Primary Health Care Operational Data Landscape Review

Insights from Burkina Faso, Ethiopia, Kenya, and Nigeria

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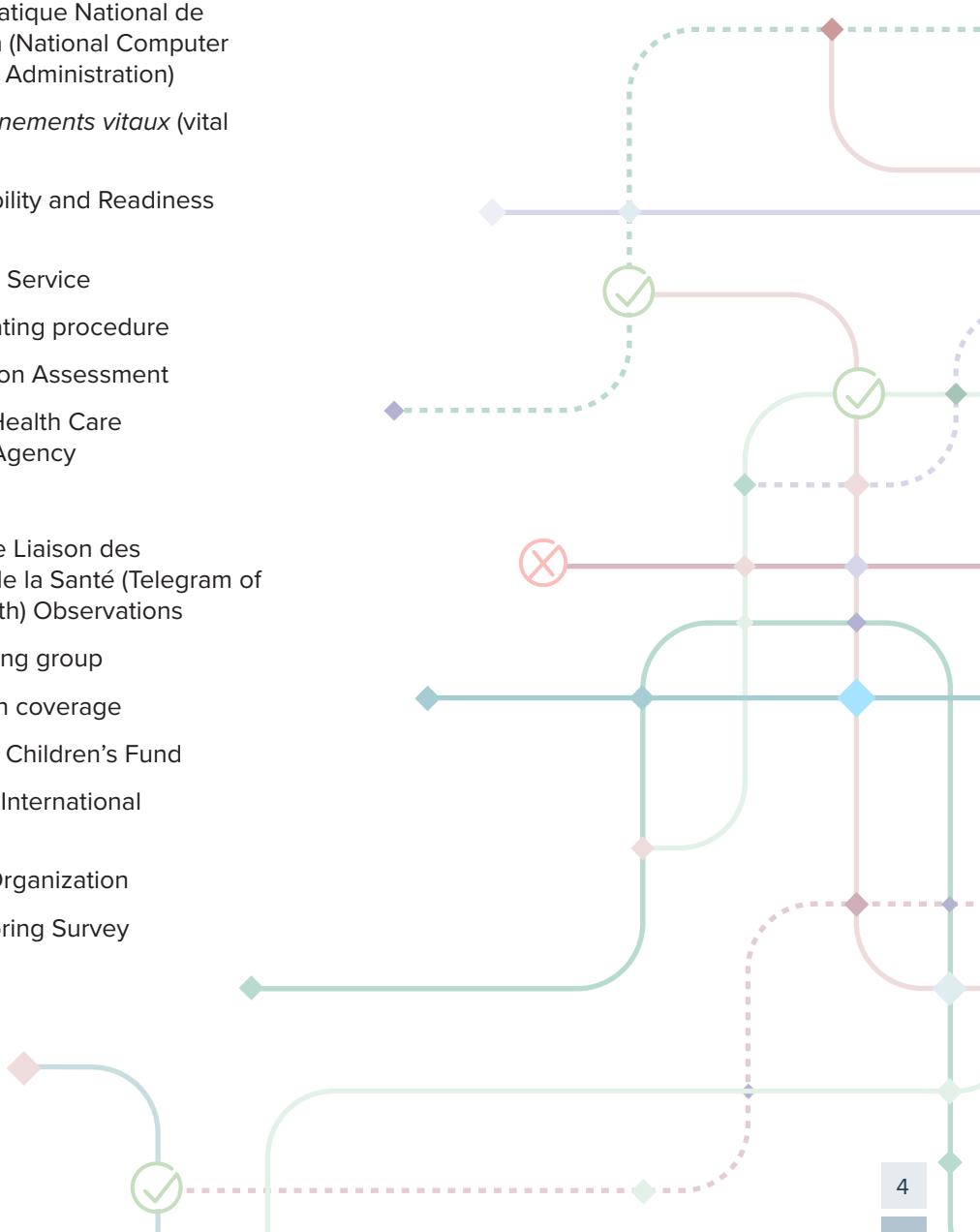
CONTENTS

ABBREVIATIONS

AHRI	Armauer Hansen Research Institute
AI	artificial intelligence
ASBC	*agent de santé à base communautaire* (community-based health worker)
BHCPF	Basic Health Care Provision Fund
BSIS	Blood Safety Information System
CDC	Centers for Disease Control and Prevention
CFA	Communauté Financière d'Afrique (African Financial Community)
CHIS/eCHIS	Community Health Information System / electronic CHIS
CHW	community health worker
CM	centre médical (medical center)
CPS	*chimioprevention du paludisme saisonier* (seasonal malaria chemoprevention)
CSA	Central Statistics Agency
CSPS	*centre de santé et de promotion sociale* (health and social promotion center)
DHIS2	District Health Information System 2
DQR	data quality review
EA	enterprise architecture
EDHS	Ethiopia Demographic and Health Survey
EDM	Ecosystème minimum digital (minimum digital ecosystem)
eLIS	electronic laboratory information system
EMDHS	Ethiopian Mini-Demographic and Health Survey
EmONC	emergency obstetric and newborn care
EMR	electronic medical record
ENDOS-BF	Entrepôt de Données Sanitaires du Burkina Faso (Burkina Faso Health Data Warehouse)
EPHI	Ethiopian Public Health Institute
EPI	Expanded Program on Immunization
eRIS	electronic regulatory information system
FIS	*feuille individuelle de soins* (individual care sheet)
FGD	focus group discussion
GDP	gross domestic product
GEMAO	Gestion des Établissements de Santé et d'Activités de Soins (Management of Health Establishments and Healthcare Activities)
HCE	Household Consumption Expenditure Survey
HCMIS	Health Commodity Management Information System
HDSS	Health and Demographic Surveillance System
HEW	health extension worker
HFR	Health Facility Registry
HIE	health information exchange
HIEC	Household Income, Expenditure, and Consumption Survey
HIS	health information system
HIV	human immunodeficiency virus
HMIS	health management information system
HR	human resources
HRH	human resources for health
HRIO	health records and information officer
HRIS/iHRIS	human resources information system / integrated HRIS
ICP	*infirmière en chef de poste* (head nurse)
ICT	information and communication technology
IDSR/eIDSR	Integrated Disease Surveillance and Response / electronic IDSR
IFMIS	integrated financial management information system
INVEA	Immigration, Nationality and Vital Events Agency
IR	Information Revolution
KHIS	Kenya Health Information System
KSh	Kenyan shilling
LGA	local government area
LGHA	Local Government Health Authority
LLIN	long-lasting insecticidal net
LMIS	logistics management information system

M&E	monitoring and evaluation
MEMIS	Medical Equipment Management Information System
MFR	Master Facility Registry
MOH	ministry of health
MS	Ministère de la Sante (Ministry of Health)
MSHP	Ministère de la Santé et de l'Hygiène Publique (Ministry of Health and Public Hygiene)
NDR	National Data Repository
NetSIGL	Système d'Information de Gestion Logistique en ligne (online Logistics Management Information System)
NHDD	National Health Data Dictionary
NHMIS	National Health Management Information System
NHWR	Nigeria Health Workforce Registry
NPHCDA	National Primary Health Care Development Agency
OIC	officer-in-charge
PCIME	Prise en Charge Intégrée des Maladies de l'Enfant (Integrated Management of Childhood Illness)
PCN	Primary Care Network
PECIME	Programme d'Extension de la Couverture Maladie Universelle (Universal Health Coverage Extension Program)
PHC	primary health care
PHCU	Primary Health Care Unit
PHEM	Public Health Emergency Management
PMA	Performance Monitoring for Action
REC	*registre électronique de consultation* (electronic consultation register)
ReDoP	Répertoire des Données du Paludisme (Malaria Data Directory)
RESINA	RESeau Informatique National de l'Administration (National Computer Network of the Administration)
REV	*relevé des événements vitaux* (vital events record)
SARA	Service Availability and Readiness Assessment
SMS	Short Message Service
SOP	standard operating procedure
SPA	Service Provision Assessment
SPHCDA	State Primary Health Care Development Agency
TB	tuberculosis
TLOH	Telegramme de Liaison des Observations de la Santé (Telegram of Liaison of Health) Observations
TWG	technical working group
UHC	universal health coverage
UNICEF	United Nations Children's Fund
USAID	US Agency for International Development
WHO	World Health Organization
WMS	Welfare Monitoring Survey



EXECUTIVE SUMMARY

Introduction

Primary health care (PHC) is an approach to organizing and strengthening national health systems to bring services closer to communities, including the most basic package of essential health services and products needed to prevent disease, promote health, and manage illness.[1] Timely, complete, and actionable data about PHC systems and operations can be used to inform performance management, planning, resource allocation, and health policy. However, PHC systems in low- and middle-income countries rely heavily on manual data collection and paper-based reporting, leading to inefficiencies, fragmentation, poor quality data, and a heavy administrative burden on frontline health workers.

With support from the Gates Foundation, PATH undertook an assessment to describe the current state of PHC operational dataflows and to identify and recommend innovative approaches to improving those dataflows. This landscape report focuses on describing the current state of PHC operational dataflows, including the key barriers, in four countries: Burkina Faso, Ethiopia, Kenya, and Nigeria.

Methods

The four African countries were purposively selected to represent different regions, language contexts, and stages of digital health maturity, as well as to align with the Gates Foundation investment priorities and PATH's existing relationships with ministries of health (MOHs). PATH conducted a rapid literature review of secondary data sources in all four countries and conducted primary data collection in two of the countries, Burkina Faso and Ethiopia. Specifically, PATH reviewed a total of 73 documents—including MOH reports, peer-reviewed and gray literature, and program reports—and conducted 25 interviews and 8 focus group discussions (40 participants) across two regions in Burkina Faso and 90 interviews and 4 focus group discussions (17 participants) across three regions in Ethiopia predominantly focused on subnational perspectives, including at the community, health facility, district, and regional levels in each country.

The data collection and analysis were guided by an analytical framework that comprises the data value chain, which describes the pathway from data collection to data use, and the broader enabling environment that supports the data value chain. PATH's primary focus was on the data extraction and data transmission steps in the data value chain, which primarily take place at the community and facility levels.

Information from the desk review and primary data collection were synthesized to develop country-specific summaries of the PHC operational dataflows and characteristics of the enabling environment. The country-specific information was then analyzed to identify cross-country patterns and common enablers and barriers sorted into five categories: tools, infrastructure, processes, people, and governance and policy.

Results

Burkina Faso, Ethiopia, Kenya, and Nigeria present four diverse contexts with varying population size, health workforce density, health information systems, country priorities, and digital health maturities. Despite their differences, common PHC operational dataflows and practices were observed across the four countries. PHC data are collected and extracted at the community and facility levels, with data generally aggregated at the facility level to complete standardized MOH reports, which are then submitted to the district level.

While some high-volume urban facilities with stable power and connectivity use digital tools, most facilities—especially in rural and low-volume settings—still rely on paper-based registers and monthly paper report submissions, sometimes complemented by hybrid paper-digital systems. Clinical staff or nurses often handle data entry and reporting in rural or low-volume facilities, whereas dedicated information officers or data clerks are more common in urban and high-volume sites. District staff are generally responsible for validating facility-level data and then entering the data into the central reporting system (District Health Information System 2).

There is an increasing push to digitize data reporting at the community level, with use of eSanteCom in Burkina Faso and the electronic Community Health Information System in Ethiopia and Kenya. However, in most cases these digital systems are still being used in parallel to required paper-based reporting.

Across all four countries, data quality gaps persist, largely due to continued reliance on manual reporting processes at both the community and facility levels.

Common barriers related to tools, infrastructure, processes, people, and governance and policy were identified across the four countries:

TOOLS: A patchwork of reporting tools and forms are used across the different types of PHC operational data (finances, service delivery, supplies, equipment, human resources, and infrastructure). Although reporting forms are generally standardized, there are many, and they sometimes capture overlapping information, causing duplication, inconsistencies, and confusion. Fragmentation is exacerbated by tools for siloed (or 'vertical') disease areas or by implementing partners or donors who introduce new tools.

INFRASTRUCTURE: Many facilities, particularly in rural areas, have unstable internet connectivity or electricity, which limits their ability to use digital tools for data collection, extraction, or transmission. For digital reporting, limited availability of devices (computers, tablets) and lack of maintenance for devices are common challenges. Health workers at community and facility levels face inadequate space to complete data work, limited or poor-quality storage areas for paper-based forms, shortages of paper-based tools, and inadequate transport to submit paper reporting forms.

PROCESSES: Reliance on time-consuming manual processes for data extraction can lead to delayed reporting and increases the risk of errors. These challenges are compounded by inconsistent standard operating procedures for data extraction and transmission, as well as weakly implemented feedback and data validation mechanisms that limit data quality and use.

PEOPLE: Overburdened health care workers must balance clinical and reporting tasks, which can delay reporting. Many rural, lower-volume, or lower-level facilities lack dedicated data staff, and training is often inconsistent and donor dependent. Women are concentrated in frontline roles that tend to require that they take on greater data-reporting responsibilities. Additionally, limited use of data at community and facility levels reduces its perceived value.

GOVERNANCE AND POLICY: Although there are robust national policies related to PHC and health information systems, implementation of these policies does not always reach subnational levels. Similarly, gender considerations in data extraction, transmission, and use are recognized in health policies but weakly implemented. There is a lack of formal standards for data privacy and confidentiality, limited coordination across vertical disease programs, and insufficient multisectoral collaboration between ministries (such as health, finance, and information and communication technology) and local governments.

To address these challenges, health system actors have begun developing innovations and process improvements to strengthen PHC reporting practices. Innovations include clarifying role definitions, simplifying community reporting templates, using alternative transport solutions to submit paper forms, sending data over WhatsApp or SMS, and taking photos to digitize paper forms.

Conclusion

This landscape report describes operational PHC dataflows and characteristics of the enabling environment across four African countries. While the study relies on available documentation and a small primary data sample, the report nevertheless highlights common cross-country enablers of and barriers to operational dataflows in a structured way—categorized by tools, processes, people, infrastructure, and policy and governance—that may be applicable to other settings. Although the focus is on strengthening frontline data value chain processes at community and facility levels, the findings underscore the critical role of the broader enabling environment in supporting or hindering these processes.

This landscape report serves as the foundation for a suite of documents—including an innovation brief summarizing approaches to address persistent challenges along the data value chain, a map-and-match visualization aligning innovations to data value chain barriers, and a synthesis report with recommendations—which together aim to inform actionable strategies for strengthening PHC data systems and processes.

INTRODUCTION

Primary health care (PHC) is an approach to organizing and strengthening national health systems to bring services closer to communities, including the most basic package of essential health services and products needed to prevent disease, promote health, and manage illness (Box 1). Timely, complete, and actionable data about PHC systems and operations can be used to inform performance management, planning, resource allocation, and health policy. However, most PHC systems are not taking full advantage of the availability of operational data to improve PHC. In many low- and middle-income countries, these systems largely depend on manual data collection and paper-based reporting, leading to inefficiencies, fragmentation, poor quality data, and a heavy administrative burden on frontline health workers.

Efforts to improve health information systems (HISs) in low- and middle-income countries are gaining momentum, driven by governments, donors, and global health initiatives. They include efforts to strengthen HISs so that countries have clear dataflows, processes, and systems from the community level to the national level and use interoperable tools and systems to streamline data collection and management. These efforts are supported by improved data governance and standards to leverage standardized approaches for PHC data collection and reporting, enabling data exchange across systems. Many efforts also recognize the need to invest in digital literacy and data use capacity among health workers and managers at all levels of the health system through training, mentorship, or supportive supervision.

As part of these efforts to improve and use PHC operational data, there is a need to identify practical and effective approaches to improving dataflows, processes, and systems for frontline health workers at the community and facility levels. There is a particular interest in low-cost, nondisruptive, scalable solutions that align with existing systems and processes. With support from the Gates Foundation, PATH is implementing a project to describe the current state of PHC operational dataflows and to identify and recommend innovative approaches to improving those dataflows. This landscape report focuses on describing the current state of PHC operational dataflows, including the key barriers, in four countries: Burkina Faso, Ethiopia, Kenya, and Nigeria. It is part of a suite of documents that describe innovative approaches and recommendations to address the challenges identified in this landscape review.

BOX 1

Key Definitions

Primary health care (PHC) refers to the most basic package of essential health services and products needed to prevent disease, promote health, and manage illness.[1]

PHC operational data refers to the data elements that enable managers to assess the functional capacity and readiness of PHC systems to deliver services. This includes data related to finances, human resources for health, supplies, equipment, facilities and infrastructure, and service coverage.

