

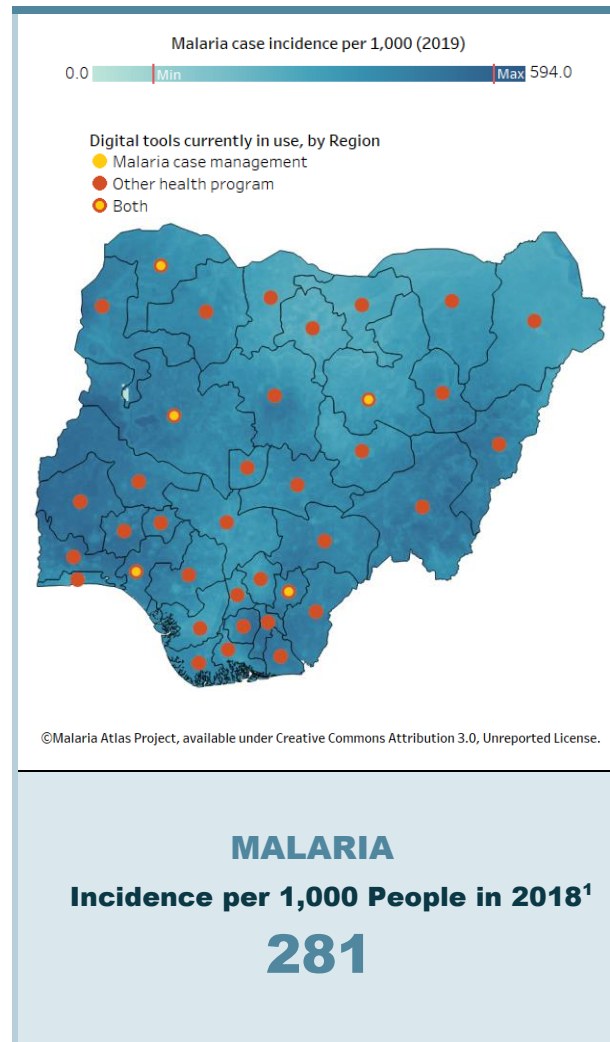
# NIGERIA

## Executive Summary

Nigeria's primary health care strategy includes the use of digital tools to improve service delivery, access, and coverage. Most of the country's population is at high risk for malaria,<sup>1</sup> and case management services are delivered at the community level by both paid and volunteer community health workers (CHWs). However, efforts to use digital tools have encountered challenges, such as inadequate funding and human resources and lack of reliable infrastructure.<sup>2</sup>

Digital readiness, in terms of the infrastructure and skills available to effectively use digital tools, is low at the community level, particularly in rural areas. Investment in community health should focus on digitalizing data collection and training health care providers, along with improving the digital enabling infrastructure. These actions will improve data reporting, enable community-level decision-making, and facilitate supervision, which can lead to improved quality of care and health outcomes.

The lack of training for CHWs and limited use of digital tools for data collection are among the challenges Nigeria faces in its efforts to accelerate malaria burden reduction. Digital tools could be leveraged to advance the collection of real-time data, track malaria and other health services, create a single-platform data warehouse, improve data quality and reliability, improve surveillance, and make better use of limited malaria resources.



### PEOPLE

Community Health Extension Worker (CHEW)



**43,000** CHEWs<sup>3</sup>  
2 per 10,000 people

### GOVERNANCE

National Digital Health Strategy<sup>4</sup>



**YES**

### SYSTEMS

Digital Health Index<sup>5</sup>



SCORE: 3



# Recommended Actions

## PEOPLE



Community health workers and other decision-makers

### Develop digital health training for CHWs

Support the Federal Ministry of Health (FMOH) in developing a curriculum for digital health training. CHWs require additional skills to strengthen their capacity to use digital tools for data collection and decision-making, including for malaria. Supervisors also need training to use digital tools for performance management. Both pre-service and refresher training should be included in the curriculum for all CHWs, including Community Health Volunteers. Digital health modules should be added to pre-service training of Community Health Officers, Community Health Extension Workers, and Junior Community Health Extension Workers in health technology schools and other educational institutions.

### Strengthen capacity for software development and management

Support the FMOH and the National Information Technology Development Agency in conducting a capacity needs analysis and developing a costed plan to provide subnational health staff with the necessary training to ensure in-house capacity for digital health software. This training will help the FMOH to increase in-house capacity to develop and maintain digital health software at all levels of the health system.

## GOVERNANCE



Strategies and policies

### Plan for community digital health deployment

Support FMOH policymakers and other digital health stakeholders to review the national digital health policy and strategic plan in order to develop an overarching plan and domestic funding budget for the sustainable implementation of community-level digital health tools, as no comprehensive plan for deploying digital health tools exists at the community level. This plan should call for a minimum standard for interoperability between digital tools and the District Health Information Software 2 (DHIS2) and also promote the use of coordination platforms (e.g., technical working groups) overseen by the FMOH to improve stakeholder engagement and collaboration.

### Improve power and mobile networks

Support the FMOH and the Nigerian Communications Commission to develop a plan to improve electricity and communication services, especially in rural areas, which would enable the health system to better leverage technology. Lack of electricity and mobile network access currently prevent the health system from moving forward with digital tools.

