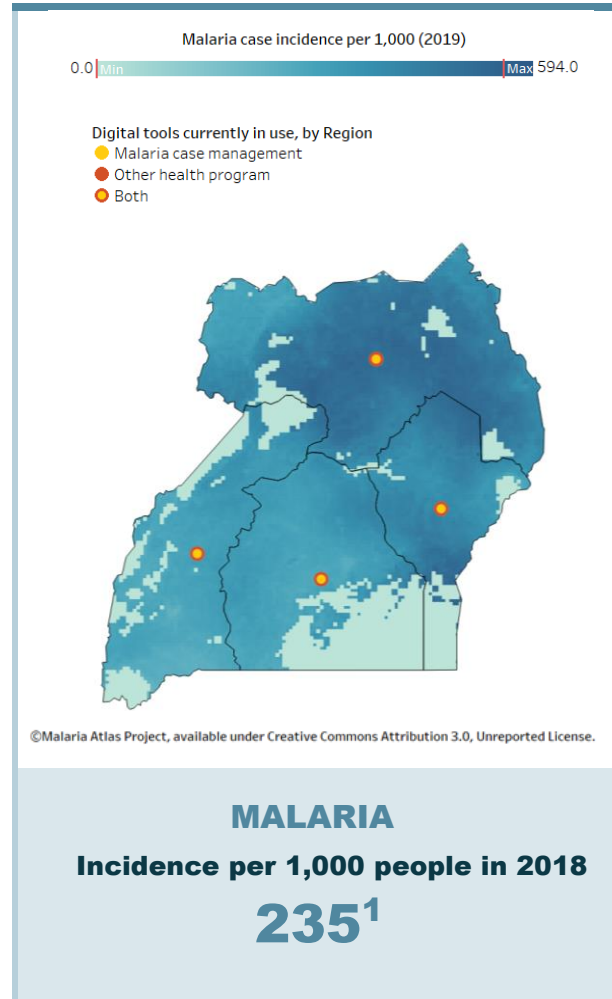


UGANDA

Executive Summary

Uganda has extensive community health programs, with 67 districts (about 50% of districts) having blanket coverage for integrated community case management (iCCM) including malaria case management. These programs, though government led, are supported by several implementing partners, which has led to variations in service delivery at the community level, including in the use of digital tools and data. The Ministry of Health (MOH) is poised to scale up the use of digital tools and data within community health programs. This would be facilitated by prioritizing finalizing, disseminating, and enforcing community health and digital health strategies, standardizing the use and functionalities of digital tools across programs, and strengthening data use and reporting. These steps will set the foundation for replicating the success seen in partner-supported community programs using digital tools across the country. Digital tools currently in use have many of the functional requirements needed for use in malaria community case management. While further assessment of digital tool alignment to national policies, standards, and functional requirements is needed, the Community Health Toolkit and CommCare show promise for broader use.



PEOPLE
Community Health Workers (CHWs)



179,000 CHWs
34 per 10,000 people

GOVERNANCE
National Digital Health Strategy



YES

SYSTEMS
Digital Health Index



SCORE: 2



Recommended Actions

PEOPLE



CHWs and other decision-makers

Develop a roadmap to standardize and scale the integration of digital tools within community health programs, including for malaria.

Given fragmentation of community health programs, it is recommended a roadmap be developed to consistently integrate of digital tools in community health services and increase support for community health workers (CHWs) nationwide. This requires alignment in funder and implementing partner plans and timelines and establishing requirements for digital literacy.

Develop guidance and tools to standardize and improve data reporting and use at the community level.

Vast disparities exist in completeness, timeliness, and quality of community-level data. Guidance, standard operating procedures, and job aids for data quality notifications, data quality audits, and data-driven program reviews can be introduced or revised to clarify data management and use expectations of community health workers. This requires introducing and strengthening training for collection, use, and management of malaria case data and training for digital tools. Incentives for data entry and use could be investigated.

GOVERNANCE



Strategies and policies

Develop a community health strategy and related policies.

No community health strategy currently exists. To set a foundation for all partners, support the Department of Community Health and Community Engagement Technical Working Group (TWG) in completing the strategy and related policy documents. This includes ensuring the integration of malaria community case management and digital health guidance and methods to support CHW retention and motivation.

Ensure the updated digital health strategy includes the needs of CHWs and digital tools for malaria.

Review strategy to ensure it addresses the use of digital tools by CHWs for malaria community case management. Policies may include developing health information standards that accommodate multiple tiers of technology capacity (e.g., short message service [SMS] to smartphone applications).

Strengthen existing governing bodies to oversee digital health efforts and coordinate funder investments for community health programs.

To align fragmented efforts, support the DHI and Health Information, Innovation, and Research (HIIRE) TWG in developing a funding plan and roadmap to integrate the digital health strategy into routine tasks and decision-making and establish mechanisms to implement and enforce digital tool standards.

SYSTEMS



Processes and digital tools

Support operationalization of digital health policies for community health.

Building on the work from this assessment, support DHI and partners to develop and disseminate digital tool standards and functional requirements for community health including community case management for malaria.

Modify digital tools and systems in alignment with national standards.

