PMI | U.S. PRESIDENT'S MALARIA INITIATIVE
LED BY

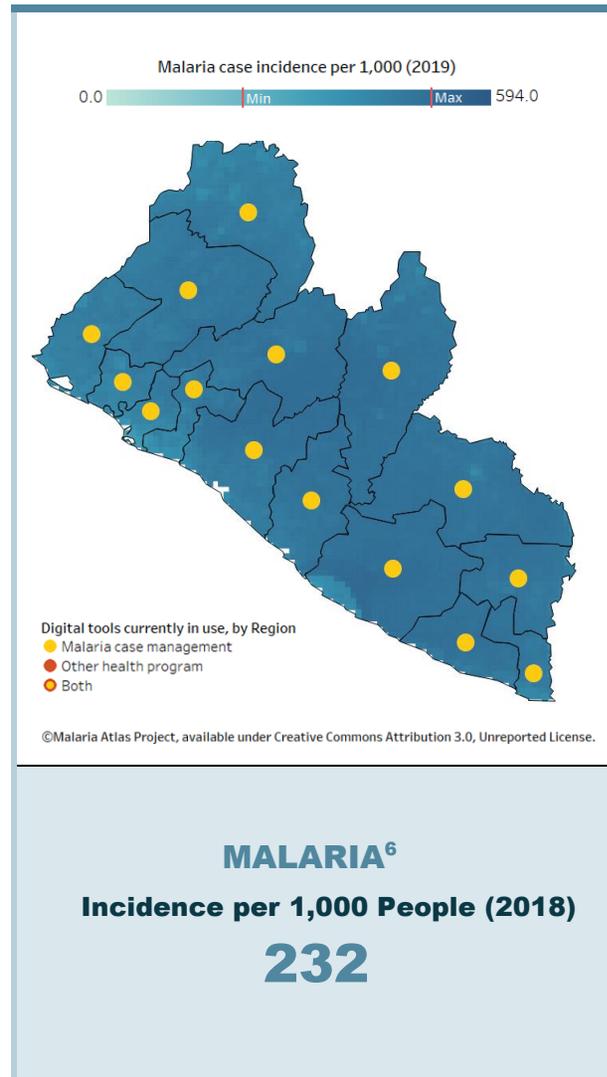**USAID** FROM THE AMERICAN PEOPLE

CDC

LIBERIA

Executive Summary

Malaria is endemic in Liberia, with transmission throughout the year and with children under five years old and pregnant women the most at risk.[1] Under the direction of the National Community Health Program (NCHP), a team of trained community health assistants (CHAs) provides malaria services through integrated community case management (iCCM) for populations living more than five kilometers from the nearest health facility. All of the CHAs have experience with at least one digital health tool.[2] The Liberian Health Information System and Information and Communications Technology (ICT) Strategic Plan 2016-2021 guides coordination of digital health initiatives.

However, significant challenges limit Liberia's capacity to scale up the use of digital health at the community level. The number of CHAs is insufficient, resulting in inequitable health access. While widely dispersed throughout the country, most digital health initiatives for CHAs remain at the pilot stage. The digitally enabling infrastructure in Liberia is also lacking. Only seven percent[3] of rural areas have access to electricity, and mobile network coverage can be scarce.

This report includes concrete recommendations developed by key country stakeholders for improving data quality and management across people, systems, and government. With investment and support, Liberia will be able to increase the number of CHAs providing high-quality malaria services and using digital tools to contribute to malaria elimination.

Malaria case incidence per 1,000 (2019)

0.0 | Min | Max | 594.0

Digital tools currently in use, by Region
- Malaria case management
- Other health program
- Both

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MALARIA[6]

Incidence per 1,000 People (2018)

232

PEOPLE

Community Health Assistant (CHA)

4,000 CHAs[4]

1 per 500 people

GOVERNANCE

National Digital Health Strategy

YES

SYSTEMS

Digital Health Index[5]

SCORE: 1

digital square

Recommended Actions

PEOPLE

Community health workers and other decision-makers

Involve CHAs in the rollout of digital tools

Support Ministry of Health (MOH) key staff in developing recommendations for CHA inclusion in digital health pilot initiatives and implementing these standards with partners. Standards will encourage partners to incorporate user experience and feedback when piloting tools for CHAs and encourage the development of digital tool training that is adapted to the needs of CHAs to support malaria case management.

Scale up CHA cadres

Support the MOH in identifying internal funding sources to hire and provide CHA training to an additional 1,000 CHAs in underserved counties and districts. This number will cover 25 percent of the current gap between trained CHAs and the MOH's stated needs and contribute to greater health equity in accessing malaria services at the community level.