### Reactivate the Digital Health Policy Observatory

Support the Department of Health Planning, Research and Statistics (DHPRS); National

## SYSTEMS



Processes and digital tools

### Provide alternative power sources

Support state-level ministries of health, state and local government bodies, and other stakeholders in developing partnerships to invest in alternative power sources for health facilities to ensure uninterrupted workflow. Electrical outages frequently interrupt service delivery and communications at health facilities; provision of alternative power sources, such as solar charging systems, would address these perennial power shortages.

### Digitalize community health data collection

Support the FMOH and other key stakeholders in planning and implementing a gradual phaseout of paper-based tools in order to completely digitalize the care pathway at the community level. Community-level data collection with paper-based tools is time consuming and increases the chance for errors. CHWs and community gatekeepers should be involved in the design and rollout of community-level tools to ensure acceptance.

### Leverage the community Health Management Information System (cHMIS) for use at the community level

Support the DHPRS; state-level ministries of health; and local government areas to scale up the deployment of the cHMIS nationally for CHW data collection for all health services,

Information Technology Development Agency; and Standards Organisation of Nigeria in reactivating the Digital Health Policy Observatory to serve as a neutral one-stop shop for the latest developments, overviews, events, actors, instruments, and other resources on digital health deployment. This body will provide greater access to digital health information in Nigeria, which is currently difficult to obtain.

### **Support implementation of Nigeria's updated digital health strategy**

Support the FMoH and other stakeholders to rollout and implement the updated digital health strategy that is currently under development for 2021—2025. Although adopted in 2015, Nigeria's previous digital health strategy was never fully implemented

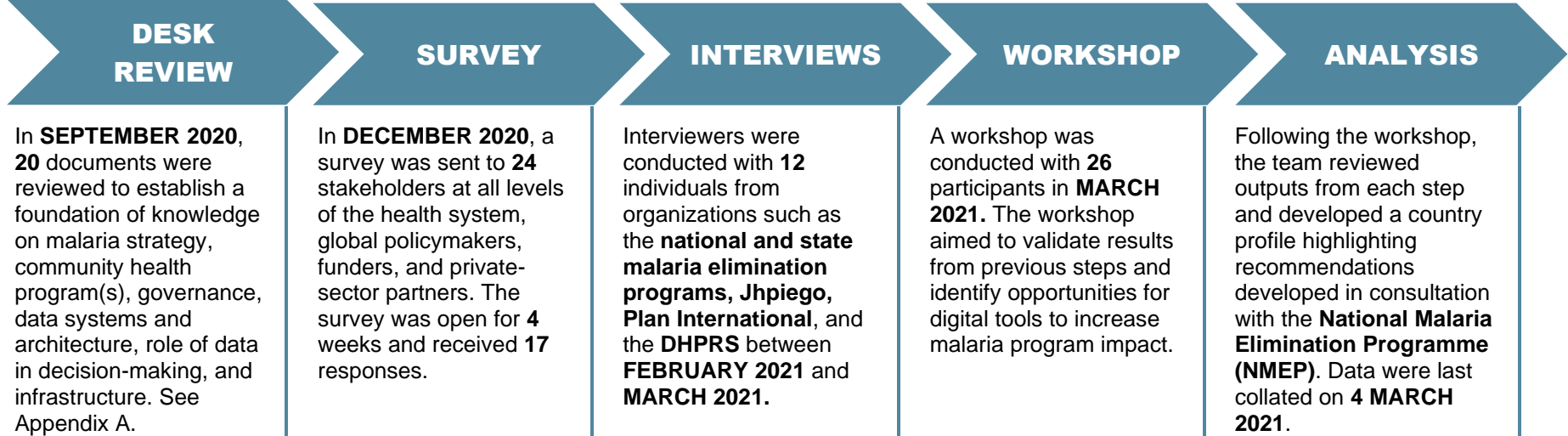
including malaria. The government implemented a pilot of the cHMIS, which showed promising results. There are plans to evaluate the tool in the states where it was piloted to support its expanded use.

### **Operationalize the existing interoperability layer**

Support the FMoH to assess current interoperability standards and architecture and implement measures to improve interoperability among national data systems and tools. Although an interoperability layer has been developed, it is not yet operational.

# Methodology


The Nigeria country profile was developed through the following process: conducting a desk review (documents published from 2015 to the present); deploying an online survey focused on the digital tool landscape; executing key informant interviews with experts in digital health, community health, and malaria; and conducting a workshop to validate findings and prioritize recommendations. Due to COVID-19, interviews were conducted virtually, and the workshop was conducted in a hybrid format (small group of socially distanced, in-person participants coupled with virtual access to the meeting). Consult Appendix C for a list of key informants interviewed and workshop participants. Consult Appendix D for detailed information on the online digital tool survey results.



