

ZANZIBAR

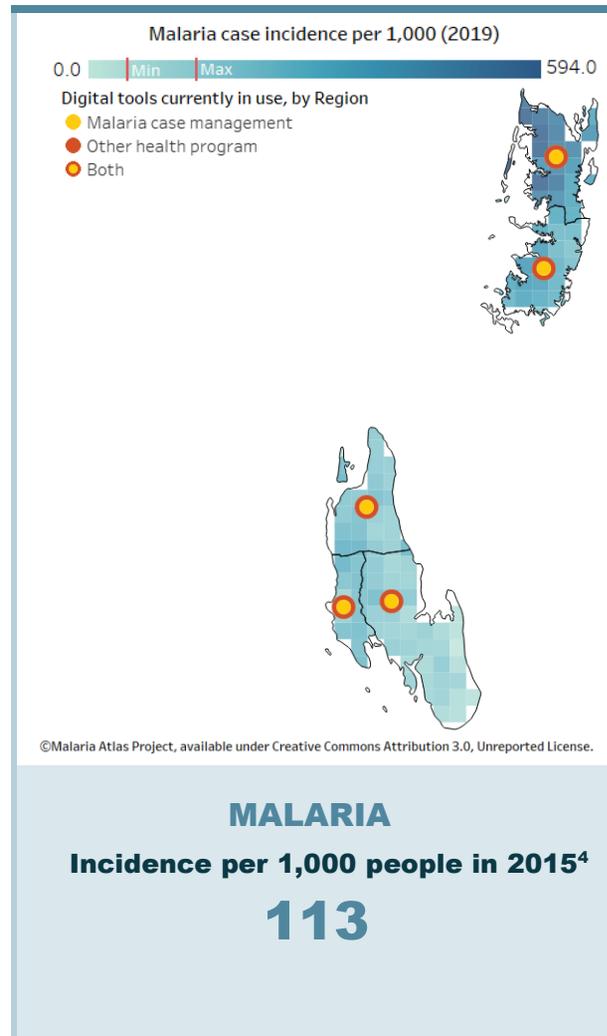
Executive Summary

Zanzibar has been successful in maintaining malaria prevalence below 1 percent for the past decade, and current efforts by the Zanzibar Malaria Elimination Programme (ZAMEP) are focused on eliminating malaria by 2023.

At the community level, malaria services are delivered by the national community health worker program, Jamii ni Afya, through community health volunteers (CHVs) as well as a separate community-based malaria staffing model through Council Malaria Surveillance Officers (CMSOs).

Both cadres use digital health tools to conduct community-based health activities, but these tools are focused on collecting different health data and feed into separate national health information systems.

The malaria program and the rest of the health system currently have parallel, nonintegrated community health worker activities, data collection, and information systems. Efforts need to be made to address redundancies in data collection and streamline community health activities, as well as to achieve data integration across systems in order to ensure data are available and used for decisions across the health system.



PEOPLE

Community health worker (CHW)

2,500 CHWs¹
15 per 10,000 people

GOVERNANCE

National Digital Health Strategy²

YES

SYSTEMS

Digital Health Index³

SCORE: 2

Recommended Actions

PEOPLE



CHWs and other decision-makers

Support efforts to develop an aligned approach to community-based malaria interventions.

In coordination with ZAMEP and donors such as Global Fund, align malaria community interventions, training, and data collection across different cadres (CHVs, CMSOs, health care workers, and other ZAMEP community units) based on the remit of malaria activities under each cadre. Ensure Shehia Health Custodian Committees and supervising health facilities have appropriate management and support structures to guide malaria activities across cadres.

Identify guidance, training, and technical support needs for CHVs.

Support ZAMEP to develop a community-based malaria training package, including a community health supportive supervision and mentorship guideline, and disseminate new guidelines to CHVs and supervisors as part of the Jamii ni Afya training program.

Build capacity and training for CHW malaria data utilization.

Support ZAMEP to develop and establish mechanism to disseminate malaria performance data to community-level health management committees. Implement data use training program at community and health facility levels in high-risk areas.

GOVERNANCE



Strategies and policies

Streamline and strengthen integrated community-based malaria interventions.

Support efforts to streamline national guidelines and policies for malaria community-based interventions, including roles and responsibilities for different actors, including CHVs, CMSOs, and facility health care workers, to facilitate malaria service delivery.

Strengthen national digital health structures and interoperability.

Support development of community digital health solutions and interoperability guide to facilitate flow of malaria information.

