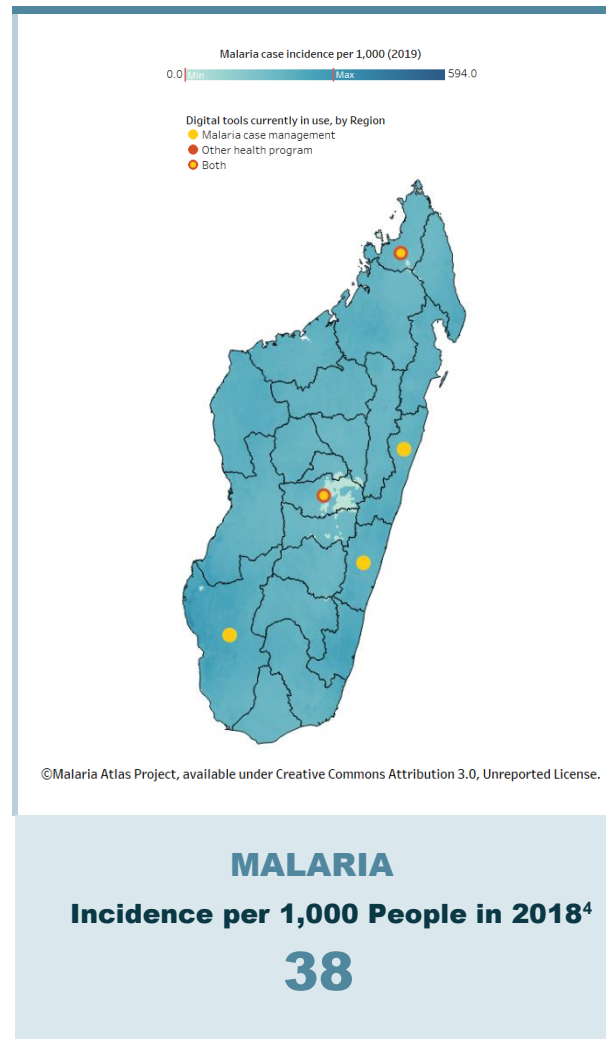# MADAGASCAR

Executive Summary

Despite a large cadre of community health volunteers (CHVs), malaria control continues to be a challenge in Madagascar. Both cases and deaths have risen in recent years, disproportionately impacting the East and West Coast regions.[1] Malaria case management services provided by CHVs are not standardized across the country, and both training and supervision of CHVs are weak outside of the regions where CHV malaria programming is supported by the U.S. Agency for International Development (USAID).

The Ministry of Health (MOH) has worked to improve national data systems in recent years, introducing DHIS2 and reorganizing the supervisory structure for data systems and digital health within the MOH. CommCare is currently being piloted for data collection and malaria case management by CHVs, and the MOH prioritizes linking this and other digital health tools to DHIS2. However, significant data quality issues and incomplete reporting continue to be a problem at the community level throughout the country.

This report provides concrete recommendations to improve CHVs' capacity and motivation to collect data and use digital tools to provide malaria services, establish coordination structures for digital health at the community level, and scale up the use of digital tools by CHVs.

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
Incidence per 1,000 People in 2018[4]
38

PEOPLE

Community Health Volunteer (CHV)

35,000 CHVs[2]
13 per 10,000 people

GOVERNANCE

National Digital Health Strategy

YES

SYSTEMS

Digital Health Index[3]

SCORE: 2

Recommended Actions

PEOPLE
Community health volunteers and other decision-makers

Train CHVs to deliver quality monthly reports
Support the MOH to train all CHVs on foundational data use and data collection skills, including interpreting data using the new, integrated, paper-based Monthly Report Format, and to conduct periodic refresher courses on using the Monthly Report Format and digital tools where appropriate. This training is needed both to improve the quality of data collected by CHVs and their ability to use data for decision-making without over-reliance on supervisory structures.

Establish incentives to motivate and formalize the CHV cadre
Support the MOH to conduct a cost-effectiveness analysis outlining potential CHV allowances, in-kind benefits, and official certification costs. Certification and compensation would recognize CHV contributions and have the potential to improve retention rates and performance.

