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Role of Digital Tools in Fighting Malaria at the Community Level

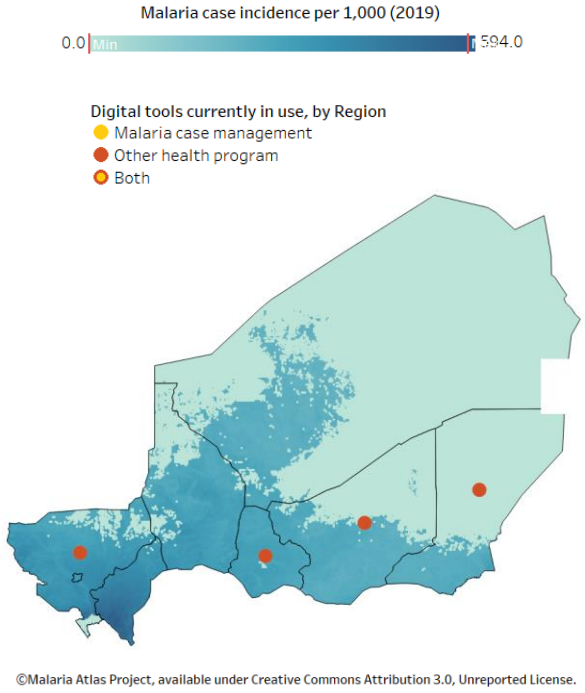
NIGER

Executive Summary

Community case management of malaria is particularly important in Niger given its large rural population. More than 50 percent of Nigeriens live more than 5 kilometers from a health center,[1] making the lack of access to quality malaria services a barrier in the fight against malaria.

Niger has drafted extensive documentation for digital and community health, with detailed strategic plans, procedural guides, and standards to increase the quality and coverage of malaria services, improve data collection, and build infrastructure to support the implementation of digital tools. The government has also taken action to improve coordination on digital health, officially prohibiting parallel data systems and promoting general usage of District Health Information Software 2 (DHIS2).

However, implementation of these strategies is lacking. Few digital health tools are in use at the community level, community data are not systematically integrated into national data systems, and parallel data systems still exist. Challenges include the limited electric and telecommunications infrastructure, in addition to competing priorities for available human and financial resources.[2] This profile provides concrete recommendations to improve coordination, training, and infrastructure in order to facilitate the introduction of digital tools in a way that will improve malaria case management.



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MALARIA

Incidence per 1,000 People in 2018[4]

154

PEOPLE

Community Health Worker (CHW)

19.787 CHWs

8 per 10,000 people

GOVERNANCE

National Digital Health Strategy

YES

SYSTEMS

Digital Health Index[3]

SCORE: 2

SEPTEMBER 2021

digital square

Recommended Actions

PEOPLE

Community health workers and other decision-makers

Provide incentives to CHWs to improve performance and retention

Support the Directorate for the Organization of Care (*Direction de l'Organisation des Soins*—DOS) to develop a costed implementation plan for providing standardized incentives to improve performance and retention of CHWs called *relais communautiares* (RCs), including for integrated community case management (iCCM). This plan should include scenarios for differing levels of financial and nonfinancial incentives and identify multiple potential funding sources. After drafting the plan, support the DOS to hold a roundtable discussion with key stakeholders to disseminate the plan and identify the most realistic funding scenarios.

Provide enhanced data collection and analysis training

Support the Directorate of Statistics (*Direction des Statistiques*—DS) to conduct a gap assessment exercise to identify opportunities to strengthen training on data collection, reporting, and analysis at all levels, with a particular focus on RCs as well as malaria and community health officials at all levels. Once gaps have been identified, support the DS to develop and implement a plan to provide enhanced training in the priority areas identified. Work with the DS and DOS to review data collection training for RCs, update training modules for RCs to align with new data collection and reporting forms and

GOVERNANCE

Strategies and policies

Establish a national coordination body to oversee digital health activities

Support the MOPH to establish a steering committee for digital health that will manage and coordinate digital health initiatives, including those for malaria, with stakeholders from the government, civil society, and funding and implementation partners. Although such a committee was envisioned as part of the National E-Health Strategic Plan, a committee has not yet been established. This structure will improve government visibility and leadership on digital health initiatives and improve coordination and alignment with national priorities.