Integrate community-level malaria case detection and management in national digital health strategy.

Work with ZAMEP to establish digital health system requirements for malaria case-based surveillance and management.

Support government of Zanzibar in strengthening digital health strategy and policies.

Support efforts to map out health data security and privacy gaps for the use of community health data and digital health technologies. Support Ministry of Health to develop Information and Communication Technology infrastructure standards, maintenance, and replacement guidelines.⁵

SYSTEMS



Processes and digital tools

Harmonize indicators and data flow across data collection tools.

Examine the existing routine malaria data collection tools and harmonize data elements and indicators to remove duplication at community and health facility levels. Support efforts to improve data reporting flow and linkages between community to health facility level and up to national level, including redesigning malaria data collection tools.

Development of comprehensive community digital health solution for malaria program.

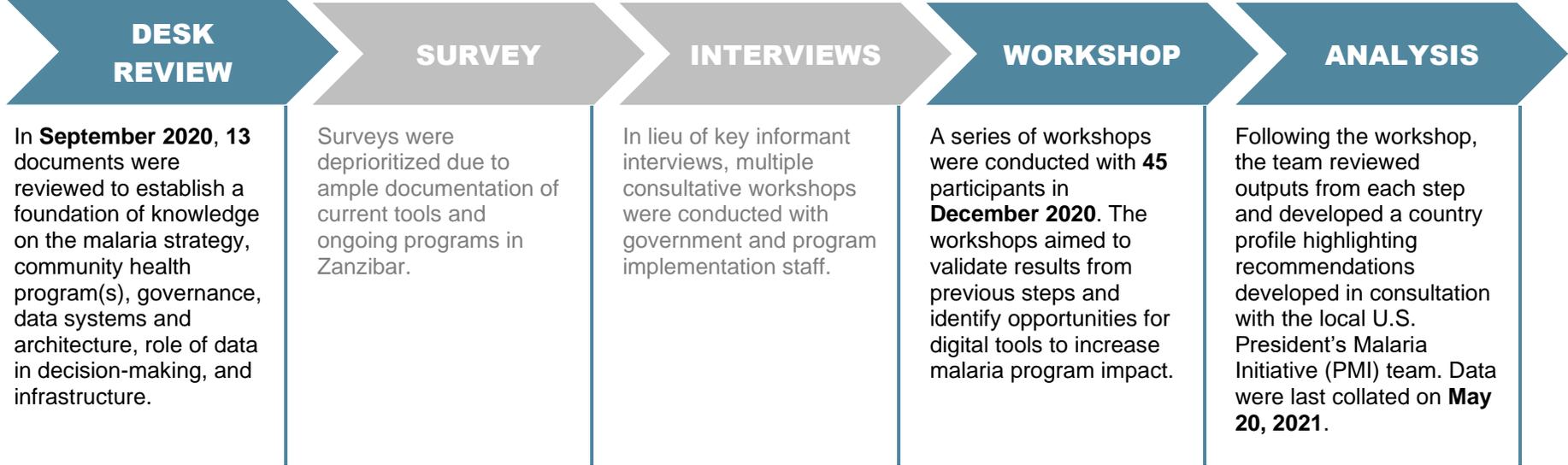
Support effort to review existing community digital tools against malaria (malaria case notification system and Jamii ni Afya) and MOH community data needs and establish gaps. Support effort to enhance/redesign existing digital health tools to enable comprehensive data collection at the community level by providing each user with a single application for data collection.

Facilitate data integration of harmonized malaria information systems into the health management information system.

Support efforts to develop an interoperability layer and implement malaria data exchange use cases that will facilitate data exchange between existing malaria data systems.

Methodology

A desk review, series of consultative workshops, and analysis were conducted to develop the content and recommendations in this document. The survey was not completed in the standard format due to ample documentation of tools and existing programs. Due to challenges in conducting individual interviews, three consultative workshops were conducted with key staff in the ZAMEP and the Zanzibar Ministry of Health (MOH) to validate findings and discuss priorities and potential areas of support.



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 and implementation of digital tools for malaria.

SYSTEMS 

Systems describes the processes and digital tools that enable community health platforms to effectively use digital technology and data to strengthen malaria and other health programs.