Incorporate digital health into the integrated career development plan for CHAs

Support the Community Health Services Department / Health Promotion Division and MOH Human Resource Unit in building digital health capacity and incentives into the integrated career development plan for CHAs to support their continued learning

GOVERNANCE

Strategies and policies

Conduct a coordinated review of digital health governance documents

Support the MOH ICT Unit and other key stakeholders in reviewing and updating existing policies, guidelines, and standard operating procedures (SOPs) related to digital health to promote consistency and the inclusion of community health priorities, including malaria.

Incorporate digital health into NCHP policy

Support the NCHP and ICT Unit in developing digital policy guidelines for community health to be incorporated into legislation, with a guidance requirement to include digital tool training into the CHA preservice curriculum.

Develop digital health SOPs for iCCM

Support the MOH in integrating digital health aspects into the existing iCCM SOPs to guide partners' digital health initiatives, including malaria services, to ensure consistent, high-quality service provision.

Ensure long-term financing for the National Community Health Program

Engage with the Health Financing Unit at the MOH and other government

SYSTEMS

Processes and digital tools

Evaluate existing digital health tools to identify a tool for scale-up

Evaluate impact of existing CHA digital health tools being piloted by the MOH and other partners to identify the most appropriate tool to adopt/adapt for national scale-up to support the national program and partners. CHAs should be actively involved in the evaluation and adaptation of the selected tool.

Conduct cost analysis for digital health integration

Support the MOH and partners in conducting a cost analysis to determine the total cost for introducing and scaling up new data collection and analysis technologies for malaria case management at the community level, including data integration with other levels. This cost analysis will help to inform advocacy and resource mobilization to address key digital health infrastructure gaps.

Increase mobile network coverage

Engage with the MOH to identify opportunities for public-private partnerships with major telecommunications companies in Liberia with a goal of improving mobile network coverage in remote parts of the country.

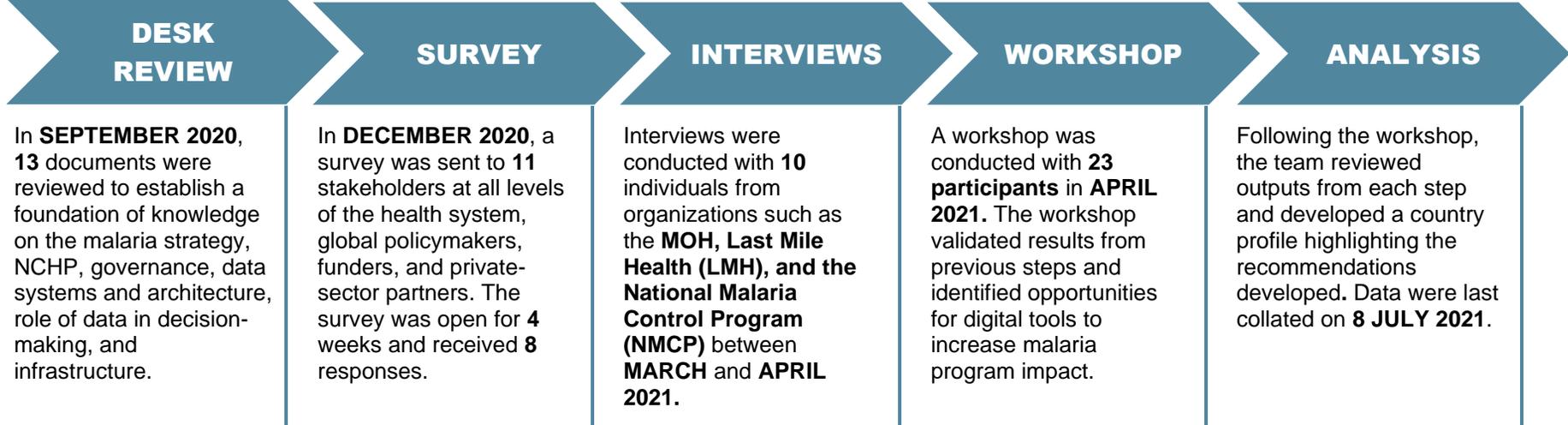and advancement and to contribute to performance, recognition, and motivation.

stakeholders to support development of a long-term financing strategy to sustain and expand the NCHP, as well as support the MOH in developing a strategy to leverage government resources to directly support CHAs and community health service supervisors (CHSSs) and overcome transition and other challenges related to irregular partner funding streams.