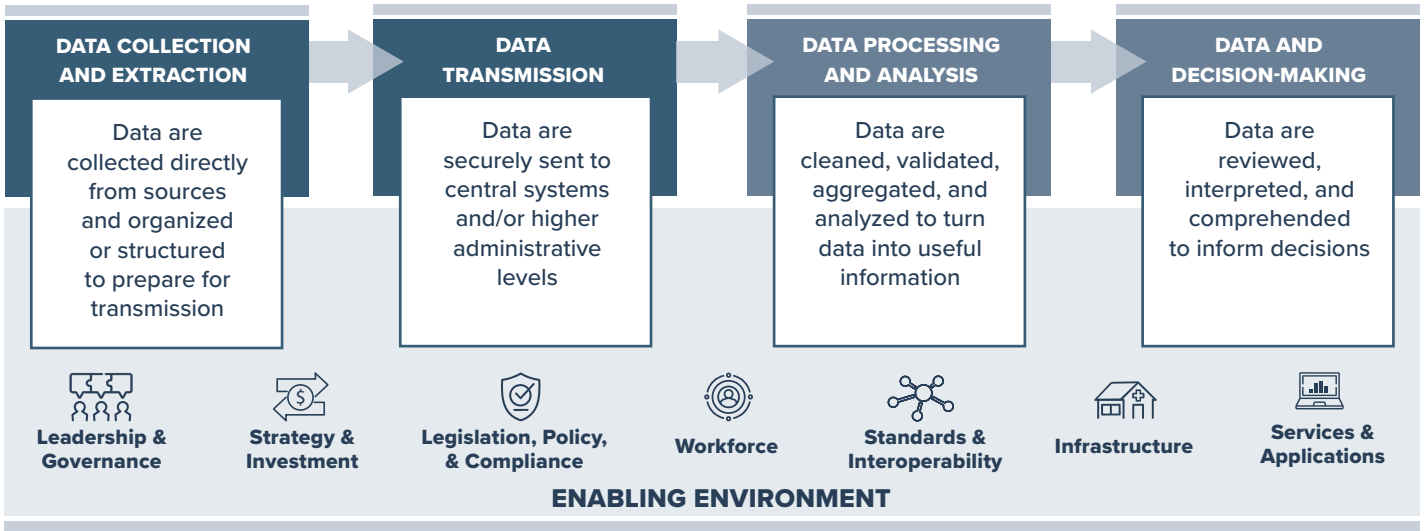
METHODS

This landscape report focuses on four African countries—Burkina Faso, Ethiopia, Kenya, and Nigeria—that were purposively selected to represent different regions, language contexts, and stages of digital health maturity; align with the Gates Foundation investment priorities; and, where PATH has staff capacity and strong existing relationships with ministries of health (MOHs), facilitate implementation. To describe the current state of PHC operational dataflows and identify key gaps, PATH conducted a rapid literature review of secondary data sources in all four countries and conducted primary data collection in two of the countries, Burkina Faso and Ethiopia. These two were selected because they represent different regions (East and West Africa) and language contexts (Anglophone and Francophone) and because they are at different stages of digital health maturity.

PATH developed an analytical framework to guide the literature review and primary data collection. The analytical framework was informed by existing global frameworks and resources related to HISs, data use, and digital health.[a] The framework comprises the data value chain that describes the pathway from data collection to data use and the broader enabling environment that supports the data value chain (Figure 1). For the purposes of this review, PATH's primary focus was on the data extraction and data transmission steps in the data value chain, which primarily take place at the community and facility levels where frontline workers collect data to be transformed and transmitted to higher administrative levels of the health system. The secondary focus was on the country's enabling environment at the national level, which supports effective, efficient functioning of the data value chain.

Based on the analytical framework, the team identified relevant documentation, including MOH reports, peer-reviewed and gray literature, and progress reports from PATH and other implementing partners. In total, 73 documents were reviewed: 19 for Burkina Faso, 18 for Ethiopia, 10 for Kenya, 17 for Nigeria, and 9 cross-country or global documents (see Appendix A for a list of all documents consulted for the rapid literature review). PATH team members who are based in the focus countries and familiar

Figure 1. Data value chain and the enabling environment.



[a] Frameworks included the World Health Organization (WHO) Operational Framework for Primary Health Care and Primary Health Care Measurement Framework and Indicators; Data Use Partnership: Theory of Change; "eHealth building blocks" or "enabling environment" as described in the WHO / International Telecommunication Union National eHealth Strategy Toolkit, WHO Digital Implementation Investment Guide (DIIG), and WHO Global Digital Health Monitor; MEASURE Evaluation's Performance of Routine Information System Management (PRISM) Toolkit; and other previous landscape assessments led by Digital Square at PATH.

with the PHC context reviewed secondary data sources and extracted information to put into a standardized analysis matrix. Information from all secondary data sources was triangulated and synthesized to develop country-specific summaries of the PHC operational dataflows and characteristics of the enabling environment.

In Burkina Faso and Ethiopia, the team collected primary data through interviews at regional, district, and facility levels and focus group discussions (FGDs) at the community level. This assessment used purposive sampling to select sites representing varied geographies (urban, rural), performance levels (data completeness and timeliness), and digital maturity. The sampling is not designed for statistical representativeness but rather to capture the range of operational realities. Table 1 presents the number of interviews and FGDs held in each country. Semi-structured interview and FGD guides were developed based on the pre-defined analytical framework (Figure 1). Primary data were analyzed to map the PHC operational dataflows, validate findings from the literature review, and capture details about the practical realities of PHC operations. Findings from the primary data collection were synthesized with the desk review findings in each country. The country-specific information was analyzed to identify cross-country patterns, common barriers, and shared opportunities.

Table 1. Number of interviews and focus group discussions (FGDs), by country and health system level.

	BURKINA FASO	ETHIOPIA
NATIONAL	**1 consultation** session with MSHP stakeholders	**1 consultation** session with MOH stakeholders
REGIONAL	**10 interviews** (7 male, 3 female) in **2 regions** (urban, rural)	**13 interviews** (13 male, 0 female) in **3 regions** (urban, rural, pastoral)
DISTRICT	**7 interviews** (5 male, 2 female) in **4 districts**	**16 interviews** (8 male, 8 female) in **4 districts**
HEALTH FACILITY	**8 interviews** (6 male, 2 female) in 8 health centers (2 per district)	**61 interviews** (43 male, 18 female) in **12 health centers** (3 per district)
COMMUNITY	**8 FGDs** with a total of **40 ASBCs** (24 male, 16 female) (2 FGDs per district)	**4 FGDs** with a total of **17 CHWs** (5 male, 22 female) (1 FGD per district)

Abbreviations: ASBC, *agent de santé à base communautaire* (community-based health worker); CHW, community health worker; MOH, ministry of health; MSHP, Ministère de la Santé et de l'Hygiène Publique (Ministry of Health and Public Hygiene).

COUNTRY CONTEXT

Burkina Faso, Ethiopia, Kenya, and Nigeria have varied PHC systems, health worker capacity, HISs, and overall digital health maturity. Table 2 presents an overview of the four country contexts.

Table 2. Summary of country contexts.

	BURKINA FASO	ETHIOPIA	KENYA	NIGERIA
POPULATION[2]	23.0 million (2023)	128.7 million (2023)	55.3 million (2023)	227.9 million (2023)
HEALTH EXPENDITURE (% OF GDP)[2]	8.4 (2022)	5.68 (2022)	8.65 (2022)	4.31 (2022)
PCH SYSTEM OVERVIEW	Burkina Faso's health system is decentralized and organized by primary, secondary, and tertiary care. PHC is delivered through health and social promotion centers (*centres de santé et de promotion sociale*) and medical centers (*centres médicaux*). Community-based health workers (*agents de santé à base communautaire*, or ASBCs) are local volunteers who receive a stipend to provide essential services and health education within communities. There are also community-based organizations that provide community services—mainly, community education—and report to health facilities.	Ethiopia's decentralized, three-tier health system consists of primary care (health posts, health centers, and primary hospitals), secondary care (general hospitals), and tertiary care (specialized hospitals). Ethiopia's national Health Extension Program is a community health program implemented by a formalized, paid cadre of health extension workers (HEWs), who provide basic services from health posts and from within the community. They are supported by community volunteers who encourage healthy behaviors and use of PHC services. The country has a community-based health insurance program scaled nationwide to provide coverage for essential services to primarily rural households and informal sector workers.	Kenya has a devolved structure under which the national level sets health policy and provides oversight for 47 County Health Management Teams that lead health planning, management, and resource allocation within each county—including delivery of PHC services. The MOH launched a new community health strategy in 2023 with the goal of strengthening PHC and advancing UHC; the strategy includes expanding coverage of community health promotors, remunerating them for their role, and digitizing community health activities using the eCHIS. The MOH also has been revitalizing PHC by establishing Primary Care Networks to link facilities to provide more integrated, people-centered care.	Nigeria has a federal structure with three levels: federal, state, and LGA. States (although autonomous) align with the national plans and work with the LGAs. The NPHCDA and SPHCDAs coordinate PHC initiatives and service delivery points. CHWs include community health officers, community HEWs, and junior community HEWs who have different levels of training and are employed and paid by the government. In addition, the NPHCDA established the Community Health Influencers, Promoters and Services program in 2018 to coordinate community volunteers. In addition to standard government funding for PHC, Nigeria introduced a performance-based funding mechanism, the Basic Health Care Provision Fund, to support facilities in providing the Basic Minimum Package of Health Services.

	BURKINA FASO	ETHIOPIA	KENYA	NIGERIA
NUMBER OF HEALTH FACILITIES	2,936 (2024)[3]	25,711 (2022)[4]	14,883 (2023)[5]	40,017 (2022),[6] including 26,756 PHC facilities (2025)[7]
CE (PER 10,000 POPULATION)[8,9]	• 1.48 medical doctors (2022) • 5.91 nurses (2022) • 1.1 ASBCs (2023)	• 1.05 medical doctors (2022) • 12.2 nurses (2022) • 3.5 CHWs (2023)	• 2.36 medical doctors (2022) • 20.2 nurses (2022) • 19.3 CHWs (2023)	• 3.86 medical doctors (2022) • 16.5 nurses (2022) • 6.8 CHWs (2022)
HEALTH INFORMATION SYSTEMS (HISS) USED AT SCALE	ENDOS (DHIS2 based) is the national reporting platform, allowing regional and central authorities to access data directly. Additional data streams feed into NetSIGL 2.0 (DHIS2 based) for logistics and diseases surveillance (MS Surveillance). Additional data include financial and facilities management as part of the gratuity program for women and for children under 5 years old.	The central HMIS is based on DHIS2, national logistics management information system, EMRs, Master Facility Registry, and iHRIS. Ethiopia's Information Revolution, launched in 2016, is a national initiative to digitize HISs and strengthen data use. Efforts are underway to develop an eHealth Architecture to improve interoperability of digital health information. A national eCHIS is being scaled to digitize community-level reporting.	The KHIS (DHIS2 based) is the national reporting platform for financial information, human resources for health data, stock levels, equipment inventory, and service use. Other national HISs used at scale include an EMR system, laboratory information system, logistics management information system, Kenya Master Health Facility List, and iHRIS. The eCHIS was expanded nationwide in early 2025.	The nationally scaled digital health systems that support public-sector priorities across key health pillars include the National Health Management Information System (DHIS2 based), Nigeria Health Workforce Registry, Health Facility Registry, and NDR. These facilitate public health reporting and decision-making, with the NDR providing real-time facility-level data from donor-supported EMRs.
DIGITAL HEALTH MATURITY[b]	**Digital health index:** 3/5 **AI index:** Emerging performer	**Digital health index:** 4/5 **AI index:** Medium performer	**Digital health index:** 4/5 **AI index:** High performer	**Digital health index:** 3/5 **AI index:** Strong performer

Abbreviations: AI, artificial intelligence; CHW, community health worker; DHIS2, District Health Information System 2; eCHIS, electronic Community Health Information System; EMR, electronic medical record; ENDOS, Entrepôt de Données Sanitaires (Health Data Warehouse); GDP, gross domestic product; HIS, health information system; HMIS, health management information system; iHRIS, integrated human resources information system; KHIS, Kenya Health Information System; LGA, local government area; MOH, Ministry of Health; MS, Ministère de la sante (Ministry of Health); NDR, National Data Repository; NetSIGL, Système d'Information de Gestion Logistique en ligne (online Logistics Management Information System); NPHCDA, National Primary Health Care Development Agency; PHC, primary health care; SPHCDA, State Primary Health Care Development Agency; UHC, universal health coverage.

[b] The digital health score is based on the overall score of the Global Digital Health Monitor indicators for the most recent year available, which assess the enabling environment for digital health, with 1 being the lowest and 5 being the highest maturity. The AI score is based on the AI Talent Readiness Index for Africa 2025, which measures countries' capacity and performance related to digital skills, data and infrastructure, and government readiness required to develop and deploy AI talent.

The landscape review results are presented for each country, followed by a cross-country analysis. Each country-specific section describes the PHC dataflows across health system levels, presents results related to the data value chain and the enabling environment, and summarizes key enablers and barriers.

BURKINA FASO

Data value chain

In Burkina Faso, the HIS operates through interconnected layers that begin with community workers, including community-based health workers (*agents de santé à base communautaire*, or ASBCs) and community-based organizations; move through health and social promotion centers (*centres de santé et de promotion sociale*, or CSPSs) and medical centers (*centres médical*, or CMs); and culminate at the district and national levels (Table 3 and Figure 2). The system is designed to capture data on service coverage, patient consultations, logistics, and facility resource management, but in practice it remains highly fragmented. Paper registers coexist with digital platforms—such as the Burkina Faso Health Data Warehouse (Entrepôt de Données Sanitaires du Burkina Faso, or ENDOS-BF), which is based on the District Health Information System 2 (DHIS2); online Logistics Management Information System (Système d'Information de Gestion Logistique en ligne, or NetSIGL 2.0), also DHIS2 based; and eSanteCom, a CommCare-based community data system—producing duplication, uneven data quality, and gaps in timeliness.

An inventory of digital health tools in Burkina Faso identified 140 public and private applications, with description information completeness ranging from 4 to 94 percent. This inventory was used to inform the development of a national health enterprise architecture (EA) and a sustainable, interoperable digital ecosystem aligned with national priorities and global standards (see Appendix B for a detailed architecture diagram).

While the process reflects steady progress toward digitization, its effectiveness is limited by structural weaknesses: absence of general EA, heavy workloads, weak infrastructure, low digital literacy, and persistent gender disparities.

Community level

At the community level, ASBCs are responsible for documenting household-level events such as visits, diagnoses, treatments, data related to vertical programs (e.g., tuberculosis, malaria), and awareness-raising activities. The primary paper-based registers include 1) consultation registers for patient encounter information, 2) integrated community case management sheets for children under five, 3) community registers for aggregated data for all health programs implemented at the community level, and 4) referral sheets for patients referred to the facility level. ASBCs use physical registers alongside the eSanteCom app, with both formats serving as the foundation for monthly activity reports sent to the facility level. The monthly activity report content is standardized for all sites, although sites supported by implementing partner organizations (e.g., Living Goods) may use adapted formats of the report.

Many ASBCs also keep personal notebooks, which they use as preliminary records before transcribing the data into official tools. Although they assured evaluators that these notebooks did not replace the records, the majority of ASBCs have integrated these personal tools into their routine work.

The eSanteCom app is deployed in 12 out of 70 districts, with approximately 5,300 of 17,148 total ASBCs connected to the app. ASBCs use eSanteCom in real time mainly for case management. For education, prevention, and promotion activities, the ASBCs first capture information in their notebooks and then populate the application later. The system is designed to work with SMS for data transmission, and this cost is supported by the Ministère de la Santé et de l'Hygiène Publique (Ministry of Health and Public Hygiene) through a contract with a mobile network operator.

Figure 2. Dataflow for service delivery data by health system level in Burkina Faso.

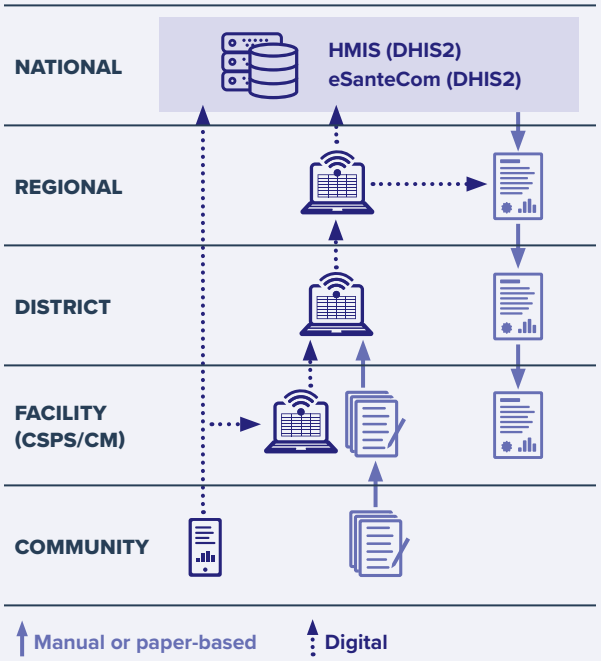


Table 3. Summary of primary health care dataflows across health system levels in Burkina Faso.

COMMUNITY: ASBCs collect household-level service delivery data in paper-based registers. In some areas where eSanteCom has been introduced, ASBCs use the application in parallel to the paper registers. ASBCs sometimes collect specific data for vertical programs in separate applications, further exacerbating fragmentation. Paper-based data are reported to the facilities via paper forms by the 25th of each month. eSanteCom data flow directly from the mobile app to a dedicated DHIS2 database, with copies shared to facilities via the CommCare-based Application Superviseur for information and supportive supervision.

FACILITY (CSPS/CM): Facility staff use more than twenty different paper-based registers and tools to capture data about service delivery, supplies, equipment, finances, human resources, and infrastructure. Facilities compile service delivery data into standardized MSHP monthly activity reports, covering the 26th of the previous month to the 25th of the reporting month. These are entered into ENDOS electronically at the facility level when equipped (i.e., when hardware and connectivity allow); otherwise, facilities submit paper reports to the district by the 5th of the following month. Each facility prepares two paper-based reports: one for facility activities and one for aggregated community activities from ASBCs. Meanwhile, eSanteCom is designed to sync data in real time and generate a monthly report for facilities to track ASBC activities in their catchment area. The eSanteCom data are aggregated and stored in a DHIS2 database to be accessed by district, regional, and national community health stakeholders.

