

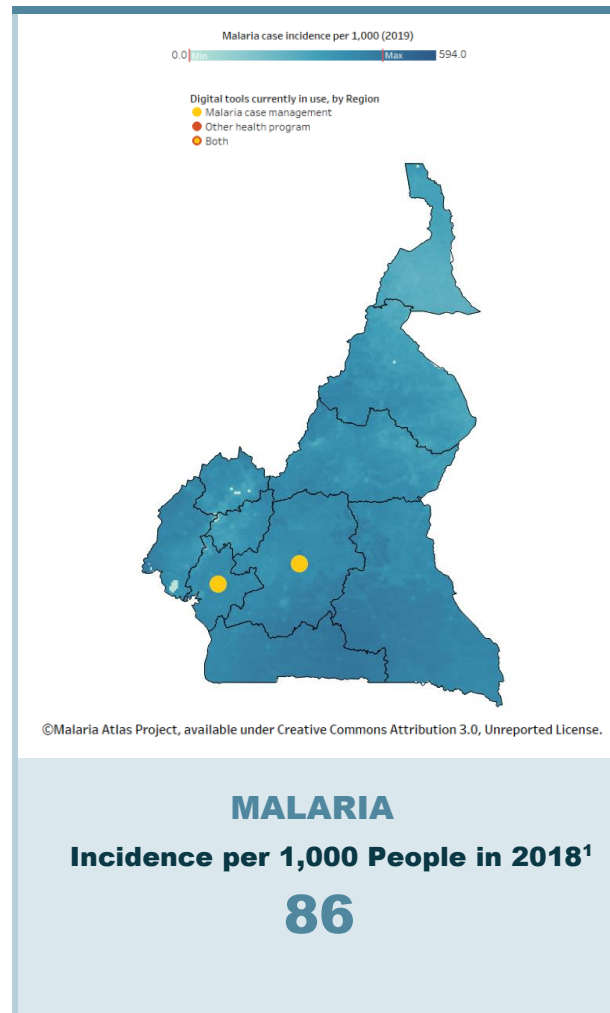
CAMEROON

Executive Summary

Malaria remains a major cause of morbidity and mortality in Cameroon, and recorded cases and recorded deaths both have increased since 2017.¹ Community health workers (CHWs) provide malaria services for children under 5 years old but operate in less than two-thirds of Cameroon's districts. Conflict in the North-West and South-West regions (armed separatists) has further disrupted malaria programming in some high-burden areas.

Although Cameroon recently adopted a comprehensive e-health strategy, multiple challenges limit its impact on community health and malaria programs. No implementation plan exists to translate this strategy into action and coordinate the multiple structures involved in digital health implementation. Few CHWs currently use digital tools, and most of the data they collect on paper are not integrated into national systems or used for decision-making. Poor telecommunications and electrical networks increase the difficulty of introducing digital tools in much of the country.

This report provides concrete recommendations to increase the use of digital health tools within the CHW program, develop detailed implementation and funding plans, and increase the uptake of CHW malaria data through improved systems and tools.



PEOPLE

Community Health Worker (CHW)

8,000 CHWs
3 per 10,000 people



GOVERNANCE

National Digital Health Strategy

YES



SYSTEMS

Digital Health Index²

SCORE: 2



Recommended Actions

PEOPLE



Community health workers and other decision-makers

Transfer management of day-to-day CHW activities to local councils

Support the Ministry of Health (MOH) to increase community ownership of CHW programs by moving day-to-day supervision from nongovernmental organizations to local community councils, the coordinating body that recruits and selects CHWs. To ensure this strategy is in line with community needs, support the MOH in carrying out a situational analysis and holding advocacy meetings with local councils and other partners, and then work with local councils to implement the new supervision structure.

GOVERNANCE



Strategies and policies

Improve digital health strategy implementation through an implementation plan and technical working group

Support the MOH in developing a digital health implementation plan for its 2020 digital health strategy and a multisectoral technical working group to provide oversight for the plan. The document and working group will clearly outline the roles of different MOH structures involved in digital health implementation, improve coordination, and provide oversight for the introduction of digital health tools, including for malaria.

Support implementation of the National Strategic Plan for Community Health and secure funding sources for CHW compensation

Support the MOH to adopt and implement the National Strategic Plan for Community Health, which is currently being drafted. As part of the strategy involves formalizing the role of CHWs and providing monetary compensation to improve CHW retention, support the MOH in identifying sources of funding and conducting advocacy with Cameroonian decision-makers to increase support for the strategy and CHW formalization.

SYSTEMS



Processes and digital tools

Update the District Health Information Software 2 (DHIS2) data entry system to capture more community health indicators

Support the MOH in modifying the existing DHIS2 data collection system at the district level to include all indicators collected by CHWs (including indicators for malaria) and, as part of this process, harmonizing all electronic and paper-based data collection tools for CHWs and their reporting chain, as well as developing and validating a monitoring and evaluation plan for CHWs.