Provide CHVs with a comprehensive performance package
Assist the MOH in developing a plan for public domestic funding to provide a comprehensive performance package: tables, chairs, solar panels, internet credit, and transportation to collect commodities from Basic Health Centers (*Centres de Santé de Base* – CSBs). CHVs currently lack basic resources to enable

GOVERNANCE
Strategies and policies

Establish a technical working group to oversee digital health initiatives
Support the Directorate of Studies, Planning, and Information System (*Direction des Études, de la Planification et du Système d'Information*—DEPSI) to establish a digital health technical working group to coordinate and oversee digital health initiatives and ensure alignment with government priorities. This group will include representatives from stakeholders, including the MOH, other government agencies, and funding and implementing partners.

Develop a funding strategy for electric and telecommunications infrastructure
Support the MOH to develop a financing plan for infrastructure needed to sustain the use of digital technology at the community level. In addition to mobilizing public funding, this plan will identify potential partners from the private sector to improve electricity access at health clinics and telecommunications capacity in rural areas, building on efforts already underway through the Private Sector Humanitarian Platform.

SYSTEMS
Processes and digital tools

Develop a standardized framework to assess the suitability of digital tools for scale-up
Support the MOH to develop standardized evaluation criteria for digital tools introduced at the community level, including those for malaria data collection and case management. This framework will include cost effectiveness, interoperability, and other user requirements identified by stakeholders, and help the MOH assess the suitability of existing and future tools for scale-up. In addition to developing a framework for tool assessment, support the MOH to develop procedural guidelines for the scale-up of digital tools, including training requirements.

Establish data quality guidelines and training standards
Support the MOH to develop a strategy and implementation plan for improving data quality. This plan will include the development of data quality assurance guidelines for the different actors involved in data collection, validation, and entry at the community, CSB, and district levels as well as a training plan to ensure uptake of the updated guidelines.

them to carry out their work effectively, which hinders their productivity and motivation.

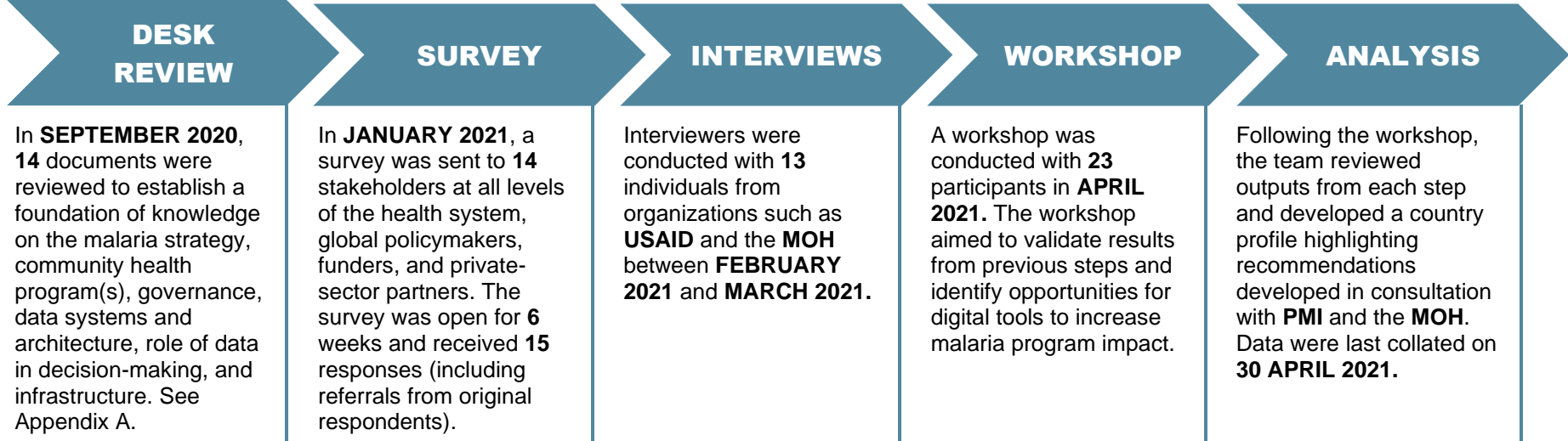**Develop CHV management guidelines and tools**

Support the MOH to develop an implementation plan for strengthening CHV supervision, including supervision guidelines and a common, paper-based supervision checklist. Currently, supervisors in CSBs have limited time or supportive tools to adequately supervise CHVs. Although implementing partners provide supplemental supervision in the regions supported by USAID, no standardized supervision guidance exists at the national level.