People



In February 2020, Jamii ni Afya (translated as “Communities are Health”) was launched as a nationwide community health program as part of the *Zanzibar Community Health Strategy*. The strategy codifies how CHVs fit within the larger Zanzibar health system and clarifies roles, responsibilities, training, and required qualifications. The program promotes maternal and child health, well-being, and optimal child development, with a focus on providing services to mothers and children under five. The MOH is now developing the CHV training program package to formalize its engagement in supporting health activities in communities. Currently, CHVs do not have formal and standardized engagement in conducting diagnosis and treatment of malaria, pneumonia or diarrheal disease.⁴

The Zanzibar Malaria Elimination Programme supports passive malaria case detection in health facilities and reactive case detection through 26 Council Malaria Surveillance Officers. CMSOs diagnose and treat malaria cases, traveling to the households of individuals with confirmed malaria infections to interview and test household members, as well as neighboring households to investigate specific hotspots. ZAMEP, CMSOs, and sometimes Shehia Health Custodian Committees (SHCCs)/CHVs also provide social and behavior change materials on malaria testing and treatment, distribute coupons for a free ITN as needed, identify visible mosquito larval sources, and provide information on environmental management.⁴

ZAMEP currently implements community-based interventions through CMSOs rather than the newly launched CHV cadre, and there is a need to determine whether and how malaria case management is incorporated in the current community health structure through a sustainable and integrated approach, rather than having two parallel systems. Through Global Fund support, ZAMEP is working with the MOH Health Promotion Unit to incorporate malaria community-based activities as part of the updated Jamii ni Afya training package.⁴

Community health worker digital readiness

CHVs have already been exposed to digital tools through the Jamii ni Afya program, which uses technology as the foundation of care delivery and monitoring. The digital health platform supporting CHVs allows for digital coordination across case management, decision support, referral coordination, work planning, and performance monitoring. Jamii ni Afya equips CHVs with a smartphone app to support and monitor delivery of health services. The program also provides digital trainings on health service delivery and allows for refresher training remotely. The tool also transmits data to supervisors with actionable alerts on CHV performance and the ability to respond to CHV needs remotely.⁶ Using separate platforms, CMSOs have been using digital tools since 2012 to track and manage malaria. With support from PMI, CMSOs are trained to use a tablet and smartphone to respond to cases within 48 hours of notification and record data to be used across the malaria case-based surveillance (mCBS) systems.⁴

* This number includes two separate community health worker cadres: CHVs (part of Jamii ni Afya) and CMSOs (who conduct malaria surveillance and case management) collectively referred to as CHWs.

2,500 Community health workers in-country*	Compensation Policy: PAID Paid by government
26 Providing malaria community case management	Compensation Policy: PAID Paid by government

Data-driven decisions at each level of health system

Digital tools for collecting and reporting malaria data are operational across the health system, creating a robust structure to allow for data-driven decision-making. However, the reliability and quality of data used for decision-making is a challenge due to multiple reporting systems for malaria and lack of data integration at the community and facility levels.

NATIONAL LEVEL	ZAMEP integrates data across the national network of malaria surveillance systems for strategy development, data reports, forecasting, and targeting of interventions. ZAMEP uses data from the Health Management Information System (HMIS) and electronic Infectious Disease Surveillance and Response (eIDSR) system to track severe malaria cases, inpatient admissions, and mortality as well as mCBS data from the Malaria Early Epidemic Detection System (MEEDS) to monitor and deliver on elimination goals.
DISTRICT / SUBNATIONAL LEVEL	At the council level, ZAMEP/District Health Management Teams (DHMTs) use mCBS data from Coconut Surveillance Malaria Case Notification (MCN, a community-level tool) and MEEDS (facility-level tool) to direct individual case investigations, detect outbreaks, and design outbreak response plans. In addition, CMSOs meet with national ZAMEP staff during quarterly meetings to discuss mCBS data. When increases in malaria cases are observed, ZAMEP staff will investigate epidemiological trends.
HEALTH FACILITY LEVEL	Health facility staff work with CMSOs and ZAMEP staff to use data from HMIS and MEEDS to monitor malaria programs and respond to outbreaks. Health facility staff who supervise CHVs also use data from community digital health tools to monitor and supervise CHVs' performance.
COMMUNITY LEVEL	CMSOs use data from MCN to conduct follow-up at the household level, using active case detection protocols to limit transmission and contain outbreaks. CHVs use the digital health data collected from Jamii ni Afya to track and respond to the needs of the community members.