Adopt a single, interoperable tool for CHW data mapping, collection, and performance management

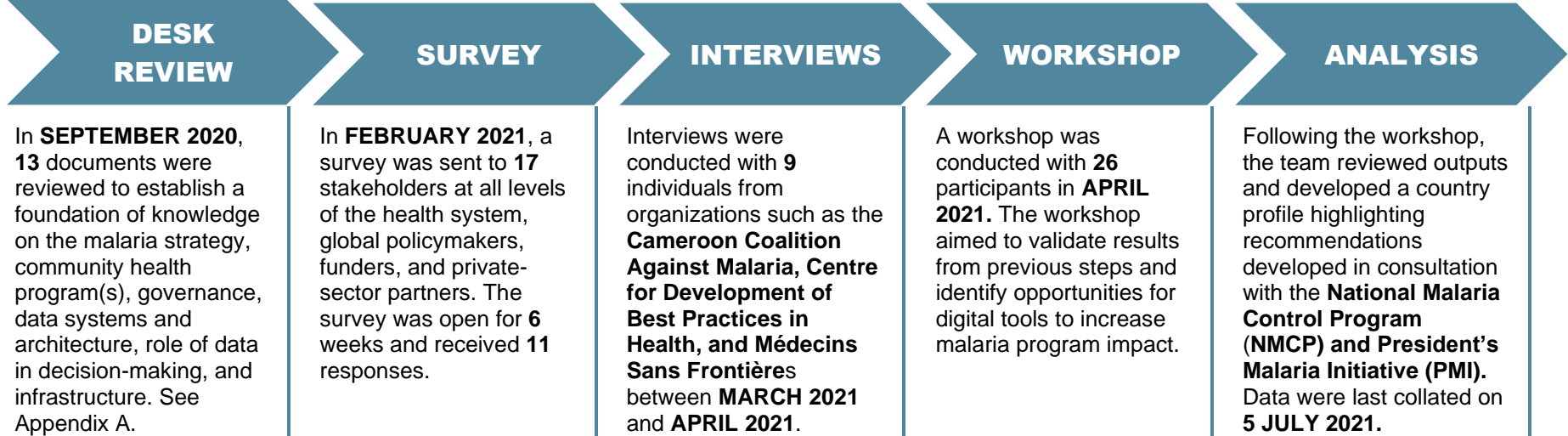
Support the MOH in developing and piloting a common digital health tool for CHWs and supervisors that provides core functionalities for data collection and performance management and is interoperable with DHIS2. During tool development, support the MOH in drafting tool testing, implementation, training, and management plans.

Develop public-private partnerships for back-up electricity infrastructure in rural areas

Support the MOH in identifying opportunities for public-private partnerships to provide power banks or solar panels for distribution to CHWs in rural areas where digital tools are planned.

Methodology


The Cameroon country profile was developed through conducting a desk review (documents published from 2015 to present); deploying an online survey focused on the digital tool landscape; executing key informant interviews with experts in digital health, community health, and malaria; and facilitating a workshop to validate findings and prioritize recommended actions. Due to COVID-19, and to protect interviewees and participants, interviews were conducted virtually, and the workshop was conducted in a hybrid format. Consult Appendix C for a list of key informant interviewees and workshop participants and Appendix D for detailed information on the online digital tool survey results.



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, 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 of decreasing 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



As part of the Integrated Strategy for Implementation of Community-Based Activities, Cameroon is in the process of incorporating integrated community case management (iCCM) elements into its national CHW service delivery package. For malaria, CHWs, known as *agents de santé communautaire*, use rapid diagnostic tests (RDTs) and treat children under 5 years old; they refer severe cases to a health center. CHWs do not routinely support proactive case detection, pre-referral rectal artesunate administration, intermittent preventative therapy in pregnancy, or distribution of insecticide-treated nets. CHWs collect data on paper, except those participating in small pilot projects, and then share the data with their supervisor, the facility head, each month. PMI supports CHW iCCM training sessions in the North and Far North Regions, alongside UNICEF, while the Global Fund supports trainings and commodity provision in the other eight regions. Incentive schemes are not yet universal and vary depending on location. The Global Fund provides monthly stipends for CHWs in their implementation areas, but CHWs in UNICEF and PMI-supported areas do not receive stipends. Two cadres of CHWs are active in Cameroon: multi-project CHWs, who are trained over ten days, and standard CHWs, who are recruited and given one-off training specific to their interventions. To streamline training and resources, the MOH is in the process of combining the two cadres.

