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Role of Digital Tools in Fighting Malaria at the Community Level

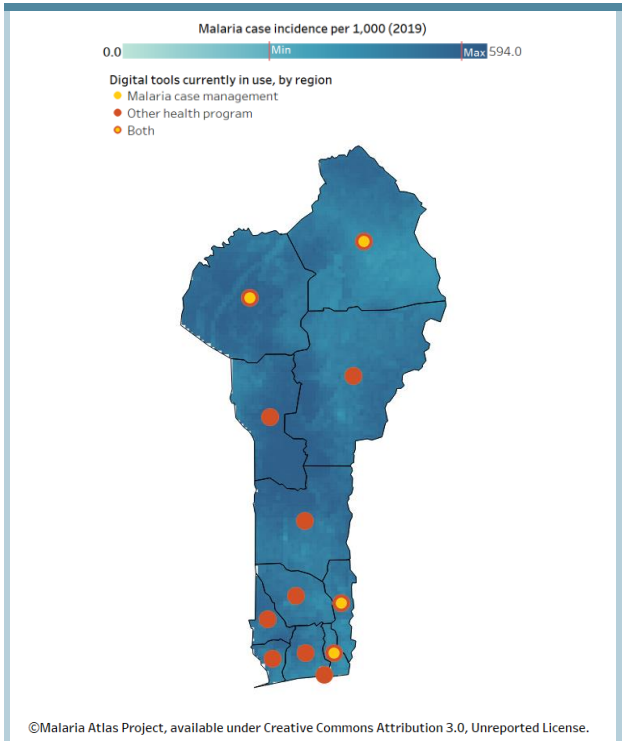
BENIN

Executive Summary

Benin's consistently high malaria burden, despite significant investments in malaria control, makes the introduction of digital tools a key opportunity for improving services at the community level. Community health workers, known as *relais communautaires* (RCs), or "community relays," work throughout the country, providing malaria case management services for children under 5 years old.

The Ministry of Health (MOH) has introduced a comprehensive digital health strategy, and the integration of digital tools with existing national data systems is a priority. However, significant challenges to implementation currently inhibit the use of digital technology for malaria control. RCs lack sufficient training and supervision, leading to poor-quality data at the community level, and new digital tools introduced for malaria case management have yet to be scaled beyond initial pilot projects or transferred to government ownership. Furthermore, access to electricity is very limited, particularly in the rural areas where most RCs work.

This report includes concrete recommendations for improving community management of malaria programs by engaging people, governance, and systems to support the adoption of digital health tools in Benin.



MALARIA

Incidence per 1,000 People in 2017[2]

150

PEOPLE

Community Health Worker (CHW)

8,000 CHWs

7 per 10,000 people

GOVERNANCE

National Digital Health Strategy

YES

SYSTEMS

Digital Health Index[1]

SCORE: 3

digital square

Recommended Actions

PEOPLE

Community health workers and other decision-makers

Establish a pool of qualified digital health trainers at the central level

Support the Conseil National de Lutte contre le VIH/Sida, la Tuberculose, le Paludisme, les Hépatites, les Infections Sexuellement Transmissibles et les Épidémies (CNLS-TP), or "National Council for the Fight against HIV/AIDS, Tuberculosis, Malaria, Hepatitis, Sexually Transmitted Infections, and Epidemics," and the Direction de l'Informatique et de Pré-Archivage (DIP), or "Department of Information Technology and Records," to establish a pool of master trainers to support training on data collection, and community-level use of digital tools. RCs lack sufficient training, resulting in poor-quality data that have limited use in improving service delivery. As digital tools are scaled, there will be an ongoing need for training. A pool of master trainers will provide greater government ownership of digital health initiatives and ensure sustainability.

Improve supervision of RCs by introducing dedicated supervisors

Support the CNLS-TP in developing a costed implementation plan for the national introduction of *agents de santé communautaires qualifiés* (ASCQs), or "qualified community health workers," who will act as dedicated supervisors for RCs. Their role was defined in the national community health policy, yet this initiative remains in the pilot phase in a small number of health zones.

GOVERNANCE

Strategies and policies

Develop interoperability standards for digital tools, including malaria case management tools

Support the DIP in developing interoperability standards, including guidelines for the interoperability of digital tools with national data systems. The guidelines will be developed with input from stakeholders, including the CNLS-TP.