Governance



	DIGITAL	COMMUNITY HEALTH	MALARIA
Name	<i>Zanzibar Digital Health Strategy</i>	<i>Zanzibar Community Health Strategy</i>	<i>Zanzibar Malaria Elimination Strategic Plan IV</i>
Current strategy dates	2020–2025	2020–2025	2018–2023
Coordinating body	Zanzibar Digital Health Steering Committee	MOH Health Promotion Unit	Zanzibar Malaria Elimination Programme
Funding strategy	Yes	Yes	Yes

The *Zanzibar Digital Health Strategy* explicitly calls out the use of MEEDS, MCN, Malaria Services and Data Quality Improvement Electronic Data System (MSDQI EDS), and Jamii ni Afya digital platforms as an opportunity to leverage digital technologies to support health promotion, surveillance, and response services. The strategy acknowledges ongoing efforts to improve system integration and extend functionalities to improve data use, sharing, and quality across the health sector.² The *Zanzibar Community Health Strategy* articulates the use of digital platforms as mechanisms to deliver integrated care service, data collection and integration into national systems, and effective monitoring and performance evaluation. Community-based health services are intended to contribute to disease programs and specifically address the role of SHCCs and CHVs to support malaria-related activities and the responsibility to contribute to national-level health impact indicators, namely the prevalence of malaria.¹ The *Zanzibar Malaria Elimination Strategic Plan IV* acknowledges coordination between ZAMEP, DHMTs, and SHCCs for effective implementation of malaria services delivered in the community. The plan also includes objectives to facilitate harmonization of malaria systems into the national HMIS.⁷

The Revolutionary Government of Zanzibar (RGoZ) launched the *Zanzibar Digital Health Strategy* in 2020, laying out the digital health vision. The strategy creates the foundations for stronger digital health implementation in terms of capacity-building, infrastructure, and foundational digital health solutions to facilitate vertical and horizontal interoperability between systems. The Zanzibar Digital Health Steering Committee provides strategic leadership, governance, and oversight of the digital health strategy, including mobilizing resources for strategic investment, reviewing and approving digital health standards and guidelines, and reviewing and approving digital health initiatives and plans of action. The committee is composed of 20 voting members from MOH departments and agencies, development and implementing partners, civil society, and the private sector. The e-government policy emphasizes the government’s priority to pass legislation to effectively implement information and communications technology (ICT) throughout public services and create connected ICT infrastructure. Both the health policy strategy and the *Health Sector Strategic Plan* identify the need for coordinated ICT/digital health structures and mechanisms for improving harmonization in the implementation and monitoring and evaluation of digital health solutions. Even with these clear indications of digital health governance structures and coordinating mechanisms, gaps remain in creating seamless data transfer across systems and different health verticals as evidenced by the two different digital reporting structures for malaria, which are separate from the broader health system.²

GOVERNANCE

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

The *Zanzibar ICT Policy 2013*, *eGovernment Policy 2015*, and *Health Policy 2011* define key governance roles, responsibility, and structures. The eGovernment Agency is responsible for implementing circulars, guidelines, standards, contracts, and compliance of public-sector ICT systems. The Ministry of Health has an ICT Unit overseeing activities and technical support, in addition to HMIS, Health Information System, and Monitoring and Evaluation Units, which also are involved in coordinating ICT projects and technical support. Zanzibar lacks a policy or regulatory framework and guideline for the use of digital health technologies.⁵

DATA MANAGEMENT

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

Currently, Zanzibar lacks a regulatory framework for health data security, confidentiality, and privacy.⁵

STANDARDS AND INTEROPERABILITY

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

Currently, Zanzibar lacks a national health-sector enterprise architecture, health information exchange platform, and defined standard guidelines for integration and enforcement of application programming interfaces.⁵ While no health enterprise architecture plan exists, data exchange is occurring across certain systems, such as supply chain and malaria surveillance.⁸

INFRASTRUCTURE

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

The Zanzibar ICT Infrastructure Agency manages the national data center and national fiber ICT network backbone. Zanzibar lacks formalized guidelines and policies for infrastructure purchasing, maintenance, replacement, and scaling of ICT infrastructure.⁵

WORKFORCE

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

Currently, Zanzibar lacks a workforce policy; however, the Public Services Act No. 2 of 2011 established a coordinating body to oversee public recruitment for government servants. Yet, no policies or guidelines exist for developing ICT literacy skills of the existing workforce.⁵ The *Digital Health Strategy 2020–2025* proposes enhancing provision of pre-service and in-service eLearning and training on digital literacy and adoption.²