Map RCs to identify coverage gaps and improve visibility on services provided at the community level

Support the DOS and DS to update and expand the existing mapping of RCs by identifying and locating RCs, the communities in which they work, and the services they provide. The results of this exercise could be available as an interactive map in DHIS2 as well as in the public-facing *Carte Sanitaire* (Health Map) and would allow stakeholders to see current RC coverage gaps and improve the

SYSTEMS

Processes and digital tools

Digitalize new community data collection and reporting tools

Support the DOS and DS to digitalize the new paper data collection and reporting tools for RCs. Digitalization of these paper tools, which are aligned with DHIS2, is needed for the eventual introduction of a digital data collection tool for RCs, like DHIS2 Tracker.

Partner with mobile network operators to improve network connectivity

Support the MOPH to develop a strategy to partner with mobile network operators and other private-sector actors to improve mobile network availability in rural areas, particularly at local health facilities. This strategy will identify potential funding sources for improved infrastructure, including through the development of public-private partnerships and partnerships with social enterprises.

develop refresher training modules and materials and job aids.

Increase the number of RCs who provide iCCM

Support the Ministry of Public Health (MOPH) to expand the number of RCs who can provide the full package of services outlined in the National Community Health Strategy, including iCCM services. Currently, fewer than one-third of RCs provide case management services for malaria.

management of the RC program and coordination among partners.

Methodology

The country profile for Niger was developed through the following process: conducting a desk review, deploying an online survey focused on the digital landscape, conducting key informant interviews, and conducting a workshop to validate the findings and prioritize recommended actions. Due to COVID-19, to protect stakeholders, the interviews were conducted in person with social distancing and the workshop was conducted in a hybrid format, although poor connection affected participation. 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

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.

SURVEY

In **MARCH 2021**, a survey was sent to **11** stakeholders at all levels of the health system, global policymakers, funders, and private-sector partners. The survey was open for **6** weeks and received **9** responses.

INTERVIEWS

Interviews were conducted with **21** individuals from organizations such as the **National Malaria Control Program (*Programme National de Lutte Contre le Paludisme* —PNLP)** and **World Health Organization (WHO)** between **MARCH 2021** and **MAY 2021**.

WORKSHOP

A workshop was conducted with **19** participants in **MAY 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 the **PNLP** and **United Nations Children's Fund (UNICEF).** Data were last collated on **19 MAY 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

Community health workers, known as *relais communautaires* (RC), work in all of Niger's 72 health districts. RCs in villages more than 5 kilometers from a health center provide a standard package of promotional, preventative, and curative services, including case management of childhood illnesses such as malaria. RCs in villages closer to a health center provide a more limited package of promotional and preventive services. Despite the standardized package, in practice, activities vary depending on priorities of implementing partners. The Ministry of Public Health (MOPH) is working to scale up the integrated community case management (iCCM) program, targeting 5,800 RCs in ten districts with high and medium malaria endemicity.[5] These RCs diagnose malaria with rapid diagnostic tests and treat confirmed cases with artemisinin-based combination therapy, in addition to managing pneumonia, diarrhea, and malnutrition for children under five years of age. Forty-two percent of villages currently have an RC, but only 5,690 of the 19,787 active RCs provide the full package of services. National policy calls for 1 RC for every 500 people (1 per 1,000 in villages close to a health center), which would require a total of 35,650 RCs. Per government policy, RCs are considered volunteers and do not currently receive stipends or any regular incentives; however, national policy calls for a standardized stipend of 20,000 FCFA per month (~US$36). The MOPH is currently in discussions with funding partners to implement this policy, which is needed to improve retention. The U.S. President's Malaria Initiative (PMI) and the Global Fund are the primary funders for community-based malaria services.