Mobilize funding for the purchase of digital equipment for RCs

Support the DIP in developing a funding strategy for the purchase of digital equipment for RCs. Despite the successful pilots of digital tools for RCs in Benin, funding is not available for purchase of the equipment required to expand the use of these tools at the national level. This funding strategy can incorporate a stocktaking of available equipment and the mobilization of domestic funding, as well as identify nontraditional donors, including social enterprises and private sector actors, that could contribute to digital health efforts.

SYSTEMS

Processes and digital tools

Develop an operational plan for digital tool scale-up

Support the DIP in developing an operational plan for the scale-up of digital tools used at the community level. This plan will include the development of a common framework to assess the suitability of a tool for scale-up and measure how well it aligns with identified needs. The plan also will detail the implementation process for tool scale-up, including sustainable funding, training plans, supervision, and device management.

Increase comprehensiveness of data collected by RCs using digital tools

Support the DIP, the Direction de la Programmation et de la Prospective (DPP), or "Department of Programming and Forecasting," and the CNLS-TP in conducting an assessment of data collected by RCs using digital tools, identifying misalignment and gaps between current digital and paper-based data collection methods. After identifying gaps, it will be important to develop a roadmap for fully digitalizing current paper-based data collection tools in order to phase out parallel collection processes once digital tools have been scaled at the national level.

Methodology

Benin's country profile was developed through conducting a document review, deploying an online survey focused on the digital tool landscape, conducting interviews with key informants, and conducting a workshop to validate the results and prioritize recommended actions. Due to COVID-19, to protect stakeholders the interviews were conducted virtually, and the workshop was conducted in person with masks and social distancing. (See Appendix C for a list of key informants interviewed and workshop participants and Appendix D for detailed information on the results of the online digital tool survey.)

DESK REVIEW

In **SEPTEMBER 2020**, **12** documents were reviewed to establish a foundation of knowledge on the malaria strategy, community health program(s), governance, data systems and architecture, role of data in decision-making, and infrastructure. See Appendix A.

SURVEY

In **FEBRUARY 2021**, a survey was sent to **14** stakeholders at all levels of the health system, global policymakers, funders, and private-sector partners. The survey was open for **3** weeks and received **11** responses.

INTERVIEWS

Interviews were conducted with **23** individuals from **CNLS-TP,** the MOH (e.g., **National Malaria Control Program [NMCP], DPP**), and **USAID**, among others, between **FEBRUARY 2021** and **MARCH 2021.**

WORKSHOP

A workshop was conducted with **10** participants in **APRIL 2021.** The workshop aimed to validate results from previous steps and identify opportunities for digital tools to increase malaria program impact.

ANALYSIS

Following the workshop, the team reviewed outputs from each step and developed a country profile highlighting recommendations developed in consultation with **CNLS-TP and US President's Malaria Initiative.** Data were last collated on **30 APRIL 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

In Benin, the community health program provides a common package of services, called the Paquet d'Interventions à Haut Impact (PIHI), or "High-Impact Intervention Package." RCs are linked to the local health center and supervised by the center's manager, a nurse who also provides clinical services. RCs in villages more than 5 km from a health center offer integrated community case management of childhood illnesses as part of the PIHI, which includes testing and treatment for malaria, acute respiratory infections, and diarrhea in children under 5 years old, while RCs in villages closer to a health center do not provide case management services. RCs also promote essential family planning practices and conduct follow-up visits for pregnant women and newborns.

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

The current Community Health Policy outlines a strategy to deploy RCs at a ratio of one RC per 50 to 200 households. With 8,000 active RCs, Benin would require an additional 4,000 to reach full coverage. The policy also describes a strategy to introduce an additional cadre of 546 ASCQs, with higher levels of education and experience, to improve supervision of RCs and support case management services at the community level. The ASCQ program is already underway in some areas, with plans to progressively bring it to scale in other areas. According to the new national policy, testing and treatment services will be provided by ASCQs, while RCs provide promotion and prevention services. The package of services should be standardized, but current practice indicates that activities and approaches can vary depending on partner priorities. Funding for PIHI services is divided among USAID, UNICEF, Belgian Development Agency/Enabel, and the Global Fund, which are each responsible for certain communes. However, out of the 34 health zones in Benin, 14 currently lack a funding partner for PIHI implementation. Per government policy, RCs are considered volunteers who can receive performance-based stipends (amounts are not standardized across partners) paid by external non-governmental sources in communes supported by USAID and UNICEF.