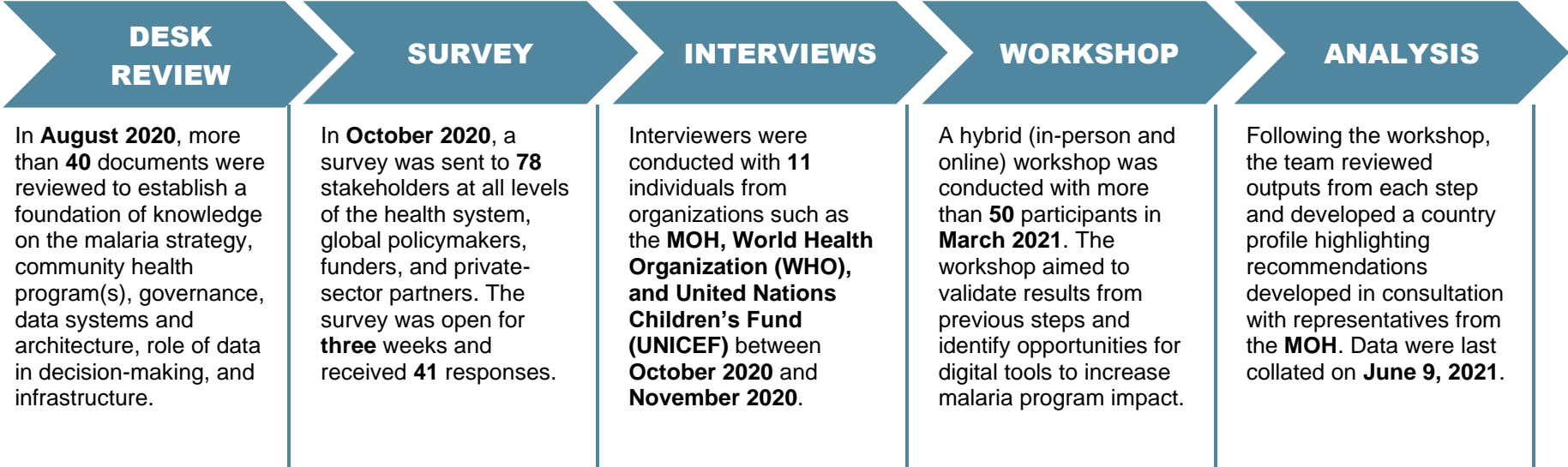
With oversight by the MOH, implementing partners, funders, and developers should align currently used and future tools to national digital health policies, standards, and functional requirements to ensure tools contribute to a functional and interoperability nationwide system.

Increase frequency of reporting for community-level data and enforce submission of data from partner-supported programs.

To improve data use, report data from community health programs should be done monthly (aligned with the health facility reporting schedule) and with greater granularity. As digital health infrastructure develops at each level of the health system, community-level data can be entered directly into the Health Management Information System (HMIS) with entries reviewed by facility-level staff.

Methodology

A desk review, survey, and key informant interviews were conducted to develop this profile. Findings from these activities were validated during the workshop and used to develop the recommendations.




Information collected through the methods described above was categorized according to key components within three domains: people, governance, and systems. These domains and their underlying components were informed by an [existing maturity model](#) and adapted to incorporate malaria-specific content. The components include personnel, training, and technical support (“People”); policies, strategies and governance structures, and their implementation (“Governance”); and data flow, digital tool structures, functionalities, and use (“Systems”). Together, these components describe the *desired state* for CHW use of digital tools for malaria case management, a state in which community health programs can leverage digital tools to generate and use data that improve malaria programming with the ultimate aim to decrease the local malaria burden.

PEOPLE



People highlights the community health workers, supervisors, information technology support staff, and other decision-makers that contribute to effective use of digital tools and data in malaria community health programs.

GOVERNANCE



Governance describes the national strategies and policies that provide the framework for community health programs’ use of digital tools for malaria, and their implementation.

SYSTEMS



Systems describes the processes and digital tools that enable community health platforms to effectively use digital technology and data to strengthen malaria and other health programs.

People



Village Health Teams (VHTs) comprise the main cadre of community health workers in Uganda. VHT services differ by region and program partner but may include iCCM; control of communicable disease (e.g., HIV, tuberculosis, neglected tropical diseases); maternal and child health services; water, sanitation, and hygiene; and health promotion. VHTs may go by different names depending on the program partner. VHTs are active in more than 100 of 134 districts,³ with blanket coverage of iCCM in 67 districts. Within each village, two members of the VHT are selected to conduct iCCM, providing malaria diagnosis via rapid diagnostic tests (RDTs), administering artemisinin-based combination therapies (ACT), and referring severe cases to nearby health facilities. VHTs may also support other malaria control interventions including long-lasting insecticidal net (LLIN) distribution campaigns, indoor residual spraying, routine entomological monitoring, and social and behavior change communication—encouraging people to sleep under nets, close windows, and seek treatment early. The VHT program has been supported by as many as 100 nonprofit partners, leading to varying levels of funding, incentives for VHTs, training, supervision, reporting, areas of responsibility (e.g., HIV, nutrition, malaria) and quality of care.⁴ The MOH developed the Community Health Extension Worker (CHEW) program strategy in 2016 to deliver equitable access to quality health services and strengthen the existing community health program following challenges with high turnover and inconsistencies within the VHT program.⁴ The main purpose of the CHEW program will be to mobilize and sensitize the community on how to prevent and control common diseases. Two CHEWs from each parish will be recruited by the district leadership and trained to support several community health programs including: environment and sanitation, family planning, maternal and child health, and health promotion and education. CHEWs will be required to be senior four graduates. CHEWs will report to health center III in-charges and will be allocated villages and assigned VHTs to supervise. CHEWs will also work closely with the local council leadership, health inspectors, health educators, community development officers, and other technical officers at the community level for health promotion and disease prevention. The Ministry of Health plans to pilot the CHEW strategy in four districts.^{5,6}