DISTRICT: District data managers validate and process reports, entering them into the relevant national systems. The district archives paper versions of the monthly activity reports in a dedicated room at the district office and enters data electronically into ENDOS for those facilities that have not entered their own data. All facility service delivery data for the previous month must be entered by the 25th of month. Each district carries out quarterly data validation activities during the following month after the quarter's end, and supervision teams from district health offices conduct regular visits to facilities to strengthen data quality.

REGIONAL AND NATIONAL: Regional and national managers access and manage routine data from health facilities centrally through ENDOS. Technical validation activities take place at the regional and national levels half-yearly. There also is an annual national HIS technical data validation session that brings together stakeholders from national and regional levels, as well as hospitals, within two months following the end of the year. A national HIS coordination committee provides administrative validation of routine data one month after the technical validation.

Abbreviations: ASBC, *agent de santé à base communautaire* (community-based health worker); CM, *centre médical* (medical center); CSPS, *centre de santé* et de promotion sociale (health and social promotion center); DHIS2, District Health Information System 2; CHIS, Community Health Information System; ENDOS, Entrepôt de Données Sanitaires (Health Data Warehouse); HCMIS, Health Commodity Management Information System; HEW, health extension worker; HIS, health information system; HMIS, health management information system; iHRIS, integrated human resources information system; LMIS, logistics management information system; MEMIS, Medical Equipment Management Information System; MSHP, Ministère de la Santé et de l'Hygiène Publique (Ministry of Health and Public Hygiene).

ASBCs send aggregate monthly data through SMS codes to a central server; however, this is costly, does not address the need for patient-level data, and duplicates paper-based information flows. While eSanteCom scale-up is ongoing, ASBCs are expected to submit data via both the app and via routine paper-based reports. Information entered into the app is transmitted directly to the national-level HIS.

Data extraction at this level is predominantly retrospective and monthly. In some cases, however, certain streams, particularly those related to logistics, are updated more frequently. Extraction is hybrid: household data are captured on paper registers and later complemented or digitized through mobile applications. Disparities emerge across roles and gender. Female ASBCs are predominantly responsible for basic household-level data collection and reporting, while male ASBCs are more present in supervisory or technical roles. Male FGD participants suggested this division is reinforced by practical barriers, client preferences, or cultural barriers.

Challenges at this level include heavy workloads, insecurity in remote areas, limited literacy among some ASBCs, poor

understanding of data terminology, lack of a phone replacement and/or maintenance strategy, and absence of a reliable power source in some areas. In addition, digital literacy is uneven, with particularly low literacy among ASBCs in rural areas, and connectivity issues prevent smooth synchronization of data. These challenges contribute to delays, errors, and incompleteness in reporting.

To safeguard materials, ASBCs typically store registers and health cards in bags hung on walls out of children's reach. This is a widespread, although informal, practice, passed on to ASBCs during training sessions based on others' past experiences. In Living Goods–supported sites, storage kits are distributed to improve the security of registers and mobile phones.

Health facility level

At the CSPS/CM level, data collection expands in both scope and complexity. Nurses and midwives capture patient-level information on consultations, diagnoses, treatments, and prescriptions in paper-based registers. There are more than 20 paper-based registers and forms used to collect PHC operational data, including 14 registers specifically for service delivery data (see Appendix C for a complete list of tools). Facility heads then aggregate these records into standardized monthly reports, often supported by consultation and sales registers.

Extraction at this level is labor-intensive and retrospective, typically carried out monthly. During periods of high caseloads—such as malaria season—staff are forced to work beyond normal hours to complete the reporting. The hybrid nature of extraction, which combines paper registers with platforms like ENDOS-BF and NetSIGL 2.0, is further complicated by the multiplicity of overlapping tools. For example, aggregated coverage data may be extracted not only from consultation registers but also from tablets running care applications (e.g., eSanteCom, DHIS2, electronic medical records [EMRs]). This duplication consumes time and creates inconsistencies.

Infrastructure challenges amplify the burden. Some CSPS/CM staff reported traveling outside their communities to find adequate network coverage for synchronizing digital data. Others noted the absence of data packages to upload information, leading to backlogs. The lack of electricity and digital equipment such as computers and tablets compounds the difficulties.

In 2024, health facilities' reporting completeness was 85 percent and timeliness was 72 percent, from both public and private facilities.

Despite these obstacles, there are examples of effective adaptations. In certain CSPSs, the head nurse (*infirmier chef de poste*, or ICP) has outlined formal roles and responsibilities for all staff in managing data, with this information displayed publicly on the facility's information board. These boards often include demographic data of the catchment area, which helps in cross-checking extracted information. To support ASBCs who struggle with monthly reports, some ICPs have created simplified templates, reducing errors and delays. When transportation is limited, some CSPSs/CMs use local transport companies to send paper reports to the district.

District level

At the district level, data are consolidated and digitized. Monthly activity reports from CSPSs are entered into ENDOS-BF, which was built on DHIS2, allowing regional and central authorities to access data directly. Additional streams feed into NetSIGL 2.0 for logistics and occasionally eSanteCom for community data.

At this level, data extraction becomes more specialized. District data managers enter paper-based facility reports, while electronically submitted reports are quality checked, corrected with facilities as needed, and then validated and uploaded into the national system (ENDOS-BF). Complex tasks are assigned to qualified specialists, while simpler reports are assigned to less qualified personnel. Despite this hierarchy, the failure to apply standard operating procedures (SOPs) at the national level for extraction of data leads to inconsistencies in practice.

Transmission of data follows a hierarchical structure: ASBCs submit reports to CSPSs, which then transmit them to districts, from where they move to regional and national levels. While SOPs such as the Manuel de Procedures et de Gestion de l'Information Sanitaire (MPGIS) exist to guide transmission,

the reality is a hybrid of physical transporting and digital uploading. Frontline staff often deliver paper reports in person, sometimes at their own expense, before the data are digitized. Connectivity remains a major obstacle. The RESINA project (RESeau Informatique National de l'Administration, or National Computer Network of the Administration), designed to provide a secure digital network, has limited availability and is viewed as ineffective due to a lack of necessary work tools, such as computers and tablets.

Gender and role disparities mirror those seen in the extraction process. Women dominate frontline reporting, whereas men tend to occupy positions responsible for aggregation and national-level transmission. This unequal division of labor limits opportunities for women to advance into technical or managerial positions.

At the district level, data are used to validate facility-level reports and to inform supportive supervision, outbreak response, and resource allocation. The aggregated data feed upward into regional and national planning, guiding program evaluation, policy, and donor accountability. However, data use is constrained by weak interoperability between systems, uneven staff capacity, and limited motivation among frontline workers, who often do not see the immediate utility of the data they collect. While policies exist to define how data should be used, staff awareness is limited, and enforcement is weak. Data that are often collected but not regularly used include sex-disaggregated data and detailed information on patient demographics. These data are often aggregated into a total number at the local level and so are less likely to be analyzed at the district or national level, which can lead to a lack of gender-sensitive planning and targeted interventions.

Crosscutting insights

Across all levels of the system, data extraction, transmission, and use are essential but remain inconsistent and constrained.

Extraction is largely retrospective and monthly, with some exceptions for logistics monitoring. Hybrid methods that blend paper and digital tools dominate the process, but in the absence of a unified SOP, practices vary widely. Heavy workloads, poor infrastructure, insecurity, and limited digital literacy slow extraction and create opportunities for error. Health data, including service coverage, are consistently extracted in sex-disaggregated form. Sex disaggregation of service coverage data is described as routine and considered crucial for monitoring the health outcomes of women and men, identifying disparities, and informing policy decisions.

Transmission likewise follows hybrid patterns. While digital tools offer speed and accuracy, connectivity gaps, unreliable electricity, and lack of equipment force reliance on manual processes that introduce delays and risk of data loss. This is particularly pronounced in rural areas.

Data use supports operational and strategic decision-making—from consultations and stock monitoring at the facility level to outbreak response and resource allocation at the district level and program evaluation at the national level. However, systemic weaknesses limit its full potential. Fragmented tools, poor interoperability, and weak accountability structures undermine trust in data. Gender dynamics further complicate the picture: women, who carry the burden of frontline collection and reporting, are underrepresented in technical and managerial roles at subnational and national levels, where decisions about data are made. This can be explained by the weak representation of women in the recruitment competition of health statistics and epidemiology specialists who, after certification, are appointed to the district's *centre d'information sanitaire et de surveillance épidémiologique* (health information and epidemiological surveillance center). This is different from the dynamics around service coverage data since those data are collected mainly by women, who predominantly hold the health provider positions responsible for documenting services and patient outcomes.

Enabling environment

Leadership and governance

In Burkina Faso, leadership and governance of PHC data are anchored within a dedicated department and national working group for HISs, supported by the national HIS (Système National d'Information Sanitaire)

as the overarching framework. Routine data from health facilities are managed centrally through ENDOS-BF, while supervision teams from district health offices conduct regular visits to PHC facilities (CSPSs/CMs) to strengthen data quality and provide technical support. Coordination among stakeholders is facilitated through technical committees and digitization initiatives. Additionally, PHC data systems are fully integrated and budgeted within national health strategies, and Burkina Faso also is advancing a national digital health strategy that incorporates emerging technologies, which is integrated into the broader national health and digital development strategies.

Although women are well represented in the health-sector workforce, gender imbalances remain in high-level decision-making and technical committees overseeing PHC data governance.

Strategy and investment

Burkina Faso's health strategy is based on the Plan National de Développement de la Santé (National Health Development Plan) 2021–2030, which aims to guarantee equitable access to high-quality care for all, in accordance with the principles of universal health coverage (UHC). The country also has a separate Digital Health Strategic Plan, with a budget of 42 billion CFA francs for 2025–2029, which aims to accelerate this transformation by digitizing community health interventions and using platforms to improve data collection. This transformation is facilitated by existing funding and collaboration with mobile phone operators who provide network coverage and preferential rates.

Legislation, policy and compliance

Burkina Faso has basic laws on data security and a commission to oversee consent in personal data collection, but it lacks comprehensive legislation or policies on privacy, telemedicine, connected devices, or use of artificial intelligence (AI) in health. Documentation on these areas is limited. At the subnational level, initiatives like eSanteCom support decentralized data use, but overall, policy gaps remain a major challenge for PHC data governance.

Workforce

The field of digital health presents a marked dichotomy in terms of training. On the one hand, there is a notable effort to provide ongoing training in the field, where nearly 98 percent of CSPS/CM agents are trained in the use of new digital tools as they are rolled out. On the other hand, the public sector suffers from a lack of structure, with no professional qualifications or clearly defined career paths for digital health experts. This gap is partly filled by private institutions, which offer diploma courses, creating an imbalance between reactive learning in the field and the absence of an official public-sector pathway.

As for data extraction, pre-service training integrates dedicated curriculum since this is a core duty for any health worker appointed to offer health services.

Standards and interoperability

Digital health / health information standards for data exchange, transmission, messaging, security, privacy, and hardware have been published and disseminated in the country under the government's leadership.

There is no national digital health (eHealth) architectural framework and/or health information exchange (HIE) established. However, PATH currently is leading the development of a national health EA for Burkina Faso, in close collaboration with the Ministry of Health and Public Hygiene. The initial architecture has been fully developed and modeled, and work is underway to finalize the target architecture alongside a ten-year investment plan and an implementation roadmap.

Infrastructure

Burkina Faso ranks low on digital readiness, with a Network Readiness Index score of 25.91 (127th globally), reflecting particularly weak performance in technology (12.73) and people (13.34), though governance (36.58) and impact (40.98) fare slightly better. No articulated plan was found for expanding or maintaining digital health infrastructure across public facilities, and there is no documented process for initiating or recording infrastructure maintenance requests.

Services and applications

The digitization of the health sector is being implemented through several specific tools and ongoing initiatives, such as the Electronic Consultation Register's Prise en Charge Intégrée des Maladies de l'Enfant (Integrated Management of Childhood Illness) and Maternité for maternal health; Alimentation du Nourrisson et du Jeune Enfant (Infant and Young Child Feeding) for nutrition; *chimioprevention du paludisme saisonier* (seasonal malaria chemoprevention), *moustiquaires imprégnées d'insecticide à longue durée d'action* (long-lasting insecticide-treated nets), and Répertoire des Données du Paludisme (Malaria Data Directory) for malaria; and the *registre électronique de vaccination* (electronic vaccination registry) for vaccination. Drug management is handled by NetSIGL 2.0, and national health data are centralized on the ENDOS-BF platform. Other tools—such as EsanteCOM (community health), *feuille individuelle de soins*, or individual care sheet (free health care), and SteLab (surveillance)—also are being implemented. Despite these numerous tools and ongoing projects, such as the WURI initiative (Unique Identification Program for Regional Integration and Inclusion in West Africa), efforts are mainly sectoral and do not form part of a unified approach at the national level.

Enablers and barriers

The main **enablers** and **barriers** to PHC data reporting in Burkina Faso are as follows:

ENABLERS

COMMUNITY LEVEL (ASBCS):

- Drive to digitize ASBC reporting using eSanteCom as an opportunity to improve data quality and provide real-time decision support.
- Nongovernmental organization support (e.g., Living Goods) in the form of a user-friendly standardized template, storage kits, and digital tools.

HEALTH FACILITY LEVEL (CSPSS/CMS):

- Assignation by facility heads (ICPs) of clear roles/responsibilities, sometimes displayed publicly to improve accountability.
- Simplified reporting templates that reduce errors and support ASBCs who are struggling with forms.
- Use of local transport companies to transmit paper reports when connectivity is poor.

DISTRICT LEVEL:

- Dedicated data managers and specialists who validate and digitize reports (ENDOS-BF/DHIS2, NetSIGL 2.0).
- District supervision and feedback support for data quality and outbreak response.

CROSSCUTTING ENABLERS:

- National HIS anchored in ENDOS-BF, which provides a common platform for reporting.
- Technical committees and digitization initiatives that strengthen coordination.
- Availability of routine sex disaggregation of service coverage data to support equity monitoring.
- National strategies that integrate PHC data systems and digital health priorities, with budgetary support.

BARRIERS

COMMUNITY LEVEL (ASBCS):

- Lack of awareness on non-use of existing SOPs for extraction.
- Reliance on personal notebooks before transcription, which is time-consuming and limits real-time data capture.
- Heavy workloads, insecurity in remote areas, and uneven literacy / digital literacy.
- Connectivity challenges that delay synchronization of mobile tools.
- Ineffectiveness of solar power for charging devices during the rainy season.
- Gender barriers (women dominate frontline reporting but are less represented in positions of responsibility).
- Expectation that ASBCs use both paper-based reporting and digital systems where eSanteCom has been piloted, which causes duplication and is time-consuming.

HEALTH FACILITY LEVEL (CSPSS/CMS):

- Duplication from overlapping tools (ENDOS-BF, NetSIGL 2.0, consultation registers).
- Tendency of monthly reporting to mobilize most of the facility's health workers, disrupting the workflow.
- High caseloads that force staff to work overtime to complete the reporting.
- Poor infrastructure—weak connectivity, lack of electricity, and shortages of tablets/ computers.

DISTRICT LEVEL:

- Lack of enforcement of existing SOPs.
- Connectivity gaps and an unstable network (RESINA), which slow transmission.
- Shortages of computers and lack of internet connection, particularly in rural districts.
- Gender disparities (women rarely occupy district-level technical/ managerial roles).
- Inadequate supervision (although it takes place, it often falls short in quality).
- Funding decisions that are largely supported by international partners and based on the available data.

CROSSCUTTING BARRIERS:

- Fragmentation across digital platforms, which undermines interoperability (140 digital tools, applications, and platforms have been identified across public and private sectors through the national health ecosystem assessment conducted in 2024).
- Weak enforcement of data governance policies and poor staff awareness.
- Limited gender-responsive budgeting and underrepresentation of women in leadership.
- Low national digital readiness, with no clear plan for infrastructure expansion/maintenance.
- Absence of a master patient index, facility/provider registries, and systematic feedback mechanisms.

ETHIOPIA

Data value chain

Ethiopia's health data value chain is evolving through a mix of paper-based and digital systems that connect community, facility, and *woreda* (district) levels. At the community level, health extension workers (HEWs) collect household and service data using both "family folders" / registers and the electronic Community Health Information System (eCHIS), though duplication and infrastructure gaps remain major hurdles. Facilities add more detailed service, finance, and supply data, increasingly using systems like DHIS2 (for service delivery data) and Dagu or Medexis (for supply data), while woredas consolidate these inputs into dashboards that guide planning and accountability. National reforms around health management information systems—such as the 2021 *HMIS Indicators Reference Guide*, Information Revolution (IR), and introduction of an integrated human resources information system (iHRIS)—are strengthening standardization, governance, and workforce capacity. However, persistent barriers—like fragmented systems, weak interoperability, workforce shortages, and infrastructure limitations—continue to challenge data quality and use. Overall, Ethiopia is moving toward a more integrated, digital, and accountable health information system, with success hinging on both technological investment and a stronger culture of data-driven decision-making.

Table 4 and Figure 3 demonstrate PHC dataflows across health system levels in Ethiopia.

Figure 3. Dataflow for service delivery data by health system level in Ethiopia.