19,787 **Relais communautaires in country**	**Compensation Policy:** **VOLUNTEER**
5,690 **Providing malaria community case management**	**Compensation Policy:** **VOLUNTEER**

A second category of health worker, known as *agents de santé communautaire* (ASCs), work in local health centers known as *cases sanitaires* (CS). ASCs receive six months of training and are paid 55,000 FCFA per month (~US$99). In some cases, ASCs provide supervision for RCs, but most RCs and ASCs are supervised by integrated health center (*centre du santé intégré* – CSI) managers. RCs should meet with supervisors monthly for supervision and to share monthly reports, discuss activities and results, and resupply commodities. In practice, supervision often does not take place according to schedule due to supervisors' competing responsibilities and lack of transportation. In some regions implementing partners also support supervision of RCs and ASCs.

Community health worker digital readiness

RCs are chosen by the community, and there are no specific requirements other than being able to read, write, and speak the local languages. RCs receive preservice training that follows a standardized national training guide. Digital health is not currently included in the training curriculum, but training on specific digital tools is provided for RCs who participate in pilot projects, such as the Open Data Kit (ODK)/Auto-Visual Acute Flaccid Paralysis Detection and Reporting (AVADAR) tool for the surveillance of acute flaccid paralysis. Training on DHIS2 has been provided at the national, regional, district, and facility levels, but there is no established technical support system for DHIS2 at the national level.

Data-driven decisions at each level of health system

Niger has used DHIS2 for health information management since 2017, and government users from the CSI to the national level can access DHIS2 with credentials. The DS has developed and disseminated a manual on standard operating procedures for the management of routine health data, which includes the division of responsibilities for data validation and dissemination at different levels of the health pyramid. However, these procedures have not been fully put into practice at all levels. Data from the community level are not systematically entered in the national data system; the data that are entered are incomplete and not considered reliable. As a result, data from the community level are for the most part not taken into account in decision-making.

NATIONAL LEVEL	National-level officials at the MOPH use data to plan strategy and monitor performance. For example, the National Malaria Control Program, *Programme National de Lutte Contre le Paludisme* (PNLP), uses data from DHIS2, including weekly surveillance data from the Integrated Disease Surveillance and Response (IDSR) system, to monitor the progress of performance indicators and to inform the implementation of malaria control interventions. Indicators are shared with key funding and implementation partners such as the Global Fund and PMI. The DS produces an annual report on health statistics called the *Annuaire des Statistiques Sanitaires du Niger*.
REGIONAL LEVEL	At the regional level, officials use data to inform the annual planning process and for supply management, to ensure that commodities are ordered in time to avoid stockouts. Semiannual data reviews should be conducted with health districts to inform decision-making, but these meetings do not always take place according to the official schedule. The data received at the regional level are often incomplete and arrive late, impacting their use.
DISTRICT LEVEL	Gaps in data quality and reliability, along with late and incomplete reporting, impact district-level officials' ability to respond to needs and make decisions using data in a timely manner. Although quarterly data review meetings should take place at the district level, these meeting are not systematically held due to a lack of financing and planning to organize the meetings as well as officials' busy schedules.
HEALTH FACILITY LEVEL	CSI managers are supposed to use data to help plan and implement malaria control interventions, although in practice data are not consistently used for decision-making at this level. They review and approve data analyzed for their facility prior to dissemination and organize weekly or monthly meetings to review data and discuss responses to problems. CSI managers are supposed to transmit information on health problems identified to local administrative authorities and other key local figures, such as village chiefs, on a monthly basis. The existence of multiple reporting forms at the community level and the lack of harmonization between RC data forms and DHIS2 make analyzing community data difficult.
COMMUNITY LEVEL	RCs collect and report data to the CSI manager. While RCs may occasionally share information on health trends that they receive from the CSI manager with the community, RCs do not analyze data or use data to inform their activities beyond estimating commodity needs.