179,000² Community health workers in country	Compensation Policy: NO FORMAL POLICY Payment varies by cadre
72,000³ Providing malaria community case management	Compensation Policy: NO FORMAL POLICY Payment varies by cadre

Community health worker digital readiness

The capacity of VHTs to use digital tools is not consistently known, as the use of digital tools by VHTs varies widely based on the area where they work. The standard VHT training includes a section on data entry but no digital component. Some partner-supported programs do include training on digital tools. While the MOH is responsible for community health policies, district health teams, with support from partners, are responsible for implementation. The MOH has started the process of developing guidance to coordinate training of VHTs across districts and programs. The planned CHEW training curriculum dedicates a seven-hour training module to digital health, designed to provide “knowledge and skills required to utilize and apply e-health technology in their work especially collecting, sharing and disseminating information.”⁷ There are essential personnel gaps for supporting digital health across the country, with little capacity at the community and facility levels to adapt, configure, and support implementation of hardware and software for community health programs. However, the MOH has started to implement a comprehensive training curriculum on information technology (IT) for health

workers. Health workers at 4 of 14 regional referral hospitals have been trained and the MOH is working to place additional IT staff to support districts permanently.

Data-driven decisions at each level of health system

Data are collected with the intention that they should be used for planning, monitoring performance, resource allocation, mobilization, accountability, and real-time decision-making. However, community case reporting is persistently low, with wide variation between districts,⁸ and the role of community-level data remains unclear.⁹

NATIONAL LEVEL	Data at the national level are used to track commodities, monitor VHT reporting rates, and facilitate the development of policies and strategies. A weekly report based on Integrated Disease Surveillance and Response (IDSR) data is produced to document trends in malaria cases, deaths, and the stocks of RDTs and ACT throughout the country. A quarterly bulletin is also produced and includes broad updates on trends in key indicators (based on data from the HMIS and IDSR), status of commodities, and updates on interventions. ¹⁰ To guide activities at the community level, an iCCM TWG at the national level meets every two months to discuss data and follow up with relevant parties, such as the National Medical Stores for commodity issues. The managers of the TWG can extract data for these meetings from District Health Information Software (DHIS2), but they also receive support from DHI for analyses.
DISTRICT LEVEL	Data reviews (quarterly and annually) are common practice at the district level. Health facility data and community data are typically reviewed separately. A major limitation to data use is the delay in response to the results of data analysis. An epidemic may be detected in a timely manner, but the response can be delayed by more than six months because districts do not have reserve funds or buffer stock in place for timely action. Data at the district level are used to provide feedback to health facilities on data quality; report to government ministries, partners, and donors; and plan for resource allocation. Some districts produce monthly analytic reports. Though still low, there is an increase in the number of districts monitoring weekly case numbers for upsurges and redistributing stock of commodities for malaria case management.
HEALTH FACILITY LEVEL	Health facilities conduct regular data reviews and audits aimed at improving data quality and use for decision-making. However, analysis of case projections and commodity stock status is minimal. In higher-level health facilities, data are used to quantify commodities needed for malaria case management while lower-level facilities receive a fixed quantity. Some facilities use data to monitor case numbers for upsurges and target communities for outreach.
COMMUNITY LEVEL	VHTs may use data to inform their individual actions, including reviewing the status of clients and requesting commodity refills. The VHTs aggregate the data for transmission to the health facilities, where it may be analyzed to inform decision-making. One of the major challenges to using data is little to no feedback provided on data collected by VHTs, ¹¹ inadequate awareness on the importance of quality data at the lower level, and lack of data accountability systems at the lower level. In instances when data are used at a community level, it is an ad hoc process with inquiries from the community to the District Health Officer. Some efforts are being made to institutionalize more data review into existing quarterly VHT meetings and other community meetings. In places where there is a digital tool, data are used for performance management. One can know how many clients have been visited, schedule follow-up visits, and determine villages where cases are clustered.

Governance



	DIGITAL	COMMUNITY HEALTH	MALARIA
Name	<i>Uganda Health Information and Digital Health Strategy</i>	<i>Community Health Strategy</i>	<i>Uganda Malaria Reduction and Elimination Plan</i>
Current strategy dates	2020–2025	Early development	2021–2025
Coordinating body	HIIRE TWG	Community Health Department	National Malaria Control Division
Funding strategy	Yes	Planned	Yes

In 2019, the MOH launched the Community Health Roadmap led by the Department of Community Health and Department of Health Promotion, Education, and Communication outlining six priority needs for Uganda’s community health program, including:

- Developing a comprehensive community health strategy.
- Strengthening community health leadership, governance, and multisectoral collaboration.
- Strengthening investment in supervision and motivation of community health cadres.
- Strengthening the supply chain.
- Investing in scale-up of appropriate technologies for community health implementation and supervision.
- Investing in active engagement of communities.¹²

As of June 2021, the community health strategy is in early stages of development within the Department of Community Health.