Information collected through the methods described above was categorized according to key components within three domains: people, governance, and systems. These domains and their underlying components were informed by an [existing maturity model](#) and adapted to incorporate malaria-specific content. The components include personnel, training, and technical support (“People”); policies, strategies 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



Nigeria's primary health care system includes several different groups of CHWs. Community Health Officers are based at health facilities and provide a range of services, including facility management and supervision. Community Health Extension Workers (CHEWs) and Junior Community Health Extension Workers (JCHEWs) work in both health facilities and communities and are employed and paid by the government, with each state managing its own program. In addition to paid CHWs, a variety of community-based volunteers, often supported by nongovernmental organizations, contribute to community health care. In 2018, the National Primary Health Care Development Agency (NPHCDA) established the Community Health Influencers, Promoters and Services (CHIPS) program to consolidate volunteer health care providers under a national program. Community Health Volunteers have already transitioned to CHIPS in some states; the transition is still in progress in other states, under the authority of the State Primary Health Care Development Agency or Board (SPHCDA/B).

CHEWs and JCHEWs implement an integrated community case management (iCCM) strategy that includes malaria. They diagnose malaria using rapid diagnostic tests and treat uncomplicated cases with artemisinin-based combination therapy. They also provide intermittent preventive treatment in pregnancy, support seasonal malaria chemoprevention, and provide referral services. In areas without CHEWs or JCHEWs, CHIPS agents can provide iCCM services. CHIPS guidelines prescribe at least ten CHIPS agents per ward, with priority given to villages more than 5 km from a health facility.<sup>6</sup> Paid CHWs receive from 25,000 to 130,000 Naira per month (US\$61 to \$316), depending on their position and experience.<sup>7</sup> Funding for community health services is provided by the state, local government area (LGA), and the federal government's Basic Health Care Provision Fund (BHCPF). Funding for community-level malaria activities is also provided by partners such as the Global Fund; USAID/PMI; Unitaid; the Bill & Melinda Gates Foundation; and the United Kingdom's Foreign, Commonwealth & Development Office.

### Community health worker digital readiness

Paid CHWs receive two to three years of training in accredited schools of health technology, whereas CHIPS agents are required to have attended at least primary school and complete pre-service training and periodic refresher training. Digital health is not included in CHWs' training curriculum, and training for digital tools is generally only provided to support implementation of specific digital health projects. Despite low levels of education in large parts of Nigeria, many CHWs use Android devices and are expected to be able to operate digital health tools if provided sufficient training. Funding for technical support, device purchase, and software maintenance and upgrades is largely provided by partners, impacting the sustainability of many digital tools already introduced. Funding from the BHCPF is being targeted for digital health tool deployment to ensure the security and sustainability of digital health financing. Additionally, both federal and state health agencies, including the National Malaria Elimination Programme (NMEP), have dedicated information technology (IT) units that are able to adapt, configure, and support digital tool hardware and software. They also outsource IT services when necessary.

|   |   |
|---|---|
| <b>43,000</b><br><b>Community health extension workers (CHEWs) in country</b> | <b>Compensation Policy:</b><br><b>PAID</b><br><b>Paid by government</b> |
| <b>43,000</b><br><b>CHEWs providing malaria community case management</b>     | <b>Compensation Policy:</b><br><b>PAID</b><br><b>Paid by government</b> |

## Data-driven decisions at each level of health system

The Federal Ministry of Health (FMoH) provides oversight and regulates the use of digital tools in Nigeria. The Federal Ministry of Science, Technology and Innovation and the Federal Ministry of Communications and Digital Economy also play critical roles in decisions related to digital tool use. The FMoH and the Standards Organisation of Nigeria are developing a decision-making framework to ensure adherence to standards. Despite these efforts, the quality of reporting through the National Health Management Information System (NHMIS), which uses the District Health Information Software 2 (DHIS2), needs further improvement. One of the aims of the National Malaria Strategic Plan for 2021 to 2025 is for at least 80 percent of all health facilities to report timely and accurate data into DHIS2 to inform decision-making. The NMEP coordinates the efforts of malaria partners to strengthen the NHMIS. Together they are developing a national data repository to warehouse key malaria data to support malaria decision-making, using data from DHIS2. Decision-making using data takes place at all levels, except at the community level, through the processes described below.

|                              |  |
|------------------------------|--|
| <b>NATIONAL LEVEL</b>        | At the national level, data from the local government area (LGA) level are accessed through DHIS2. These data are analyzed at monitoring and evaluation (M&E) coordination meetings that cover all health domains with relevant partners that support health programming. Strategic and donor-related decisions are made, such as informing national priorities and investment plans, based on the data presented in M&E reports and program dashboards. Additionally, the NMEP has a separate Surveillance, Monitoring and Evaluation and Operations Research branch and uses malaria data to inform all programmatic areas, including malaria case management. |
| <b>STATE LEVEL</b>           | State Health Management Information Systems units review data and report findings to the state-level malaria elimination programs and primary health care development agencies. Data entered at the LGA level are accessed through DHIS2 and are analyzed at M&E coordination meetings with relevant partners. State-level operational decisions—such as state-level plans, budgetary allocation, and health management—are made based on the data presented in M&E reports and program dashboards to respond to gaps identified and other needs or trends within each state.  |
| <b>DISTRICT LEVEL</b>        | LGA officials work with facility staff in monthly meetings to analyze data and make recommendations for services and commodities. Monthly data are subsequently compared to make observations and decisions. LGA officials access data for decisions through reports, charts, and pictorial information prepared and provided by state malaria program managers and M&E officers at the state and LGA level.   |
| <b>HEALTH FACILITY LEVEL</b> | During the monthly meetings of health facility staff and LGA officials, data are analyzed and feedback on services and commodities are provided to the community health workers (CHWs). Monthly data are subsequently compared to make observations on trends and to inform decisions for actions needed to improve services.  |
| <b>COMMUNITY LEVEL</b>       | Decision-making does not occur at the community level in Nigeria due to lack of CHW training in data use for decision-making. However, policy indicates that CHWs should be trained to analyze and use data for decision-making and feedback should be shared with communities.  |