Increase MOH oversight and coordination of pilot initiatives

Support the MOH in putting into place an internal mechanism to systematically oversee and manage digital health tool pilots, centralizing information from tool evaluations and assessments, and providing guidance on tool scale-up. This initiative will enable better coordination of partner initiatives and ensure tools align with country health priorities, including for malaria.

Methodology

The Liberia country profile was developed through the following process: conducting a desk review, deploying an online survey focused on the digital landscape, conducting key informant interviews, and facilitating a workshop to validate the results and prioritize recommended actions. To protect stakeholders from COVID-19, many activities were conducted virtually. See Appendix C for a list of key informant interviewees and workshop participants, and Appendix D for detailed information on the results of the online digital tools survey.

DESK REVIEW	SURVEY	INTERVIEWS	WORKSHOP	ANALYSIS
In **SEPTEMBER 2020**, **13** documents were reviewed to establish a foundation of knowledge on the malaria strategy, NCHP, governance, data systems and architecture, role of data in decision-making, and infrastructure.	In **DECEMBER 2020**, a survey was sent to **11** stakeholders at all levels of the health system, global policymakers, funders, and private-sector partners. The survey was open for **4** weeks and received **8** responses.	Interviews were conducted with **10** individuals from organizations such as the **MOH, Last Mile Health (LMH), and the National Malaria Control Program (NMCP)** between **MARCH** and **APRIL 2021.**	A workshop was conducted with **23 participants** in **APRIL 2021.** The workshop validated results from previous steps and identified opportunities for digital tools to increase malaria program impact.	Following the workshop, the team reviewed outputs from each step and developed a country profile highlighting the recommendations developed**. Data were last collated on **8 JULY 2021**.

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

The NCHP covers 14 of Liberia's 15 counties. CHAs are recruited to work in communities. They complete a six-month MOH training on health promotion and preventive and curative services and are supervised by clinic-based CHSSs. In addition to CHAs, community health volunteers (CHVs) are trained in community engagement and health promotion. CHVs work within five kilometers of a health facility, and CHAs operate beyond 5 km. Community health committees (CHCs)—comprising religious, traditional, women, and youth leaders and CHAs—coordinate health activities in their communities. They report to health facility development committees, consisting of elected representatives of CHAs, CHSS, the facility, and the community, who link the health facility and its catchment community. The government has not yet started paying CHAs but plans to gradually roll them into the payroll. Incentives for CHAs are paid by donors, and have been since 2017, at a rate of US$70.00 per month.[7] While CHAs contribute to decreasing malaria, particularly among children under five years old, the current number of CHAs does not meet the needs of the rural population, particularly in southeastern counties, where donor funding has ended. According to the MOH, approximately 8,000 CHAs are needed to cover the population that lives more than five kilometers from a health facility.[7]

4,000 Community Health Assistants (CHAs) in country	**Compensation Policy: PAID** Paid by external party
4,000 Providing malaria community case management	**Compensation Policy: PAID** Paid by external party

CHAs provide iCCM services, which includes treating malaria, diarrhea, and pneumonia for children under five years old. CHA malaria-specific services include diagnosis and treatment of uncomplicated malaria, insecticide-treated net distribution campaigns, community health promotion and mobilization, and proactive case detection. Pre-referral rectal artesunate for severe malaria was piloted in Rivercess and Grand Bassa Counties and is being reviewed for scale-up to other counties; however, funding is required. Community health and malaria partners in Liberia are as follows: the Global Fund, the U.S. President's Malaria Initiative (PMI), the World Health Organization, LMH, the International Rescue Committee, UNICEF, Partners in Health, and the World Bank.

Community health worker digital readiness

CHAs are required to be literate in English, have basic math skills, and be fluent in the local dialect of the area they serve. The CHA preservice curriculum does not include digital health, but it is being revised to include it in the future. In areas where digital tools are being used, CHAs receive tool-specific hands-on training. In 2019, LMH rolled out devices with the Liberia Open Data Kit (LODK), a data collection and aggregation tool, to over 2,200 CHAs and CHSSs across the NCHP. LODK enables CHAs to collect more data than the paper-based forms and transfer data without an internet connection.[8] In addition, LMH has an ongoing e-learning platform and digital application, CHA Academy that has reached nearly all 4,000 CHAs. LMH plans to continue to support the MOH through initiatives to digitalize both the national community health reporting systems and the national training curriculum.[9] Dedicated technicians for digital health exist only at the national level and 15 county-based ICT technicians will be hired under the mHealth strategy if funding becomes available. Monitoring and evaluation (M&E) staff currently serve as ICT technicians, but their M&E workloads leave little time to provide digital health support. In-country implementing partners have the skills and expertise to address technical issues at various levels. LMH will fund the travel of ICT technicians and plans to replace devices every four years.