Community leaders and local council members provide non-technical oversight of VHTs, while health facilities provide technical oversight, including replenishing VHT supplies, collating data, and holding quarterly meetings to discuss issues and improve coordination. District Health Officers plan and monitor the VHT program, with assistance from subdistrict representatives. Nationally, the VHT program is supervised by the National Coordination Committee and Stakeholders Forum, which includes representatives from several MOH departments, other ministries, funders, and implementing partners.

Building on plans for a strengthened community health system, the *Uganda Malaria Reduction and Elimination Plan (UMREP) 2021–2025*¹³ cites scaling of iCCM as a key strategy to manage cases at the community level. In addition to iCCM, the UMREP contains an objective on data reporting and use—including strengthening data collection, quality, and use at facility and community levels. The UMREP aims to improve the accuracy and timeliness of data collected at the facility and community levels by revising and disseminating tools to ensure appropriate malaria indicators are captured, integrating community and entomological data into HMIS, strengthening data quality and reporting in facilities, and mentoring and training MOH-employed health workers in data analysis, interpretation, and dissemination.

The Government of Uganda prioritized digital health at the national level with the development of the *National eHealth Policy and Strategy (2017–2021)*. The main objective of the strategy is to “create an enabling environment for the development, deployment, and utilization of sustainable, ethically sound and harmonized eHealth initiatives at all levels.”¹⁴

<p>GOVERNANCE Policies define digital health and health data governance roles, responsibilities, and structures.</p>	<p>The National eHealth Strategy is coordinated by the HIIRE TWG. The HIIRE TWG reports to MOH senior management and the eHealth Steering Committee. The DHI is responsible for the implementation of the strategy and is working with other MOH departments and partners to develop guidelines to support the implementation of digital health tools. In addition to the National eHealth Strategy, a sustainability strategy is in development.</p>
<p>DATA MANAGEMENT Policies provide specifications for data access, privacy, security, and confidentiality and outline stipulations for data sharing.</p>	<p>The Government of Uganda passed the Data Protection and Privacy Act in 2019, which outlines principles of data protection, standards for data collection and processing, data security, and rights of data subjects to ensure patient confidentiality. Other national laws, policies, and guidelines are in place or in development on computer misuse, transactions, e-signatures, and privacy and confidentiality for patient data. Knowledge management and data quality assurance guidelines and a data use toolkit are also in development.</p>
<p>STANDARDS AND INTEROPERABILITY Policies describe an enterprise architecture, normative standards—such as health information standards—and digital identity.</p>	<p>The MOH has prioritized the development of a national digital health enterprise architecture (planning for community health information systems) by the HIIRE TWG, which will define technology requirements and data exchange formats for interoperability, thus serving as the basis for development of all digital tools and allowing for exchange of information across different datasets. Implementation standards and guidelines for electronic medical records and unique identification are also in development. Guidelines for health-related surveys and assessments, the implementation of a master facility registry, the implementation of a patient registry, and the implementation of a community health information system are in development.</p>
<p>INFRASTRUCTURE Policies define data hosting and storage (e.g., local or cloud), mobile device management, and telecommunications access.</p>	<p>National guidelines for supporting digital health infrastructure, including equipment (e.g., computer, tablets, phones, devices, software, etc.) provision and maintenance are nascent. A large investment in hardware and training is required to implement digital health at the community level on a large scale. In addition, guidelines are in development for the hosting and management of health data and the implementation of telemedicine.</p>
<p>WORKFORCE Policies describe workforce job structures and descriptions, plans for training, digital literacy expectations, and incentives for digital adoption.</p>	<p>The current MOH structure is not responsive to the needs for implementation of digital health, resulting in dependency on partners. Some capacity building efforts are ongoing, but much of the digital health capacity lies within partner organizations. At the district level, there is basic training for health workers, but a lack of reliable connectivity and tools is a disincentive to adoption of digital tools.</p>



Data flow

VHTs record data in a paper register on a variety of indicators, disaggregated by age and sex, including births, deaths, vaccinations, family planning, home deliveries, and sanitation. They also maintain a village map to track where clients live and identify vulnerable populations. VHTs aggregate data into a summary form that is intended to be submitted to the health facility following the quarterly meeting of VHTs. Some VHTs, especially those supported by partners, use digital tools for data collection and reporting.

At the health facility level, staff submit weekly surveillance reports and monthly facility reports through either paper-based or digital tools (e.g., mTrac or DHIS2), depending on the facility. Health facility staff report data from the VHTs once per quarter. The closing date for reporting is 15 days after the end of the month, leaving limited time to gather and review information from VHTs. This also affects completeness of reporting.¹⁵ As a result of these challenges, reporting rate from the community is as low as 50 percent, but it is higher where there are partners to support community health programs. However, a level of granularity is lost when the summary data are entered into DHIS2 by a health facility rather than by VHTs.