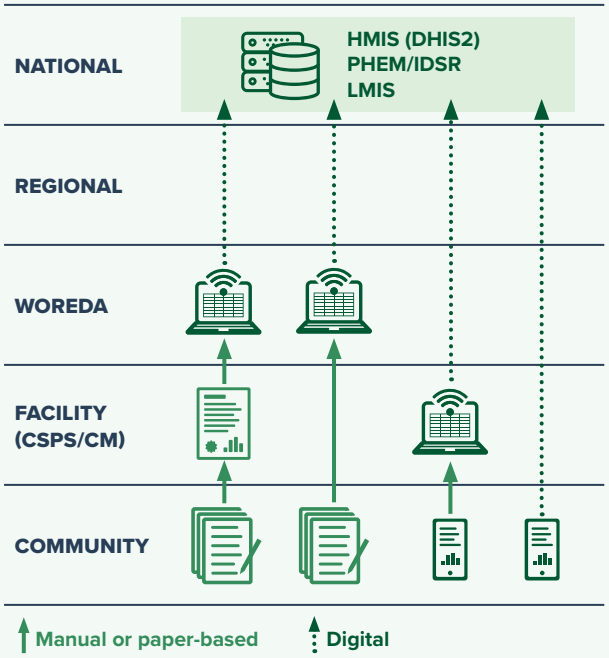


Table 4. Summary of primary health care dataflows across health system levels in Ethiopia.

COMMUNITY: HEWs across the country largely use a paper-based CHIS, and in some pilot areas they use an electronic form of CHIS (eCHIS). They record household-, health post–, and community-level service data using paper-based CHIS tools (e.g., family folders, mother/child health cards, and service registers) for select services, including Expanded Program on Immunization and integrated community case management. In some areas where eCHIS has been introduced, HEWs use the electronic system in parallel to a paper-based CHIS. HEWs sometimes collect additional data for vertical programs or project-supported / newly introduced programs in separate parallel recording/reporting formats. HEWs submit paper-based reports to the health center.

FACILITY (CSPS/CM): At the facility level, the health information technician or HMIS focal point enters the community reports into DHIS2. Facilities compile community and facility data using paper registers, client folders, ledgers, and electronic systems (DHIS2, Medexis, LMIS, HCMIS, MEMIS, iHRIS); perform data quality checks; and report to woreda offices according to weekly, monthly, quarterly, or annual timelines. Dashboards and quality improvement teams support real-time monitoring and evidence-based decision-making.

WOREDA: Woreda offices consolidate community and facility data; analyze them to monitor service coverage, finances, workforce capacity, and infrastructure; and report to regional and national levels. Information Revolution dashboards are updated every six months to support performance monitoring, planning, and accountability, while demonstration woredas pilot innovations and train staff to ensure timely data use aligned with national reforms.

REGIONAL AND NATIONAL: The Ministry of Health aggregates data from regions and woredas; monitors nationwide service coverage, resource allocation, and health outcomes; and integrates information into policy, planning, and strategic decisions. Standardized reporting frameworks, dashboards, and the Health Sector Transformation Plan guide national data use, ensuring timeliness, quality, and alignment with reforms such as the Information Revolution.

Abbreviations: DHIS2, District Health Information System 2; CHIS, Community Health Information System; HCMIS, Health Commodity Management Information System; HEW, health extension worker; HMIS, health management information system; iHRIS, integrated human resources information system; LMIS, logistics management information system; MEMIS, Medical Equipment Management Information System.

Source: Digital Square. *Role of Digital Tools in Fighting Malaria at the Community Level: Ethiopia*. Digital Square; 2022: 9.

Community level

At the community level, HEWs are the backbone of Ethiopia's PHC information flow specifically and health information system more broadly. HEWs record and manage data across six health system pillars—service delivery, finance, HR, supply, equipment, and infrastructure—using a combination of paper-based tools and self-developed forms (see Appendix C for a complete list of tools used at the community level). For service coverage they use field books, family folders, tally sheets, integrated community case management and Expanded Program on Immunization registers, personal notebooks, and other forms to capture clients' personal information (age, sex, address), as well as details on the types of service provided, referrals, and disease classifications. HEWs extract data from these records to populate Community Health Information System (CHIS) or DHIS2 reporting formats for submission. Supply data are tracked using transaction documents—including Model 19 and Model 22 forms, bin cards, and health post monthly report and resupply forms—recording beginning balances, quantities received, ending balances, and adjustments. Financial information, including daily revenue collection and expenditures, is recorded on Model 17 and Model 22 forms. HR data, particularly on community trainings and meetings, are documented in the health post minute book. Equipment records, including received or issued items, are captured on Model 19 and Model 22 forms, respectively, while letters are used to notify health centers about nonfunctional equipment. In addition to HR data, infrastructure and facility-related information is maintained in the health post minute book, providing a comprehensive record of local service delivery capacity.

The CHIS and its electronic counterpart, eCHIS, provide a household- and individual-level platform for recording services, health outcomes, and insurance enrollment. As of March 2024, the eCHIS is used in 8.086 (52%) of the 15,531 health posts nationwide—and has digitally registered approximately 22 million individuals.[11] Despite its potential, synchronization failures, device issues, and poor connectivity have prevented eCHIS from replacing paper tools. HEWs often record services on tablets and later transcribe them into family folders (stored at the health post) for continuity.

To communicate with supervisors and transmit reports, HEWs frequently rely on personal phones, SMS, WhatsApp, or Telegram. In Afar, for example, malaria and measles cases are reported by phone immediately, followed by paper submissions to the health center. Data processes generally follow a standard flow: services are recorded in family folders or registers (or directly into tablets), extracted into reporting formats, and transmitted to health centers, with copies retained at the health post. Supervisors periodically review these records, offering corrections and feedback. HEWs also record referrals and track follow-up from higher-level facilities.

Challenges are widespread. Fragmentation and duplication arise from multiple tools and parallel reporting channels, sometimes compounded by language barriers. Infrastructure constraints—including lack of electricity, weak internet, unsafe or inadequate storage, and difficulty replacing tools—undermine consistency. Resource shortages, such as frequent stockouts of registers, add further pressure. HR limitations are evident as HEWs often cover more households than the planned 500, leaving insufficient time for accurate recording. Capacity and motivation issues also are significant: new HEWs frequently learn through informal peer support rather than standardized SOPs, digital literacy among HEWs remains low, and many HEWs feel disheartened by stagnation and lack of career advancement, despite being motivated by visible health improvements in their communities. In urban and agrarian regions—such as Oromia and southwest Ethiopia—nearly all HEWs are female, whereas there are male HEWs in pastoral areas; gender roles were not reported to affect HEWs' ability to record and report health data.

Despite these barriers, community-level data play a critical role. Service records help identify unvaccinated children, monitor treatment adherence, and guide household visits; commodity records underpin supply and resupply requests; and surveillance data enable rapid outbreak reporting. Community Scorecards, which were developed by the MOH to be completed quarterly by a group of community representatives, further strengthen accountability by empowering citizens to evaluate facility performance and hold providers responsible.

Solutions proposed by HEWs include scaling up eCHIS coverage with more reliable infrastructure (such as solar power), expanding training and mentorship, institutionalizing supportive supervision, providing transport and airtime allowances, and ensuring better systems for data storage and backup. Ultimately, the community level remains the foundation of Ethiopia's health data value chain, with local ownership and motivation sustaining information flows despite resource- and system-level challenges.

Health facility level

Health facilities build upon community-level reporting by managing more comprehensive data systems across the six health system pillars (service delivery, finance, HR, supply, equipment, and infrastructure):

- Service delivery data are recorded using 57 paper registers, 21 tally sheets, and client folders, which capture demographic information, service type, and disease-specific details across outpatient, maternal and child health, family planning, immunization, and nutrition services (see Appendix C). Register types include outpatient department, ante- and postnatal care, delivery, family planning, Expanded Program on Immunization, cervical care, central, and emergency registers, while client folders encompass patient cards, history sheets, summary sheets, and master patient indexes. Extracted data are reported through weekly Public Health Emergency Management reports and monthly, quarterly, or annual DHIS2 submissions, disaggregated by age and sex. Timeliness is emphasized, with specific due dates for each reporting cycle, though delays are common due to staff shortages, infrastructure constraints, and transport challenges.
- Financial data are documented through ledgers, trial balances, bank slips, and transaction forms such as Models 7, 9, 19, 22, and 64, capturing daily revenue, expenditures, and community-based health insurance usage.
- HR data, including staff attendance, absenteeism, performance, and appraisal results, are maintained in staff files, timesheets, and evaluation forms, often disaggregated by profession, sex, and years of experience.
- Supply management relies on bin cards, the Internal Facility Reporting and Requisition register, the Report and Requisition Form, dispensing registers, and Models 19 and 22 to track stock levels, consumption, losses, and expiry dates.
- Equipment and infrastructure data remain less standardized, typically recorded ad hoc.

Electronic systems, including DHIS2 for service reporting and a logistics management information system (LMIS) for supply management, improve efficiency, while platforms such as the Health Commodity Management Information System (HCMIS) and Medexis for supplies, Medical Equipment Management Information System (MEMIS) for equipment, and iHRIS for HR are used, as well, though integration is limited. Data quality is monitored internally by quality improvement teams and externally through supervision and assessments by woreda health offices and partners. Dashboards enable facility managers to visualize performance and inform evidence-based decisions.

Despite these advances, facilities face systemic barriers similar to those at the community level. Staff shortages lead to after-hours or inconsistent recording, power outages and limited internet access restrict electronic reporting, and local technical support is often unavailable, requiring travel for hardware or connectivity repairs. Paper records are bulky and insecure, and multiple registers and parallel systems create duplication and burden staff. Consequently, data are often incomplete, inconsistent, delayed, and underutilized, with unclear accountability for reporting tasks and missed reporting deadlines.

Nonetheless, facilities apply data in practical ways. Service delivery information informs program monitoring, HR data guide payroll and performance evaluations, financial records support planning and budgeting, and supply data direct procurement and stock management. Timely submission of reports helps track trends and respond to emerging issues, including epidemics and stock shortages. There is growing recognition that digitalization, standardization, and a stronger information culture could reduce inefficiencies, improve data quality, and enhance service delivery.

District (woreda) level

At the woreda (or district) level, health offices consolidate, analyze, and use data from both community and facility sources across the six health system pillars. Woreda offices aggregate information such as financial flows, service coverage indicators, workforce availability, and infrastructure status to inform planning, resource allocation, and accountability. Data from HEWs and health facilities are submitted according to established timelines, including weekly, monthly, quarterly, and annual due dates, and are cleaned and synthesized using standardized formats such as DHIS2 submissions and supply chain reports.

The IR positions woredas as central hubs for digitalization, data use, and health system innovation. Demonstration woredas pilot new approaches, provide training for neighboring districts, and implement IR dashboards that monitor infrastructure, resource availability, data quality, and information use. Dashboards are updated every six months, allowing managers and regional stakeholders to track performance and guide strategic decisions. Woreda-level technical working groups (TWGs) mirror national structures to align planning, workforce management, service delivery priorities, and financing reforms with the Health Sector Transformation Plan. IR scores (out of 100) have improved substantially, rising from 48.3 in 2018 to 80.8 in 2021, reflecting measurable gains in data quality, use, and accountability.[c, 12]

Woreda offices apply data to guide decisions and improve system performance. Service delivery trends inform program planning, financial data support budgeting and resource allocation, supply data guide procurement and stock replenishment, and workforce data inform HR planning and performance oversight. The offices also facilitate feedback loops, ensuring insights from aggregated data reach the health facility and community levels to strengthen service delivery, accountability, and responsiveness.

Crosscutting insights

Standardization remains a cornerstone of Ethiopia's HIS reforms. The HMIS involves 57 registers and 21 tally sheets for recording and reporting, with 177 indicators to be tracked. The 2021 *HMIS Indicators Reference Guide* has harmonized reporting across community, facility, and woreda levels by defining indicators for each of the six pillars, along with reporting frequency and responsibility. This has reduced duplication, strengthened accountability, and improved comparability. By linking directly with the Health Sector Transformation Plan and the IR, the guide ensures that data supports strategic reforms. Still, fragmentation and parallel reporting remain persistent, especially in vertical programs.

Enabling environment

Leadership and governance

The governance of PHC data practices is anchored by a National Health Care Financing Technical Group, led by the MOH, which brings together key stakeholders from the Ministry of Finance, planning agencies, revenue authorities, academia, and development partners. Replicated at regional, zonal, and woreda levels, these groups ensure alignment of financing and data practices with policy priorities. Governance also extends to mechanisms such as the Community Scorecard, which is completed quarterly by a group of community representatives to evaluate their health facility's performance. However, a 2021 assessment of Ethiopia's HIS scored 2.68 out of 5, revealing gaps in policy enforcement, governance coordination, and integration of HIS leadership functions across levels.[13]

Strategy and investment

Strategically, the Health Sector Transformation Plan identifies the IR as a central pillar of reform, aiming to digitalize HISs, strengthen the culture of data use, and improve decision-making. The Human Resources for Health Strategic and Investment Plan for Ethiopia 2016–2022 / 2024–2030 similarly underscores the importance of evidence generation and data use for effective workforce planning and policy development. Investments are directed toward building

[c] An IR model woreda measurement tool is used by sites (woreda health offices, hospitals, health centers, health posts, and Primary Health Care Units) to self-assess HIS structure, resources, data quality, and information use. The woreda IR score is the mean score of all IR scores of all public health institutions in the woreda. As of 2021, four woredas are verified to reach IR "model" status based on an IR score equal to or greater than 90 percent.

information and communication technology (ICT) infrastructure, strengthening interoperability, and expanding IR implementation across woredas and health institutions. Targets for 2025 include supporting 35 percent of woredas to graduate as model woredas and 15 percent as digital model woredas, alongside bringing 25 percent of woreda health offices, hospitals, and Primary Health Care Units to the level of digital model institutions.

Legislation, policy, and compliance

In terms of policy, Ethiopia has introduced legal frameworks and guidelines to standardize reporting, support the licensing and regulation of health professionals, and establish EMR standards. The MOH, with support from technical groups, is responsible for developing, implementing, and advocating for these frameworks. The country also has introduced the Digital Health Blueprint (2021–2030)—which supports the expansion of digital infrastructure in health care settings—as well as the National Health Data Access and Sharing Guideline (2021) and the Health Information System Governance Framework (2021). A unit at the MOH, the Digital Health Lead Executive Office, was established to design and implement the national eHealth architectural framework. The Data Protection Act outlines the required consent for data processing, imposes duties on data controllers and processors, mandates the appointment of data protection officers, and includes strict regulations for cross-border data transfers and data breaches. Despite this progress, significant challenges remain, particularly fragmentation of monitoring and evaluation (M&E) systems, the existence of vertical and parallel reporting channels, redundant data collection, and poor design of tools and processes. These issues not only burden health workers but also undermine data consistency and compliance.

Workforce

Progress has been made with the iHRIS platform and capacity-building programs through six universities, alongside structured career pathways for health informatics. Still, digital literacy remains low, with insufficient levels of trained staff, and incomplete system adoption is especially acute in private facilities. Motivation also is a challenge: HEWs often cite stagnation and lack of career advancement as demotivating factors, despite the pride they feel regarding their impact in the community. Health information technicians working at health facilities report low motivation due to substandard salary scale. The iHRIS captures information on health worker numbers, skills, qualifications (licensing, certification, and training), and locations, although its utilization is low at lower levels of the health system due to shortage of resources, such as computers for and training on its use. The iHRIS does not include information about HEWs, and currently there is no database in which HEWs are registered.

Standards and interoperability

Efforts have been made to advance standards and interoperability through the development of a digital health blueprint, standardized EMR guidelines, and use of master facility lists. Nevertheless, interoperability remains limited, with gaps in the integration of systems such as the HMIS, LMIS, HCMIS, and MEMIS, as well as financial platforms. Data exchange across supply chains and between different levels of the system is still constrained, and ICT infrastructure lacks adequate continuity planning.

Services and applications

Ethiopia has introduced a diverse suite of digital applications to support PHC data management. At the community level, eCHIS (which is interoperable with DHIS2) enables HEWs to register households and capture service delivery data. At the facility level, HMIS platforms such as DHIS2, iHRIS, HCMIS, and MEMIS are used to manage service, workforce, commodity, and equipment data. Ethiopia has made some progress in improving efficiencies of supply chain data-driven management through use of a suite of interoperable systems and applications, including deployment of Fanos (a supply chain dashboard) and Dagu (a health commodity management system) to health facilities. Despite their potential, these applications face persistent challenges related to usability, infrastructure constraints like inconsistent electricity and connectivity, susceptibility to cyberattacks, high implementation costs, fragmented ownership of systems, and weak coordination across programs.

Enablers and barriers

The main **enablers** and **barriers** to PHC data reporting in Ethiopia are as follows:

ENABLERS

COMMUNITY LEVEL (HEWS / HEALTH POSTS):

- eCHIS scale-up (6,320+ health posts, 2.8 million households, and 12 million family members).
- Use of mobile phones, SMS, WhatsApp, and Telegram for reporting and communication.
- Community Scorecards, which enable accountability and feedback.
- Supervisory feedback loops from Primary Health Care Units / health centers.
- Strong HEW motivation from community impact.
- Identified solutions (solar power, mentorship, transport/airtime support, device repair, data backup).

FACILITY LEVEL (HEALTH CENTERS / PRIMARY HOSPITALS):

- HISs for timely, high-quality reporting, including:
  - DHIS2 for service delivery and surveillance reporting.
  - LMIS, HCMIS, Dagu, Vitas, mBrana, Medexis, DHIS2, and eCHIS for supply data.
  - MEMIS for equipment data.
  - iHRIS for HR data.
- Internal quality improvement teams and external supervision.
- Dashboards for visualizing performance and supporting evidence-based decisions.
- Routine application of data (service monitoring, HR management, financial planning, and procurement).
- Recognition that digitalization and standardized tools can reduce inefficiencies.