Ensure interoperability between digital tools and the national HMIS (DHIS2)

Support DEPSI and the MOH to conduct an assessment to identify challenges that limit the interoperability of digital tools for community health with DHIS2. After completing the assessment, develop an operational plan in coordination with implementing partners to support the integration of existing and future digital tools with DHIS2.

Methodology

The Madagascar 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 holding a workshop to validate the results and prioritize recommended actions. Due to COVID-19, the interviews and workshop were conducted virtually. See Appendix C for a list of key informant interviewees and workshop participants. See Appendix D for detailed information on the results of the online digital tools survey.

DESK REVIEW	SURVEY	INTERVIEWS	WORKSHOP	ANALYSIS
In **SEPTEMBER 2020**, **14** 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.	In **JANUARY 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 **6** weeks and received **15** responses (including referrals from original respondents).	Interviewers were conducted with **13** individuals from organizations such as **USAID** and the **MOH** between **FEBRUARY 2021** and **MARCH 2021**.	A workshop was conducted with **23** participants in **APRIL 2021**. The workshop aimed to validate results from previous steps and identify 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 recommendations developed in consultation with **PMI** and the **MOH**. 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 CHV 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

Madagascar has a large community health program with around 35,000 CHVs throughout the country (two CHVs per *fokontany*, the lowest administrative level). Although all CHVs are expected to provide malaria community case management services, the specific services provided are not standardized across the country, but rather depend on partner priorities and the capacity of local CSBs to provide training and supervision. CHVs in the 10 (out of 22) regions supported by USAID's ACCESS project provide integrated community case management for diarrhea, malaria, and pneumonia.[5] CHVs make home visits to administer rapid diagnostic tests and treat uncomplicated cases with artemisinin-based combination therapy for children under five years old.

In addition to USAID, several funding and implementing partners support community health programs, including Gavi, the Vaccine Alliance; the World Bank; and the Global Fund. Other partners, including UNICEF and Marie Stopes, have engaged a small number of CHVs to support their specific health activities but have not provided general funding for the CHV program. According to government policy, CHVs should be supervised monthly by CSB managers. However, in practice these managers have many competing clinical responsibilities, and supervision is often not carried out on a regular schedule. Only CHVs in regions supported by USAID receive additional supervision from the implementing partner. CHVs do not receive a salary but may receive financial incentives such as per diems provided by implementing partners. Significant turnover is a major challenge for the community health program due to the voluntary nature of these positions.

35,000 Community health volunteers in country	Compensation: VOLUNTEER
35,000 Providing malaria community case management	Compensation: VOLUNTEER

Community health volunteer digital readiness

There are no formal prerequisites to be eligible to be a CHV. CHVs are chosen by the community and are expected to be able to read and write, but in general they have a low level of education. No standardized training curriculum exists; rather, partners develop their own training plans based on their own priorities. Digital health training is only provided for CHVs involved in digital pilot projects. For example, after completing a general training program for CHVs provided by USAID implementing partners, CHVs in CommCare pilot regions receive five to six days of training on smartphone use, followed by specific training on the CommCare tool, which is used to support malaria case management. This training includes malaria data collection. In regions not supported by USAID, training is provided by the CSB manager, and its length and content depend on the managers' availability and motivation to conduct training, both of which tend to be limited.

Data-driven decisions at each level of health system

The health system is organized at five levels: national, regional, district, health facility, and community. Several challenges limit the use of data for decision-making, including delays in data transmission and poor data quality. Data analysis is concentrated at the national level and actors at the district, facility, and community level rely on feedback from the national level to adjust activities in response to data; therefore, delays in data transmission mean that data are often not taken into account in programming at the district, facility, and community levels. For example, if cases of malaria increase among children under five years old, CHVs may improvise but are largely unable to adapt their activities in an informed manner without timely feedback. Limited supervision further inhibits CHVs' capacity to adjust activities and services.