Data-driven decisions at each level of health system

Data are used for decision-making at the national level and, to a lesser extent, other levels of the health system. Grand Gedeh, Grand Bassa, and Rivercess Counties are currently piloting the use of the LODK to improve the timely availability, quality, and use of data for decision-making, although results are not yet available. Bimonthly surveillance and M&E meetings are conducted by the NMCP's Surveillance Monitoring, Evaluation, and Operational Research Unit and the MOH's Health Management Information System (HMIS), Monitoring and Evaluation, and Research Unit. Quarterly data review meetings are held with the county health teams and partners to assess program performance, identify data gaps, and resolve quality issues. Implementing partners also support county health teams in holding monthly data review meetings.

NATIONAL LEVEL	Data and reports are accessible to the MOH and partners to use for decision-making: the MOH reviews data related to the quality, timeliness, and consistency of malaria service coverage to assess the impact on the population; and data are used to quantify commodity needs and resource allocation. Liberia's HMIS is managed through the District Health Information Software v. 2 (DHIS2). The Community-Based Information System (CBIS), a subsystem within the HMIS, captures information from the NCHP, including malaria data. The MOH Central-Level CBIS Focal Point is responsible for the overall management of the system, including troubleshooting and providing reports to stakeholders, and uses data for coordination and management of other health information systems (HISs) and subsystems to ensure interoperability.[10]
REGIONAL / PROVINCE / STATE LEVEL	County M&E teams, comprising the County M&E Officer and staff, provide feedback to health facilities and conduct monthly verification of malaria and other health data. The M&E Officer is responsible for providing data and information to line managers, program supervisors, and other stakeholders in the county. The CBIS is analyzed for use in coordination and management meetings. Quarterly meetings take place to review malaria case management data at the county level.
DISTRICT/ SUB-NATIONAL LEVEL	The district level focuses more on data management rather than decision-making. The primary responsibility of the District Health Officer (DHO) is to collect reports from the district's facilities on a monthly basis and transmit those data to the county M&E team. The DHO is responsible for ensuring that the Officers in Charge (OICs) of health facilities and CHSSs use data available for decision-making at the facility level on malaria and other health issues.
HEALTH FACILITY LEVEL	Each CHSS is responsible for analyzing individual CHA forms to make informed decisions regarding changes needed for community health service delivery. The CHSS and OIC analyze data to oversee quality assurance and disease tracking and to determine the need for quality improvements and CHA supervision. For example, if the number of patients treated for malaria within 24 hours of diagnosis is much lower than the number of patients treated after 24 hours, the CHSS can coach the CHA on the importance of routine visits and community education on malaria. Additionally, feedback from the district or county to the facility can trigger action to be taken in the CHSS's catchment community.
COMMUNITY LEVEL	Information from the CHA data collection forms can be used by the CHAs, CHSSs, and CHCs for decision-making around health education and other interventions, including malaria services. For example, the CHA can present the number of incidents of diarrhea in the community to the CHC, and together they can plan an intervention on sanitation and clean drinking water.

Governance

	DIGITAL	COMMUNITY HEALTH	MALARIA
Name	Liberian Health Information System & ICT Strategic Plan	Revised National Community Health Services Strategic Plan	Liberia National Malaria Strategic Plan
Current strategy dates	2016–2021	2016–2021	2021–2025
Coordinating body	National Digital Health Coordinating Body	Community Health Technical Working Group Community Health Steering Committee	iCCM Technical Working Group Vector Control Technical Working Group Malaria in Pregnancy Technical Working Group M&E Technical Working Group Laboratory Working Group
Funding strategy	No	No	Yes

The NCHP, the ICT Unit, and ICT Steering Committee are the key decision-makers regarding the use of digital health systems for the MOH. The national mHealth strategy, an offshoot of the Health Information System (HIS) & ICT Strategic Plan, was authorized in February 2021. This strategy gives the ICT Unit the power to oversee all mHealth applications in collaboration with donors and partners. In addition, the mHealth strategy will work towards developing laws and enabling policies for mHealth to promote growth in the ICT industry. Developing a digital health policy is one component of the mHealth strategy. The mHealth strategy requires coordination with other agencies, such as the Ministry of Finance and the Ministry of Posts and Telecommunication. The NCHP also has a digital strategy, as well as a coordinating body that meets regularly to decide on tools to be used for digital health. Its members include various MOH units, such as IT, M&E, HIS, and Research, and the Community Health Services Division.