WOREDA LEVEL (DISTRICT HEALTH OFFICES):

- Implementation of the IR to improve data quality, digital platforms, and culture of use.
- Demonstration woredas that pilot innovations, serve as training hubs, and share best practices.
- Updates to IR dashboards every six months for performance monitoring and decision-making.
- Documented improvements (rise in IR scores from 48.3 in 2018 to 80.8 in 2021 and achievement of “model” status by four woredas).
- Woreda-level TWGs who align data use with financing, workforce, and service delivery reforms.
- Use of mBrana to manage vaccine inventory at woredas and zones throughout Ethiopia.

CROSSCUTTING ENABLERS:

- Standardization via the *HMIS Indicators Reference Guide* (2021).
- Supportive policies and guidelines, including the *Digital Health Blueprint* (2021–2030), *National Health Data Access and Sharing Guideline* (2021), Health Information System Governance Framework (2021), and Data Protection Act.
- Use of supervisory feedback, mentorship, and capacity-building programs.
- Use of digital tools and dashboards (eCHIS, DHIS2, Medexis, iHRIS, and Vitas for warehouse management and inventory control and LMIS in the Ethiopian Pharmaceuticals Supply Service center and at hub warehouses).
- Established governance structures at community, facility, woreda, and national levels.
- IR as a systemic driver of data quality, integration, and use.

BARRIERS

COMMUNITY LEVEL (HEWS / HEALTH POSTS):

- Fragmented and duplicative tools (paper-based and eCHIS parallel reporting).
- eCHIS synchronization failures; unreliable connectivity and power.
- Frequent stockouts of registers, forms, and tally sheets.
- Language barriers (some reporting formats are not translated into local languages, creating gaps in HEW understanding of the tools).
- Inadequate and insecure storage for records and devices.
- Heavy workloads (often over 500 households per HEW).
- Lack of clear written roles and SOPs.
- Low digital literacy and analytical capacity.
- Poor data quality (incomplete, inconsistent, and/or underutilized).
- Limited financial support for transport, airtime, and device maintenance.

FACILITY LEVEL (HEALTH CENTERS / PRIMARY HOSPITALS):

- Paper-heavy, time-consuming processes with multiple registers.
- Staff shortages, which lead to delayed or inconsistent recording.
- Weak accountability for data tasks; unclear roles.
- Frequent power outages and unreliable internet connectivity.
- Lack of local information technology / technical support; long travel for repairs.
- Insecure and inadequate storage for records.
- Weak data use culture: report data is often not applied to improve service delivery.
- Poor data quality (incomplete, inconsistent, and/or delayed reporting).

WOREDA LEVEL (DISTRICT HEALTH OFFICES):

- Limited interoperability across HMIS, LMIS, HCMIS, MEMIS, and finance systems.
- ICT infrastructure gaps and limited local technical support.
- Insufficient analytical capacity for data interpretation and decision-making.
- Inconsistent use of data for planning and performance monitoring.

CROSSCUTTING BARRIERS:

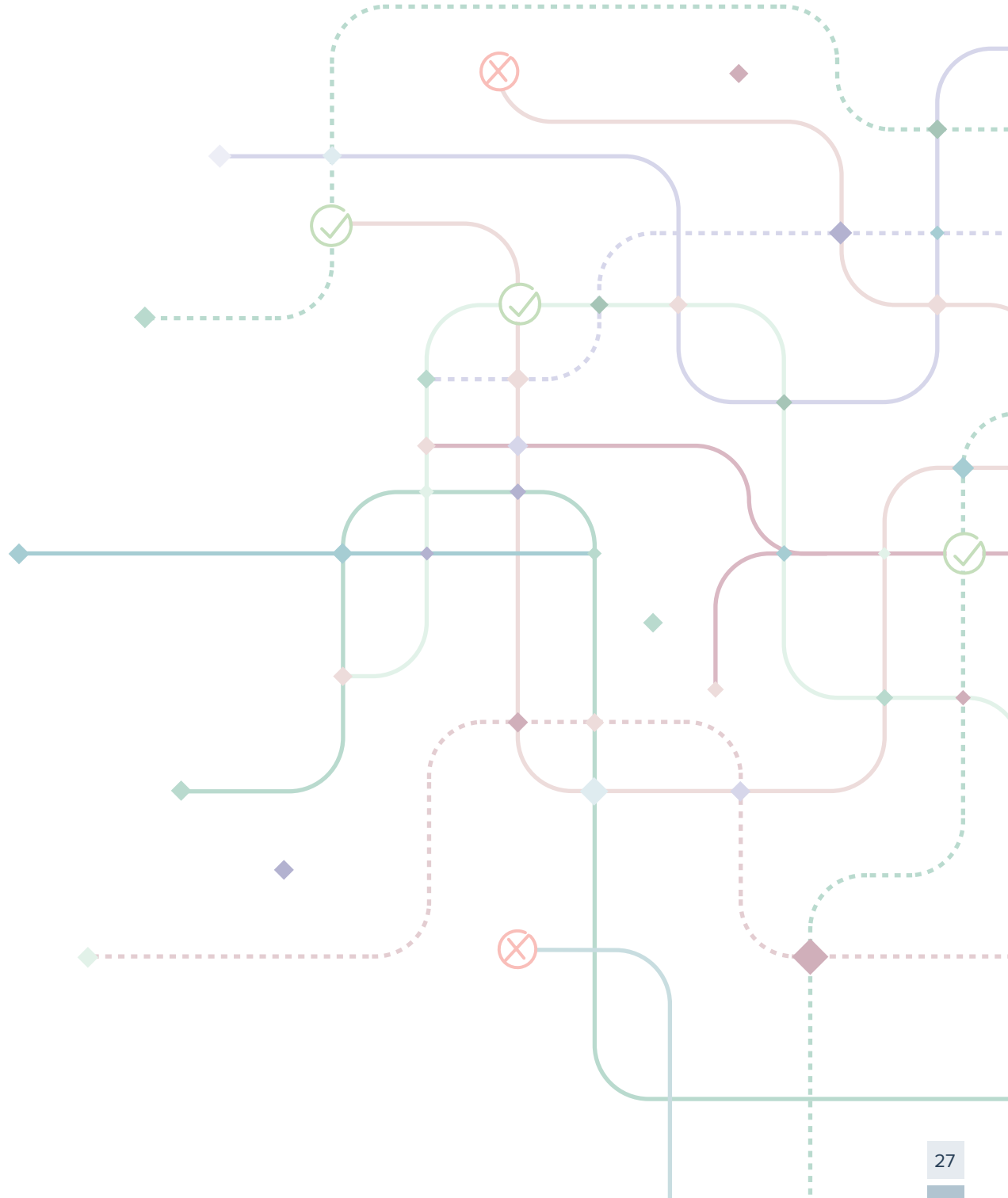
- Fragmentation and parallel reporting across all levels.
- Infrastructure gaps (electricity, connectivity, storage).
- Low availability of electronic devices (desktops, laptops, tablets, smartphones).
- Workforce shortages and low digital literacy.
- Weak integration and standardization across information systems.

Solutions and innovations

To overcome these barriers, Ethiopia is pursuing a set of interlinked solutions. Digitalization is at the core, with ongoing scale-up of eCHIS, DHIS2, and LMIS, as well as demonstration and scale-up of Medexis, EMRs, Simple App for neglected tropical diseases, SmartCare for antiretroviral therapy, and Referral Monitoring App at the tertiary health care level, alongside investments in ICT infrastructure and solar power for health facilities. Standardization of registers and reporting formats is being strengthened to reduce duplication and improve quality. Workforce capacity is being addressed through regular training, mentorship, and the Capacity Building and Mentorship Program, while supportive supervision and feedback loops are being institutionalized.

Practical innovations are also emerging from the field: when registers run out, HEWs create self-developed forms; when connectivity fails, they revert to SMS or WhatsApp for timely reporting; and when equipment breaks down, staff pool resources or travel long distances for repairs. Facilities are advocating for broader solar energy coverage to power both service delivery and digital reporting.

Ultimately, the success of Ethiopia's IR depends not only on investing in technology but also on building a strong culture of data use and ensuring that data collected at all levels—from household to woreda—are accurate, accessible, and applied to improve health outcomes and accountability.



KENYA

Data value chain

Table 5 and Figure 4 demonstrate PHC dataflows across health system levels in Kenya.

Figure 4. Dataflow for service delivery data by health system level in Kenya.

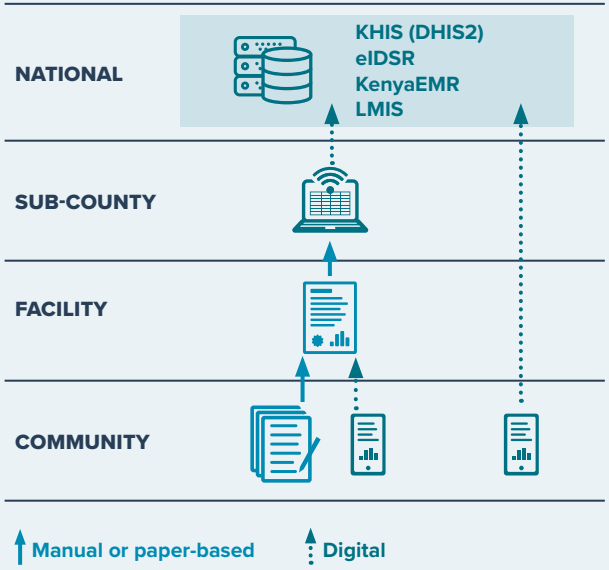


Table 5. Summary of primary health care dataflows across health system levels in Kenya.

COMMUNITY: CHWs (community health promoters) compile data using a paper-based household register and logbook, which they present to their respective supervising community health assistant at the end of every month. The community health assistants compile data from all the CHWs in their respective community units into a summary report, which they then submit to the subcounty monthly. The eCHIS, first piloted in five counties in 2018, is supporting digital reporting in all 47 counties as of a nationwide CHW training in 2024, with about 42 counties having fully operationalized the system. The eCHIS transmits data directly to the central level, but CHWs are still required to submit the same information through the paper-based monthly reports.

FACILITY: Most facilities report using paper-based or hybrid tools. Low-volume facilities tend to be reliant on paper-based forms and registers, whereas some medium- to high-volume facilities are using varied electronic medical records in addition to paper-based tools. Facilities summarize service delivery data in a standardized paper-based MOH monthly reporting tool. The facility in-charge delivers the monthly report to the subcounty level on the 5th of every month. Financial expenditure and revenue data also are submitted monthly. Data on HRH, facilities, equipment, and budgets are submitted on an annual basis during the annual work-planning process. Some high-volume facilities report directly into the KHIS not only for service delivery data but also for commodities/supplies and financial data. For HRH, equipment, infrastructure, and facility registration data, the process is predominantly paper based, followed by transmission and entry into the KHIS at the subcounty level.

SUBCOUNTY: County health records and information officers review and input data into the KHIS national reporting platform for their entire subcounty by the 14th of the month for data related to service delivery, commodities/supplies, and financial data. They are responsible for validating facility-level data and flagging data quality issues for feedback.

NATIONAL: The KHIS (based on DHIS2) is the national reporting platform that aggregates facility data, including financial information, HRH data, stock levels, equipment inventory, and service utilization. Other national HISs used at scale include an electronic medical record system, laboratory information system, logistics management information system, Kenya Master Health Facility List, and integrated human resources information system.

Abbreviations: CHW, community health worker; DHIS2, District Health Information System 2; eCHIS, electronic Community Health Information System; eIDSR, electronic Integrated Disease Surveillance and Response; EMR, electronic medical record; EMR, electronic medical record; HRH, human resources for health; KHIS, Kenya Health Information System; LMIS, logistics management information system; MOH, Ministry of Health.

Source: Digital Square. R*ole of Digital Tools in Fighting Malaria at the Community Level: Kenya.* Digital Square; 2021: 9. https://media.path.org/documents/Kenya_PMIDCHI.pdf?_gl=1*jdpnzp*_gcl_au*MTQ0OTc5NjA4NC4xNzYxMDYyMjU0*_ga*NTM2MjU3OTI1LjE3NjEwNjIyNTQ.*_ga_YBSE7ZKDQM*czE3NjIxOTcwMTUkbzEzJGcwJHQxNzYyMTk3MDg4JGo2MCRsMCRoMA

Data extraction

At the foundation of Kenya's PHC system, data are primarily generated and extracted at the facility level. Health facilities are responsible for maintaining accurate records across multiple areas, including financial management, staffing, inventory, and service delivery. Medium- to high-volume health facilities increasingly use EMR systems for data extraction. In contrast, low-volume rural facilities, which form the backbone of Kenya's Primary Care Network (PCN), still rely heavily on paper-based registers and forms. Typically, in low-volume facilities a health care worker is responsible for extracting data to complete the monthly reports, whereas high-volume facilities are more likely to have a specialist (e.g., health records and information officer [HRIO]) who is responsible for data extraction.

There are currently no PHC facilities doing electronic-only reporting. While some programs (like HIV) have piloted paperless systems, all PHC facilities still use hybrid reporting (i.e., both paper-based and electronic records). EMRs and the eCHIS support data aggregation and electronic transmission, but paper registers and monthly paper submissions remain mandatory.

The Kenya Health Information System (KHIS), built on the DHIS2 platform, plays a crucial role in aggregating data from various sources, including financial data, information on human resources for health (HRH), commodity stock levels, equipment inventories, and service utilization figures. However, the data workflow remains fragmented, particularly across health system pillars. Different counties and partners use separate systems for commodities, financing, and HRH, with no nationally standardized software. Fragmentation is evident as facilities juggle both paper-based and electronic tools, with parallel reporting lines—eCHIS transmitting directly to the national level while paper reports flow through subnational structures. This is compounded by limited interoperability between the eCHIS, EMRs, and KHIS. There are SOPs in place, but they are not consistently implemented. Manual processes dominate, especially in rural facilities, where gaps in both training and access to technology are common. Women are disproportionately involved in data extraction, particularly in low-volume facilities, where they make up the majority of frontline workers.

Challenges such as delayed reporting, limited infrastructure, and interoperability issues persist. The private sector is not well integrated and often excludes trainings and lacks capacity for reporting. Whereas public facilities, especially in rural areas, face hardware and connectivity gaps that hinder electronic reporting, manual processes such as tallying reports further delay submissions. Government-led innovations, like EMR deployment and mobile tools, are helping to improve data availability and support evidence-based planning. Sex disaggregation of HR and service coverage data is maintained through the data chain as both the KHIS and human resources information system (HRIS) provide sex-disaggregated data for these types of health indicators.

Data transmission

Data transmission varies significantly by facility type and location. Rural areas primarily use paper-based formats, while urban and higher-volume facilities rely on systems like the KHIS, HRIS, and other HMISs. Counties are adopting financial management software, but there is limited documentation on using SOPs for financial reporting. Reporting frequency can range from daily to monthly, with annual work plans serving as the primary means of aggregating budgeting and operational information. Often, facilities combine formal electronic platforms with informal tools like WhatsApp for routine reporting. WhatsApp is commonly used but not standardized or well documented, and there is a risk of personal data exposure.

Facility in-charges transmit monthly reports to the subcounty level, where county HRIOs are responsible for validating facility-level data and flagging data quality issues for feedback. In practice, the officers generally do a quick review of the paper report at the time of submission, and corrections are taken back to the facility but are sometimes forgotten.

Facility rates for on-time submission to the KHIS were reported at 93% in 2018 and up to 94% by 2020. Community-level reporting submitted on time ranged from 88% in Kisumu County to 78% in Garissa County, according to the KHIS in 2020. KHIS dashboards highlight periodic delays in data submission, often

linked to logistical challenges in remote areas. At the facility level, the average time spent on compiling monthly reports under the KHIS ranges from two to five days.

While the KHIS is widely used, its effectiveness is hampered by poor infrastructure and internet access in rural areas. Some facilities have implemented hybrid or automated extraction methods in their workflow. However, these approaches are not yet widely adopted, and manual processes continue to dominate. In locations where such tools are available, they are not fully embedded within routine data management workflows, and manual processes are still used for validation. HRIOs—who provide support at subcounty and county levels and are primarily men—along with clinical and administrative staff, are essential in data management.

Challenges such as inconsistent financial practices and delays from manual validation lead to data errors and slow decision-making, particularly regarding stockouts. However, there is a trend toward innovation at facility and subcounty levels, with increasing use of the KHIS, HRIS, and mobile platforms. The PCN model (see Box 2) supports the testing and scaling of these promising innovations, emphasizing local adaptability.

Data use

Data use primarily involves facility, subcounty, and county staff. Regarding gender balance, women are predominant in lower-level facilities. There is a notable lack of capacity for data use across all staff categories, though significant capacity gaps exist in rural and hard-to-reach areas. Decision-making focuses on resource allocation at the county level. Despite limited documentation of processes, there is growing recognition of the importance of data quality, timeliness, and completeness for improving planning, accountability, and community engagement.

Enabling environment

Leadership and governance

The MOH, through the Directorate of Health Informatics, manages HISs, overseeing policy, dataflow, and system functionality. The Kenya Primary Health Care Strategic Framework (2019–2024) establishes multiple coordination mechanisms, including subcounty PHC TWGs, the PCN Advisory Council, inter-sectoral forums, and multidisciplinary teams led by family physicians. While these structures support data quality, standardization, and service delivery, gaps remain in gender mainstreaming, as neither the Kenya Health Sector Strategic Plan (2018–2023) nor the PHC Strategic Framework sets gender targets for governance bodies. It is unclear how gender balanced these government structures and advisory councils are. Additionally, PHC data systems are not consistently budgeted for or embedded in national strategies, and emerging digital technologies are not explicitly addressed. Overall, governance structures emphasize

BOX 2

Approaches to implementing and financing primary health care in Kenya

Kenya's Primary Health Care Strategic Framework (2019–2024) aims to revitalize and strengthen PHC services through establishing PCNs and financing models and integrating community health systems. Seven counties were initially selected to model the PCN approach: Kisumu, Nakuru, Vihiga, Makueni, Garissa, Mombasa, and Nyeri.