Community health worker digital readiness

Few RCs currently use digital tools, but most informants interviewed believe they have sufficient skills to do so if provided sufficient training, especially given the recruitment criteria that they read and speak French and have a minimum level of education. All RCs receive standardized preservice training. Training on digital tools is not currently included in the curriculum but is provided for RCs participating in pilot projects. For example, 50 RCs in two health zones were provided training on AlafiaComm, a mobile platform for data collection and service delivery, including for malaria—with the opportunity to scale to 1,500. Currently, training and technical support for mobile tools generally is provided by the implementing partners. However, the MOH has information technology staff at the central level who provide technical support and training on the District Health Information Software 2 (DHIS2). These staff could be a resource for the future expansion of training for mobile tools.

Data-driven decisions at each level of health system

Although data from community health programs are integrated into the data used for decision-making at all levels of the health system, in practice these data are most often aggregated with data from the broader health zone rather than analyzed for decision-making specific to the community level. The DPP is responsible for the Système National d'Information et de Gestion Sanitaires (National Health Information and Management System), which uses DHIS2 as its software platform. Government officials at the national, departmental, and zonal levels regularly access data via DHIS2, but RCs and staff at community health centers generally do not have access. Other stakeholders, including funding and implementing partners, can request credentials to access DHIS2 data from the DPP.

NATIONAL LEVEL	At the national level, community data are used to calculate gaps, identify needs, and plan activities (e.g., target priority geographic areas, identify priority groups, and plan timing of interventions). Indicators are shared with key MOH partners, such as the Global Fund and US President's Malaria Initiative. National DPP officials work with statisticians at the departmental and zonal levels to validate data and adapt programming. Once a year, the MOH publishes an annual report on health statistics (*Annuaire des Statistiques Sanitaires*), which includes indicators across all health programs. At the national level, the NMCP validates malaria indicators and produces quarterly malaria bulletins.
REGIONAL LEVEL	At the departmental level, managers use data to adapt the implementation of health strategies. The NMCP has a Focal Point at this level who acts as a liaison for malaria programming, coordinating the implementation of malaria activities and participating in the validation of malaria data along with the departmental statistician.
DISTRICT LEVEL	At the health zone level, statisticians use data in DHIS2 to inform and adapt the implementation of health strategies. Statisticians enter data into DHIS2 that they receive from health centers in the zone, including data from RCs. Data are validated during trimestral meetings, and statisticians work with health center managers, as well as with other stakeholders in the health zone, to identify and interpret notable indicators and plan interventions in response. For example, if weaknesses are noted for a particular indicator, a team from the health zone can go to the community in question to evaluate the problem or organize awareness or training sessions.
HEALTH FACILITY LEVEL	At the health center level, the nurse who manages the center meets with all RCs on a monthly basis to review and validate data, sometimes with support from the implementing nongovernmental organization (NGO) in the zone. Center managers can use data to monitor different management parameters, such as monthly average RC stock consumption and RC performance. Additionally, these data allow managers to plan, implement, and adjust interventions at the community level. However, in practice, the use of data beyond stock monitoring is low at this level. Center managers do not have access to DHIS2, and they have many competing priorities that may take precedence over RC supervision or data analysis. Data are available by RC on paper in the health centers and can be used to measure RC performance (generally with the help of implementing partner NGOs), but data are not available by RC in DHIS2.
COMMUNITY LEVEL	At the community level, RCs rarely use the data they collect for decisions beyond tracking commodity needs. Supervisors may support RCs in sharing key indicators and trends within the community, but RCs typically are not able to interpret the data they collect or use them directly to inform their activities.