The National Malaria Strategic Plan does not include plans for the use of digital health; however, any decisions to use digital tools for iCCM will include malaria services. The Community Health Services Division provides leadership and oversight for malaria community health activities through iCCM. The district health team (DHT) is responsible for supervision, training, and policy dissemination at each health facility. This level also supervises community-level implementation of malaria case management by CHAs and CHSSs. CHAs report to the CHSS and CHVs report to other clinic staff based on their specific job descriptions. In addition to supervisory visits, CHSSs also transport commodities to CHAs and collate malaria case counts, which are entered into the CBIS, which is a subsystem within the HMIS.

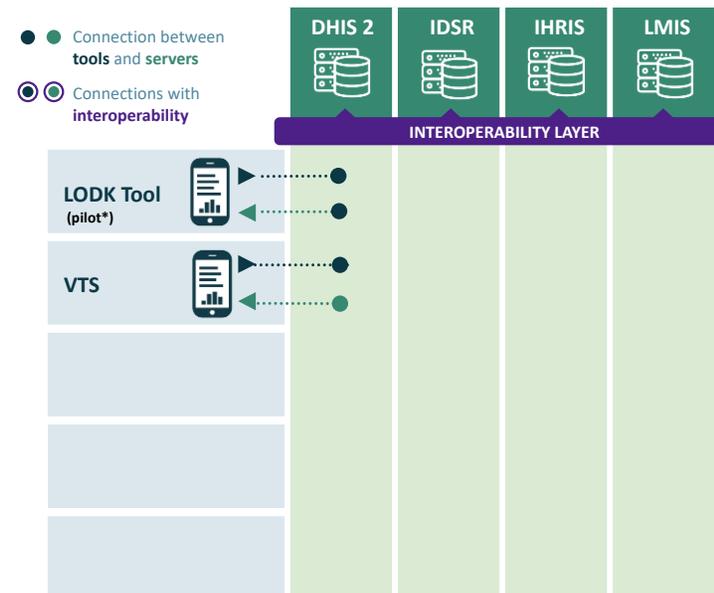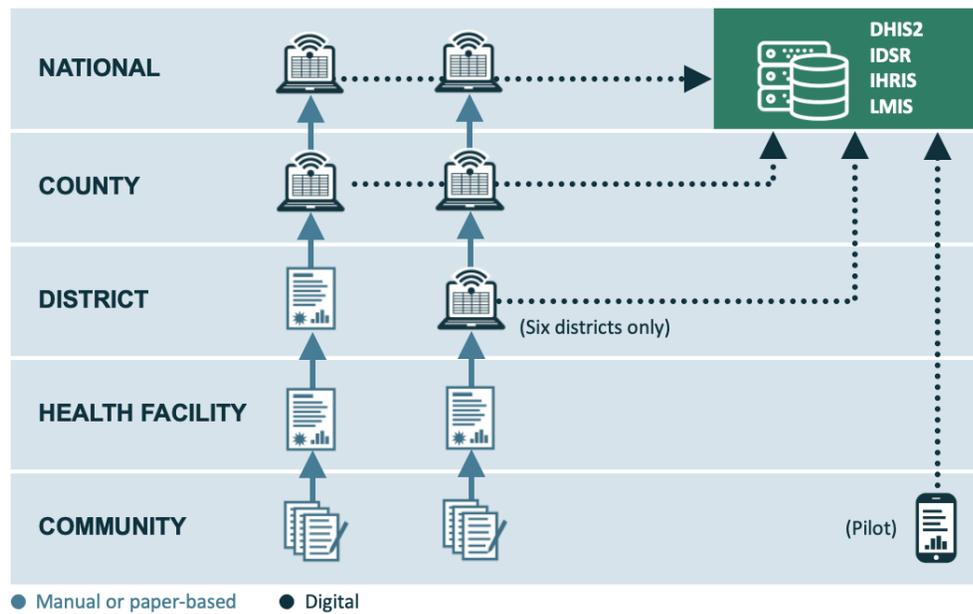|	
GOVERNANCE Policies define digital health and health data governance roles, responsibilities, and structures.	The Liberian Health Information System & ICT Strategic Plan includes Liberia's current digital health strategy, which in turn includes the national digital health policy. The policy has been rolled out but is in its infancy, so it is premature to gauge its impact or effectiveness. A full costing of the policy also needs to be undertaken to assess the full cost of implementation. Decisions about the use of digital health systems, including for malaria, are made together by the Deputy Minister for Planning and Policy and the Deputy Minister for Administration at the MOH.
DATA MANAGEMENT Policies provide specifications for data access, privacy, security, and confidentiality and outline stipulations for data sharing.	No specific legislation protects patient or health data. Similarly, Liberia lacks sufficient SOPs and guidelines for the implementation of mHealth strategy. While there is a plan to develop SOPs during the first half of 2021, this process has not yet started.
STANDARDS AND INTEROPERABILITY Policies describe an enterprise architecture, normative standards—such as health information standards—and digital identity.	The MOH, along with other government institutions, provides guidance for the Liberian health system and HIS functioning. Currently, the MOH organizational structure is based on a set of governance, policy, and SOP documents defining the mission, processes, and standard operations to guide daily functioning of the health system and the HIS. No national HIS enterprise architecture document defines technology requirements and data exchange formats for interoperability. HIS ICT policy expires in 2021 and will be reworked to include this information.
INFRASTRUCTURE Policies define data hosting and storage (e.g., local or cloud), mobile device management, and telecommunications access.	The Liberia Telecommunication Authority has a cyber security policy for all government line agencies. The MOH uses NetSuite, a cloud-based system hosted in the United States, for financial management, procurement, human resources, fixed asset management, and program management for malaria and other health areas. DHIS data are also stored in the cloud, and the Liberian Health Information System & ICT Strategic Plan includes storage and hosting guidelines.
WORKFORCE Policies describe workforce job structures and descriptions, plans for training, digital literacy expectations, and incentives for digital adoption.	The Department of Administration manages the health workforce. No strategy or policy guides workforce digitalization issues. The Community Health Services Department, in collaboration with the Health Promotion Division and the Environmental and Occupational Health Division, plans to work closely with the MOH Human Resources Unit and other relevant stakeholders to develop an integrated career development plan for CHAs that creates a pathway for continued learning and advancement for motivated CHAs while also encouraging retention of these individuals within the health sector.