At the national level, Kenya has undertaken a process of developing a PCN "functionality matrix"—an Excel-based tool developed at the national level to support regular monitoring of PCNs across key domains, such as governance, service delivery, workforce, infrastructure, and community engagement. The MOH recommends that the tool is administered annually, with the Division of Primary Health Care Networks overseeing the process. This is a new practice introduced to complement existing data systems, like DHIS2. While DHIS2 captures service delivery indicators, the matrix focuses on functionality and system readiness, offering a more holistic view of PCN performance. It does not replace DHIS2 but fills a critical gap in operational monitoring, performance tracking, and strategic planning for PHC.

Learn more

data and technology integration, but gender, financing, and systematic inclusion of PHC data systems require further attention.

The PCN model described previously has emerged as a key enabler of Kenya's UHC strategy, strengthening PHC by fostering stakeholder collaboration, promoting patient-centered care, and improving health system efficiency.

Strategy and investment

Kenya's National eHealth Policy 2016–2030 outlines the country's strategy for improving HISs, emphasizing data collection, analysis, and system interoperability to support decision-making and health outcomes. Aligned with PHC and UHC, the policy positions eHealth as a key tool for delivering high-quality health services using ICTs, with objectives including improving health literacy, expanding access to ICT infrastructure, and deploying user-friendly eHealth platforms. While the government acknowledges the importance of gender-responsive budgeting, its integration into the PHC budget remains limited, with insufficient tracking and unclear implementation across existing frameworks.

Legislation, policy, and compliance

Kenya has a robust legal and regulatory framework for data protection and digital health. The Data Protection Act (2019) and the Office of the Data Protection Commissioner provide a comprehensive framework to safeguard personal data, including health information, by regulating collection of, consent for, access to, and sharing of such data. The MOH has developed guidelines for connected medical devices, telemedicine, and eHealth services, ensuring safety, data integrity, and quality of care, while the National eHealth Policy 2016–2030 sets standards for health data sharing across digital platforms. The Kenya Artificial Intelligence Strategy 2025–2030 guides responsible AI adoption, while subnational policies and tools, including PHC guidelines and the KHIS, promote data-driven decision-making. However, gaps persist in the implementation and enforcement of these policies, particularly at the subcounty level, where data use and decision-making oversight are not as robust. The Human Resources for Health Strategy 2012–2018 emphasizes the importance of capacity-building and professional development for health care workers, including women, and acknowledges the need for women's participation in professional development opportunities, but it does not specifically address the barriers they may face.

Workforce

Health care workers in Kenya receive training on data collection, recording, and reporting using both digital and non-digital tools, supported by facility-level SOPs for data management and enforced by subcounty health teams. PCN guidelines require assessment of facility capacity, HR, and training needs, with counties expected to develop HR plans addressing gaps and professional development. Despite these measures, capacity challenges persist, particularly in low-volume and rural facilities where clinical staff are overburdened and HRIOs are scarce, creating disparities across PCN facilities (Levels 2 and 3). Generally, women and men who are in the same data management positions and performing the same functions (e.g., data clerks, data analysts, and HRIOs) have similar levels of training due to the skills and knowledge requirements associated with those functions and the software used to perform the work. However, the health workforce is predominantly female—especially among nurses and midwives, who often may perform initial data capture—and there is limited documentation on gender balance broken down by facility level and on ways that gender-related barriers to training and professional development are addressed.

Standards and interoperability

The government has taken a proactive approach to standardizing and integrating HISs through the Kenya Health Information Systems Interoperability Framework. This comprehensive framework establishes data standards, infrastructure, and applications, ensuring consistency and interoperability across different HISs and enabling seamless exchange of health information between all levels of the health system, including PHC facilities.

Infrastructure

Most health facilities are connected to the national power grid, but only 41 percent have backup power, and only 31 percent use fully integrated electronic systems. Rural facilities are disproportionately affected by limited digital tools, weak connectivity, and poor system maintenance. To address these gaps, the government has launched a ten-year, KSh 104.8 billion public-private initiative, led by Safaricom and partners, to provide an EA, a standards-based HMIS, digitized supply chains, digital tools (tablets, PCs), power backups, and cybersecurity measures under the oversight of the Digital Health Agency. Maintenance of tools and equipment remains largely manual in rural areas, relying on phone calls, notebooks, and later, Excel transcriptions, with practices varying across counties.

Services and applications

The launch of UHC and PHC is aligned with nationally scaled digital platforms and governance structures. Key enablers include the Digital Health Bill 2023 and the legally mandated Digital Health Agency, which oversees integrated HISs, standards, registries, and interoperability. Digital health initiatives—such as the KHIS, National Data Warehouse, and eCHIS—and innovations in case-level surveillance (DHIS2-FHIR® integration),[d] along with professional registries like the Kenya Master Health Facility List, contribute to public health reporting and decision-making at the PHC level. Patient feedback mechanisms are notably absent, with no widely accessible or secure systems in place.

[d] FHIR (Fast Healthcare Interoperability Resources) is a registered trademark of Health Level Seven International.

Enablers and barriers

The main **enablers** and **barriers** to PHC data reporting in Kenya are as follows:

ENABLERS

- Support through the National eHealth Policy (2016–2030) for data collection, analysis, and interoperability.
- Strong coordination stemming from the Directorate of Health Informatics, PHC Strategic Framework, and PCN Advisory Council.
- Systems such as the KHIS (DHIS2 based), HRIS, eCHIS, National Data Warehouse, and Kenya Master Health Facility List.
- Launch of new community health strategy in 2023 (including remuneration for community health promotors).
- Facility-level SOPs for data management, supported by subcounty health teams.
- HRIOs, nurses, and midwives who receive routine training and are actively engaged in data work (e.g., 25,000 community health promotors trained in 2024 on the eCHIS).
- Partner support for systems, training, and hardware (mobile tools, tablets, PCs) and infrastructure (e.g., solar power pilots in rural counties) for data reporting.
- KHIS interoperability framework, national standards for data exchange, and national data dictionary (in progress) to enable integration of other systems with the KHIS.
- PCN framework, which encourages local innovation and adaptation.
- PCN functionality matrix (although this is an emerging tool).
- UHC-linked digital platforms, Digital Health Bill (2023), and Digital Health Agency oversight.
- Improved access to training and digital tools and the capacity to use them for facilities in urban areas and their staff.
- Support for digital innovation, in that (a) an EMR system (based on OpenMRS, an open-source medical records system) has been piloted in seven counties to allow facilities to report directly to the National Data Warehouse, and (b) the eCHIS supports community health workers (CHWs) in using tablets for electronic reporting.

BARRIERS

- PHC data systems that are not consistently budgeted for or embedded in national strategies.
- Lack of implementation of gender considerations (e.g., tracking gender representation in governance bodies), despite their recognition in budgeting and governance frameworks.
- Slow policy adoption and weak enforcement and compliance, especially at the subcounty level.
- Fragmented systems and interoperability issues between EMRs and the KHIS (health EA has been designed but not implemented).
- Missing or inconsistently applied SOPs and reliance on manual processes, especially in rural facilities.
- Shortage of HRIOs in rural/low-volume facilities, overburdened staff, and the concentration of women in lower-level roles with limited advancement.
- Weak connectivity, unreliable power backup, poor maintenance, and reliance on paper/manual transcription in rural facilities.
- Limited documentation and inconsistent practices in financial and operational reporting.
- Delayed reporting, manual validation, and stockout-related data errors.
- Lack of patient feedback mechanisms.
- Capacity gaps in rural/subcounty areas (trainings generally reach Level 1 facilities but may not reach Levels 2 and 3); limited training and professional development opportunities for women.
- Manual data extraction, which leads to reporting errors.
- Limited data quality feedback loops beyond a quick review of the paper report at the subcounty level upon submission.
- Infrequent data quality assessments and audits for financial data.
- Lack of hardware.
- Limited integration of the private sector into the national reporting system; limited access to training by private-sector staff.

NIGERIA

Data value chain

Table 5 and Figure 4 demonstrate PHC dataflows across health system levels in Kenya.

Figure 5. Dataflow for service delivery data by health system level in Nigeria.

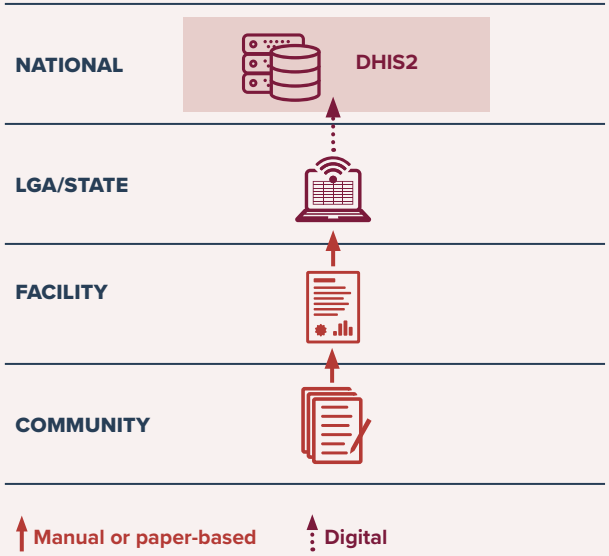


Table 6. Summary of PHC dataflows across health system levels in Nigeria.

COMMUNITY: Health data from community-level activities flow into the PHC facility, which serves as the main source point for PHC data. Community-level PHC activities vary by LGA/state but are usually focused on community engagement, education, and awareness and are supported by resources from health care facilities within the community's geographic area. CHWs primarily use paper-based tools to collect and record data. Data are shared with the facility and captured in facility registers.

FACILITY: The facility level is the central point of aggregating data for community-level activities. Data on service delivery, finances, and HRH attendance are captured daily through various registers. Aggregate details related to service delivery and stock data are manually extracted to complete the monthly summary forms. The facility shares the summary form for service delivery data with the ward/LGA level monthly. Other types of data (e.g., related to HRH, equipment, or facility infrastructure) are reported on demand when requested by higher administrative levels.

LGA/STATE: At the LGA level, M&E meetings are routinely held to validate the monthly summary reports across facilities in the LGA. When completed, the LGA M&E officers aggregate data for their LGAs and further validate them with the state M&E officer, who then inputs data in the NHMIS (by the end of the month). State-level operational decisions are made based on data available through the NHMIS.

NATIONAL: At the national level, data are accessed through the NHMIS (DHIS2 based). Other nationally scaled systems that support PHC include the Nigeria Health Workforce Registry, the Health Facility Registry, and the National Data Repository. There is a digital PHC dashboard managed by the NPHCDA to highlight service availability, readiness, and health insurance status (i.e., inclusion in the Basic Health Care Provision Fund program).

Abbreviation: Abbreviations: CHW, community health worker; DHIS2, District Health Information System 2; HRH, human resources for health; LGA, local government area; M&E, monitoring and evaluation; NHMIS, National Health Management Information System; NPHCDA, National Primary Health Care Development Agency; PHC, primary health care.

Source: Digital Square. Role of Digital Tools in Fighting Malaria at the Community Level: Nigeria. Digital Square; 2021: 10. https://media.path.org/documents/Nigeria_PMIDCHI.pdf?_gl=1*12px6md*_gcl_au*MTQ0OTc5NjA4NC4xNzYxMDYyMjU0*_ga*NTM2MjU3OTI1LjE3NjEwNjIyNTQ.*_ga_YBSE7ZKDQM*czE3NjIxOTcwMTUkbzEzJGcwJHQxNzYyMTk3MDE1JGo2MCRsMCRoMA

Data extraction

In Nigeria, PHC data extraction originates from both paper-based and, increasingly, electronic tools. At the facility level, officers-in-charge (OICs) are responsible for pulling information from diverse registers, such as staff attendance logs, patient service registers, and inventory books. These sources capture a wide range of data, including finance (budgets, expenditures, revenue), HR (staffing levels, absenteeism, and training), and supplies (stock levels, distribution, and consumption). Facility and equipment data, as outlined in the ward's Minimum Service Package, are also monitored. Extraction is monthly for financial and service coverage data but on demand for equipment and infrastructure data. Service coverage data extraction is sex disaggregated, while HR data are paper based at the PHC facility level but can be disaggregated by sex, as needed. In larger facilities or those facilities with support staff, clerks or data officers may assist with data aggregation for monthly reporting. While national- and state-level tools and guidelines exist, the successful integration of data extraction into daily workflow depends heavily on the capacity and initiative of local staff and their coordination with higher administrative levels.

Challenges include disparities in infrastructure across rural and urban sites, inconsistent training, lack of data management skills, and limited availability of automated systems, leading to risks of delays, duplication, and data quality issues. The gender balance of health data extractors is unknown; however, data extraction is typically handled by the PHC facility OICs, who are often women.

Some health facilities use EMRs, often for specific disease areas like HIV. The EMRs tend to be donor supported; for example, NigeriaMRS (based on OpenMRS) was supported by the US Centers for Disease Control. A recent study estimated that 18-23 percent of Nigerian hospitals are using EMRs.[14]

Data transmission

Once extracted, data are transmitted through a mix of manual and electronic processes. At the facility level, registers are summarized into monthly summary forms, which move through the M&E governance structures comprising the ward, Local Government Health Authority (LGHA), State Primary Health Care Development Agency (SPHCDA), and state MOH, with support from local implementation partners, before being entered into the national DHIS2. Transmission can be both paper based and digital, with Microsoft Excel and email widely used to facilitate data accuracy and validation, as well as reporting. Sex disaggregation is maintained during transmission, depending on reporting needs and relevance—particularly for data related to HR and service coverage.

For finances, registers are completed daily, while supplies and service coverage are reported monthly. Larger facilities keep more detailed financial records, especially if engaged with the Basic Health Care Provision Fund (BHCPF), while state-level oversight of PHC government funding is limited to occasional audits. The remaining domains can be submitted by the facility on demand when requested from higher administrative levels.

Responsibility for transmission lies primarily with OICs at the PHC level, supported by M&E officers at both the LGHA and state levels. This task is included in their job descriptions, and they are aware of how the data are used. Information about the gender balance of these transmission roles and functions is not available. Although standardized SOPs are in place, challenges exist, including heavy reliance on manual processes, limited capacity, and persistent difficulties in data management. Donors and partners have supported validation checks and embedded them within Excel tools to improve accuracy, but issues such as timeliness, double counting, and non-standardized reporting remain.

Data use

Extracted and transmitted data are ultimately used across all levels of Nigeria's health system to inform planning, financing, and service delivery. At the PHC level, data guide day-to-day decisions, such as staff scheduling, drug procurement, and minor equipment purchases, leveraging direct facility financing structures such as the BHCPF. At the state level, HR data support workforce management decisions, redistribution of health workers, and advocacy for recruitment. Drug data are used by state-level Drug Management Agencies to allocate stock, while equipment and infrastructure data inform SPHCDA-led renovations and investments. Nationally, aggregated data feed into the DHIS2, where they inform broader health-sector strategies and resource allocation. However, gaps persist in quality, completeness, and timeliness, particularly where manual reporting dominates.

For example, outdated records at the Drug Management Agencies have led to inefficiencies, including expired drugs, while incomplete facility reporting has hampered service coverage assessments. Despite these challenges, there is growing recognition of the importance of data for performance-based financing under the BHCPF, which incentivizes PHCs to maintain reliable reporting. The gender balance of data users is unknown.

Ultimately, while the system demonstrates structured processes for extraction, transmission, and use, it is critical to strengthen infrastructure, build capacity at lower levels, and standardize reporting to ensure data effectively drive health system improvements.

Enabling environment

Leadership and governance

Nigeria's health sector is supported by multiple mechanisms operating at both national and subnational levels. At the national level, governance structures are aligned to health domains such as HRH, financing, and disease programs, with groups like the M&E TWG meeting regularly to review dataflows. Additional bodies, such as the Health Data Consultative Committee and the Health Data Coordination Group, provide oversight of national health data. While these structures exist, coordination varies across health domains, influencing how policies are updated and how often they are revised. Data management, once centralized, has shifted toward being streamlined within specific health pillars.

At subnational levels (e.g., state, local government area, ward, community), various departments, agencies, and TWGs provide relevant coordination, with the National Primary Health Care Development Agency (NPHCDA) playing a central role in overseeing PHC nationally. The NPHCDA coordinates all PHC facilities through the SPHCDA; ultimately, all PHC facilities are answerable to the state MOH. While these structures strengthen coordination, particularly at the state level, further investigation is needed into how TWGs operate to ensure mandates are consistently achieved.

Recently, Nigeria developed a policy on AI use, signaling efforts to align governance with emerging digital health technologies.

Information on the gender balance of TWGs, consultative committees, and national and subnational government entities engaged in data governance is not readily available, and it may be useful to explore this issue in greater depth.

Strategy and investment

Nigeria previously had a national digital health strategy (2015-2020), but it has since expired, and while a draft of a new strategy exists, it is not yet public. Efforts to develop the new strategy encountered delays, though a national digital health team has been established to coordinate and streamline key areas of focus. The new draft strategy is aligned with PHC and UHC, reflecting national priorities. In terms of financing, some nuances of gender-responsive budgeting are considered in the development of PHC budgets and digital health plans, particularly in relation to gender-sensitive programs. However, this area requires further investigation to determine the extent and consistency of its application.