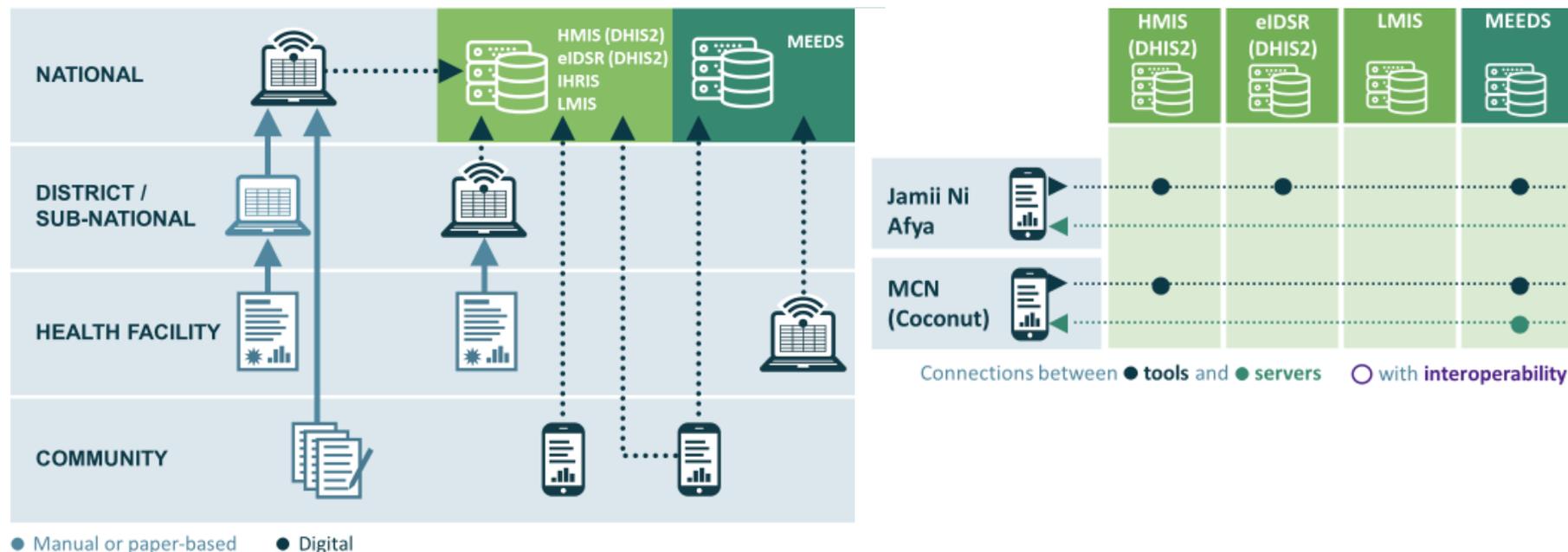
Data flow

Malaria data are stored in two separate systems in Zanzibar due to limitations in data collection tools and the ability of information systems to hold data elements. Despite this duplication, the Zanzibar Malaria Elimination Advisory Committee recommended maintaining MEEDS as a separate system due to the limitations in the capacity of HMIS to hold malaria-related surveillance data.

At the community and health facility levels, there are approximately 51 unique malaria indicators being collected. Of these indicators, 38 (30 unique) are collected at the community level and 31 (21 unique) are collected at the health facility level. Six malaria indicators are the same across the two levels (see Appendix F). Data collected digitally from client visits by health care workers are aggregated and submitted to District Health Information Software 2 (DHIS2) for use in program monitoring and the national HMIS system. For malaria, CHVs only collect indicators on long-lasting insecticidal net (LLIN) usage by pregnant women and children less than one year old. CSMOs collect mCBS indicators at the household and facility levels using a separate tool that feeds into MEEDS and DHIS2.⁹ However, integration of malaria data collected at the community and facility levels happens at the ZAMEP level, creating a lack of visibility and potential mismatch of information across the system.