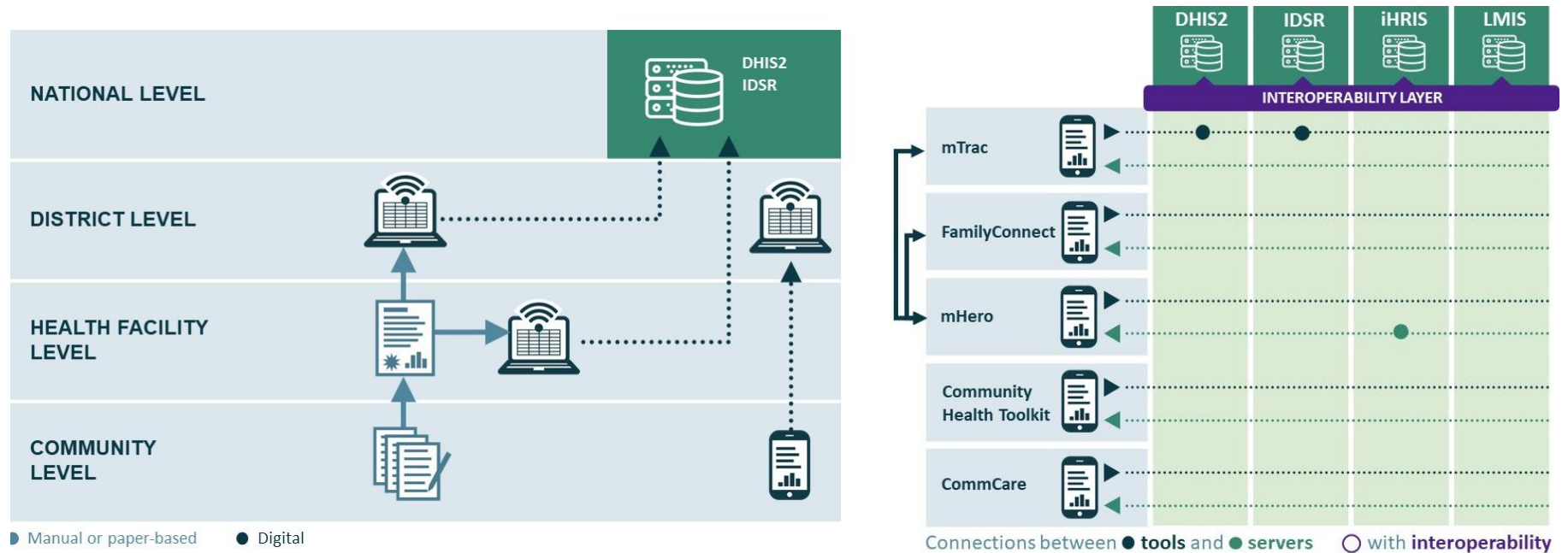
In addition to low reporting rates and a low level of engagement from health facilities on community data, the quarterly reporting structure of VHTs limits the ability to analyze community data with monthly health facility data and quickly respond to any issues the data identify. Reports from the health facility are managed by a biostatistician or Records Officers, with oversight from the facility in-charge and reported to the district biostatistician monthly, plus quarterly for VHTs. The District Health Office reviews the data and submits periodic reports to the MOH.¹⁶

Additional data systems that support community health and malaria program data include:

- The **Integrated Disease Surveillance and Response (IDSR) program**: IDSR was scaled nationally in 2012, and through this system, case-based information on notifiable diseases—including malaria—is reported weekly from the facility level along with lab results. Emergency events are reported immediately. This process is managed by the Records Officers at a facility with oversight from the facility in-charge. At the district level, priority IDSR data from DHIS2 are transcribed and reported to DHI and managed by the district biostatistician or surveillance focal person with oversight from the District Health Officer. Reports are summarized at the national level by the DHI, which provides feedback to districts and appropriate authorities.¹⁷
- **Human Resources for Health Information System (HRHIS)**: In 2018, the MOH began to implement a registry to be able to formally track community health workers in the country, including VHTs and other community health workers. The registry is built on the integrated Human Resource Information System (iHRIS) platform, a computerized human resource (HR) management tool consisting of electronic databases for storing, reporting, and analyzing that enables users to design and manage a comprehensive HR strategy. It links all HR data from the time professionals enter preservice training to when they leave the workforce and is designed to be integrated with the government HRIS portal.¹⁸ The new registry is intended to support identification and recruitment of existing VHTs who meet minimum education standards.¹⁹ The registry is managed at the district level by the biostatistician.
- The **logistics management information system** takes multiple forms depending on the health facility. Some facilities use a paper-based system with stock cards, a stock book, and order forms. Other facilities are implementing electronic solutions such as Clinicmaster,²⁰ RxSolution,²¹ or IICS.²²

While DHIS2 has the functionality to receive data, community data currently collected by partner-supported digital tools are managed on partners' servers and are not currently linked to DHIS2. The DHI aims to have partners submit community data to health facilities.

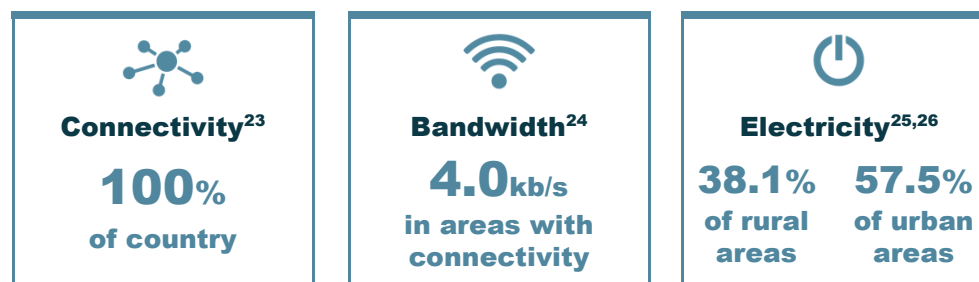
Most digital tools in use have very few connections with national data systems including DHIS2 and IDSR. For the tools that do send or receive information with national data systems (i.e., mTrac and mHero), it seems data is exchanged directly and does not flow through an interoperability layer. Other tools, including the Community Health Toolkit and CommCare do have the potential functionality of exchanging data with national data systems (including through an interoperability layer), but this does not appear to be enabled. Some tools in use are able to share information with each other, as indicated by the arrows in the second graphic.