CHWs do not yet operate at the national level; only 117 out of 189 districts have a formal CHW program in place.³ The MOH intends to expand the current cadre to 20,000 to support the iCCM package; however, funding has not been secured.⁴ When the community health strategy was written, population-density data determined the number of CHWs in different communities, giving rise to CHW shortages in some lower-density districts. Other implementation challenges include conflict in the Anglophone area and constant CHW turnover, typically a result of the lack of payment or other incentives. CHWs encounter challenges such as shortages and stockouts of artemisinin combination therapy and RDTs and the lack of efficient supervision and monitoring of activities.

Community health worker digital readiness

While a minority of CHWs are trained and capable of using DHIS2 as a data collection platform, the vast majority of CHWs in Cameroon do not use digital tools to support their work. CHWs can read and write, and some have cell phones. Although a national digital health strategy was established in 2020, no training documents for CHWs are included in the digital health curriculum. Technical support for DHIS2 implementation at the community and facility levels is also limited. While the NMCP (or Programme National de Lutte contre le Paludisme [PNLP]) has technical staff in all ten regions who specialize in data management, the cadre is too limited to deal with the plethora of troubleshooting challenges that occur. To fill this gap, the Global Fund has consistently conducted DHIS2 training at the national and district levels,¹ while PMI provides direct support to the National Health Information System, or *Système National d'Information Sanitaire* (SNIS).

8,000 Community health workers in country	Compensation: VOLUNTEER
8,000 Providing malaria community case management	Compensation: VOLUNTEER

Data-driven decisions at each level of health system

Currently, only two malaria indicators collected by CHWs are integrated into the SNIS, and community-collected health data does not have a significant impact on decision-making at any level of the health system. The parallel malaria health data system introduced in 2019, the Système de Gestion des Données du PNLP (SGDP), or NMCP Data Management System, includes mechanisms to support the use of data to inform decision-making, including malaria commodity forecasting and distribution, program adaptation, and grants reporting. However, the lowest level of SGDP analysis is at the regional level, and analysts do not use community-level data to inform any programs or policies. Little is known about how CHWs use their data to inform their activities and daily decision-making. In Cameroon, the perceived poor quality and lack of timeliness of CHW monthly reports lead some stakeholders interviewed to lack trust in these data. While standards for data quality, adopted from global standards, exist at the national level, these standards are not applied universally to district and health facilities.

NATIONAL LEVEL	At the national level, the MOH has yet to establish a system for using CHW-collected data for decision-making. However, national-level data are used in policy development and adapted for national health programs, as well as for forecasting and distribution of health products and consumables at the national level.
REGIONAL LEVEL	At the regional level, information is gathered to produce reports, using qualitative and quantitative data, that are submitted periodically (no specific timeline) to the NMCP. Based on the data captured in DHIS2, health managers generate reports on the prevalence of malaria, the use of bed nets for the effective control of malaria and forecasting and distribution of health products and consumables.
DISTRICT LEVEL	At the district level, reports sent by health facility managers include data from CHWs, enabling health managers to track the number of malaria cases and other infectious disease incidences. The data are only used for regional-level reporting on the prevalence of malaria, the use of bed nets for the effective control of malaria and forecasting and distribution of health products and consumables.
HEALTH FACILITY LEVEL	At the facility level, the facility manager uses the data provided by CHWs to compile a paper-based report on the epidemiological status of malaria, HIV, tuberculosis, and pneumonia to send to the district health office monthly. Facility managers also use the data provided by CHWs to provide feedback on data collection and planned health promotion activities. However, feedback sessions are ad hoc, as facility managers do not have enough bandwidth among all their duties to support regular sessions. No process for data quality assurance or validation has been put in place for community-level data.
COMMUNITY LEVEL	CHWs use the data they collect to decide where and when to conduct home visits and how much product to order from the health clinics. They also receive ad hoc guidance from facility managers to adjust planned activities and home visits within the community. However, CHWs are not aware of the vertical impact of the data they collect and do not spend significant time on indicator collection and report compilation, leading to data quality issues that discourage the use of CHW data at higher levels of the health system.

Governance



	DIGITAL	COMMUNITY HEALTH	MALARIA
Name	National Digital Health Strategic Plan	Plan Stratégique National 2021–2025 de la Santé Communautaire au Cameroun	Malaria National Strategic Plan
Current strategy dates	2020–2024	2021–2025 <i>Currently being finalized</i>	2019–2023
Coordinating body	Intra-Ministerial Committee	Taskforce central de coordination	NMCP
Funding strategy	Yes	Yes	Yes

In Cameroon, the MOH recognizes the potential of digital health to improve decision-making for health. Written in 2020, the National Digital Health Strategic Plan (2020–2024) uses the guiding principles of patient-centered care and data-based decisions to create reliable and interoperable digital tools at all levels of the health system. Cameroon’s digital health vision is directly connected to the country’s universal health coverage aspiration; the e-health strategy aims to use reliable and secure digital platforms to encourage informed health decision-making at every level of the health system.