NATIONAL LEVEL	The national level is responsible for the overall coordination of policy and strategic directions. It sets standards and provides decision-makers with quality information for timely and appropriate decision-making. Managers use data to review strategies, plan activities, and manage health commodities. For example, they monitor malaria cases to identify localities that may be at risk of stockouts. Data analysis is concentrated at the national level, and this level is responsible for providing feedback to lower levels based on data they receive through DHIS2. In addition to MOH officials, implementing and funding partners can obtain login credentials to view data in DHIS2, and MOH officials also share data directly with partners. The Directorate of Health Surveillance and Epidemiological Monitoring and Intervention (*Direction de la Veille Sanitaire, la Surveillance Épidémiologique et la Riposte*) also shares data analysis through its internal newsletter and web page.
REGIONAL LEVEL	The regional health directorates are responsible for planning and coordinating the implementation of health programs at the regional level. However, officials at this level have limited capacity to make decisions and are not involved in data validation or analysis. In practice, the national level analyzes data and provides directives to regions. While some national-level officials would support devolving more decision-making power to the regional level, regional officials currently lack sufficient training and personnel.
DISTRICT LEVEL	Staff in most districts have been trained on data use though USAID projects and as a result have a limited capacity to make data-driven decisions, although in practice they largely rely on feedback and directives from the national level. Health data (including malaria data) are used for monitoring epidemics, and district officials also use data to monitor commodity use at the community level and adjust commodity shipments when needed.
HEALTH FACILITY LEVEL	The lowest level of data analysis is at the CSB, where managers analyze data for inventory forecasting. However, in practice data is rarely used for decision-making beyond commodity management.
COMMUNITY LEVEL	CHVs do not have the foundational skills necessary to interpret data and adapt community health programming in response to data. CHVs rely on feedback from the managers and officials at higher levels of the health system, but due to delays in data transmission and inconsistent supervision, they rarely have the opportunity to adjust programming in a timely manner.

Governance

	DIGITAL	COMMUNITY HEALTH	MALARIA
Name	Plan Stratégique de Renforcement du Système d'Information Sanitaire de Madagascar (Strategic Plan to Strengthen the Health Information System of Madagascar)	Politique Nationale de Santé Communautaire à Madagascar (National Community Health Policy in Madagascar)	Plan Stratégique National de Lutte Contre le Paludisme (National Strategic Plan to Fight Malaria)
Current strategy dates	2018–2022	2017	2018–2022
Coordinating body	Direction des Études, de la Planification, et du Système d'Information (DEPSI)	Direction des Soins de la Santé de Base	Direction de Lutte Contre le Paludisme
Funding strategy	No	No	Yes

The primary digital and community health governance documents in Madagascar provide a high-level overview of strategic goals but few concrete activities or implementation plans to achieve these goals. While both the Strategic Plan to Strengthen the Health Information System and the National Community Health Policy detail numerous needed policies, documents, and coordinating bodies, implementation of these plans is lacking.

The only strategic plan related to digital health in Madagascar focuses on strengthening the health information system. This plan prioritizes improving management and governance of the health information system, data access and integration with national systems, capacity-building, data quality, and information dissemination. Community-level data processes and challenges are detailed, but no specific digital tools for CHVs (or other actors) are included.

The most recent community health policy in Madagascar was drafted in 2017 and defines the general strategic priorities for community health and the responsibilities of actors at different levels. No activities related to digital health are discussed, although the integration of community health data in national data systems is included as a priority strategic area. This document describes previous gaps in the implementation of community health policies, despite the existence of strategic documents and specific implementation plans. The policy also calls for the drafting of a Strategic Plan for the Reinforcement of Community Health (*Plan Stratégique de Renforcement de la Santé Communautaire*) and a National Strategy for Community Health (*Stratégie Nationale de Santé Communautaire*) as well as the establishment of a steering committee, coordination committee, and exchange platform, but none of these plans or governance bodies have yet been put in place.