Digitally enabling infrastructure

While electricity and mobile network connectivity are improving, significant gaps in coverage exist. Aside from larger cities—such as Kampala—the unreliable electricity supply makes charging digital devices a challenge. Regions with the lowest electricity coverage include West Nile, North Eastern (Karamoja), Western, and South Western hill areas, and fishing communities on the shores of Lake Victoria.

The major mobile network providers are Airtel, MTN, and AFRI Cell. Although coverage is reported to be 100 percent, some places have unusable networks as the network providers cannot justify investment in these places. Innovations are being piloted to have health facilities in areas with network access to relay network access to nearby health facilities with limited supply. The network coverage is also poor along the major highways. MTN is more reliable in major towns while Airtel is stronger off the main highway. In addition, the internet connectivity is better for calls and SMS, but less reliable for data.



Digital health tools in use and functionality

There are several digital health tools used by VHTs in Uganda in partner-supported pilots and implementation, but there is no single tool for public-sector community health programs. The MOH is developing a Community Health Management System suite of tools, which includes FamilyConnect, to engage VHTs and patients in seeking, reaching, and receiving essential health services. These tools are meant to help VHTs monitor patient-level outcomes, receive patient feedback, and receive detailed health information for the services they provide.²⁷ The Community Health Toolkit (CHT) is the basis for several tools in use in Uganda, including the Smart Health app introduced by Living Goods. The CHT and CommCare are currently used for iCCM and offer the most comprehensive set of use cases and functionalities.

USE CASE(S)	mTrac	FamilyConnect	mHero	CHT	CommCare
Providing malaria community case management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tracking malaria proactive and reactive case detection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tracking malaria screening with referral	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Transmitting messages to community on malaria	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Training health workers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tracking routine LLIN distribution during ANC or EPI visits	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

■ = Current use ■ = Possible, but not currently in use □ = Does not meet use case

	mTrac	Family Connect	mHero	CHT	CommCare
CASE MANAGEMENT FUNCTIONALITIES					
Aggregate case reporting and analytics Tool collects aggregate case data and has data analytic functions in tool or online	■	■	■	■	■
Individual case entry and analytics (<i>important in low-burden or elimination settings</i>) Tool collects individual case data and has data analytic functions in tool or online	□	■	■	■	■
Case geolocation (<i>important in low-burden or elimination settings</i>) Tool allows collection or use of geospatial data for individual cases	□	■	■	■	■
Interoperability with HMIS Tool sends information to the official national health information system	■	■	■	■	■
Offline capability Tool functions, at least partially, offline	■	■	■	■	■
MANAGEMENT & SUPERVISION FUNCTIONALITIES					
CHW identification Tool uniquely identifies CHWs	■	□	■	■	■
CHW catchment location Tool identifies CHW associated position in org unit hierarchy/link to health facility/system	□	□	■	■	■
CHW performance analytics Tool has analytic functions (data validation, graphs, charts) that support data quality, quality of care, or other performance issues	□	□	□	■	■
Communication Tool allows two-way communication between peer groups, associated health facilities, or supervisors	□	■	■	■	■

■ = Current functionality ■ = Possible, but functionality not currently in use □ = Does not have functionality

Appendices

APPENDIX A ► **References**

APPENDIX B ► **Abbreviations**

APPENDIX C ► **Contributors**

APPENDIX D ► **Community digital health tools**

APPENDIX E ► **Next-generation digital health tool functionalities for malaria case management**



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For more information: digitalsquare@path.org

APPENDIX A

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APPENDIX B

Abbreviations

ACT	artemisinin-based combination therapy	LLIN	long-lasting insecticidal net
ANC	antenatal care	LMIS	logistics management information system(s)
CDC	U.S. Centers for Disease Control and Prevention	MOH	Ministry of Health
CHT	Community Health Toolkit	NMCD	National Malaria Control Division
CHEW	community health extension worker	ODK	Open Data Kit
CHW	community health worker	PACE	Programme for Accessible Health Communication and Education
CIFF	Children's Investment Fund Foundation	PMI	U.S. President's Malaria Initiative
DHI	Division of Health Information	SMAPP	Smartphone App
EPI	Expanded Program on Immunization	SMS	short message service
HIIRE	Health Information, Innovation, and Research	TWG	technical working group
HISP	Health Information Systems Programme	UK FCDO	United Kingdom Foreign, Commonwealth & Development Office
HMIS	Health Management Information System	UMRESP	Uganda Malaria Reduction and Elimination Strategic Plan
HR	human resource	UNICEF	United Nations Children's Fund
HRHIS	Human Resources for Health Information System	USAID	United States Agency for International Development
iCCM	integrated community case management	VHT	Village Health Team
IDSR	Integrated Disease Surveillance and Response	WHO	World Health Organization
iHRIS	integrated Human Resource Information System		
IT	Information Technology		