At the community level, the e-health strategy intends to build e-platforms for health worker decision support and provide training and provider-to-provider remote supervision, as well as design digital tools for stock notification and commodity management. While there is no explicit mention of malaria programs in the e-health strategy, the document could support NMCP priorities for CHWs by incorporating digital tools when training the cadre on how to use and confirm RDTs and manage crucial malaria commodity stock, such as artemisinin combination therapy and long-lasting insecticide-treated nets.

A new National Strategic Plan for Community Health is currently being finalized. This plan focuses on improving community health governance and expanding the CHW program to reach 80 percent of the population living more than 5 km from a health center. Digital health is not mentioned in the plan, but one of its strategic priorities is improving the availability and quality of data at the community level. Specific activities include improving the collection, transmission, and storage of community-level data, reinforcing data quality assurance mechanisms, and increasing analysis of community-level data and their use in decision-making.

GOVERNANCE

Policies define digital health and health data governance roles, responsibilities, and structures.

While Cameroon has an updated, comprehensive e-health strategy, there are crucial unknown factors that could impact strategy operationalization. For instance, while the e-health strategy uses data quality as one of its guiding principles, it does not mention a national coordinating body for digital health. The digital health strategy aims to increase CHW training and peer-to-peer supervision; yet CHW locations are not mapped, nor is there evidence of an updated master facility list of uniquely identifiable providers. Before Cameroon can operationalize its digital health strategy, important data quality protocols and an updated mapping of the CHW cadre need to be developed.

DATA MANAGEMENT

Policies provide specifications for data access, privacy, security, and confidentiality and outline stipulations for data sharing.

There are loopholes related to the management of health data in Cameroon. While the implementation of the sector strategy cannot function without a digital component, the use of digital tools brings privacy and/or individual freedom risks, as there is no law protecting data collected via digital health in Cameroon. It is therefore necessary to have regulatory tools validated by a multisector body to regulate all digital health practices in Cameroon.

STANDARDS AND INTEROPERABILITY

Policies describe an enterprise architecture, normative standards—such as health information standards—and digital identity.

In Cameroon, the DHIS2, implemented by the Health Information Unit, provides a non-exhaustive list of the structures making up the health pyramid, which is a prerequisite for the implementation of interoperability. In addition, health applications are developed according to a set of specifications that does not always consider the existence of parallel solutions or operational integrity constraints in relation to interoperability. Digital health implementors frequently discount interoperability, and this leads to an increase of parallel applications that often address the same issues using the same data but that are neither interoperable nor visible to the NMCP.

INFRASTRUCTURE

Policies define data hosting and storage (e.g., local or cloud), mobile device management, and telecommunications access.

Cameroon does not have a policy that defines data-hosting requirements or the management of mobile devices and airtime. One of the tasks of the e-health coordination body created by the MOH is to ensure that the country has a policy on data storage, mobile devices, and airtime management and to explore a partnership with the telecommunication sector for better network access.

WORKFORCE

Policies describe workforce job structures and descriptions, plans for training, digital literacy expectations, and incentives for digital adoption.

Despite the numerous academic and professional institutions that train and graduate information and communications technology technicians and engineers, there is a need for a formal assessment and definition of skills and competencies required to support the growing digital health ecosystem. Furthermore, there are insufficient numbers of information technology professionals responsible for managing and maintaining computer equipment and assisting health workers in using computer equipment and systems, especially in health facilities at the operational level. The implementation of digital health in Cameroon at all levels of the health pyramid is facing a qualitative and quantitative shortage of competent and available human resources.