Governance

	DIGITAL	COMMUNITY HEALTH	MALARIA
Name	Stratégie Nationale de Cybersanté (National Digital Health Strategy)	Politique nationale en matière de santé communautaire au Bénin (Benin Community Health Policy)	Plan Stratégique National de Lutte Contre le Paludisme (National Strategy for the Fight Against Malaria)
Current strategy dates	2018–2022	2020–2024	2017–2021
Coordinating body	A coordinating committee that reports directly to the MOH.[3] The DIP serves as the committee's permanent technical secretariat.	Conseil National de Lutte contre le VIH/Sida, la Tuberculose, le Paludisme, les Hépatites, les Infections Sexuellement Transmissibles et les Épidémies*	Programme National de Lutte Contre le Paludisme (National Malaria Control Program)
Funding strategy	Yes	Yes	Yes

* National Council for the Fight against HIV/AIDS, Tuberculosis, Malaria, Hepatitis, Sexually Transmitted Infections and Epidemics.

The MOH recognizes that digital health could play a role in helping it to expand, improve, and better monitor malaria interventions. Benin's National Digital Health Strategy (2018–2022) focuses on improving equitable access to reliable health information and using digital health to strengthen the capacity and management of health workers, as well as improving the infrastructure and legal framework for digital health. One of the prioritized projects detailed in the strategy is a digital tool for RCs to monitor the health of children under 5 years old.

Benin’s community health policy was updated in 2020 to bring it into better alignment with the broader national health policy launched in 2018. Although the policy highlights the lack of full integration of community health data into the national system as a challenge, it does not include any specific measures or goals related to digital health.

Benin’s National Strategy for the Fight Against Malaria (2017–2021) includes specific interventions to strengthen RCs’ capacity to diagnose and treat cases and improve the provision of commodities at the community level. Community health is not a primary focus of the strategy, however, and there are no dedicated budget lines for activities related to community health. Digital health is not included in the strategy but strengthening data systems and improving data reporting at the community level are mentioned briefly.

GOVERNANCE Policies define digital health and health data governance roles, responsibilities, and structures.	The DIP within the MOH is responsible for the planning and implementation of digital health projects, while the DPP manages the Système National d'Information et de Gestion Sanitaire through its Service de la Gestion du Système d'Information (Information Systems Management Service). Implementation of the National Digital Health Strategy is overseen by a coordination committee under the direct authority of the MOH, and the DIP acts as permanent secretary for the committee.
DATA MANAGEMENT Policies provide specifications for data access, privacy, security, and confidentiality and outline stipulations for data sharing.	Benin first enacted a law for the protection of personal data in 2009 (Law N°2009-09). An additional digital code (Law N°2017-20) was adopted in 2018 to update the legal framework for the protection of personal data, including statutes on the collection, processing, transmission, storage, and use of personal data.
STANDARDS AND INTEROPERABILITY Policies describe an enterprise architecture, normative standards—such as health information standards—and digital identity.	There is currently no enterprise architecture for digital health in Benin or other documentation to guide interoperability. The development of interoperability standards is one of the key pillars promoted by the current National Digital Health Strategy; however, the Strategy lacks a specific plan for implementation but highlights the challenges, including a lack of financing and sufficient human resources. It recommends external technical support to set up the necessary architecture.
INFRASTRUCTURE Policies define data hosting and storage (e.g., local or cloud), mobile device management, and telecommunications access.	No specific policy currently exists for data hosting or storage. Benin's most recent National Digital Health Strategy includes plans for a government data center where all systems and applications will be hosted, including a secondary site for backup servers. This center is currently in development.[4]
WORKFORCE Policies describe workforce job structures and descriptions, plans for training, digital literacy expectations, and incentives for digital adoption.	The first two strategic objectives of the National Digital Health Strategy relate to strengthening the health workforce: (1) increasing qualified information and communications technology (ICT) personnel for the management of health information and ICT infrastructure and (2) strengthening the capacity of health professionals at all levels of the health system through the use of digital health. The plan also includes the development of a human resources information system.

Systems

Data flow

RCs collect data in paper registers when they conduct home visits and promotional and educational activities. The data collected include the number of children with fever, children who test positive for malaria using rapid diagnostic tests, and the treatment of confirmed malaria cases using artemisinin-based combination therapy. Beyond malaria data, RCs collect a variety of other data, including on integrated community case management activities, commodity usage, and promotional activities.