Legislation, policy, and compliance

Nigeria has a legal and policy framework that addresses data protection and privacy in health, including the Data Protection Act, which regulates how patient data are collected, processed, stored, transmitted, and used. This law also covers individual privacy rights, including ownership of, consent for, access to, and sharing of identifiable digital health data, with deliberate efforts at the central level to ensure implementation, particularly in government and donor-supported initiatives. At the subnational level, policies and tools developed by the NPHCDA are meant to guide data use and decision-making, with states expected to adapt and implement them. However, while some states are more advanced than others, the proliferation of multiple tools and guidelines has created challenges for consistent and efficient use.

Workforce

Health workers in Nigeria receive training on data collection, recording, and reporting at both the pre-service stage before graduation and again through in-service training. However, challenges, such as double entries, are common in the processes of synthesizing and extracting data. SOPs exist, particularly through initiatives such as the BHCPF, which focuses on PHC facilities. It is unclear whether refresher training is regularly conducted, as they are often dependent on donor presence and the strength of governance structures at the state, ward, or PHC level. Workforce capacity for data extraction and transmission varies widely: some PHCs can afford a skilled data officer, while others rely on the OIC to manage data. Disparities also exist across gender, age, and geographic location, with rural facilities generally facing greater challenges. While national health policies are designed to support gender inclusion and gender-sensitive programs, there is no documentation available on the gender balance of the PHC workforce.

The Community-based health Research, Innovative training and Services Programme (CRISP), a joint effort of the NPHCDA and universities, provides training to strengthen quality PHC service delivery. In recognition of capacity gaps at the PHC level, the NPHCDA established the CRISP–PHC Human Resources for Health Optimization Collaboration to deploy public health hospital residents to selected PHC facilities to provide on-the-job training and mentorship for facility- and community-level health workers.

Standards and interoperability

Nigeria established a national digital health architectural framework, with the previous version built on the OpenHIE model and the draft of the more recent version structured along similar lines. Additionally, the Standards Organisation of Nigeria has launched over 30 national digital health and health information standards, covering areas such as data exchange, transmission, messaging, security, privacy, and hardware, which provide a foundation for interoperability and secure health information management across the system. The country is working to harmonize these standards into a unified architecture and existing systems may require adaptations to comply.

Infrastructure

Nigeria continues to face infrastructure challenges, particularly in terms of hardware availability. Disparities are more pronounced between rural and urban areas, with many rural facilities lacking reliable power and further constrained by security challenges. According to the Network Readiness Index, Nigeria scores 34.87, which falls below the average for lower-middle-income countries (approximately 40.00), reflecting broader limitations in digital infrastructure.[10] Plans for expanding digital health infrastructure exist across different administrative levels and within disease-specific programs, often supported by donors, but a key challenge lies in centralizing these efforts and ensuring sustainability post–donor support. Maintenance of infrastructure is embedded in the government, but the processes for ensuring repairs are limited.

Services and applications

The nationally scaled digital health systems that support public-sector priorities across key health pillars include the National Health Management Information System (DHIS2 based), the Nigeria Health Workforce Registry (NHWR), the Health Facility Registry (HFR), and the National Data Repository (NDR). These systems facilitate public health reporting and decision-making, with the NDR providing real-time facility-level data from donor-supported EMRs. However, outside donor-funded programs, the vast majority of facilities still rely on paper-based data capture. The NHWR has not been updated recently, while the HFR provides registry data on facilities, and the NPHCDA dashboard supports geotagged data visualization for PHC. For patient identification, a Patient Information Management System was developed under the US President's Emergency Plan For AIDS Relief to improve interoperability and care quality, complemented by national digital birth and death registries, which are managed by the Population Council and linked to the Nigeria Identification Number system. Despite these advancements, patient feedback systems remain weak, with no widely accessible or secure mechanism in place.

Enablers and barriers

The main **enablers** and **barriers** to PHC data reporting in Nigeria are as follows:

ENABLERS

- Use of central databases—National Health Management Information System / DHIS2, NHWR, HFR, and NDR—nationwide at scale.
- Existence of facility-level EMRs in some states (funded by donors like the US Agency for International Development, President's Emergency Plan For AIDS Relief, and Centers for Disease Control and Prevention), supporting retrospective data entry and point of service.
- National Data Protection Act, which regulates privacy, consent, and use of health data.
- Support from entities like the National Health Data Consultative Committee and Health Data Coordination Group, which provide oversight for health data, and the NPHCDA and SPHCDAs, which provide coordination, plus the M&E TWG.
- A structured reporting pathway (facility → LGHA → state → DHIS2).
- Donor-supported validation checks, embedded Excel tools, and EMRs (especially for HIV programs).
- Workforce training in data collection and reporting (pre-service and in-service).
- Existence of a national digital health architecture (OpenHIE model), as well as more than 30 national digital health standards on data exchange, security, and interoperability.
- BHCPF incentives for financing the Basic Minimum Package of Health Services, primarily for PHC facilities.
- Linkage of the Patient Information Management System with EMRs and the NDR and of the digital birth/death registries with the National Identification Number system.
- Policy recognition of gender-sensitive programs.

BARRIERS

- Heavy reliance on paper-based data capture in PHCs.
- Proliferation of electronic tools and guidelines (e.g., those supported by donors or those developed for specific diseases) which are not integrated with routine reporting.
- Limited coordination within and across health domains and subnational levels.
- Manual reporting processes at the PHC level, with resulting timeliness and duplication issues.
- Sustainability concerns once donor support is withdrawn.
- Capacity gaps for data reporting in rural PHCs, such as limited HRH, with particular scarcity of data officers who could support the OICs, resulting in frequently overburdened OICs.
- Expired national digital health strategy, with the new framework delayed.
- Irregular, often donor-dependent refresher training.
- Outdated registries (e.g., NHWR).
- Weak patient feedback mechanisms to improve care at the facility level.
- Despite availability of sex-disaggregated HRH data, lack of regular review or use of those data to address underlying barriers that individuals may face in occupying various roles in the PHC system.
- Lack of sex-disaggregated data about TWG membership to track and support gender-balanced perspectives.

CROSS COUNTRY

Data value chain

Common PHC operational dataflows and practices were observed across the four countries. PHC operational data are collected and extracted by CHWs and facility staff, generally aggregated at the facility level to complete standardized MOH reports, and these reports are submitted to the district level.

A patchwork of reporting tools and forms are used across the different types of PHC operational data (finances, service delivery, supplies, etc.). Although reporting forms are generally standardized, there are many, and they sometimes capture overlapping information. For example, basic patient or facility information must be entered multiple times across different tools. Fragmentation is exacerbated by tools for siloed disease areas or by implementing partners or donors who introduce new tools.

While some high-volume urban facilities with stable power and connectivity use digital tools, the majority of facilities—especially in rural and low-volume settings—still rely on paper-based registers and monthly paper report submissions, sometimes complemented by hybrid paper-digital systems. Clinical staff or nurses often handle data entry and reporting in rural or low-volume facilities, whereas dedicated HRIOs or data clerks are more common in urban and high-volume sites. District staff are generally responsible for validating facility-level data and then entering the data into the central reporting system (DHIS2).

Service delivery data are reported monthly. Other types of PHC operational data, such as data related to HR, equipment, and facilities/infrastructure, are reported less frequently.

There is an increasing push to digitize data reporting at the community level, with use of eSanteCom in Burkina Faso and eCHIS in Ethiopia and Kenya. However, in most cases these digital systems are still being used in parallel to required paper-based reporting.

Across all four countries, data quality gaps persist, largely due to continued reliance on manual reporting processes at both the community and facility levels.

Common enablers and barriers

Based on the synthesis of findings across Burkina Faso, Ethiopia, Kenya, and Nigeria, a set of common enablers and barriers to PHC operational data reporting emerges. Table 7 organizes these enablers and barriers into categories: tools, infrastructure, processes, people, and governance and policy.

Table 7. Common enablers and barriers across Burkina Faso, Ethiopia, Kenya, and Nigeria.

CATEGORY	ENABLERS	BARRIERS
Tools Includes the design, usability, and function of digital and non-digital tools used to extract and transmit PHC operational data.	• National HIS is based on DHIS2 and provides a common platform for reporting • Routine sex disaggregation of data, particularly for service delivery • Use of digital tools that can improve ease, timeliness, and security of data reporting and offer real-time decision support	• Fragmented and sometimes overlapping reporting tools, causing duplication, inconsistencies, and confusion

CATEGORY	ENABLERS	BARRIERS
Infrastructure Includes physical infrastructure (e.g., electricity, internet connectivity, solar power), facility infrastructure (adequate space, quality of space), and essential supplies and equipment (digital tools, hardware, paper forms).	• Progress on national blueprints/ standards for interoperability	• Weak/unstable internet and electricity, particularly in rural areas • Limited availability of devices (computers, tablets) • Lack of maintenance for devices • Inadequate space for data work • Limited, poor-quality storage areas for paper-based forms • Shortages of paper-based tools • Inadequate transport for submitting paper reporting forms
Processes Includes workflow practices, SOPs, supervision processes, and data quality and validation checks related to PHC data extraction and transmission.	• Structured reporting pathways from subnational to national levels • Processes in place for data validation and supportive supervision	• Time-consuming manual processes for data extraction, which can lead to delayed reporting • Manual processes that can result in errors • Inconsistent SOPs for data extraction and transmission; limited awareness of SOPs • Weakly implemented feedback and data validation mechanisms
People Includes the responsibilities, bandwidth, competing priorities, motivation, training, and capacity of health system actors involved in PHC operational data extraction, transmission, and use.	• Dedicated data staff (HRIOs, data clerks) who support processes in higher-volume facilities • Training to support workforce capacity-strengthening	• Health care workers who are overburdened with clinical and reporting tasks; competing priorities (outbreaks, campaigns), which can delay reporting • Lack of data support staff in lower-volume, rural facilities • Training that is inconsistent, donor dependent, or not reaching lower-level facilities • Concentration of women in lower level/frontline roles, meaning they often have unequal access to training and more data responsibilities • Limited use of data at community and facility levels; low perceived value of data

CATEGORY	ENABLERS	BARRIERS
Governance & policy Includes national and/or subnational regulatory requirements, accountability structures, budget allocation procedures, and coordination mechanisms governing PHC operational data.	• Involvement of technical committees that strengthen coordination in support of PHC systems and processes • Robust national policies related to PHC and HISs • Recognition of gender in policies	• Gaps in the implementation and enforcement of policies, especially at subnational levels • Acknowledged gender mainstreaming that is nevertheless weakly implemented • Lack of formal standards for data privacy and confidentiality • Limited coordination mechanisms across vertical disease programs • Limited multisectoral collaboration between ministries (health, finance, ICT) and local governments

Abbreviations: DHIS2, District Health Information System 2; HIS, health information system; HRIO, health records and information officer; ICT, information and communication technology; PHC, primary health care; SOP, standard operating procedure.

Innovations

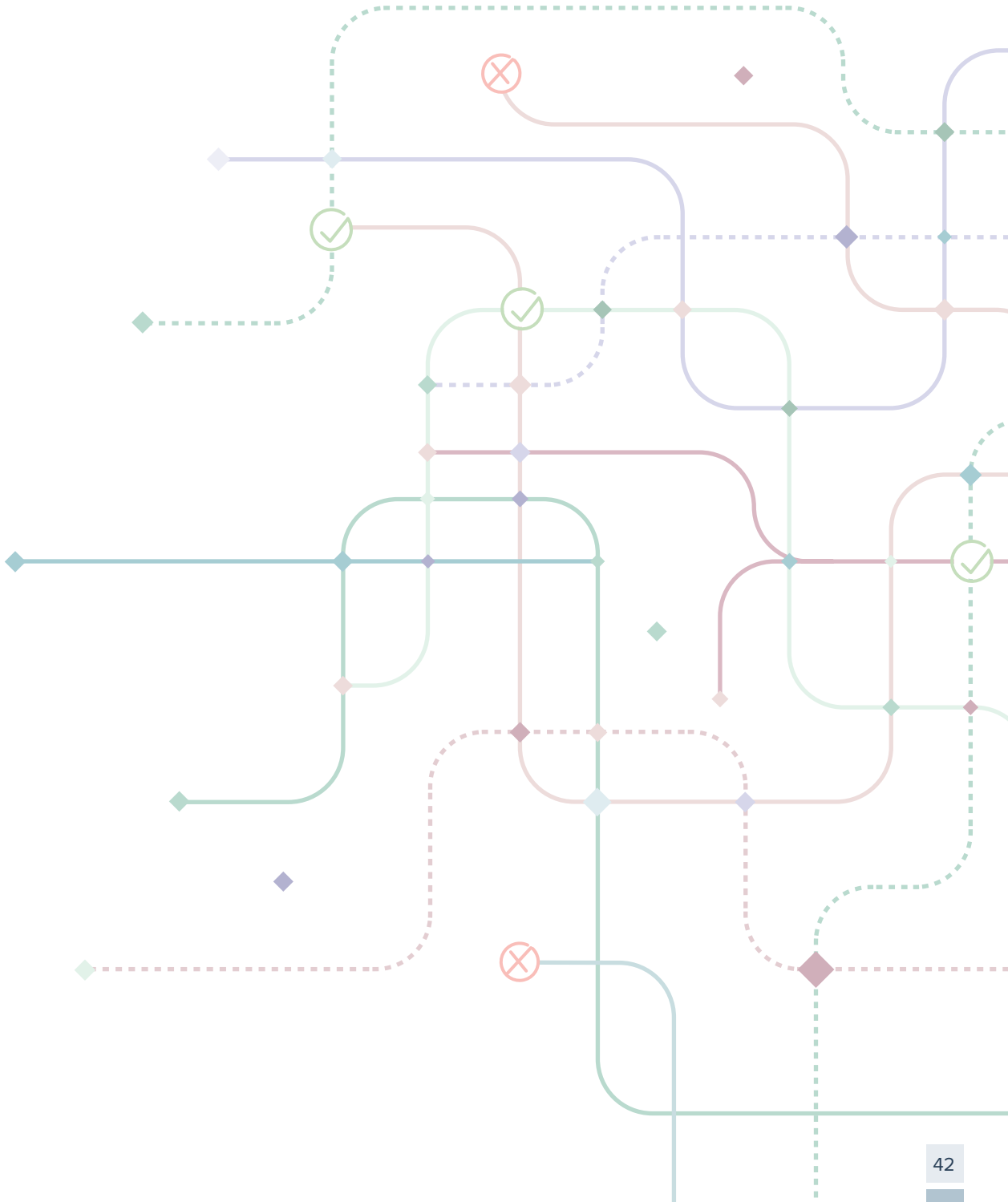
To address persistent challenges in the data value chain, health system actors have begun developing and introducing innovations and process improvements that strengthen reporting practices and reduce bottlenecks. Examples of innovations at the community and facility levels include:

- **Clear role definition and accountability:** In two facilities visited in Burkina Faso, the ICP has outlined formal roles and responsibilities for all staff in managing data (based on national guidance) and publicly displayed this information on the facility's information board. These boards often include demographic data of the catchment area, which helps in cross-checking extracted information.
- **Simplified community reporting templates:** In Burkina Faso, two districts supported by Living Goods have created simplified templates for ASBCs who struggle with monthly reports, thus reducing errors and delays.
- **Alternative transport solutions:** A district-level key informant in Burkina Faso shared that when transportation is limited, some facilities in their district use local transport companies to send paper reports to the district office.
- **WhatsApp groups:** In Kenya, WhatsApp groups provide a platform for sharing non-routine data (e.g., from health campaigns) in real time. Program leads at the subcounty level manage a WhatsApp group for facility health workers.
- **TWGs:** In Kenya, PHC guidelines specify that TWGs operate at all health system levels, with county TWGs established that meet monthly to address challenges and manage issues as they arise.

Gender considerations

Gender considerations in data extraction, transmission, and use across Burkina Faso, Ethiopia, Kenya, and Nigeria point to disparities between women and men in the ways that they are engaged in various data functions. This partly results from gender imbalances across health-sector positions since some positions are more likely to involve data extraction and management than others. This also can vary across data types. The extent to which sex-disaggregated data are maintained at different levels of the data chain and the degree of gender responsiveness reflected in national PHC strategies and budgeting, including the costing of national digital health strategies, differed somewhat across countries. General training levels were described as similar for women and men holding positions in data transmission, since this process often happens beyond the PHC facility level and usually requires specific data skills and experience to qualify for those positions.

The country reviews highlighted several knowledge gaps in which information was not identified in our desk review. These include the extent of gender disparities in access to data extraction tools and specialized trainings, the gender balance in roles involving data transmission and use in particular, and the gender composition of national and subnational health data TWGs, committees, and government entities.



CONCLUSION

This landscape report has systematically documented practices, including enablers and barriers, in operational PHC data and reporting systems across tools, infrastructure, people, processes, and governance/policy. While many of these challenges are already recognized, the report adds value by mapping them consistently to the data value chain, creating a structured overview that may be applicable to other settings with similar contexts. Although the focus is on strengthening frontline data value chain processes at community and facility levels, the findings also underscore the critical role of the broader enabling environment in supporting or hindering these processes.

Limitations of this work include the small sample size for primary data collection and the focus on four countries, which may limit generalizability to other settings. In addition, the desk review relied on available documentation, which may not fully capture informal practices or innovations at subnational levels.

Each subsequent deliverable in this suite of documents builds on this foundation: the forthcoming innovation brief will highlight promising approaches to address the challenges identified, depicted in the map and match visualization which will take the challenges identified in this report and map them to the innovations, while the follow-on summary report will bring these insights together and provide recommendations. Together, this suite of documents aims to inform actionable strategies for improving operational PHC data systems and processes.