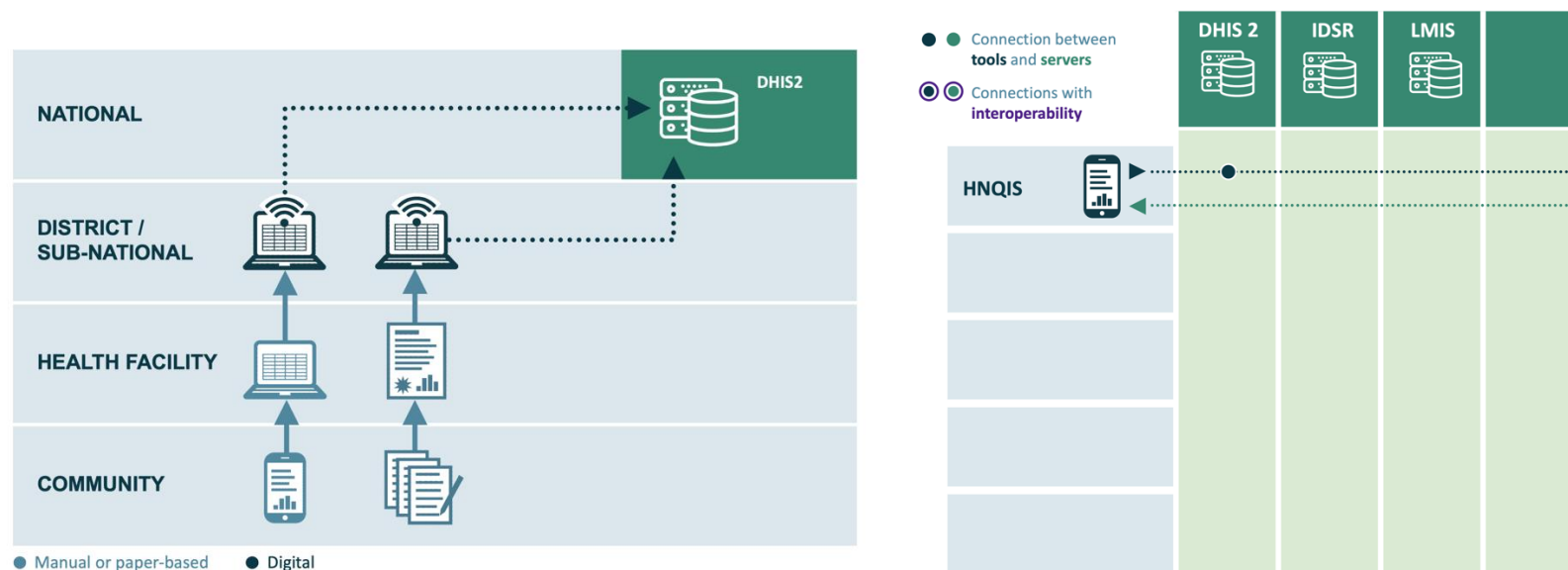
Data flow

Within the SNIS, CHWs use either paper forms or the DHIS2 App (in small-scale pilot projects with data inputted off-line and then uploaded when CHWs are in signal range) to collect health indicators that are then given to the manager of the health facility for data compilation each month. All data collection starts with CHWs, who use a paper-based consultation register to collect data from patients. CHWs compile all daily recorded indicators into a collated summary form and physically travel to the health center to deliver the report to the facility manager by the 29th of each month. On the 30th, the facility manager transmits either the paper-based forms or DHIS2 data to the health district team, which has until the 5th of the following month to enter the data into DHIS2, which is interconnected with the logistics management information system. Each health district team is responsible for data analysis and/or data entry for approximately 30 health facilities and reports its findings to the Regional Health Information Service monthly. Each of the ten Regional Health Information Service teams completes data consolidation and further analysis within DHIS2 before transmitting its report to the national Health Information Unit.

There are a number of data collection challenges that currently exist at the community level, which degrade the quality and completeness of the data. Firstly, the paper-based data collection system between CHWs and health centers is not yet streamlined. There are still discrepancies between the forms used by CHWs and by health facility managers. For example, some forms contain different data input language despite collecting the same indicators, leading to confusion and delays in data reporting. Moreover, both CHWs and managers require further training in data collection and compilation, as there are inconsistencies in data reporting at the community level, which are exacerbated by the unavailability of the facility heads to answer questions from or provide adequate supervision for CHWs. These data collection challenges impact data flow, and the MOH would like to overcome two crucial challenges: the lack of timely data report transmission and, most importantly, missing variables in the reported data.

Only 20 percent of the data collected by CHWs is captured in the SNIS, including only 2 of the 30 malaria variables collected by CHWs. This gap is due to limitations in the district-level DHIS2 capture form, which only includes the 2 malaria indicators for community-level data. Hence, there is a need to adapt the current DHIS2 input form at the district level to seamlessly include all CHW-collected indicators. Current investments in community and digital health include a pilot study for health centers, headed by the World Health Organization, to provide CHWs phones for DHIS2 data collection; however, limited phone battery capacity is a barrier to phone use for data collection. Outside of the community health space, the Excel-based *masque de saisie de information*, or “information entry template,” is used as a training and clinical case-management digital tool for providers; while it is not currently used in the malaria space, it is successful at efficiently and accurately testing the skills and gaps of providers and should be investigated by malaria program implementers as a low-bandwidth alternative digital tool for supervision and management. Despite the tool’s success within public clinic and hospital settings, there are no current plans to expand the tool into community settings.