Governance

	DIGITAL	COMMUNITY HEALTH	MALARIA
Name	*Stratégie National de E-Santé*	*Plan Stratégique National de Santé Communautaire*	*Plan Stratégique National de Lutte Contre le Paludisme*
Current strategy dates	2019–2023	2019–2023	2017–2021 *Extended to 2023*
Coordinating body	Not specified, other than a steering committee (*not yet established*)	*Comité national de coordination des interventions de santé communautaire*	*Programme National de Lutte Contre le Paludisme* (PNLP)
Funding strategy	Yes	No	Yes

Niger's digital health priorities are outlined in the National E-Health Strategy, which focuses on improving the enabling environment for digital health as well as digital health service provision. The plan outlines specific projects relevant to community health, including the development of a mobile application for disease surveillance by RCs and the reinforcement and extension of the National Health Information System (*Système National d'Information* Sanitaire—SNIS), ensuring the full integration of data from all levels of the health system. The plan also provides a very detailed overview of which documents exist for data and digital health governance as well as gaps in documentation. To address these gaps, it includes the development of documents on interoperability norms and exchange protocols as priority projects to be implemented by 2023. Although the plan outlines a proposed governing structure for digital health, including a steering committee to monitor and support implementation of the strategic plan, this committee has not yet been put in place. This committee would report directly to the MOPH, and the *Direction des Archives de l'Information*, *de la Documentation et des Relations Publiques* (DAIDRP) would host its permanent technical secretariat.

The Division of Community Health (*Division de la Santé Communautaire*—DSC) within the Directorate for the Organization of Care (*Direction de l'Organisation des Soins*—DOS) drafted a strategic plan for community health in 2019. However, implementation of the plan is delayed. The plan focuses on improving the availability and quality of community health services and community health governance. Digital health is not a large component of the strategic plan, but it calls for training RCs on data entry using mobile tools and the promotion of digital tool pilots, including for iCCM. Priority activities include improved RC training and supervision, integrating RC data into DHIS2, and increasing the use and analysis of community health data.

The national strategic plan for malaria prioritizes universal coverage for prevention and case management along with improved information systems and surveillance. Case management of malaria by RCs through home-based care is central to the strategy outlined in the plan, which calls for the progressive expansion of iCCM service provision throughout the country. The plan does not incorporate digital health, but it calls for the improvement of malaria data quality, completeness. and timeliness. However, no specific activities are proposed to improve malaria data at the community level.

GOVERNANCE Policies define digital health and health data governance roles, responsibilities, and structures.	The 2013 decree organizing the MOPH does not specify which structure will be responsible for digital health initiatives. The MOPH has delegated responsibility for data governance to the *Direction des Statistiques* (Directorate of Statistics). The DS developed a data review guide for DHIS2 to standardize data review processes. The MOPH has also created a technical group to oversee the quality of health data, which the DS is responsible for. According to Niger's digital health strategic plan, both the Ministry's General Directorate and the Directorate of Information Archives, Documentation and Public Relations (*Direction des Archives de l'Information, de la Documentation et des Relations Publiques*—DAIDRP) should be involved in the development of digital health services. However, a steering committee outlined in the strategic plan to oversee digital health initiatives has not yet been established.
DATA MANAGEMENT Policies provide specifications for data access, privacy, security, and confidentiality and outline stipulations for data sharing.	Niger has a law on the protection of personal data (Law No. 2017-28 of May 3, 2017), and a structure to administer this law (*Haute Autorité de Protection des Données à Caractère Personnel*) was put in place in 2019. No specific guidelines exist on health data security or data sharing.
STANDARDS AND INTEROPERABILITY Policies describe an enterprise architecture, normative standards—such as health information standards—and digital identity.	No enterprise architecture or formal protocols on interoperability currently exist in Niger. However, the 2019–2023 digital health strategic plan calls for the development of data exchange protocols and interoperability standards as priority projects.
INFRASTRUCTURE Policies define data hosting and storage (e.g., local or cloud), mobile device management, and telecommunications access.	Government health data are currently stored on servers in the MOPH's data center, but no formal policies exist on data hosting and storage. The digital health strategic plan calls for the purchase of additional servers and investments to bring the data center up to norms. The MOPH plans to use its data center to back up health data once the government's central data center is established. No formal policies exist for mobile device management, which is handled on a case-to-case basis by implementing partners.
WORKFORCE Policies describe workforce job structures and descriptions, plans for training, digital literacy expectations, and incentives for digital adoption.	The National E-Health Strategy identifies human resources deficits and limited staff capacity as limitations to the implementation of the plan. While no systematic capacity-building for digital health is envisioned in the strategy, the plan calls for the reinforcement of e-learning platforms to support more generalized capacity-building for health workers and training for DAIDRP staff to improve their capacity to manage networks and databases and ensure data security.