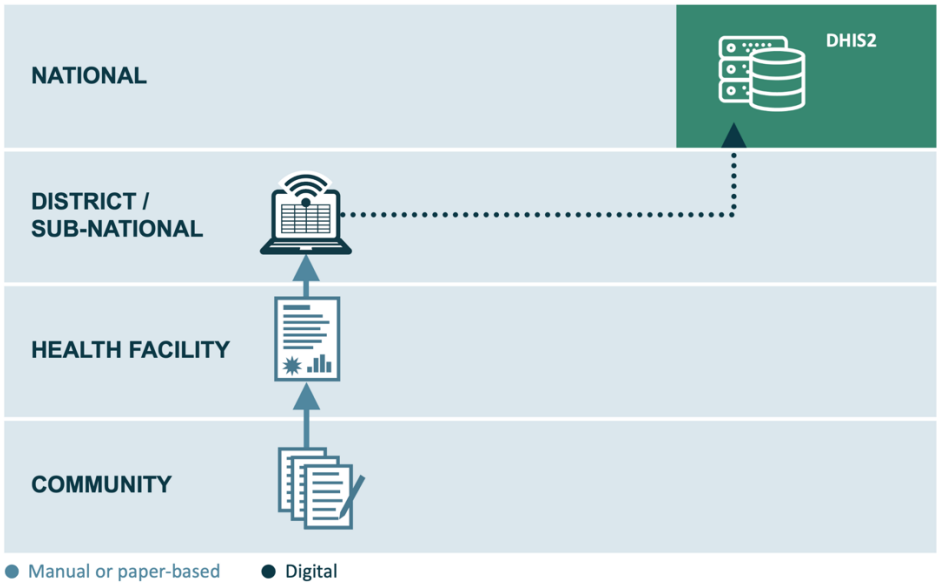
Every month, all RCs go to the community health center for a group meeting with their center manager, sometimes with the participation of the local NGO implementing partner. Together, they collate and validate the data collected over the course of the month. The center manager then shares the aggregated data for all RCs attached to the center with the health zone statistician, who reviews and enters the data into DHIS2 monthly. At the regional level, the statistician reviews data monthly, and validation of indicators takes place during trimestral meetings at the zonal, departmental, and national levels. Additionally, data quality assessments are conducted every six months at the departmental level. At the national level, malaria data in DHIS2 are also reviewed by the NMCP's Monitoring and Evaluation Focal Point, who works directly with the DPP to resolve any data issues.

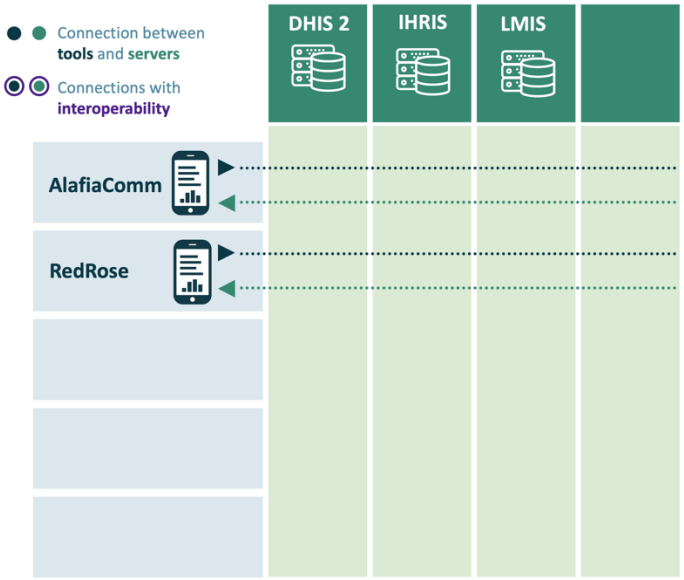
The timeliness and quality of data collected at the community level have consistently been a challenge. Errors are frequently introduced during data collection and collation, and center managers do not have sufficient time to provide the detailed supervision and supplemental training needed to improve RCs' data collection capacity. During interviews, stakeholders noted that the data collected by RCs using digital tools was found to be more accurate than data collected by RCs on paper.