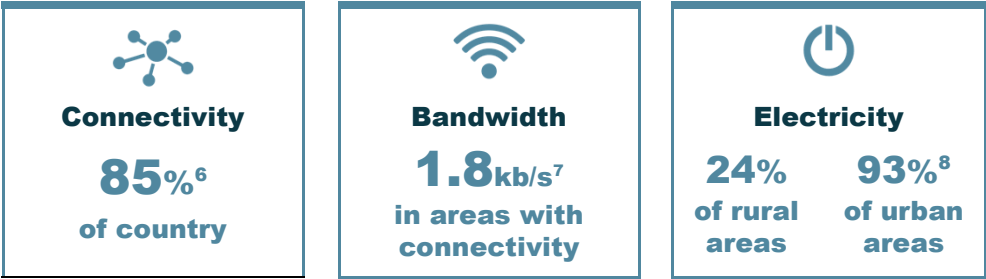
In Cameroon, malaria data flows through three different collection systems: the SNIS; the Surveillance Intégrée des Maladies et de la Riposte (SIMR), or Integrated Disease Surveillance and Response; and the SGDP, which was created by the MOH/ NMCP as a parallel malaria system to respond to the low level of completeness of malaria data reports by both the SNIS and SIMR systems.⁵ The SIMR does not collect community-based health data. Although the SGDP has the most qualified malaria statisticians out of all the systems and the highest level of malaria report completeness, it does not allow for data analysis at the community level. Community health data only flow through the SNIS, with limited technical staff to assist CHWs and facility-level workers with data compilation and analysis.



Abbreviations: DHIS2, District Health Information Software 2; HNQIS, Health Network Quality Improvement System; IDSR, Integrated Disease Surveillance and Response; LMIS, logistics management information system.

Digitally enabling infrastructure

In Cameroon, fewer than 40 percent of people have access to a mobile phone, and only one in four adults (23 percent) have access to the Internet.⁹ While the broadband network is slow, over four in five (85 percent) people live in an area where 3G access is available.⁶ Unlike other countries in the region, Cameroon does not have gender inequity with regards to mobile phone ownership. However, 43 percent of Cameroonians live in rural areas,¹⁰ where the broadband network is much slower. Most CHWs live in rural areas, where they are likely to experience mobile network, Internet, and electricity access challenges, and the health facilities they report to have low Internet and electrical capacity. Most localities do not have electricity; hence, there is a need to provide digitally enabling infrastructure, such as solar panels and power banks, and ensure the availability of technical maintenance to maintain this infrastructure.



Digital health tools in use and functionality

Cameroon has few digital tools to support CHWs and their managers in providing quality health services to the communities they serve. Currently, a priority in the Cameroon e-health strategy is to be able to capture health worker data electronically. The country is in the process of training health facilities to directly transfer paper-based CHW data into DHIS2. The Health Network Quality Improvement System (HNQIS) tool is being implemented by PMI / Impact Malaria in harder-to-reach regions of Cameroon (Far North, North) as a clinical supervision and management tool, with plans to extend the tool to supervision of CHWs. As few digital tools are currently in use, Cameroon requires further investigation into the need for digital tools at the community level, coupled with robust funding plans for scale-up of the few digital tools currently implemented.

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

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

Abbreviations: ANC, antenatal care; EPI, Expanded Program on Immunization; HNQIS, Health Network Quality Improvement System; LLIN, long-lasting insecticide-treated net.

CASE MANAGEMENT FUNCTIONALITIES	HNQIS
Aggregate case reporting and analytics Tool collects aggregate case data and has data analytic functions in tool or online	<input type="checkbox"/>
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	<input type="checkbox"/>
Case geolocation (<i>important in low-burden or elimination settings</i>) Tool allows collection or use of geospatial data for individual cases	<input type="checkbox"/>
Interoperability with HMIS Tool sends information to the official national health information system	<input checked="" type="checkbox"/>
Offline capability Tool functions, at least partially, offline	<input checked="" type="checkbox"/>

Abbreviations: CHW, community health worker; HMIS, Health Management Information System; HNQIS, Health Network Quality Improvement System.

MANAGEMENT & SUPERVISION FUNCTIONALITIES	HNQIS
CHW identification Tool uniquely identifies CHWs	<input checked="" type="checkbox"/>
CHW catchment location Tool identifies CHW associated position in org unit hierarchy/ link to health facility/system	<input checked="" type="checkbox"/>
CHW performance analytics Tool has analytic functions (data validation, graphs, charts) that support data quality, quality of care, or other performance issues	<input checked="" type="checkbox"/>
Communication Tool allows two-way communication between peer groups, associated health facilities, or supervisors	<input type="checkbox"/>

= 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 tool functionalities for malaria case management**

APPENDIX F ► **Optional appendix**



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APPENDIX A

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APPENDIX B

Abbreviations

ANC	antenatal care
CHW	community health worker
DHIS2	District Health Information Software 2
EPI	Expanded Program on Immunization
HMIS	Health Management Information System
HNQIS	Health Network Quality Improvement System
iCCM	integrated community case management
IDSR	Integrated Disease Surveillance and Response
IHRIS	integrated human resources information system
LLIN	long-lasting insecticide-treated net
LMIS	logistics management information system
MOH	Ministry of Health
NMCP/PNLP	National Malaria Control Program / Programme National de Lutte contre le Paludisme
PMI	U.S. President's Malaria Initiative
PSI	Population Services International
RDT	rapid diagnostic test
SGDP	Système de Gestion des Données du PNLP (NMCP Data Management System)
SIMR	Surveillance Intégrée des Maladies et de la Riposte (Integrated Disease Surveillance and Response)
SNIS	Système National d'Information Sanitaire (National Health Information System)
SOP	standard operating procedure
UNICEF	United Nations Children's Fund

APPENDIX C

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[†] Cameroon Coalition Against Malaria.