The main routine health surveillance data systems are the HMIS, MEEDS, and eIDSR. All 275 health facilities in Zanzibar are registered to report to HMIS (via DHIS2 platform) and MEEDS but do so with varying degrees of completeness and timeliness. At the national level, the MOH Epidemiology Unit analyzes and interprets data from DHIS2 and ZAMEP and manages surveillance and monitoring and evaluation of data collected in MEEDS. Currently, ZAMEP uses HMIS data on severe malaria cases, inpatient admissions, and mortality related to malaria. Additionally, MEEDS collects data from the MCN system on a number of indicators, including total visits, confirmed malaria-positive cases, and confirmed malaria-negative cases. Weekly summary data are sent via mobile phones to key ZAMEP staff and Council Medical Officers. Longitudinal weekly aggregated data are available over a secure website. A separate eIDSR system built within the DHIS2 platform also collects similar indicators as MEEDS at the health facility level, but comparisons between the systems reveal significant differences in the reporting of malaria indicators.⁹

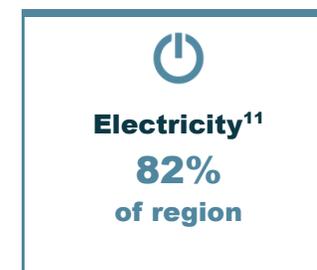
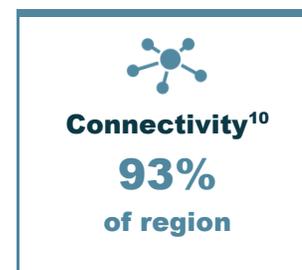
In Zanzibar, multiple nonintegrated and noninteroperable digital systems exist. While there is no health-sector enterprise architecture or interoperability layer, some systems are integrated and support data exchange. For example, DHIS2 is integrated with MCN, and the Logistics Management Information System (LMIS) is integrated with mSupply. The Jamii Ni Afya platform and MCN Coconut tool both collect data that flow into MEEDS and DHIS2, however, Coconut is not currently reporting data into the eIDSR system. An e-portal with application programming interface for integration exists, and the ICT infrastructure could support interoperability and data flow through fiber optics. There are ongoing efforts to integrate DHIS2 with other systems.⁵



Abbreviations: DHIS2, District Health Information Software 2; eIDSR, electronic Integrated Disease Surveillance and Response; HMIS, Health Management Information System; HRHIS, Human Resource Health Information System; LMIS, Logistics Management Information System; MCN, Coconut Surveillance Malaria Case Notification; MEEDS, Malaria Early Epidemic Detection System.

Digitally enabling infrastructure

The major fixed and mobile network operator is Zanzibar Telecommunications Limited (Zantel), which was launched as a joint venture with a private firm and the government of Zanzibar in 1999. In 2012, Zantel launched a 3G/3.5G network in Zanzibar.¹² Generally, backbone infrastructure exists to support internet connectivity throughout Unguja and Pemba Islands, although full connectivity to facilities can be unstable.⁸ Health staff report challenges with digital systems, including system reporting overload, challenges with data sharing back to the facilities, internet bandwidth, server costliness, computer and platform literacy, and lack of hardware. While many public facilities have access to laptops, availability is not universal and there is no strategy for replacement when laptops are stolen or destroyed. All major hospitals and DHMTs have a connection to a health information system, some level of electronic communication, and mobile reporting from lower levels.¹³ The RGoZ, in collaboration with partners, has implemented various initiatives to improve ICT infrastructure in the health sector. Such initiatives include availability of electricity power supply, fiber optic infrastructure, mobile network connectivity, and distribution of computing devices.¹⁴



Digital health tools in use and functionality

CHVs and CMSOs in Zanzibar use several digital health tools, namely the Jamii ni Afya and MCN applications. Jamii ni Afya is implemented nationally, allowing CHVs to schedule and manage maternal and child health services with clients, including early childhood development, nutrition, and immunization. The data are integrated within the national HMIS and eIDSR through DHIS2, and the platform also allows for tracking care and outcomes over time to support monitoring by supervisors and decision-making across the health system. CMSOs use the MCN or mCBS system to conduct case investigations at the community level. MCN data from Coconut feed into HMIS and MEEDS and are used to monitor and deliver on malaria elimination goals. Jamii ni Afya and MCN both report on LLIN usage at the household level, but they report into different systems and data are stored on separate servers due to the unique data needs of each system.⁹

USE CASE(S)	MCN (Coconut Surveillance)	Jamii ni Afya
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	MCN (Coconut Surveillance)	Jamii ni Afya
Aggregate case reporting and analytics Tool collects aggregate case data and has data analytic functions in tool or online	■	■
Individual case entry and analytics (<i>important in low-burden or elimination settings</i>) Tool collects individual case data and has data analytic functions in tool or online	■	■
Case geolocation (<i>important in low-burden or elimination settings</i>) 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	MCN (Coconut Surveillance)	Jamii ni Afya
CHW identification Tool uniquely identifies CHWs	■	■
CHW facility 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; DHIS2, District Health Information Software 2; eIDSR, electronic Infectious Disease Surveillance and Response; EPI, Expanded Program on Immunization; HMIS, Health Management Information System; LLIN, long-lasting insecticidal net; MCN, Coconut Surveillance Malaria Case Notification.