## Governance



|                               | DIGITAL  | COMMUNITY HEALTH   | MALARIA  |
|-------------------------------|--|--|--|
| <b>Name</b>                   | <i>National Health ICT Strategic Framework</i> | <i>Second National Strategic Health Development Plan</i> | <i>National Malaria Strategic Plan</i>                             |
| <b>Current strategy dates</b> | 2015–2020                                      | 2018–2022  | 2021–2025  |
| <b>Coordinating body</b>      | The Health Data Governance Council             | National Council on Health                               | The National Malaria Elimination Programme Technical Working Group |
| <b>Funding strategy</b>       | Yes  | Yes  | Yes  |

Nigeria’s guiding digital health strategy, the *National Health ICT Strategic Framework* for 2015 to 2020, was developed by the FMOH in collaboration with the National Information Technology Development Agency. It does not specifically mention malaria or community health; rather, the strategy focuses on strengthening local and regional health programs generally. The strategy highlights activities in leadership and governance, strategy and investment, architecture, standards and interoperability, legislation, policy and compliance, capacity-building, and infrastructure and solutions (services and applications). Nigeria has a funding plan in place for its digital health strategy, but further costing analyses of specific activities are needed. There is an ongoing effort to conduct an end-term evaluation for the review and update of this document for 2021 to 2025. Overall implementation of the five-year digital health strategy has been slow due to lack of funding. The Health Data Governance Council, which coordinates the strategy, was inaugurated in January 2017 as the national health information system coordinating body, but it is only partially functional due to inconsistent financing and lack of political will following personnel changes.

The 2014 to 2020 *National Malaria Strategic Plan* included the rollout of mobile technology to health facilities as a high-priority action and highlighted the need to invest in human resource development. Monitoring and evaluation priorities included strengthening routine malaria information systems, supporting periodic household surveys, and improving operations research to ensure that new intervention strategies are evidence based. The target to roll out DHIS2 to all local government areas (LGAs) has been achieved, with virtually all LGAs now reporting data via DHIS2. The National Malaria Strategic Plan for 2021 to 2025 prioritizes strengthening the generation and use of high-quality malaria data and scaling up the use of mobile technology for data reporting.

A National Policy and Strategic Framework for Community Health in Nigeria is currently being drafted with priority given to digital health. The CHIPS program is coordinated at the national level by the NPHCDA and at the state level by the SPHCDA/B. Additionally, several entities coordinate community health activities, including the iCCM Task Force; the Reproductive, Maternal, Newborn, Child, Adolescent and Elderly Health Plus Nutrition Multi-Stakeholder Partnership Coordination Platform; and the National Emergency Maternal and Child Health Intervention Centre.

## GOVERNANCE

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

Nigeria's digital health deployment is guided by the *National Health ICT Strategic Framework*. Standard operating procedures for the National Health Management Information System (NHMIS) were developed under Federal Ministry of Health (FMOH) leadership to guide deployment of digital health tools. Pilot deployments require approval from federal or state governments. At the subnational level, some states are working on the development of their digital health policies. The Department of Planning, Research and Statistics and Primary Health Care Board of each state decide what digital tools will be used at the community level.

## DATA MANAGEMENT

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

The National Data Protection Regulation issued by the National Information Technology Development Agency is the overarching law protecting the use of data. To ensure data privacy and confidentiality, individuals are represented by unique ID numbers when their case data are transmitted from local government areas to the state and to federal levels.

## STANDARDS AND INTEROPERABILITY

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

The National eHealth Technical Working Group of the FMOH supports the federal government in enforcing and implementing the minimum national health information system enterprise architecture standards in the deployment of digital health tools in terms of designing and managing the interrelationship of national information systems. It is now compulsory for donors to use the NHMIS; however, some data (including individual electronic medical records) collected by states and the private sector have not been integrated into DHIS2 yet. The national digital health strategy addresses interoperability. An interoperability layer has been developed through the Health Information Exchange, but the interoperability layer is not yet operational.

## INFRASTRUCTURE

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

DHIS2 is the digital tool approved by the National Council on Health to report into the NHMIS platform. It is housed in the Department of Health Planning, Research and Statistics and can be viewed at all levels of government. An ongoing review of the National Health Act is expected to ensure health data are warehoused locally and not on foreign servers. The Nigerian National Telecommunications Policy is overseen and implemented by the Nigerian Communications Commission. There is no known device management policy.

## WORKFORCE

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

The FMOH's *Second National Strategic Health Development Plan, 2018–2022* includes activities to strengthen the health system workforce's regulatory, policy, planning, and institutional capacities.