APPENDIX C

Contributors

Informant Name	Organization
Andrew Abila	Living Goods
Mary Achen	Living Goods
Edgar Agaba	U.S. President's Malaria Initiative / USAID, Uganda
Dick Ainomugisha	The AIDS Support Organisation
Stephen Akena	Ministry of Health, Division of Health Information
Kenneth Alinda	BRAC Uganda
Maureen Amutuhair	Ministry of Health, National Malaria Control Division
Richard Arogai	The AIDS Support Organisation
Priscillah Balirwa	Living Goods
George William Barigye	PATH
Kassahun Belay	U.S. President's Malaria Initiative / USAID, Uganda
Warren Blessing	Living Goods
Bongomin Bodo	World Health Organization
Sarah Burnett	PATH
John Bwanika	Malaria Action Programme for Districts
Melissa Cederqvist Njihia	UNICEF Uganda
Immaculate Ddumba	U.S. President's Malaria Initiative / USAID, Uganda
Bayo Fatunmbi	World Health Organization
Rogers Kaganda	Living Goods
Carol Kamasaka	Ministry of Health, Division of Health Information
Stella Kanyerere	Living Goods
Matthias Kasule	Ministry of Health, National Malaria Control Division
Charles Katureebe	World Health Organization
Ruth Kigozi	Malaria Action Programme for Districts
Sam Kigundu	Catholic Relief Services
Nicholas Kizito	The AIDS Support Organisation
Steven Kwesiga	AIDS Information Centre
Daniel Kyabayinze	Ministry of Health, National Malaria Control Division
Myers Lugemwa	Ministry of Health, Department of Non-Communicable Diseases
Catherine Maiteki-Sebuguzi	Ministry of Health, National Malaria Control Division
Livingstone Makanga	Ministry of Health, Department of Reproductive and Child Health
Peter Mbabazi	Ministry of Health, National Malaria Control Division
Paul Mbaka	Ministry of Health, Division of Health Information
Chimwemwe Msukwa	UNICEF Uganda
Duncan Mugabi	The AIDS Support Organisation
Robert Mugerwa	Ministry of Health, National Malaria Control Division
Emmanuel Mugisha	PATH
Asaph Muhanguzi	PMI VectorLink
Mathias Mulumba	Centre for Participatory Research and Development
Daniel Mwanje	Community Health Care Initiatives

Ruth Nabwire	Ministry of Health, National Malaria Control Division
Sheila Nakalema	Ministry of Health, National Malaria Control Division
Nasan Natseri	World Health Organization
Rogers Naturinda	Ministry of Health, National Malaria Control Division
Charles Ngobi	The AIDS Support Organisation
Mame Niang	U.S. President's Malaria Initiative / USAID, Uganda
Lesley Ninsiima	Uganda Healthcare Federation
Jesca Nsungwa	Ministry of Health, Department of Reproductive and Child Health
Anthony Nuwa	Malaria Consortium
Jimmy Ogwal	Ministry of Health, Division of Health Information
Ivan Onyutta	Uganda Healthcare Federation
Jimmy Opigo	Ministry of Health, National Malaria Control Division
Anita Owakunda	Living Goods
Jessica Oyugi	UNICEF Uganda
Denis Rubahika	Ministry of Health, National Malaria Control Division
Damian Rutazaana	Ministry of Health, National Malaria Control Division
Anzél Schönfeldt	PATH
Allen Semambo	UNICEF
Stellah Sikyomu	PATH
Brian Ssenoga	Medic Mobile
Mary Tabaro	The AIDS Support Organisation
Rogers Twesigye	Regional Health Integration to Enhance Services in East Central Uganda (RHITES-EC)
George Upenytho	Ministry of Health, Department of Community Health
Andrew Wabwire	PATH

APPENDIX D

Community digital health tools*

Name of Tool	Type of Digital Health Intervention†	Implementer (Funder)	Scale	Malaria Use Case
mTrac	<p>1.1 Targeted client communication</p> <p>1.2 Untargeted client communication</p> <p>1.3 Client to client communication</p> <p>1.5 Citizen based reporting</p> <p>2.2 Client health records</p> <p>2.3 Healthcare provider decision support</p> <p>2.4 Telemedicine</p> <p>2.5 Healthcare provider communication</p> <p>2.6 Referral coordination</p> <p>2.7 Scheduling and activity planning for healthcare providers</p> <p>2.8 Healthcare provider training</p> <p>2.9 Prescription and medication</p> <p>3.2 Supply chain management</p> <p>3.3 Public health event notification</p> <p>3.4 Civil registration and vital statistics</p> <p>3.7 Facility management</p> <p>4.1 Data collection, management, and use</p> <p>4.3 Location mapping</p> <p>4.4 Data exchange and interoperability</p>	MOH, UNICEF, WHO	National	<ul style="list-style-type: none"> Tracking malaria proactive and reactive case detection Tracking malaria screening with referral Transmitting messages to community on malaria Training health workers Tracking routine LLIN distribution during ANC or EPI visits
FamilyConnect (RapidPro)	<p>1.1 Targeted client communication</p> <p>1.4 Personal health tracking</p> <p>2.1 Client identification and registration</p> <p>2.3 Healthcare provider decision support</p> <p>2.7 Scheduling and activity planning for healthcare providers</p> <p>2.10 Laboratory and diagnostics imaging management</p>	MOH, UNICEF (UK FCDO, The ELMA Foundation, Johnson & Johnson)	National	<ul style="list-style-type: none"> Training health workers Tracking routine LLIN distribution during ANC or EPI visits Transmitting messages to community on malaria
mHero	<p>2.5 Healthcare provider communication</p>	IntraHealth International, UNICEF, GoodCitizen,		<ul style="list-style-type: none"> Tracking malaria screening and referral