Systems

Data flow

Data are collected using paper-based forms at the community, facility, and district levels, while digital tools are used at the district level in six districts but otherwise at the county and national levels to feed into the CBIS/DHIS2. CHAs and CHVs submit health service data related to health promotion, prevention, and care services on a monthly basis. They use iCCM reporting forms to aggregate monthly service delivery data, which are submitted to the CHSS at the health facility level. The CHSS validates data before submitting them and provides feedback to CHAs on data quality. After review, the CHSS and the OIC tabulate the data onto the facility monthly reporting forms. The facility data are then submitted to the DHO and the DHT, who collect and review monthly activity reports from the facilities before submission to the county health team. The county level M&E teams collect, collate, and enter the paper–based data into DHIS2, although six districts now enter their data into DHIS2 directly. At the national level, the NMCP and the MOH receive data through DHIS2. The national-level system is managed by the MOH's HMIS, Monitoring and Evaluation, and Research Unit. At the national level, data analysis is done using dashboards and bulletins specific to malaria prevention and control.

Across Liberia, various pilot projects on digital health tools are in progress, and no evaluations are available yet. There are pilot tools for malaria case management in use in each county, although not in all districts within the counties. The LMH LODK is operational in three counties: as pilots in Grand Gedeh and Grand Bassa and fully scaled up in Rivercess. It is designed for Liberia to digitize data collection for CHA household visits for diagnosis and treatment using the sick child management form, which tracks all forms of childhood illness. In 14 of the 15 counties, the LMH Academy app is used at full scale by 3,600 CHAs for continuing education through the Community Health Academy. This Continuing Clinical Education initiative digitized the National CHA Program curriculum and introduced sections of the NCHP curriculum on diagnosing and treating cough and pneumonia. LMH and other consultants developed the NCHP curriculum system and training videos for CHA devices. The Deutsche Gesellschaft für Internationale Zusammenarbeit (German Society for International Cooperation) developed the integrated Human Resource Information System, and the United States Agency for International Development and UNICEF assisted with mHero, a two-way communication system that connects health workers through messaging. The MOH and LMH are piloting a vaccine tracking tool, which is being used by 230 CHAs in Rivercess. Also, UNICEF implemented the Child Friendly Communities tool (which included malaria as part of the community scorecard) in the Southeast Region until funding ended in March 2020.