APPENDIX D

Community digital health tools*

Name of Tool	Type of Digital Health Intervention†	Implementer (Funder)	Scale	Malaria Use Case
HNQIS	2.3 Healthcare provider decision support 2.8 Healthcare provider training 4.3 Location mapping	PMI Impact Malaria, PSI (PMI Impact Malaria)	Sub-National Level Implemented in North and Far North Regions. 450 CHW supervisors use the tool.	Training health workers

*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.

Abbreviations: CHW, community health worker; HMIS, Health Management Information System; HNQIS, Health Network Quality Improvement System; PMI, U.S. President's Malaria Initiative; PSI, Population Services International.

APPENDIX E

Next-generation digital health tool functionalities for malaria case management

CASE MANAGEMENT FUNCTIONALITIES	HNQIS
Notifications Tool sends and receives notifications	<input type="checkbox"/>
Stock reporting & analytics Tool collects stock data and has analytic functions to support stock and logistics data analysis and decision-making	<input type="checkbox"/>
Interoperability with other national health systems Tool sends information to other national systems (iHRIS, LMIS, etc.)	<input checked="" type="checkbox"/>
Referral coordination Tool allows CHW to notify local health facility of referrals and track them	<input type="checkbox"/>
Scheduling & work planning Tool allows CHW to plan and schedule key activities in the community	<input type="checkbox"/>
<i>Abbreviations:</i> CHW, community health worker; HNQIS, Health Network Quality Improvement System; iHRIS, integrated human resources information system; LMIS, Logistics Management Information System.	
MANAGEMENT & SUPERVISION FUNCTIONALITIES	HNQIS
Decision support Tool provides algorithms or checklists to guide CHW service provision	<input checked="" type="checkbox"/>
Training materials & resources Tool provides access to training materials, policies, or other useful reference documents	<input checked="" type="checkbox"/>
CHW geolocation Tool allows collection or use of CHW geolocation data for monitoring and planning distribution	<input checked="" type="checkbox"/>
Supervision Tool can be used by supervisors to assess CHW skills and capacity	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> = Current functionality <input type="checkbox"/> = Possible, but functionality currently not in use <input type="checkbox"/> = Does not have functionality	

APPENDIX F

Next steps with community health and digital health strategies

Indicator	Baseline status	Stage	Short-term strategy to attain the next stage of maturity	Long-term strategy to attain Stage 5
1. Scale of community health worker (CHW) implementation and national CHW policy	There is an official policy on CHWs, and the government is implementing the CHW program, with trained CHWs deployed to 25%–50% of the country.	3	Recruit, train, and deploy CHW to achieve a 100% coverage	Put in place a strategy for councils to manage CHW programs for purpose of sustainability
2. Standardized CHW package of care and standard operating procedures (SOPs)	The standard package of care has been implemented with 25%–50% of CHWs. There are SOPs (including forms), but they are not used consistently across all programs.	3	Advocate for the adoption of CHW standard training package and SOPs by all implement partners	Put in place a strategy for councils to manage CHW programs for purpose of sustainability
3. Skills of CHWs, including ability to use information and communication technologies to find, evaluate, create, and communicate information	All CHWs are literate and have a basic level of education (e.g., primary) and can demonstrate ability to use mobile phones and tablets. The CHW training is extensive but is not standardized.	2	Include the training for the use of cell phones and tablets in CHWs training	Design capacity-building program for CHWs in collaboration with the Ministry of Employment and Vocational Training
4. Data collection and quality (complete, accurate, and timely)	Some data are collected by CHWs, but data are not standardized, consistent, or digitized and is not reliably complete, accurate, or timely.	1	Establish data collection SOPs for CHWs with a monitoring and evaluation system. During training of new CHWs, sensitize them on the need for reliable, complete, accurate, and timely data collection and organize refresher training for existing CHWs to address issues related to data collection	Ensure that implementing partners respect the data collection SOPs for CHWs
5. Leadership and governance structure for digital health for CHW	Digital tools for CHWs are not included in the national health strategy, and there is no coordinating or governance structure established.	1	Ensure the coordinating body established by the Ministry of Public Health works with key stakeholders to include digital tools for CHWs in the national health strategy	Ensure the established body meets regularly with key stakeholders to evaluate activities related to the inclusion of digital tools for CHWs in the national health strategy
6. Digital health policies and legislation	There are no laws or policies on data security, privacy, and data ownership relevant to digital tools for CHW programs.	1	Ensure the coordinating body established above addresses the legal loopholes observed in the implementation of health interventions, including the absence of instruments guaranteeing confidentiality and the right to privacy	Have the coordinating body ensure that all implementing partners adhere to relevant laws.