Appendices

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APPENDIX D ► **Community digital health tools**

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APPENDIX G ► **Malaria indicators collected at the community level**



Digital Square is a PATH-led initiative funded and designed by the United States Agency for International Development (USAID), the Bill & Melinda Gates Foundation, and a consortium of other donors. This country brief was made possible by the generous support of the American people through USAID. The contents are the responsibility of PATH and do not necessarily reflect the views of USAID or the United States Government.

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APPENDIX A

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APPENDIX B

Abbreviations

ANC	Antenatal care
CHV	Community health volunteer
CHW	Community health worker
CMSO	Council Malaria Surveillance Officers
DHIS2	District Health Information Software 2
DHMT	District Health Management Team
eIDSR	electronic Infectious Disease Surveillance and Response
EPI	Expanded Program on Immunization
HMIS	Health management information system
ICT	Information and communication technology
ITN	Insecticide-treated bed net
LLIN	Long-lasting insecticidal net
LMIS	Logistics Management Information System
mCBS	Malaria case-based surveillance
MCN	Coconut Surveillance Malaria Case Notification tool
MEEDS	Malaria Early Epidemic Detection System
MOH	Ministry of Health
MSDQI EDS	Malaria Services and Data Quality Improvement Electronic Data System
NMCP	National Malaria Control Program
PMI	U.S. President's Malaria Initiative
RGoZ	Revolutionary Government of Zanzibar
SHCC	Shehia Health Custodian Committee
ZAMEP	Zanzibar Malaria Elimination Programme

APPENDIX C

Contributors

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Kali A Omary

Omary J Othman

Shija Joseph Shija

Idrissa M Ukasha

Ghanima Mbarak Ussi

Organization

MOH – HMIS

MOH – Head ICT

ZAMEP – SME

ZAMEP – Head Diagnostic

ZAMEP – Treatment

MOH – HMIS Unit

HMIS – Demography

ZAMEP – Vector Control

ZAMEP – CMT

MOH – ICT

ZAMEP – SBCC

ZAMEP – SME

MOH – ICT

MOH – Support

ZAMEP – Entomology

ZAMEP – Diagnostic

ZAMEP – Diagnostic

HMIS – Statistics

ZAMEP – Head CMT

MOH – ICT

ZAMEP – SBCC

Abbreviations: CMT, Council Management Team; HMIS, Health Management Information System; ICT, information communication technology; MOH, Ministry of Health; SBCC, social and behavior change communication; SME, small and medium enterprises; ZAMEP, Zanzibar Malaria Elimination Programme.

APPENDIX D

Community digital health tools*

Name of Tool	Type of Digital Health Intervention†	Implementer (Funder)	Scale	Malaria Use Case
Jamii ni Afya	<p>1.2 Untargeted client communication.</p> <p>2.1 Client identification and registration.</p> <p>2.3 Healthcare provider decision support.</p> <p>4.1 Data collection, management, and use.</p> <p>4.3 Location mapping.</p>	Ministry of Health, PO-RALG, D-tree (Fondation Botnar, HDIF)	National (expected, currently in six districts)	Tracking LLIN usage (pregnant women and children < 1). Malaria screening
Coconut Surveillance (MCN)	<p>2.1 Client identification and registration.</p> <p>2.3 Healthcare provider decision support.</p> <p>2.5 Healthcare provider communication.</p> <p>4.1 Data collection, management, and use.</p> <p>4.3 Location mapping.</p>	ZAMEP, RTI (USAID/PMI)	National	Malaria active or reactive case detection. Malaria case management. Foci investigation. Tracking LLIN and IRS usage.

*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: HDIF, Human Development Innovation Fund; IRS, indoor residual spraying; LLIN, long-lasting insecticidal net; MCN, Coconut Surveillance Malaria Case Notification; PMI, U.S. President's Malaria Initiative; PO-RALG, President's Office, Regional Administration and Local Government Tanzania; USAID, US Agency for International Development; ZAMEP, Zanzibar Malaria Elimination Programme.