The strategic plan to fight malaria does not include digital health but focuses on improving malaria data as a strategic priority, including improving the timeliness and completeness of reporting at all levels. The role of CHVs in achieving different strategic goals is integrated throughout the plan.

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

Digital health governance within the MOH was restructured in 2019, with oversight and management of national data systems and digital health activities now centralized under the new Directorate of Studies, Planning, and Information System (DEPSI). Within DEPSI, the Service for the Operation, Maintenance, and Development of Data Systems (*Service de l'Exploitation, de la Maintenance Informatique, et du Développement du Système Informatique*) is responsible for managing DHIS2.

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

A law on the protection of personal data (N. 2014-038) was adopted in 2014. However, the structure responsible for enforcing the law (*Commission Malagasy sur l'Informatique et des Libertés*) has not yet been established and the law is not currently enforced. A procedural manual (*Manuel des Normes et Procédures du Système National d'Information Sanitaires à Madagascar)* provides general guidelines for data security and sharing, but no formal statutory guidance governs data sharing. A procedural manual also provides guidance on accessing data and assigning login credentials and levels of access in DHIS2.

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

No enterprise architecture for digital health or interoperability standards currently exist in Madagascar. DHIS2 is the primary health information management system. While the government strongly promotes the integration of all digital tools with DHIS2, no formal guidelines or standards have been adopted.

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

The 2017 Strategic Plan to Strengthen the Health Information System outlined several policies that were under development, including the maintenance and management of electronic infrastructure. However, these policies have not yet been adopted or published. Data collected via national data systems is hosted on local servers, and the MOH is currently working to increase server capacity. A system is also in place to back up data on external mobile hard drives. Development partners implementing digital health tools have internal policies for mobile device management, but no government policies exist.

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

In Madagascar, DEPSI has a small number of dedicated staff for system management who provide training throughout the country on DHIS2, data quality assurance, and other topics, dependent on donor funding and priorities.
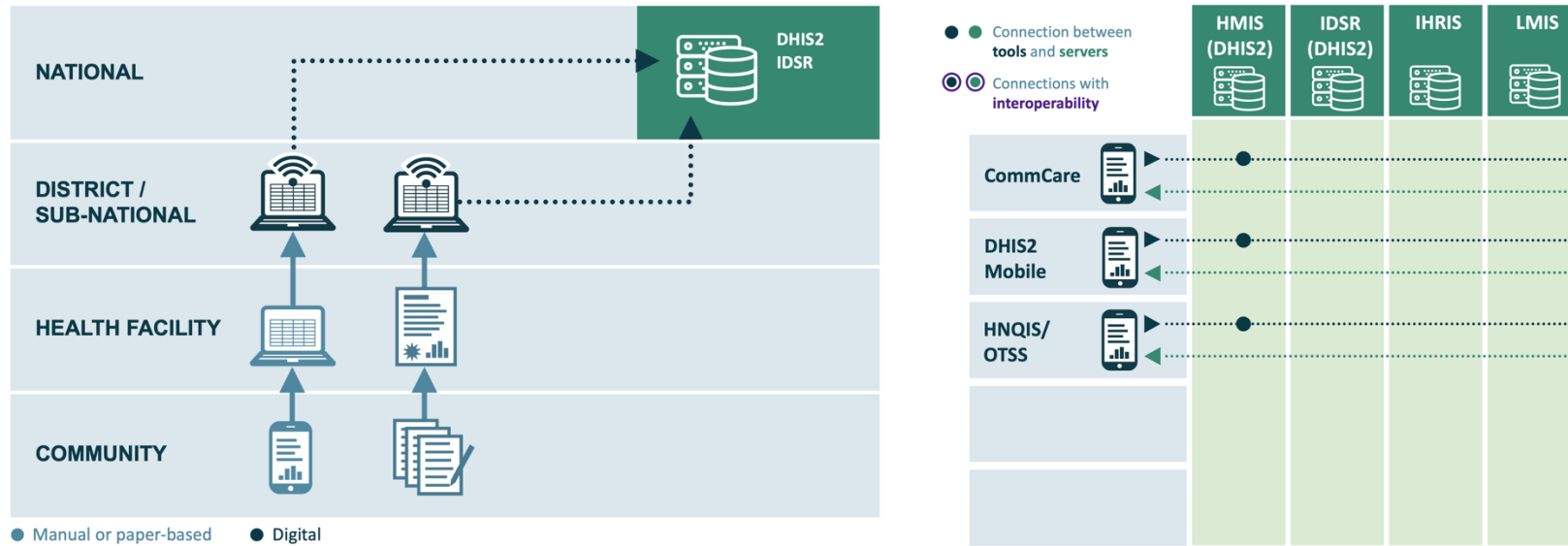
Systems