## Data flow

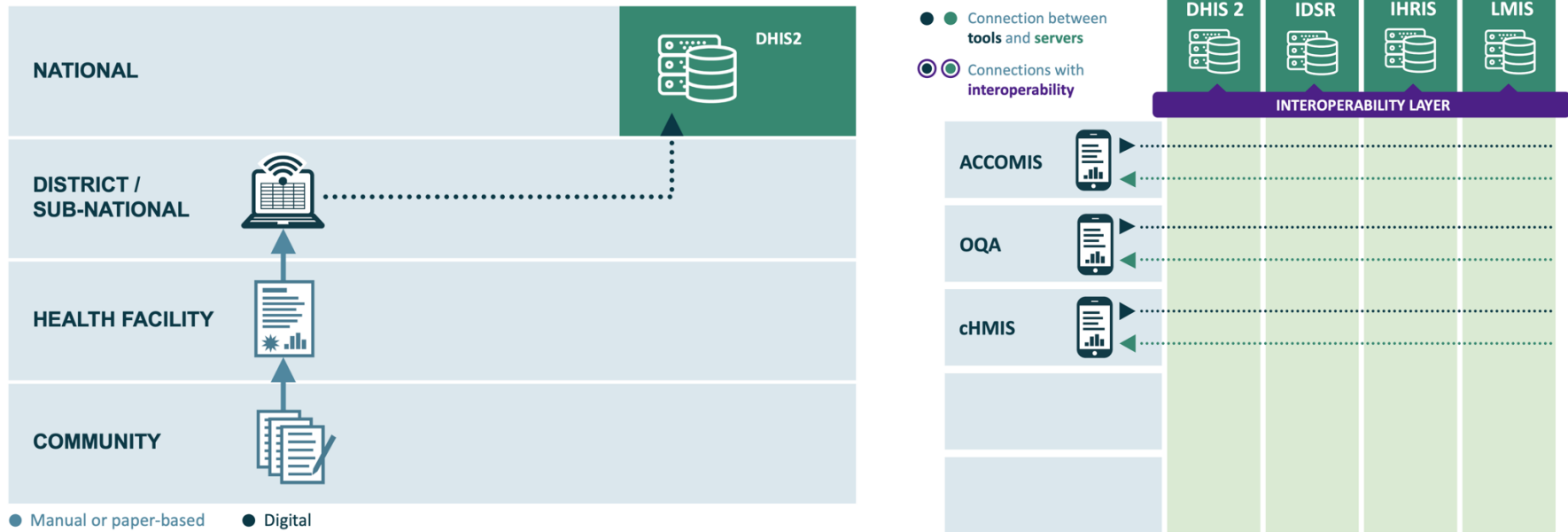
CHWs, including Community Health Officers, CHEWs, JCHEWs, and CHIPS agents, primarily use paper-based tools to collect and record data, such as health maps, home-based records, facility-based family cards, wall charts, and health facility registers. Data then flow to health facilities, where service providers enter data into NHMIS registers and collate these into monthly paper based NHMIS summary forms. LGA monitoring and evaluation officers collate these forms from all health facilities and enter the data into the NHMIS DHIS2 platform. The State Health Management Information System unit is the main body that completes data verification, validation, and quality checks. After review, the State Health Management Information System unit reports the data and findings to the state-level Malaria Elimination Programme and Primary Health Care Development Agency. Finally, the FMOH's NHMIS unit accesses the data and shares reports with the NMEP, National Primary Health Care Development Agency, and other relevant entities.

A national instance for CHIPS has been developed on DHIS2 as a specific platform to collect community data from the CHIPS program. It reports both aggregate and individual household data, with data at the LGA, state, and national levels available through the platform. Data are collected by CHIPS agents and then validated and summarized by Community Engagement Focal Persons (a community-based volunteer cadre within the CHIPS program) and CHEW supervisors. CHEW supervisors submit paper copies to the primary health care facility for entry into the national instance for CHIPS.

The community health system's reliance on paper-based records creates challenges for timely data use, analysis, and storage. However, the paper forms are well integrated into the workflow and do not rely on electricity or technical systems and support. Plan International and Jhpiego piloted a community health management information system (cHMIS) tool in five states to collect community-level data via digital tools for over 200 indicators, including malaria, maternal health, iCCM, neglected tropical diseases, and family planning. Data from the cHMIS tool are entered into DHIS2 via monthly reporting forms, but the cHMIS tool is not currently interoperable with DHIS2. The cHMIS was not expanded to other states due to the COVID-19 pandemic, but it is still being considered for scale-up.

The malaria surveillance system relies on passive malaria case surveillance with routine year-round data collection on malaria cases from health facilities. Stakeholders at the state and LGA levels collect and collate information, then use it to plan appropriate responses to the malaria situation. Malaria program managers at the state and LGA levels provide technical assistance and monitoring and evaluation officers enter data into the web-based DHIS2 platform. These data can only be accessed by designated stakeholders at the levels of government where data are used for decision-making or for giving feedback.