7. Budget is available and aligned with health system	A budget for digital tools for CHWs is available through short-term once-off funding for small-scale implementation, mainly covering the cost of the technology (system, devices, and airtime).	1	Mobilize resources with bilateral donors and the public sector to enable appropriation of 5% of the national budget allocated to digital health for 2021	Advocate for the increase of digital health funding yearly
8. CHWs integrated within national digital health policies, systems, and services	CHWs are not integrated within the national digital health policies, systems, and services (including registration in health workforce registry, digital health architecture, terminology standards, etc.).	1	Have the coordinating body (see #5 above) oversee the integration of CHWs within national digital health policies	Ensure the established body meets regularly with key stakeholders to evaluate the integration of CHWs in digital health policies, systems, and services.
9. Connectivity and electricity infrastructure in regions where digital tools for CHWs are planned	Information on connectivity (coverage and bandwidth) and electricity has been collected as part of digital tools for CHW program planning.	2	Provide power banks, solar panels, and transport fees to CHWs who live in areas without Internet and electricity as part of the infrastructural upgrade	In collaboration with the telecom industry, develop a system that sends data to a secure database
10. In-country software technical capacity	In-country partners have the capacity to adapt, configure, and support implementation of hardware and software with significant technical support provided by out-of-country entities.	3	Reduce technical support from out-of-country entities through the capacity building of local staff	Train a contingent of local staff on an annual basis
11. Geographical coverage of digital tools for CHWs	Some programs with CHWs using digital tools exist at a small scale, but they are not standardized or integrated with the formal health system.	1	Conduct pilot study on the existence and usage of digital tools by CHWs	Provide digital tools (e.g., cell phones, tablets) to CHWs
12. Range of digital tools for CHWs (all standard health care packages, such as malaria, HIV, or maternal)	Digital tools for CHWs are used for a single health care package (e.g., just for HIV).	1	Design and test digital tools that can be used to collect data on more than one health care package	Improve the best digital tool selected after the pilot phase to collect all data related to the CHW package and to connect the tool to the national data system
13. Digital health for CHW functionality (the various functions digital tools can perform, e.g., data collection, education, decision support, case management, scheduling, etc.).	Digital tools for CHWs are only used for one function (e.g., only for data collection).	1	Design and test digital tools that can be used for more than one function (i.e., a multifunctional tool)	Improve the best digital tool selected after the pilot phase so that it can provide more functions and indicators
14. Interaction with clients/public using digital health	Digital tools for CHWs do not interact with clients.	1	Design and test digital tools that can be used by CHWs to communicate with clients	Improve the best digital tool selected after the pilot phase so that it can improve communication between CHWs and clients
15. Interoperability of CHW system with other digital health systems	The digital tool for CHWs is stand-alone and is not interoperable with any other digital health systems.	1	Implement the interoperability plan by partners in the public and private sectors	Enable CHWs to enter their data into the District Health Information Software 2 (DHIS2) on a read-

				only basis after submission to the next level in the hierarchy for validation
16. Digitalization of reporting	Data capture is required on both electronic and paper systems.	1	Ensure that CHWs have paper and digital tools for data collection and explore the possibility of collecting data with digital tools only	Ensure a continuous stream of all data collected by CHWs is directly uploaded to DHIS2
17. User-centered design of digital health for CHWs	Some CHWs, supervisors and administrators were engaged in initial design of digital health tools with testing and user feedback.	2	Seek opinion of CHWs and their supervisors when conceiving / rolling out digital health training for CHWs	Organize workshops on a regular basis to review CHW training and update them with new information
18. Training of CHWs on the use of digital health tools for CHWs	There is no digital health in the preservice training curriculum for CHWs. There is limited one-off training provided on specific digital health tools as they are introduced.	1	Design a digital training module and include it in CHWs' training package	Train all CHWs and their supervisors using the module
19. Technical support for digital health	Limited or ad hoc technical support is provided to CHWs and supervisors for troubleshooting as problems arise.	1	Recruit and train at least one person in each district to provide support to CHWs	Establish a technical unit in each regional delegation to support and oversee the usage of digital tools by CHWs
20. Performance management	The digital tool for CHWs is not used for performance management.	1	Design and pilot digital tools that can be used to monitor CHWs' performance	Select the best digital tool after the pilot phase and use it to monitor CHWs' performance
21. Airtime and device management	There is no formal policy for management of airtime or devices after they have been allocated to CHWs. There are no replacement devices.	1	Have the coordinating body (see #5 above) work toward having a national policy for the management of airtime and devices after allocation	Advocate for implementing partners to adopt the national airtime and device management policy