Systems

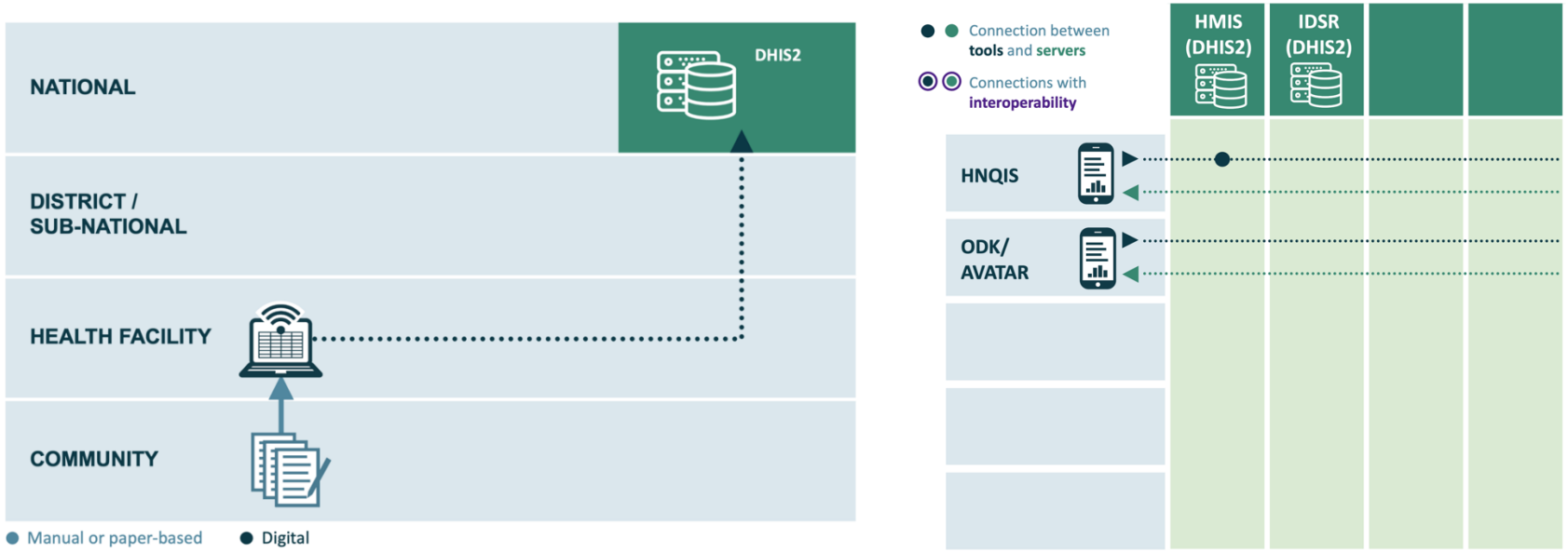
Data flow

Community health data are not systematically entered into the national data system in Niger. RCs collect data on their activities and case management in paper registers and submit monthly reports to the CSI (or in some cases to the ASC). However, these reports are based on the programmatic area(s) on which the RC works (e.g., iCCM, family planning, etc.) and were previously not aligned with DHIS2. At the CSI, the manager or person responsible for the programmatic area reviews the forms. The CSI manager is then supposed to enter the data into DHIS2 or assign someone else at the facility to enter the data. In practice, RC forms are rarely entered into DHIS2 due to difficulties arising from the lack of alignment with DHIS2 indicators, multiple reporting forms, and time constraints by CSI personnel. When data are entered, often only a small number of indicators are included. ASCs follow the same process for data collection and transmission, with paper-based data collection and monthly reporting via paper forms to the CSI. However, their reporting forms have been aligned with DHIS2 and are more frequently entered into DHIS2 by CSI officials. Once data are entered in DHIS2, they undergo review and validation at the district, regional, and national levels. Although there is a clear process for data review and cleaning defined in MOPH documents, implementation of these processes has not been fully achieved.