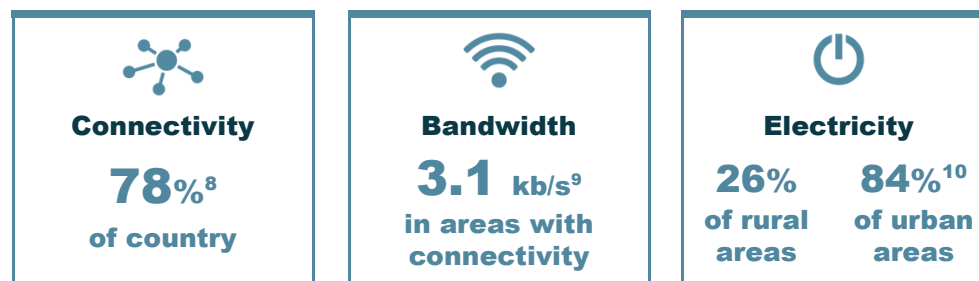
Although an interoperability layer has been developed, it is not yet operational, and national health data systems, such as DHIS2 and the logistics management information system, are not currently interoperable. Currently, no digital tools identified through this profile send data directly to national data systems or receive data from these systems; however, efforts are underway to connect tools, such as the Obstetrics Quality Assurance (OQA) tool and InStrat Global Health Solutions' Electronic Health Data Management tool, to DHIS2.



Abbreviations: ACCOMIS, Accountability Management Information System; cHMIS, community health management information system; DHIS2, District Health Information Software 2; IDSR, integrated disease surveillance and response; iHRIS, Integrated Human Resource Information System; LMIS, logistics management information system; OQA, Obstetrics Quality Assurance.

## Digitally enabling infrastructure

Nearly half (48 percent) of the Nigerian population live in rural areas.<sup>11</sup> Power supply in most regions of Nigeria is generally poor and unreliable, particularly in the northern regions; however, some health facilities, particularly in the south, have alternate power sources with generators and solar power systems. Approximately 49 percent of adults have a mobile phone subscription,<sup>12</sup> and 78 percent of people live in areas with access to 3G networks.<sup>8</sup> Mobile network signals are good in state capitals and big cities, but their strength drops in rural areas.



## Digital health tools in use and functionality

Numerous digital health tools have been introduced throughout the country. However, most of these tools operate in silos and generally do not exchange information with existing national information management systems. Tools used at the community level include cHMIS, which is used to collect data; the Accountability Management Information System (ACCOMIS), which is used to gather information on client satisfaction and identify problems with malaria service delivery and accessibility; the OQA tool, a data collection and reporting platform used throughout Nigeria to address preventable maternal and perinatal deaths; and InStrat's Electronic Health Data Management tool, which is used to electronically capture patient health data at the facility level.

| USE CASE(S)   | ACCOMIS                  | OQA                                 | cHMIS <sup>13</sup>                 |
|---|--------------------------|-------------------------------------|-------------------------------------|
| Providing malaria community case management                 | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Tracking malaria proactive and reactive case detection      | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Tracking malaria screening with referral                    | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| Transmitting messages to community on malaria               | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| Training health workers                                     | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| Tracking routine LLIN distribution during ANC or EPI visits | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

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

Abbreviations: ACCOMIS, Accountability Management Information System; ANC, antenatal care; cHMIS, community health management information system; EPI, Expanded Programme on Immunization; LLIN, long-lasting insecticidal net; OQA, Obstetrics Quality Assurance.

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

= Current functionality     = Possible, but functionality not currently in use     = Does not have functionality

Abbreviations: ACCOMIS, Accountability Management Information System; cHMIS, community health management information system; HMIS, health management information system; OQA, Obstetrics Quality Assurance.

| MANAGEMENT & SUPERVISION FUNCTIONALITIES  | ACCOMIS                             | OQA                      | cHMIS                               |
|---|-------------------------------------|--------------------------|-------------------------------------|
| <b>CHW identification</b><br>Tool uniquely identifies CHWs  | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>CHW catchment location</b><br>Tool identifies CHW associated position in org unit hierarchy/link to health facility/system   | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <b>CHW performance analytics</b><br>Tool has analytic functions (data validation, graphs, charts) that support data quality, quality of care, or other performance issues | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

**MANAGEMENT & SUPERVISION FUNCTIONALITIES**

ACCOMIS

OQA

cHMIS

**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: ACCOMIS, Accountability Management Information System; cHMIS, community health management information system; CHW, community health worker; OQA, Obstetrics Quality Assurance.

# Appendices

- APPENDIX A ► **References**
- APPENDIX B ► **Abbreviations**
- APPENDIX C ► **Contributors**
- APPENDIX D ► **Community digital health tools**
- APPENDIX E ► **Next-generation tool functionalities for malaria case management**
- APPENDIX F ► **Nigeria's malaria data flow and eHealth information architecture**



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## APPENDIX A

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## APPENDIX B

### Abbreviations

|          |  |
|----------|--|
| ACCOMIS  | Accountability Management Information System           |
| BHCPF    | Basic Health Care Provision Fund                       |
| CHEW     | community health extension worker                      |
| CHIPS    | Community Health Influencers, Promoters and Services   |
| cHMIS    | community health management information system         |
| CHW      | community health worker                                |
| DHPRS    | Department of Health Planning, Research and Statistics |
| DHIS2    | District Health Information Software 2                 |
| FMoH     | Federal Ministry of Health                             |
| iCCM     | integrated community case management                   |
| IT       | information technology                                 |
| JCHEW    | Junior Community Health Extension Worker               |
| LGA      | local government area                                  |
| M&E      | monitoring and evaluation                              |
| NHMIS    | National Health Management Information System          |
| NMEP     | National Malaria Elimination Programme                 |
| NPHCDA   | National Primary Health Care Development Agency        |
| OQA      | Obstetrics Quality Assurance                           |
| SPHCDA/B | State Primary Health Care Development Agency or Board  |