The results of the LMH LODK and the CHA Academy pilot will contribute to the MOH's development of an electronic CBIS tool, which allows for digital collection of the data that feeds into the CBIS. It will likely consist of a suite of tools designed to enhance the National CHA Program workflows and the existing CBIS system, which is a subsystem of DHIS2. With the electronic CBIS tool, CHAs will continue to report all CBIS indicators. The existing paper forms will be used as a backup for instances where the technology is not viable. Plans also include new tools and systems, such as Bluetooth transfer for supervisors so that the system can be used without internet, in response to current poor network coverage. While this transition addresses issues of community-level data collection quality, other challenges that will need to be addressed are the lack of equipment and supplies for CHAs and CHSSs, poor network connectivity, and the limited rural electrical network. Interoperability is an ongoing issue, and decisions will need to be made once pilots are completed. There is no national HIS enterprise architecture document defining technology requirements and data exchange formats for interoperability between digital tools and the CBIS/DHIS2. However, a proposal has been submitted to the Global Fund to support creation of interoperability between DHIS2 and the LMIS in the coming year.
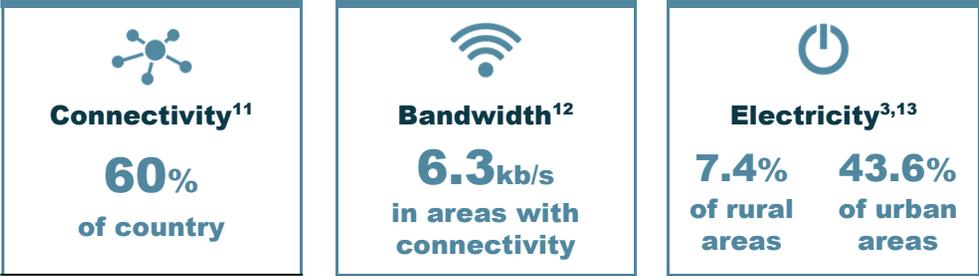
Left diagram — vertical health system levels:

NATIONAL → DHIS2, IDSR, IHRIS, LMIS

COUNTY

DISTRICT (Six districts only)

HEALTH FACILITY

COMMUNITY (Pilot)

Legend: ● Manual or paper-based   ● Digital

Right diagram:

● ● Connection between **tools** and **servers**

◉ ◎ Connections with **interoperability**

Servers: DHIS 2 | IDSR | IHRIS | LMIS

INTEROPERABILITY LAYER

LODK Tool (pilot*)

VTS

*LODK has this potential but it is not currently used.

Abbreviations: DHIS2, District Health Information Software 2; IDSR, Integrated Disease Surveillance and Response; iHRIS, integrated Human Resource Information System; LMIS, logistics management information system; LODK, Liberia Open Data Kit; VTS, Vaccine Tracking System.

Digitally enabling infrastructure

Electricity is in short supply in Liberia. The national electricity company provides electricity to six percent of health facilities. At the county and central levels, power is mainly produced by generators (50 percent), solar panels (31 percent) and a combination of generators and solar panels (13 percent).[14] Only 58 percent of health facilities have access to 18 hours of electricity per day.

Most counties have access to at least one network operator (92 percent),[15] and one-third of counties have access to more than two network operators. The MOH central headquarters has 100 percent network coverage, but coverage drops to 93 percent at the county headquarters level and to 58 percent at the facility level.[15]

Connectivity[11]	Bandwidth[12]	Electricity[3,13]	
60% of country	**6.3**kb/s in areas with connectivity	**7.4%** of rural areas	**43.6%** of urban areas

Digital health tools in use and functionality

Liberia has a functioning data-capturing and flow system for malaria and other health data. The country's data backbone for community health data is the CBIS, which currently relies on paper-based data collection that is entered into DHIS2 and is available nationally. CBIS is available at health facilities and is supported by community data collection via LODK, which is used by the CHAs in areas beyond five kilometers from health facilities. Although the Child Friendly Communities pilot project has ended, this tool may merit review for future use.

USE CASE(S)	VTS	CFC (Ended)	LODK
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	☐	☐	☐

◼ = Current use   ◼ = Possible, but not currently in use   ☐ = Does not meet use case

Abbreviations: ANC, antenatal care; CFC, Child Friendly Communities; EPI, Expanded Program on Immunization; LLIN, long-lasting insecticide-treated net; LODK, Liberia Open Data Kit; VTS, Vaccine Tracking System.

CASE MANAGEMENT FUNCTIONALITIES	VTS	CFC (ended)	LODK
Aggregate case reporting and analytics Tool collects aggregate case data and has data analytic functions in tool or online	■	■	■
Individual case entry and analytics (*important in low-burden or elimination settings*) Tool collects individual case data and has data analytic functions in tool or online	■	■	▨
Case geolocation (*important in low-burden or elimination settings*) 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	VTS	CFC (ended)	LODK
CHW identification Tool uniquely identifies CHWs	□	■	■
CHW facility catchment location Tool identifies CHWs 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 currently not in use □ = Does not have functionality

Abbreviations: CFC, Child Friendly Communities; CHW, community health worker; HMIS, Health Management Information Syst.; LODK, Liberia Open Data Kit; VTS, Vaccine Tracking Syst.