Although most data collection by RCs continues to be on paper, approximately 50 RCs use the application AlafiaComm to collect data using smartphones as part of a pilot project. RCs collect data on a variety of indicators, including for malaria, mother-child health, and family planning. Data collected digitally are validated using the same process as paper-based collection, starting at the district level. Although a trial attempt was made to connect AlafiaComm to DHIS2, the tool does not currently share information directly with DHIS2. RCs' supervisors are not currently included in the AlafiaComm pilot and so do not oversee digital data collection; rather, digital data collection is supervised by the implementing NGO. Because only some indicators collected by RCs are integrated into the tool, these RCs continue to collect data in paper registers and submit monthly reports to their supervisors using the standard process outlined above.

The MOH has deployed a logistics management information system (LMIS), using the OpenLMIS platform, for commodity management. This system has been set up in some health centers and health zone offices to support commodity management and is interoperable with DHIS2. A Logistics Data Visualization System has also been introduced to track commodity inventories for 75 tracer medicines monthly.

Benin has not yet developed comprehensive interoperability standards, and connections between systems are handled on a case-by-case basis. No tools have been identified that connect directly to national data systems.

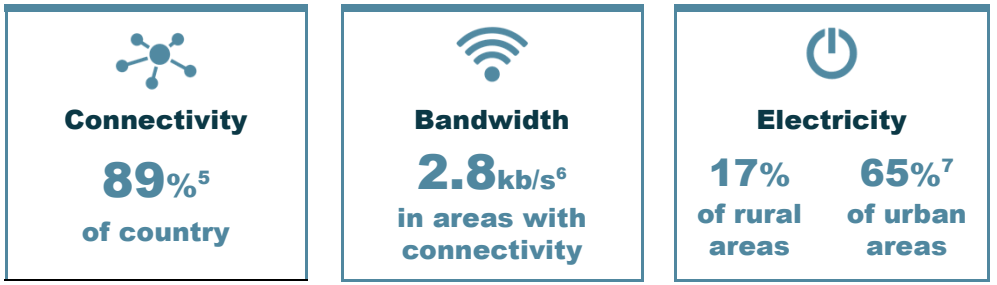




Abbreviations: DHIS2, District Health Information Software 2; iHRIS, integrated Human Resource Information System; LMIS, logistics management information system.

Digitally enabling infrastructure

More than half of the Beninese population live in rural areas where access to mobile networks can be limited. Although 3G coverage is available for 89 percent of the population,[5] one of the highest rates in Western Africa, the mobile phone penetration rate is relatively low, with 84 mobile connections per 100 people.[5] Benin also has a large gender gap in mobile phone ownership.[8] MTN, Moov, and Libercom are the primary mobile cellular networks, but network coverage varies. In areas where digital tools have been introduced, the SIM cards provided are not always aligned with local network availability.



Access to electricity is also limited, particularly in the rural areas where most RCs live. RCs frequently have challenges keeping cellphones charged, and partners have had to provide solar charging equipment to ensure their tools can be used consistently at the community level. Both electricity and internet access are inconsistent in community health centers.

Digital health tools in use and functionality

Use of digital tools in the delivery of malaria services in Benin has thus far been limited to small-scale pilot projects, which have generally not continued past the initial pilot phase. The MOH aims to eventually have a single comprehensive digital tool for RCs and their supervisors to scale at the national level. The AlafiaComm tool, developed through the USAID Integrated Health Services Activity using the CommCare platform, will be expanded to reach approximately 1,500 RCs in USAID-funded health zones, pending results from the tool's ongoing pilot phase evaluation. The tool digitalizes existing RC registers for data collection, but data are not currently interoperable with DHIS2. The tool also signals data errors and automatically calculates data for monthly reports, which has resulted in improved data quality, according to stakeholders involved in the project. Other digital tools that have been introduced to help RCs and their supervisors at the community level include RedRose, which supports long-lasting insecticide-treated net distribution.

USE CASE(S)	ALAFIACOMM	REDROSE
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; EPI, Expanded Program on Immunization; LLIN, long-lasting insecticide-treated net.

CASE MANAGEMENT FUNCTIONALITIES	ALAFIACOMM	REDROSE
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	■	■

Abbreviation: HMIS, Health Management Information System.

MANAGEMENT & SUPERVISION FUNCTIONALITIES	ALAFIACOMM	REDROSE
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

Abbreviation: CHW, community health worker.