## APPENDIX C

### Contributors

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World Health Organization  
World Health Organization  
World Health Organization  
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## APPENDIX D

### Community digital health tools\*

| Name of Tool  | Type of Digital Health Intervention†   | Implementer (Funder)   | Scale   | Malaria Use Case  |
|---|--|--|---|---|
| <b>ACCOMIS</b>  | <p>1.5 Citizen based reporting</p> <p>3.1 Human resource management</p> <p>3.7 Facility management</p>   | ACOMIN<br>(Global Fund)  | Subnational:<br>13 states, 65 districts<br>208 community<br>volunteers (Community<br>Accountability Team) | Not applicable  |
| <b>Household registration for LLIN campaign (I-3)</b> | Not available  | Catholic Relief Services<br>(Global Fund)  | National:<br>30,000 users   | LLIN distribution   |
| <b>i-8a-Distribution Summary</b>                      | Not available  | Catholic Relief Services<br>(not available)  | National  | LLIN distribution   |
| <b>KoboCollect</b>                                    | 4.1 Data collection, management, and use   | Society for Family Health<br>(Society for Family Health)   | Subnational:<br>Kwara and Osum<br>states, 46 districts<br>100 users                                       | LLIN campaigns  |
| <b>OQA</b>  | <p>1.5 Citizen based reporting</p> <p>2.1 Client identification and registration</p> <p>2.2 Client health records</p> <p>2.3 Healthcare provider decision support</p> <p>3.2 Supply chain management</p> <p>3.3 Public health event notification</p> <p>3.4 Civil Registration and Vital Statistics</p> <p>3.6 Equipment and asset management</p> <p>3.7 Facility management</p> <p>4.1 Data collection, management, and use</p> | Federal Ministry of Health,<br>Rotary International<br>(Rotary International,<br>Federal Ministry of Health) | National<br>1,643 users   | Malaria active or reactive case detection<br>(visiting communities to find additional<br>cases) |
| <b>Reveal</b>   | <p>2.1 Client identification and registration</p> <p>4.1 Data collection, management, and use</p> <p>4.3 Location mapping</p>  | Malaria Consortium<br>(Malaria Consortium)   | Subnational:<br>Sokoto State<br>650 users   | Seasonal malaria chemoprevention  |

| Name of Tool          | Type of Digital Health Intervention <sup>†</sup> | Implementer (Funder)  | Scale   | Malaria Use Case        |
|-----------------------|--|---|---|-------------------------|
| <b>InStrat Global</b> | Not available                                    | InStrat Global Health Solutions<br>(State governments, WB NSHIP)                  | Subnational:<br>Southern states (Ogun, Edo, Ondo, Anambra) and one state in the North | Not available           |
| <b>cHMIS</b>          | Not available                                    | Plan International, Nigeria, Jhpiego, Nigeria<br>(Global Affairs Canada, Unitaid) | Subnational:<br>Sokoto, Bauchi, Ebonyi, Niger, Ondo<br><br>Used by over 1,000 CHWs    | Malaria case management |

Abbreviations: ACOMIN, Civil Society for Malaria Control, Immunization and Nutrition; ACCOMIS, Accountability Management Information System; cHMIS, community health management information system; CHW, community health worker; Global Fund, The Global Fund to Fight AIDS, Tuberculosis and Malaria; LLIN, long-lasting insecticidal net; OQA, Obstetrics Quality Assurance; WB NSHIP, World Bank Nigeria States Health Investment Project.

\*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.

## APPENDIX E

### Next-generation digital health tool functionalities for malaria case management

| CASE MANAGEMENT FUNCTIONALITIES  | ACCOMIS                  | OQA                                 | cHMIS                    |
|--|--------------------------|-------------------------------------|--------------------------|
| <b>Notifications</b><br>Tool sends and receives notifications  | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |
| <b>Stock reporting &amp; analytics</b><br>Tool collects stock data and has analytic functions to support stock and logistics data analysis and decision-making | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <b>Interoperability with other national health systems</b><br>Tool sends information to other national systems (iHRIS, LMIS, etc.)                             | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |
| <b>Referral coordination</b><br>Tool allows CHW to notify local health facility of referrals and track them  | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |
| <b>Scheduling &amp; work planning</b><br>Tool allows CHW to plan and schedule key activities in the community  | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |

■ = Current functionality   ■ = Possible, but functionality currently not in use   □ = Does not have functionality

Abbreviations: ACCOMIS, Accountability Management Information System; cHMIS, community health management information system; CHW, community health worker; iHRIS, Integrated Human Resource Information System; LMIS, logistics management information system; OQA, Obstetrics Quality Assurance.