Several challenges impact data flow for community data. Beyond lack of alignment with DHIS2, RCs have limited training, supervision, and feedback on data collection. As a result, data quality is low, and reports are often incomplete and submitted late. Due to significant clinical and supervision responsibilities at the CSI level, data entry is often not prioritized, and when time is limited, CSI and ASC data are prioritized for entry ahead of RC data. CSIs have limited access to the internet, and only 60 percent of these facilities have electricity.[6] Although most CSIs have either a computer or tablet for data entry, data transmission often requires that officials travel to a place with better network access. Paper data collection and reporting tools were recently revised at all levels, and the new RC forms now align with DHIS2, which should facilitate higher rates of data entry in DHIS2. Training on the use of these data collection and reporting forms has started, although not yet at the community level.

The national Integrated Disease Surveillance and Response (IDSR) system, managed by the Department of Surveillance and Response to Epidemics (*Direction de la Surveillance et de la Riposte aux Épidémies*), also collects data on malaria using DHIS2. CSI managers call ASCs on a weekly basis and combine their data with data from the CSI for weekly reporting in DHIS2. CSIs also submit reports on commodity management via DHIS2. Different paper reporting forms are used for each program and include information such as stockouts and the quantity of different products used during the period. RCs and ASCs transmit commodity data to the CSI on paper forms on a monthly basis for integration into CSI reporting and in order to be resupplied. However, CSI reports are frequently incomplete. According to some interview respondents, CSI managers may not accurately report stockouts and other commodity management problems. Commodity supply is a major challenge, and RCs often lack sufficient commodities to support case management. A logistics management information system is currently being developed but is not yet in use.

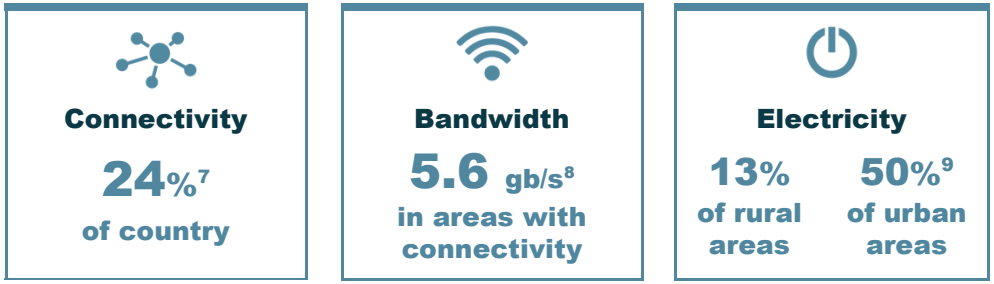
The government of Niger promotes the alignment of digital systems and tools with DHIS2 and banned the use of parallel systems in 2019, issuing a formal letter to development partners to prohibit the introduction of new digital tools that are not aligned with national systems. The Health Network Quality Improvement System (HQNIS) tool connects directly with the DHIS2 server, but no separate national data systems are currently in use.



Abbreviations: DHIS2, District Health Information Software 2; HMIS, health management information system; HNQIS, Health Network Quality Improvement System; IDSR, Integrated Disease Surveillance and Response; ODK/AVADAR, Open Data Kit/ Auto-Visual Acute Flaccid Paralysis Detection and Reporting.