Appendices

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Abbreviations

ANC	antenatal care
CBIS	Community-Based Information System
CFC	Child Friendly Communities
CHA	community health assistant
CHC	community health committee
CHSS	community health service supervisor
CHV	community health volunteer
DHIS2	District Health Information Software v. 2
DHO	District Health Officer
DHT	district health team
EPI	Expanded Program on Immunization
HIS	health information system
HMIS	Health Management Information System
iCCM	integrated community case management
ICT	information and communication technology
iHRIS	integrated Human Resource Information System
LLIN	long-lasting insecticide-treated net
LMH	Last Mile Health
LODK	Liberia Open Data Kit
M&E	monitoring and evaluation
MOH	Ministry of Health

NCHP	National Community Health Program
NMCP	National Malaria Control Program
OIC	Officer in Charge
PMI	United States President's Malaria Initiative
SOP	standard operating procedure
UNICEF	United Nations Children's Fund
VTS	Vaccine Tracking System

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Community digital health tools*

Name of Tool	Type of Digital Health Intervention†	Implementer (Funder)	Scale	Malaria Use Case
Child Friendly Communities	**1.1** Targeted client communication **1.2** Untargeted client communication **1.3** Client-to-client communication **1.5** Citizen-based reporting **2.1** Client identification and registration **2.2** Client health records **2.3** Health care provider decision support **2.4** Telemedicine **2.5** Health care provider communication **2.7** Scheduling and activity planning for health care providers **2.8** Health care provider training **2.9** Prescription and medication management **3.1** Human resource management **3.2** Supply chain management **3.4** Civil Registration and Vital Statistics **3.5** Health financing **4.1** Data collection, management, and use **4.2** Data coding **4.3** Location mapping	UNICEF (UNICEF)	Grand Gedeh 250 users (closed)	Malaria case management Malaria screening with referral Malaria active or reactive case detection (visiting communities to find additional cases) Communication/messaging to community on malaria Training of health workers

Name of Tool	Type of Digital Health Intervention[†]	Implementer (Funder)	Scale	Malaria Use Case
Vaccine Tracking System (VTS)	**1.1** Targeted client communication **2.1** Client identification and registration **2.2** Client health records **2.5** Health care provider communication **2.7** Scheduling and activity planning for health care providers **2.8** Health care provider training **3.2** Supply chain management **3.4** Civil Registration and Vital Statistics **4.1** Data collection, management, and use **4.4** Data exchange and interoperability	Ministry of Health in collaboration with Last Mile Health (Gavi, the Vaccine Alliance and Last Mile Health)	Subnational 306 users	Vaccine / Expanded Program on Immunization
Liberia Open Data Kit (LODK)	**2.2** Client health records	Last Mile Health (Last Mile Health)	Grand Gedeh County, Rivercess County, Grand Bassa County 4,000 CHA users	Digital data collection for CHA household visits for diagnosis and treatment using the sick child management form, which tracks all forms of childhood illness Malaria case management Malaria screening with referral Malaria active or reactive case detection (visiting communities to find additional cases)
CHA Academy App	**2.5** Health care provider communication	Last Mile Health (Last Mile Health)	14 counties 4000 users	Supervision from Central, CHSS, Community Health Focal Person, Health Promotion Focal Person
Implementation Fidelity Initiative	**2.5** Health care provider communication	Last Mile Health (Last Mile Health)	14 counties	Supervision using Kobo-Collect App
mHero	**2.5** Health care provider communication	UNICEF (UNICEF)	National	Two-way communication system that connects health workers through messaging
CommCare	**2.2** Client health records	Partnership for Advancing Community-Based Services (PACS)	Bong County	Use case unknown
CommCare	**2.2** Client health records	Partners in Health (Partners in Health)	Maryland County	Use case unknown

*Data come from the survey and have not been independently validated aside from tools featured within the profile.
[†]See Classification of digital health interventions v1.0, World Health Organization, 2018.
Abbreviations: CHA, community health assistant; CHSS, community health service supervisor; UNICEF, United Nations Children's Fund.

Next-generation digital health tool functionalities for malaria case management

CASE MANAGEMENT FUNCTIONALITIES	VTS	CFC (ended)	LODK
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	■	□	■

Abbreviations: CFC, Child Friendly Communities; CHW, community health worker; iHRIS, integrated Human Resources Information System; LMIS, logistics management information system; LODK, Liberia Open Data Kit; VTS, Vaccine Tracking System.

MANAGEMENT & SUPERVISION FUNCTIONALITIES	VTS	CFC (ended)	LODK
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 currently not in use   □ = Does not have functionality