| MANAGEMENT & SUPERVISION FUNCTIONALITIES   | ACCOMIS                  | OQA                                 | cHMIS                    |
|--|--------------------------|-------------------------------------|--------------------------|
| <b>Decision support</b><br>Tool provides algorithms or checklists to guide CHW service provision                                       | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <b>Training materials &amp; resources</b><br>Tool provides access to training materials, policies, or other useful reference documents | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |
| <b>CHW geolocation</b><br>Tool allows collection or use of CHW geolocation data for monitoring and planning distribution               | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |

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## Supervision

Tool can be used by supervisors to assess CHW skills and capacity

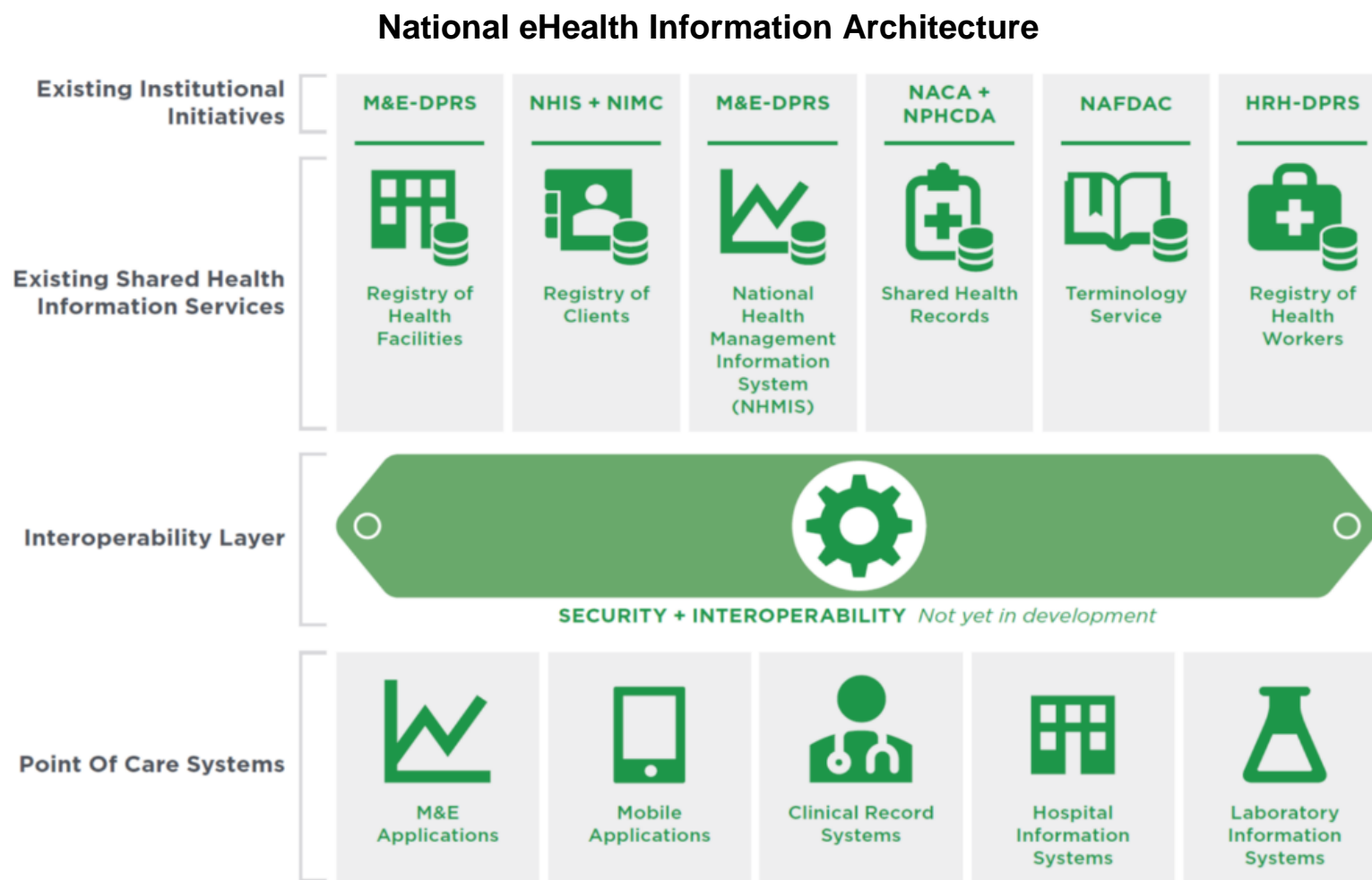


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■ = Current functionality   ■ = Possible, but functionality currently not in use   □ = Does not have functionality

Abbreviations: ACCOMIS, Accountability Management Information System; cHMIS, community health management information system; CHW, community health worker; OQA, Obstetrics Quality Assurance.

## Nigeria’s malaria data flow and national eHealth information architecture



Source: Republic of Nigeria, Federal Ministry of Health (FMoH). *National Health ICT Strategic Framework 2015–2020*. Abuja, Nigeria: FMoH; 2016. [https://www.who.int/goe/policies/Nigeria\\_health.pdf?ua=1](https://www.who.int/goe/policies/Nigeria_health.pdf?ua=1).