Data flow

At the community level, with the exception of the CommCare tool implemented by the USAID ACCESS project, CHVs collect health data using paper forms that are forwarded to the CSB for review and validation each month. The CSB sends paper-based health data to the district level on a monthly basis, where they are integrated with data from the first-level hospitals and entered electronically into DHIS2. These data then flow automatically to the national level, where they are validated and analyzed. Community indicators have been integrated in the national data system since 2015. The national level is supposed to provide feedback based on the data received, but in practice this process is slow and infrequent. Similarly, CSB managers are supposed to share data with CHVs and community-based health oversight committees to improve the quality of their activities, but in practice this type of feedback is not provided on a regular basis.

No digital tools used by CHVs currently connect directly to DHIS2; however, the USAID ACCESS program is working to achieve interoperability between CommCare and DHIS2. Currently, the USAID ACCESS project has its own server where data are stored. CSB managers use tablets to review data collected via CommCare on a monthly basis. The aggregated indicators are then sent to the districts electronically via the CommCare tool. The district manager validates the indicators, which then enter automatically into DHIS2. CHVs using CommCare also collect data on paper following the same process as other CHVs. In these areas, data are therefore collected both on paper and electronically. While the aggregated indicators should be identical, in practice discrepancies are frequently seen.

Several challenges limit efficient data flow. Data collected by CHVs are often inaccurate. Certain indicators are not well understood by CHVs, and the large volume of information that needs to be recorded by CHVs contributes to frequent errors and incomplete reporting. CHVs currently lack sufficient training in data collection and indicators to improve the quality of data produced. As a result of these errors, officials at the district level must devote significant time to data cleaning, and community data are discounted by the MOH due to doubts about their reliability. Such validation and data entry delays further limit the timely integration of community data in DHIS2 and result in delayed decision-making.

Madagascar previously used the Open Data Kit (ODK) application to collect surveillance data, including suspected and confirmed cases of malaria and other notifiable diseases. However, this system was replaced in 2020 by the Integrated Electronic Epidemiologic Surveillance tool (*Surveillance Épidémiologique Intégrée à base Électronique*—SEIE), which allows CSB managers to report cases directly via tablet into DHIS2. Fifty-nine of 114 districts have been trained to use SEIE; the remaining districts continue to use ODK (with data transferred regularly to DHIS2) or weekly surveillance reports sent from CSBs to districts by paper or text message. Districts compile the paper reports in Excel and share the data with national officials weekly by email. CHV data are aggregated with CSB data. Madagascar uses CHANNEL for its logistics management information system (LMIS) to track inventory, manage expiration dates, and serve as a logistics reporting tool. Commodities received by CHVs are aggregated with those from the CSB, and the system is manually connected to DHIS2 after data reach the national level. An official list of health facilities (2015) is also available, and the Health Statistics and Demographics Unit is finalizing a master list of CSBs.