APPENDIX E

Next-generation digital health tool functionalities for malaria case management

CASE MANAGEMENT FUNCTIONALITIES	MCN (Coconut)	Jamii ni Afya
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	MCN (Coconut)	Jamii ni Afya
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

APPENDIX F

Community and facility data collection tools

Data collection tools	Number of indicators collected
Community-level tools	38 (30 unique)
ACD form (paper)	6
Jamii ni Afya tool (digital)	1
Foci investigation tool (paper)	4
Household registration tool (paper)	2
IRS data collection tool (paper)	5
LSM tool (paper)	5
M/FDA tool (paper)	3
Coconut/MCN form (digital)	8
SBCC community monitoring tool (paper)	3
SBCC school health education monitoring tool (paper)	1
Facility-level tools	31 (21 unique)
Malaria case register (paper)	6
MEEDS booklet (paper)	3
Outpatient Department/Immunization/Reproductive and Child Health register book (paper)	3
SBCC health facility monitoring tool (paper)	2
Slide confirmation tool (paper)	2
Report and request form (paper)	1
MSDQI EDS	9

Data collection tools	Number of indicators collected
DHIS2 weekly disease surveillance tool	5
Grand Total	69 (51 unique)

Abbreviations: ACD, active case detection; DHIS2, District Health Information Software 2; HH, household; IRS, indoor residual spraying; LLINs; long-lasting insecticide-treated nets; LSM, larval source management; MCN, Malaria Case Notification; MEEDS, Malaria Early Epidemic Detection System; M/FDA, mass or focal drug administration tool; MSDQI EDS, Malaria Services and Data Quality Improvement Electronic Data System; mRDT, malaria rapid diagnostic test; SBCC, social and behavior change communication.

APPENDIX G

Malaria indicators collected at the community level

Name of tool	Indicator
ACD form (paper)	Confirmation of LLINs usage (HH)
ACD form (paper)	Number of malaria-positive cases (HH)
ACD form (paper)	Number of malaria-positive cases during pregnancy (HH)
ACD form (paper)	Number of malaria tested by mRDT and microscope
ACD form (paper)	Patient travel history
ACD form (paper)	Total/target household population per Shehia
Jamii ni Afya tool (digital)	Confirmation of LLINs usage (pregnant women and < 1)
Foci investigation tool (paper)	Adult mosquito collection
Foci investigation tool (paper)	Environmental sanitation
Foci investigation tool (paper)	IRS assessment
Foci investigation tool (paper)	Number of LLINs available (HH)
Household registration tool (paper)	Number of LLINs available (HH)
Household registration tool (paper)	Total/target household population per Shehia
IRS data collection tool (paper)	IRS insecticide usage
IRS data collection tool (paper)	Number of population protected
IRS data collection tool (paper)	Number of pregnant women protected
IRS data collection tool (paper)	Number of sprayed structures
IRS data collection tool (paper)	Number of under-five protected
LSM tool (paper)	Larvae density

Name of tool	Indicator
LSM tool (paper)	Number and type of breeding site
LSM tool (paper)	Number and type of breeding site
LSM tool (paper)	Number of larvae (scooping)
LSM tool (paper)	Number of treatment rounds conducted
M/FDA tool (paper)	Malaria treatment given (HH)
M/FDA tool (paper)	Population coverage
M/FDA tool (paper)	Total/target household population per Shehia
Coconut/MCN form (digital)	Confirmation of IRS usage
Coconut/MCN form (digital)	Confirmation of LLINs usage (HH)
Coconut/MCN form (digital)	Household location
Coconut/MCN form (digital)	Malaria case classification
Coconut/MCN form (digital)	Malaria treatment given (HH)
Coconut/MCN form (digital)	Number and type of breeding site
Coconut/MCN form (digital)	Number of malaria-negative cases (HH)
Coconut/MCN form (digital)	Number of malaria-positive cases (HH)
SBCC community monitoring tool (paper)	Number of health days conducted by community health committees
SBCC community monitoring tool (paper)	Number of malaria awareness health meetings conducted
SBCC community monitoring tool (paper)	Number of SBCC materials distributed per shehia
SBCC school health education monitoring tool (paper)	Number of malaria awareness events done by school health club

Abbreviations: ACD, active case detection; HH, household; IRS, indoor residual spraying; LLINs, long-lasting insecticide-treated nets; LSM, larval source management; MCN, Malaria Case Notification; M/FDA, mass or focal drug administration tool; mRDT, malaria rapid diagnostic test; SBCC, social and behavior change communication.