Name of Tool	Type of Digital Health Intervention [†]	Implementer (Funder)	Scale	Malaria Use Case
Community Health Toolkit (CHT)	1.1 Targeted client communication 2.1 Client identification and registration 2.2 Client health records 2.3 Healthcare provider decision support 2.4 Telemedicine 2.5 Healthcare provider communication 2.7 Scheduling and activity planning for healthcare providers 2.8 Healthcare provider training 2.9 Prescription and medication 3.1 Human resource management 3.4 Civil registration and vital statistics 4.1 Data collection, management, and use 4.3 Location mapping	Living Goods (Skoll Foundation, The ELMA Foundation, Gavi, CIFF), BRAC, Malaria Consortium	National	<ul style="list-style-type: none"> • Providing malaria community case management • Tracking malaria proactive and reactive case detection • Tracking malaria screening with referral • Transmitting messages to community on malaria • Training health workers • Tracking routine LLIN distribution during ANC or EPI visits
CommCare	1.1 Targeted client communication 2.1 Client identification and registration 2.2 Client health records 3.1 Human resource management 3.2 Supply chain management 4.1 Data collection, management, and use 4.3 Location mapping	Pilgrim Africa (Gates Foundation), World Vision	Eastern	<ul style="list-style-type: none"> • Providing malaria community case management • Tracking malaria proactive and reactive case detection • Tracking malaria screening with referral • Transmitting messages to community on malaria • Training health workers • Tracking routine LLIN distribution during ANC or EPI visits
Open Data Kit (ODK)	2.7 Scheduling and activity planning for healthcare providers 3.7 Facility management 4.1 Data collection, management, and use 4.3 Location mapping	MOH, WHO, HISP	National	<ul style="list-style-type: none"> • Tracking routine LLIN distribution during ANC or EPI visits • Training health workers

Name of Tool	Type of Digital Health Intervention [†]	Implementer (Funder)	Scale	Malaria Use Case
E-referral system	1.1 Targeted client communication 1.3 Client to client communication 2.1 Client identification and registration 2.2 Client health records 2.3 Healthcare provider decision support 2.5 Healthcare provider communication 2.6 Referral coordination 4.1 Data collection, management, and use	PACE (CDC)	Central	<ul style="list-style-type: none"> Tracking malaria screening with referral
Community Health Academy	1.2 Untargeted client communication 1.6 On demand information services to clients 2.8 Healthcare provider training 3.1 Human resource management 4.4 Data exchange and interoperability	Last Mile Health	National	<ul style="list-style-type: none"> Training health workers
Data Logger Smartphone App (SMAPP)	1.4 Personal health tracking 2.2 Client health records 2.5 Healthcare provider communication 2.10 Laboratory and diagnostics imaging management 3.2 Supply chain management 3.3 Public health event notification 4.1 Data collection, management, and use 4.3 Location mapping	MOH (Abbott)	Mpigi	<ul style="list-style-type: none"> Providing malaria community case management
Open Client Registry	2.1 Client identification and registration 2.2 Client health records	IntraHealth	National	<ul style="list-style-type: none"> Providing malaria community case management

*Data that come from the survey have not been independently validated aside from tools featured within the profile.

[†]See [Classification of digital health interventions v1.0](#), World Health Organization, 2018.

APPENDIX E

Next-generation digital health tool functionalities for malaria case management

CASE MANAGEMENT FUNCTIONALITIES	mTrac	FamilyConnect	mHero	CHT	CommCare
Notifications Tool sends and receives notifications	■	■	■	■	■
Stock reporting & analytics Tool collects stock data and has analytic functions to support stock and logistics data analysis and decision-making	□	□	■	■	■
Interoperability with other national health systems Tool sends information to other national systems (iHRIS, LMIS, etc.)	■	■	■	■	■
Referral coordination Tool allows CHW to notify local health facility of referrals and track them	□	■	□	■	■
Scheduling & work planning Tool allows CHW to plan and schedule key activities in the community	□	□	□	■	■
MANAGEMENT & SUPERVISION FUNCTIONALITIES	mTrac	FamilyConnect	mHero	CHT	CommCare
Decision support Tool provides algorithms or checklists to guide CHW service provision	■	□	■	■	■
Training materials & resources Tool provides access to training materials, policies, or other useful reference documents	□	■	□	■	■
CHW geolocation Tool allows collection or use of CHW geolocation data for monitoring and planning distribution	□	□	■	■	■
Supervision Tool can be used by supervisors to assess CHW skills and capacity	□	■	□	■	■

■ = Current functionality ■ = Possible, but functionality not currently in use □ = Does not have functionality