The CommCare, DHIS2 mobile, and HNQIS/OTSS tools all share data with DHIS2; however, they do not currently share data with other national data systems or receive data from these systems.
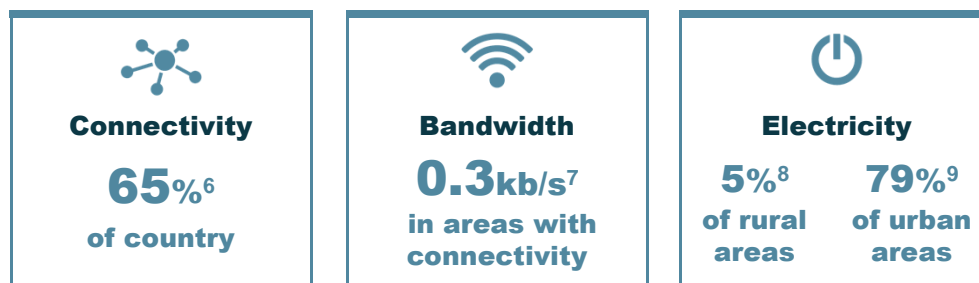

Abbreviations: DHIS2, District Health Information Software 2; HMIS, health management information system; HNQIS, Health Network Quality Improvement System; IDSR, Integrated Disease Surveillance and Response; IHRIS, Integrated Human Resources Information System; OTSS, outreach, training, and supportive supervision; LMIS, logistics management information system.

Digitally enabling infrastructure

More than 61% of Madagascar's population lives in rural areas with very limited connectivity and access to electricity.[10] The national electricity provider is unable to cover interior, landlocked areas (49 out of 114 districts). Private providers supply energy in some areas, but their reliability depends on a stable fuel supply, and renewable and solar energy is provided in some remote areas by development partners. In general, district health offices have electricity, but community-level facilities do not.

Sixty-five percent of the population lives in areas where 3G networks are available.[11] Three major mobile networks are available in Madagascar, but their availability varies by locality. Of the 13 health regions supported by USAID (including three where USAID does not support malaria services), 80% contract with Orange, while the remaining areas, where Orange does not have good reception, have service provided by Airtel or Telma. Given the limited infrastructure, CHVs engaged in digital health pilots are often provided with alternative power and connectivity devices, including solar panels, solar chargers, power banks, and relay antennas, to support the use of digital tools. Nevertheless, CHVs in many areas struggle to access mobile networks and as a result take safety risk, such as climbing a tree or going to a higher location to access the mobile network.

Connectivity

65%[6]

of country

Bandwidth

0.3kb/s[7]

in areas with connectivity

Electricity

5%[8]
of rural areas

79%[9]
of urban areas

Digital health tools in use and functionality

Several digital tools have been introduced for malaria case management, surveillance, and stock tracking in Madagascar. CommCare and the DHIS2 application are both tools that support malaria case management. CommCare is being implemented through the USAID ACCESS project in three regions. It is currently used by more than 1,300 CHVs, and USAID is planning to scale up its use to 2,000 CHVs by September 2021. Impact Malaria is currently piloting the DHIS2 mobile application in 96 CSBs in two regions to support data collection by tablet; however, CHVs do not use the tool. Health Network Quality Improvement System (HNQIS), a clinical supervision and management tool funded by USAID, is used by 45 CSB managers in two regions to assess and give feedback on CHV performance in malaria programs.

USE CASE(S)	CommCare	DHIS2 Mobile	HNQIS OTSS
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; DHIS2, District Health Information Software 2; EPI, Expanded Program on Immunization; HNQIS, Health Network Quality Improvement System; LLIN, long-lasting insecticide-treated net; OTSS, outreach, training, and supportive supervision.

CASE MANAGEMENT FUNCTIONALITIES	CommCare	DHIS2 Mobile	HNQIS OTSS
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	■	■	■

Abbreviations: CHW, community health worker; DHIS2, District Health Information Software 2; HMIS, Health Management Information System; HNQIS, Health Network Quality Improvement System; OTSS, outreach, training, and supportive supervision.

MANAGEMENT & SUPERVISION FUNCTIONALITIES	CommCare	DHIS2 Mobile	HNQIS OTSS
CHW identification[12] 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

Abbreviations: CHW, community health worker; DHIS2, District Health Information Software 2; HNQIS, Health Network Quality Improvement System; OTSS, outreach, training, and supportive supervision.