Digitally enabling infrastructure

Niger has limited electric and telecommunications coverage, particularly in the rural areas of the country where 83 percent of the population lives.[10] Four mobile telephone networks are available (Airtel, Zamani, Moov, and Niger Telecom) covering 92 percent of the population. However, 3G coverage is only available for 24 percent, primarily those living in urban centers.[8] With only 45 active mobile connections per 100 people, Niger's mobile penetration rate is far below most other countries in West Africa. Only 19 percent of the total population has access to electricity. Health facility connectivity is particularly low. Sixty percent of CSIs have electricity, three-quarters of which are connected to the electrical grid and another quarter with solar panels.[11]



Digital health tools in use and functionality

Most digital health tools in Niger have been introduced by nongovernmental organizations or international organizations as small-scale pilot projects, with little involvement from the government. These projects have tended to disappear after initial financing ended, with no evaluation of their impact on Niger's health system. Nigerien startups have also started to introduce their own digital health tools. Few tools are currently used by RCs. The ODK/AVADAR tool, funded by the Bill & Melinda Gates Foundation, is used for the surveillance of acute flaccid paralysis, with RCs in four regions reporting cases by mobile phone. Data are sent to a server, and health officials then follow up and submit reports on the suspected case. The Information Communication Technologies for Development (ICTD4) tool was piloted in 2021 by Catholic Relief Services (CRS), with funding from the Global Fund, to support seasonal malaria chemoprevention, including by RCs. Other tools include the Health Network Quality Improvement System (HNQIS) tool, implemented by Impact Malaria as a quality assurance tool to support ASC supervision at the CSI level in five regions, including supervision of malaria service provision. CommCare is used by CRS for activities related to mother and child health, including iCCM, vaccination, malnutrition, and tracking pregnancies, but no other information on the use of this tool was available at the time of publication.

USE CASE(S)	HNQIS	ODK/AVADAR
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

CASE MANAGEMENT FUNCTIONALITIES	HNQIS	ODK/AVADAR
Aggregate case reporting and analytics Tool collects aggregate case data and has data analytic functions in tool or online	□	■
Individual case entry and analytics (*important in low-burden or elimination settings*) Tool collects individual case data and has data analytic functions in tool or online	□	■
Case geolocation (*important in low-burden or elimination settings*) Tool allows collection or use of geospatial data for individual cases	□	■
Interoperability with HMIS Tool sends information to the official national health information system	■	□
Offline capability Tool functions, at least partially, offline	■	■

MANAGEMENT & SUPERVISION FUNCTIONALITIES	HNQIS	ODK/AVADAR
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

Abbreviations: ANC, antenatal care; CHW, community health worker; EPI, Expanded Program on Immunization; HMIS, health management information system; HNQIS, Health Network Quality Improvement System; LLIN, long-lasting insecticidal nets; ODK/AVADAR, Open Data Kit/ Auto-Visual Acute Flaccid Paralysis Detection and Reporting.

Appendices

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For more information: digitalsquare@path.org

APPENDIX A

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APPENDIX B

Abbreviations

ASC	*agents de santé communautaire*
CHW	community health worker
CRS	Catholic Relief Services
CS	*case sanitaire*
CSI	*centre de santé integré*
DAIDRP	*Direction des Archives de l'Information, de la Documentation et des Relations Publiques*
DGSR	*Direction Générale de la Santé de la Reproduction*
DHIS2	District Health Information Software 2
DOS	*Direction de l'Organisation des Soins*
DS	*Direction des Statistiques*
DSC	*Division de la Santé Communautaire*
HNQIS	Health Network Quality Improvement System
iCCM	integrated community case management
IDSR	Integrated Disease Surveillance and Response
MOPH	Ministry of Public Health (*Ministère de la Santé Publique*)
MSP	*Ministère de la Santé Publique* (Ministry of Public Health)
ODK/AVADAR	Open Data Kit/Auto-Visual Acute Flaccid Paralysis Detection and Reporting
PMI	U.S. President's Malaria Initiative
PNLP	*Programme National de Lutte Contre le Paludisme*
RC	*relais communautaire*
UNICEF	United Nations Children's Fund
WHO	World Health Organization

