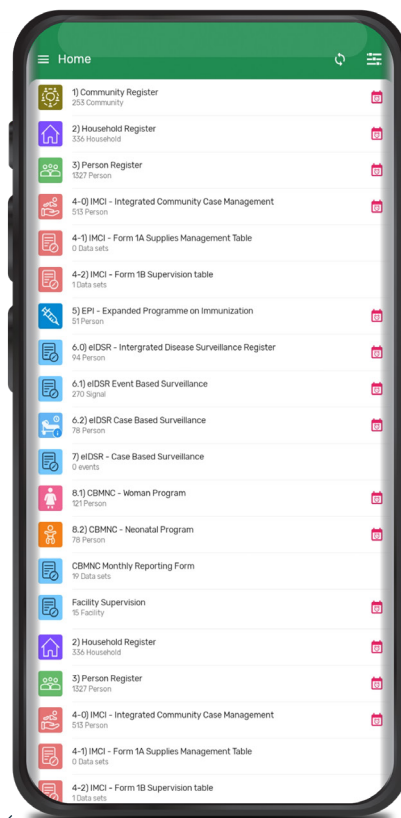
Accessible on the web and on android mobile devices

Scale capacity to sustain multiple thousand devices in the case of national deployment

Local hosting capacity and infrastructure with system running on locally installed servers and hardware

Dashboard to visualize program and community-level indicators

Sync with DHIS2 data repository enables aggregation of all community data into a central server (when internet is available)



For **more information** about this case study, contact:

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