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Abbreviations

ANC	antenatal care
CHV	community health volunteer
CHW	community health worker
CSB	Basic Health Center (*Centre de Santé de Base*)
DEPSI	Directorate of Studies, Planning and Information System (*Direction des Études, de la Planification et du Système d'Information*)
DHIS2	District Health Information Software 2
DLMT	Directorate for the Fight against Communicable Diseases (*Direction de la Lutte contre les Maladies Transmissibles*)
DVSSER	Department of Health Watch, Epidemiological Surveillance and Response (*Direction de la Veille Sanitaire, la Surveillance Épidémiologique et la Riposte*)
EPI	Expanded Program on Immunization
HMIS	health management information system
HNQIS	Health Network Quality Improvement System
iHRIS	Integrated Human Resources Information System
LLIN	long-lasting insecticide-treated net
LMIS	logistics management information system
MOH	Ministry of Health
ODK	Open Data Kit
OTSS	outreach, training, and supportive supervision
PMI	President's Malaria Initiative
PNLP	National Malaria Control Program (*Programme National de Lutte contre le Paludisme*)
SEIE	Integrated Electronic Epidemiologic Surveillance tool (*Surveillance Épidémiologique Intégrée à base Électronique*)

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Community digital health tools*

Name of Tool	Type of Digital Health Intervention†	Implementer (Funder)	Scale	Malaria Use Case
CommCare	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 3.2 Supply chain management 3.6 Equipment and asset management 4.1 Data collection, management, and use 4.4 Data exchange and interoperability	USAID ACCESS (USAID)	Subnational Used in Atsimo-Andrefana, Atsinanana, Vatovavy Fitovinany. Around 1,500 CHVs and CSB managers use the tool, including more than 1,300 CSVs.	Malaria case management Malaria screening with referral Training of health workers
DHIS2 Mobile	1.1 Targeted client communication 1.2 Untargeted client communication 1.5 Citizen based reporting 1.6 On demand information services to clients 2.1 Client identification and registration 2.2 Client health records 2.3 Healthcare provider decision support 2.5 Healthcare provider communication 2.7 Scheduling and activity planning for healthcare providers 2.10 Laboratory and diagnostics imaging management 3.1 Human resource management 3.2 Supply chain management 3.3 Public health event notification 3.4 Civil Registration and Vital Statistics (CRVS) 4.1 Data collection, management, and use 4.2 Data coding 4.3 Location mapping 4.4 Data exchange and interoperability	PNLP and PMI Impact Malaria (PMI-USAID)	Subnational Used in Vakinankaratra (Antsirabe II, Faratsiho) and Diana (Antsiranana I) 95 health officers use the pilot tool	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

Name of Tool	Type of Digital Health Intervention[†]	Implementer (Funder)	Scale	Malaria Use Case
HNQIS OTSS	2.8 Healthcare provider training 2.10 Laboratory and diagnostics imaging management 3.1 Human resource management 3.2 Supply chain management 3.7 Facility management 4.1 Data collection, management, and use 4.3 Location mapping	PMI-Impact Malaria and the Ministry of Health (PMI-Impact Malaria)	Subnational Used in Vakinankaratra (Antsirabe II) and Diana (Antsiranana I) 45 CSB managers use the tool	Communication/messaging to the community about malaria Training of health workers
campMID	Not available	PMI	The tool will be tested and then immediately operational on a national scale	LLIN distribution

* 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: CSB, Centre de Santé de Base; DHIS2, District Health Information Software 2; HNQIS, Health Network Quality Improvement System; LLIN, long-lasting insecticide-treated net; OTSS, outreach, training, and supportive supervision; PMI, U.S. President's Malaria Initiative; PNLP, Programme National de Lutte contre le Paludisme

Next-generation digital health tool functionalities for malaria case management

CASE MANAGEMENT FUNCTIONALITIES	CommCare	DHIS2 MOBILE	HNQIS OTSS
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; DHIS2, District Health Information Software 2; HNQIS, Health Network Quality Improvement System; iHRIS, integrated human resources information system; LMIS, Logistics Management Information System; OTSS, outreach, training, and supportive supervision.

MANAGEMENT & SUPERVISION FUNCTIONALITIES	CommCare	DHIS2 MOBILE	HNQIS OTSS
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