APPENDIX C

Contributors

Informant Name	Organization
Dadé Abdou	PNLP
Nafissatou Abdou	CSI Djiginis
Zakari Amadou	DOS
Mahamane Badamasi	PMI Impact Malaria/PSI
Abdoul Razack Bagourmé	PSI Niger
Moussa Barazé	District Sanitaire de Badaguichiri
Hamza Boubacar	CRS Magaria
Ibrahim Souley Daoda	District Sanitaire de Magaria
Abdoulaye Goumare	CSI Azao
Djibrilla Maiga Harouna	PMI Impact Malaria/PSI
Hindatou Inoussa Ibrahim	MSP/DOS
Sitti Idrissa	PNLP
Kiari Kairo Kaka	World Health Organization
Ibrahim Manou Kane	PSI Niger
Ezechiel Mahamane	World Vision Maradi
Mme Omar Maimouna	Direction de la Santé Mère Enfant
Aboubacar Manirou	Mother Children Health
Abdoul Rachid Balla Nomao Moussa	PSI Consultant
Almoustapha Moussa	CRS Magaria
Oumoulkairou Siddo	Mother Children Health/World Vision
Ibrahim Saadou	PNLP
Issiakou Seidi	DGSR/MSP
Abdoul Wahabou	PSI Consultant
Diallo Oumarou Yacouba	UNICEF Maradi
Mahamadou Yahaya	DS

Abbreviations: CRS, Catholic Relief Services; CSI, *centre du santé intégré*; DGSR, *Direction Générale de la Santé de la Reproduction*; DOS, *Direction de l'Organisation des Soins*; DS, *Direction des Statistiques*; MSP, *Ministère de la Santé Publique*; PNLP, *Programme National de Lutte Contre le Paludisme*; PSI, Population Services International; UNICEF, United Nations Children's Fund.

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 2.5 Healthcare provider communication 2.8 Healthcare provider training 4.2 Data coding	Impact Malaria, PSI (USAID)	Subnational: The tool is used in Niamey, Dosso, Tahoua, Maradi, and Zinder Used by around 42 health managers	Malaria case management Malaria screening with referral intermittent preventative therapy in pregnancy (IPTp) Malaria active or reactive case detection (visiting communities to find additional cases) Training of health workers
ODK/AVADAR	1.1 Targeted client communication 1.2 Untargeted client communication 1.5 Citizen based reporting 2.1 Client identification and registration 2.2 Client health records 2.3 Healthcare provider decision support 2.4 Telemedicine 2.6 Referral coordination 2.7 Scheduling and activity planning for healthcare providers 2.8 Healthcare provider training 3.1 Human resource management 3.2 Supply chain management 3.3 Public health event notification 4.1 Data collection, management, and use 4.2 Data coding 4.3 Location mapping 4.4 Data exchange and interoperability	E-Health, Novel-T, WHO (Bill & Melinda Gates Foundation)	Subnational: The tool is used in Tillabery, Maradi, Zinder, and Diffa. To be expanded to national level in June 2021 Used by between 500 and 1,000 people	None, not used for malaria

*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: HNQIS, Health Network Quality Improvement System; ODK/AVADAR, Open Data Kit/ Auto-Visual Acute Flaccid Paralysis Detection and Reporting; PSI, Population Services International; USAID, US Agency for International Development; WHO, World Health Organization.

APPENDIX E

Next-generation digital health tool functionalities for malaria case management

CASE MANAGEMENT FUNCTIONALITIES	HNQIS	ODK/AVADAR
Notifications Tool sends and receives notifications	■	■
Stock reporting & analytics Tool collects stock data and has analytic functions to support stock and logistics data analysis and decision-making	□	■
Interoperability with other national health systems Tool sends information to other national systems (iHRIS, LMIS, etc.)	■	■
Referral coordination Tool allows CHW to notify local health facility of referrals and track them	□	■
Scheduling & work planning Tool allows CHW to plan and schedule key activities in the community	□	□

MANAGEMENT & SUPERVISION FUNCTIONALITIES	HNQIS	ODK/AVADAR
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

Abbreviations: CHW, community health worker; HNQIS, Health Network Quality Improvement System; iHRIS, integrated human resources information system; LMIS, logistics management information system; ODK/AVADAR, Open Data Kit/ Auto-Visual Acute Flaccid Paralysis Detection and Reporting.