Appendices

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APPENDIX A

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APPENDIX B

Abbreviations

ANC	antenatal care
ASCQ	*agent de santé communautaires qualifiés* (qualified community health worker)
CHW	community health worker
CNLS-TP	Conseil National de Lutte contre le VIH/Sida, la Tuberculose, le Paludisme, les Hépatites, les Infections Sexuellement Transmissibles et les Épidémies (National Council for the Fight against HIV/AIDS, Tuberculosis, Malaria, Hepatitis, Sexually Transmitted Infections and Epidemics)
DHIS2	District Health Information Software 2
DIP	Direction de l'Informatique et de Pré-Archivage (Department of Information Technology and Records)
DPP	Direction de la Programmation et de la Prospective (Department of Programming and Forecasting)
HMIS	Health Management Information System
ICT	information and communications technology
iHRIS	integrated Human Resource Information System
LLIN	long-lasting insecticide-treated net
LMIS	logistics management information system
MOH	Ministry of Health
NGO	nongovernmental organization
NMCP	National Malaria Control Program
PIHI	Paquets d'Interventions à Haut Impact (High-Impact Intervention Package)
PMI	US President's Malaria Initiative
PNLP	National Malaria Control Program (Programme National de Lutte contre le Paludisme)
RC	relais communautaire
USAID	US Agency for International Development

APPENDIX C

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Jean Affo Assongba	Consultant, Population Services International
Amadou Assouma	Relais communautaire
Imourana Assouma	Relais communautaire
Marius Awonon	Advancing Newborn, Child and Reproductive Health / USAID
Loukmane Chabebou	Relais communautaire
Yaya Chabi	Relais communautaire
Fortuné Challa	US Agency for International Development (USAID)
Sarè Adamou Dramani	Relais communautaire
Lola Flomen	Consultant, Population Services International
Hervé Gbègnidé	Relais communautaire
Djibo Goudi	Relais communautaire
Ousmane Mama	Relais communautaire
Samuel N'dah	Relais communautaire
Florida Niyuhire	Integrated Health Services Activity / USAID
Ballè Okpe	CNLS-TP*
Ahmed Saadani	US President's Malaria Initiative
Amina Samao	Relais communautaire
Gilberte Sègnonnan	Ministry of Health
Leandre Sohoundé	Integrated Health Services Activity / USAID
Victor Sokou	Integrated Health Services Activity / USAID
Fouséni Souraka	Nurse Chief Post
Venance Vodougbo	Ministry of Health
Perfect Wouékpé	Ministry of Health

* Conseil National de Lutte contre le VIH/Sida, la Tuberculose, le Paludisme, les Hépatites, les Infections Sexuellement Transmissibles et les Épidémies

APPENDIX D

Community digital health tools*

Name of Tool	Type of Digital Health Intervention†	Implementer (Funder)	Scale	Malaria Use Case
AlafiaComm	**1.1** Targeted 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 **2.8** Healthcare provider training **2.9** Prescription and medication management **4.1** Data collection, management, and use **4.4** Data exchange and interoperability	Direction des Systèmes d'Information, Ministry of Health, Dimagi, Management Sciences for Health (US Agency for International Development)	Subnational Four departments: Ouémé, Plateau, Atacora, Alibori Will be used by 1,500 relais communautaires and health center managers during the expansion phase	Malaria case management Malaria screening with reference Active or reactive detection of malaria cases (community visits to find additional cases)
RedRose	**1.1** Targeted client communication **1.4** Personal health tracking **1.7** Client financial transactions **2.1** Client identification and registration **2.3** Health care provider decision support **2.5** Health care provider communication **2.9** Prescription and medication management **3.1** Human resource management **4.1** Data collection, management, and use	Catholic Relief Services (Gates Foundation, Global Fund)	National Used by 5,000 people	Routine distribution of long-lasting insecticide-treated nets during antenatal care or Expanded Program on Immunization visits

*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.

APPENDIX E

Next-generation digital health tool functionalities for malaria case management

CASE MANAGEMENT FUNCTIONALITIES	ALAFIACOMM	REDROSE
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: CHW, community health worker; iHRIS, integrated Human Resource Information System; LMIS, logistics management information system.

MANAGEMENT & SUPERVISION FUNCTIONALITIES	ALAFIACOMM	REDROSE
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