APPENDIX A
List of rapid literature review documents

DOCUMENT REFERENCE	COUNTRY
Ministry of Health. *Nigeria Health Information System Policy. Ministry of Health*, Republic of Nigeria; 2014.	Nigeria
National Primary Health Care Development Agency. *Community-Based health Research,Innovative-training and Services Programmes (CRISP)*. Republic of Nigeria; 2023.	Nigeria
National Primary Health Care Development Agency. *Standards and Regulatory Framework*. Republic of Nigeria; 2023.	Nigeria
National Primary Health Care Development Agency. *Strategy for PHC Revitalization in Nigeria: A Collaborative Approach by Government, Donors and Development Partners (2023-2030)*. Republic of Nigeria; 2023.	Nigeria
National Primary Health Care Development Agency. *Scorecard Six Report on Implementation Status of Primary Healthcare Under Once Roof (PHCUOR)*. Republic of Nigeria; 2022.	Nigeria
National Primary Health Care Development Agency. *The Revised Ward Health System Strategy: A Harmonised Framework*. Republic of Nigeria; 2023.	Nigeria
National Primary Health Care Development Agency. *Facility and Financial Management Toolkit For Primary Healthcare Centres*. Republic of Nigeria; 2023.	Nigeria
Ministry of Health. *The Joint Annual Report*. Ministry of Health, Republic of Nigeria; 2024.	Nigeria
Ministry of Health. *National Health Act.* Ministry of Health, Republic of Nigeria; 2014.	Nigeria
National Primary Health Care Development Agency. National Health Insurance Scheme. National Emergency Medical Treatment Committee. *Basic Health Care Provision Fund*. Republic of Nigeria; 2020.	Nigeria
Ministry of Health. *State of Health of The Nation.* Ministry of Health, Republic of Nigeria; 2024.	Nigeria
Ministry of Health. *Handbook of The National Health Workforce Registry.* Ministry of Health, Republic of Nigeria; 2020.	Nigeria
Ministry of Health. *National Health Management Information Systems (NHMIS)*. Ministry of Health, Republic of Nigeria: 2021.	Nigeria
Salam D, Kolawole I, Ohaeri B, et al. **Electronic health record: an underutilized tool in Nigeria's healthcare system.** *Continental Journal of Applied Sciences.* 2023. https://doi.org/10.5281/zenodo.8352513	Nigeria

DOCUMENT REFERENCE	COUNTRY
Biru A, Birhan D, Melaku G, et al. **Pathways to improve health information systems in Ethiopia: current maturity status and implications. *Health Research Policy and Systems.*** 2022. https://doi.org/10.1186/s12961-022-00860-z	Ethiopia
Ministry of Health. *iHRIS Implementation Progress*. Ministry of Health, Republic of Ethiopia; 2021. https://www.researchgate.net/publication/359055549_iHRIS_Implementation_Progress	Ethiopia
Bayafers M, Asrade G, Minyihun A, et al. **Process evaluation of the district health information system version two (DHIS2) in East Belesa district, central Gondar one, Northwest Ethiopia. *International Journal of Scientific and Engineering Research. 2021.*** https://www.researchgate.net/publication/379958072_Process_Evaluation_of_the_District_Health_Information_System_Version_Two_DHIS2_in_East_Belesa_District_Central_Gondar_Zone_Northwest_Ethiopia	Ethiopia
Ministry of Health. *Request of Expression of Interest: Development and Implementation of an Inclusive National Digital Health Payment Solutions*. Ministry of Health, Republic of Ethiopia; 2024.	Ethiopia
Mengistu T, Endalamaw A, Zewdie A, et al. **Strengthening primary health care in Ethiopia: a scoping review of successes, challenges, and pathways towards universal health coverage using the WHO monitoring framework.** PLOS Global Public Health. 2025. https://doi.org/10.1371/journal.pgph.0004470	Ethiopia
Ministry of Health. *National Primary Health Care Strategic Framework:2022/2023-2029/2030.* Ministry of Health, Republic of Ethiopia; 2022.	Ethiopia
Ethiopian Pharmaceutical Supply Agency. *Pharmaceuticals Supply Transformation Plan II (PSTPII) 2020/21-2029/30).* Republic of Ethiopia; 2020.	Ethiopia
Pharmaceuticals Funds and Supply Agency. *Standard Operating Procedures (SOP) Manual for the Integrated Pharmaceuticals Logistics System in Health Facilities of Ethiopia*. Republic of Ethiopia; 2017.	Ethiopia
Ministry of Health. *National Health Data Access and Sharing Guideline.* Ministry of Health, Republic of Ethiopia; 2021.	Ethiopia
Ministry of Health. *Health Information System Governance Framework.* Ministry of Health, Republic of Ethiopia; 2021.	Ethiopia
Ethiopia Data Use Partnership (DUP). *Year IV Annual Report*. Republic of Ethiopia; 2021.	Ethiopia
Ethiopia Data Use Partnership (DUP). *End of Project Report.* Republic of Ethiopia; 2023.	Ethiopia
Ministry of Health. *Five Year Progress Report.* Ministry of Health, Republic of Ethiopia; 2021.	Ethiopia
Ethiopia Data Use Partnership (DUP). *Doris Duke Charitable Foundation Supported Activity Summary Report.* Republic of Ethiopia; 2024.	Ethiopia
Ministry of Health, JSI, Data Use Partnership (DUP). *Building Learning Health System Through Implementation Research*. Ministry of Health, Republic of Ethiopia; n.d.	Ethiopia

DOCUMENT REFERENCE	COUNTRY
Ministry of Health, Regional Health Bureaus, Capacity Building and Mentorship Program (CBMP). *Performance of Routine Information Management System in Capacity Building and Mentorship Program (CBMP) Woredas in Ethiopia.* Ministry of Health, Republic of Ethiopia; 2019.	Ethiopia
Ministry of Health, JSI. *Data Use Partnership Brochure.* Ministry of Health, Republic of Ethiopia; "n.d."	Ethiopia
Ministry of Health. *Information Revolution Implementation Guideline 2021-2025.* Ministry of Health, Republic of Ethiopia; n.d.	Ethiopia
Pharmaceutical and Medical Equipment Directorate. *Medical Equipment Information System (MEMIS).* Republic of Ethiopia; 2020.	Ethiopia
Ministry of Health. *Approaches to Implementing and Financing Primary Health Care in Kenya: The case of Kisumu, Nakuru, Vihiga, Makueni, Garissa, Mombasa, and Nyeri Counties*. Ministry of Health, Republic of Kenya; 2022.	Kenya
Ministry of Health. Division of Community Health Services. *Kenya Community Health Strategy 2020-2025*. Ministry of Health, Republic of Kenya; 2022.	Kenya
National Tuberculosis, Leprosy and Lung Disease Program. *Data Quality Assessment Report.* Republic of Kenya; 2023.	Kenya
Ministry of Health. *Kenya Health Facility Census Report.* Ministry of Health, Republic of Kenya; 2023.	Kenya
Ministry of Health, United States Agency for International Development (USAID), President's Emergency Plan for AIDS Relief (PEPFAR), GPSD, University of Nairobi, HealthIT. *Kenya Health Information Systems Interoperability Framework.* Ministry of Health, Republic of Kenya; 2018.	Kenya
Oware P, Omondi G, Adipo C, et al. **Quality and utilisation of DHIS2 data for health decision making and advocacy in Kenya: a qualitative study.** *medRxiv.* 2025. https://doi.org/10.1101/2025.03.25.25324643	Kenya
Alliance for Health Policy and System, World Health Organization (WHO). *Primary Health Case Systems (PRIMASYS): Case study from Kenya.* Republic of Kenya; 2017.	Kenya
Karimi J, Hussien S, Waniga E, et al. **Approaches to implementing and financing primary health care in Kenya: a case of seven counties. *Frontiers in Health Services.*** 2025. https://doi.org/10.3389/frhs.2025.1298379	Kenya
Ministry of Health, Bill and Melinda Gates Foundation (BMGF), the Global Fund (GF), Civil Society (CS). *National Health Information System and Strategic Plan Evaluation 2010-2020*. Ministry of Health, Republic of Burkina Faso; 2020.	Burkina Faso
Direction Des Systeme D'information. *Evaluation Nationale de l'Environnement Numerique du Systeme Sanitaire du Burkina Faso.* Republic of Burkina Faso; 2024.	Burkina Faso
Clinton Health Initiative. *Deploying the Health Facility Financial Management Tool (E-flux) as part of the Digital Minimal Ecosystem*. Republic of Burkina Faso; 2024.	Burkina Faso

DOCUMENT REFERENCE	COUNTRY
Recherche pour la Santé et le Développement. *Rapport de la Premiere Enquete D'Evaluation de L'EDM.* Republic of Burkina Faso; 2024.	Burkina Faso
Smith C. *Gratuité Landscape Assessment.* Republic of Burkina Faso; 2023.	Burkina Faso
Recherche pour la Santé et le Développement. *Evaluation de L'Ecosysteme Digital Minimal (EDM) : Resultats de la Troisieme Enquete.* Republic du Burkina Faso; 2025.	Burkina Faso
Recherche pour la Santé et le Développement. *Evaluation de L'Ecosysteme Digital Minimal (EDM) : Resultats de la Seconde Enquete*. Republic du Burkina Faso; 2024.	Burkina Faso
Ebubechi N, Boniface M, Aloycia M, et al. *Enhancing data management for strategic health purchasing: lessons from Kenya & Burkina Faso*. Republic of Burkina Faso; n.d. https://sparc.africa/download/enhancing-data-management-for-strategic-health-lessons-from-kenya-and-burkina-faso-english/	Burkina Faso
Sylla B, Ouedraogo B, Traore S, et al. **Current status of digital health interventions in the health system in Burkina Faso. *BMC Medical Informatics and Decision Making.*** 2024. https://doi.org/10.1186/s12911-024-02574-4	Burkina Faso
Strategic Purchasing for Primary Health Care. *Burkina Faso: Strategic purchasing strategies and emerging results*. Republic of Burkina Faso; 2024.	Burkina Faso
Direction Génerale des Etudes et des Statistiques Sectorielles. *Annuaire Statistique 2023*. Republic Burkina Faso; 2023.	Burkina Faso
Mohamed K, Kouassi C, Sawadogo I, et al. **La plateforme electronique "One Health" du Burkina Faso**. Poster presented at: MEASURE Evaluation conference; 2020. https://www.researchgate.net/publication/341359095_La_plateforme_electronique_One_Health_du_Burkina_Faso	Burkina Faso
Ministry of Health, United States Agency for International Development (USAID), Measure Evaluation. *Evaluation de la performance du systeme d'information sanitaire de routine (PRISM) au Burkina Faso*. Ministry of Health. Republic of Burkina Faso; 2020.	Burkina Faso
Ministry of Health. *Plan Strategique du Systeme National D'Information Sanitaire 2022-2025*. Ministry of Health, Republic of Burkina Faso; 2022.	Burkina Faso
Direction Statistiques Sectorielles. *Guide de Controle de la Qualite Des Donnees Sanitaire de Routine.* Republic of Burkina Faso; 2017.	Burkina Faso
Direction Statistiques Sectorielles. *Guide pour l'Archivage de l'Information Sanitaire.* Republic of Burkina Faso; 2016.	Burkina Faso
Direction Generale des Etudes et des Statistiques Sectorielles. *Manuel de Procedures de Gestion de L'Information Sanitaire (MPGIS)*. Republic of Burkina Faso; 2023.	Burkina Faso
Ratcliffe H, Schwarz D, Hirschhorn L, et al. **PHC progression model: a novel mixed-methods tool for measuring primary health care system capacity**. ***BMJ Global Health***; 2019. https://doi.org/10.1136/bmjgh-2019-001822	Burkina Faso

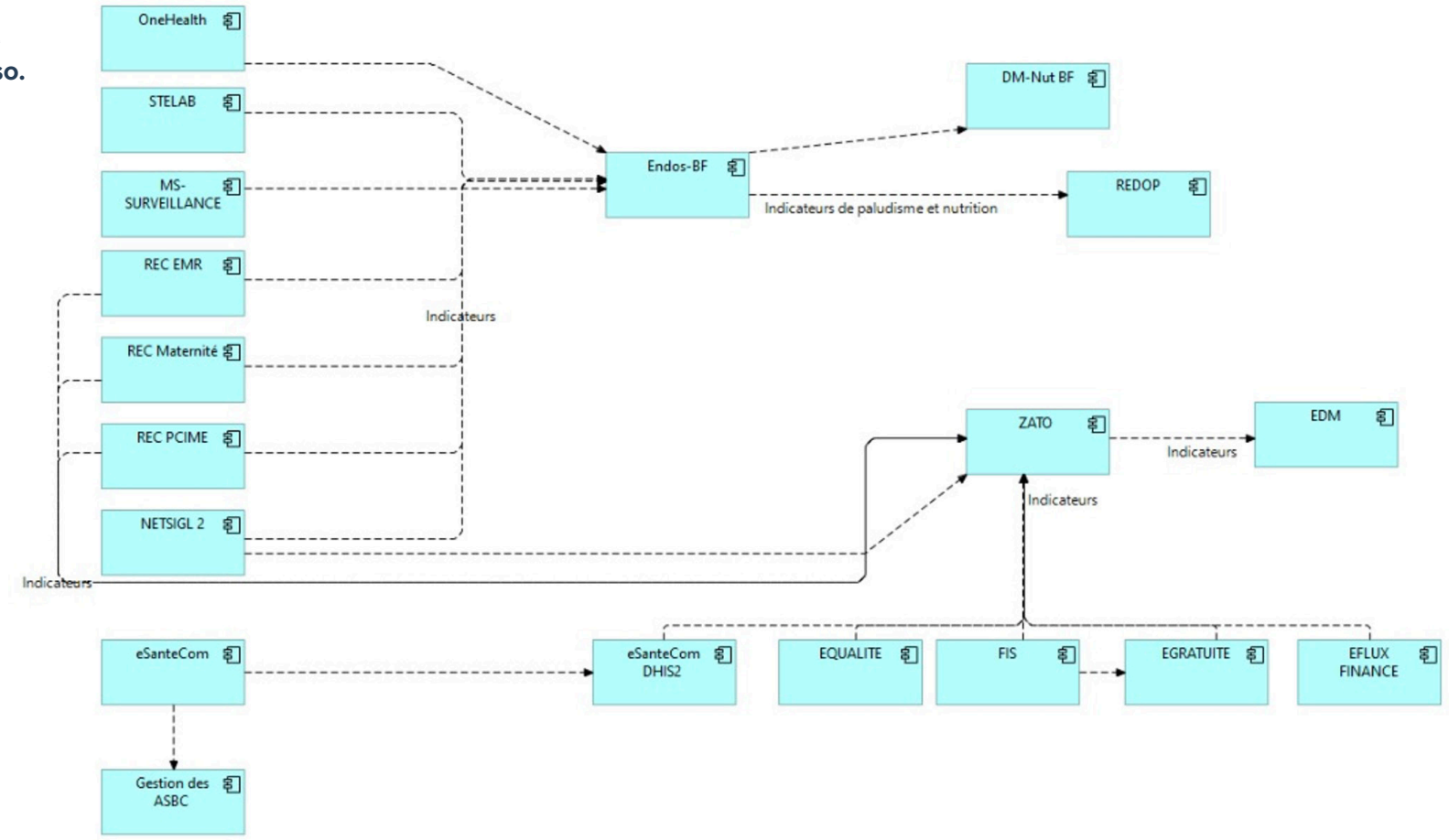
DOCUMENT REFERENCE	COUNTRY
The World Health Organization (WHO). *Operational Framework for Primary Health Care: Transforming vision into action*. WHO; 2020.	Global
PATH. *State of primary health care across six African countries*. PATH; 2023.	Global
Akhlaq A, McKinstry B, Muhammad K, et al. **Barriers and facilitators to health information exchange in low- and middle-income country settings: a systematic review**. ***Oxford Academic Health Policy and Planning***; 2016. https://doi.org/10.1093/heapol/czw056	Global
O'Neil S, Taylor S, Sivasankaran A, et al. **Data equity to advance health and health equity in low- and middle- income countries: a scoping review.** *Digital Health*; 2021. https://doi.org/10.1177/20552076211061922	Global
Mayston R, Ebhohimen K, Jacob K. **Measuring what matters - information systems for management of chronic disease in primary healthcare settings in low and middle-income countries: challenges and opportunities. *Cambridge University Press***; 2020. https://doi.org/10.1017/s204579602000030x	Global
Ghalavand H, Shirshahi S, Rahimi A, et al. **Common data quality elements for health information systems: a systematic review**. ***BMC Medical Informatics and Decision Making***; 2024. https://doi.org/10.1186/s12911-024-02644-7	Global
Carnahan E, Grack A, Kangethe B, et al. **Root causes of COVID-19 data backlogs: a mixed methods analysis in four African countries. *Oxford Open Digital Health***; 2024. https://doi.org/10.1093/oodh/oqae009	Global
Bode M, Goodrich T, Kimeu M. **COVID-19 led many healthcare systems in lower- and middle-income countries to adapt digital-healthcare platforms**. ***McKinsey & Company***; 2021. https://www.mckinsey.com/industries/healthcare/our-insights/unlocking-digital-healthcare-in-lower-and-middle-income-countries	Global

APPENDIX B
Detailed dataflows between systems

Burkina Faso

Figure B1 shows the data exchange flows between the main applications in the health care system in Burkina Faso. It identifies data sources, centralization platforms, and systems that use indicators for monitoring, management, or decision-making purposes.

Figure B1. Dataflows within the health care system in Burkina Faso.

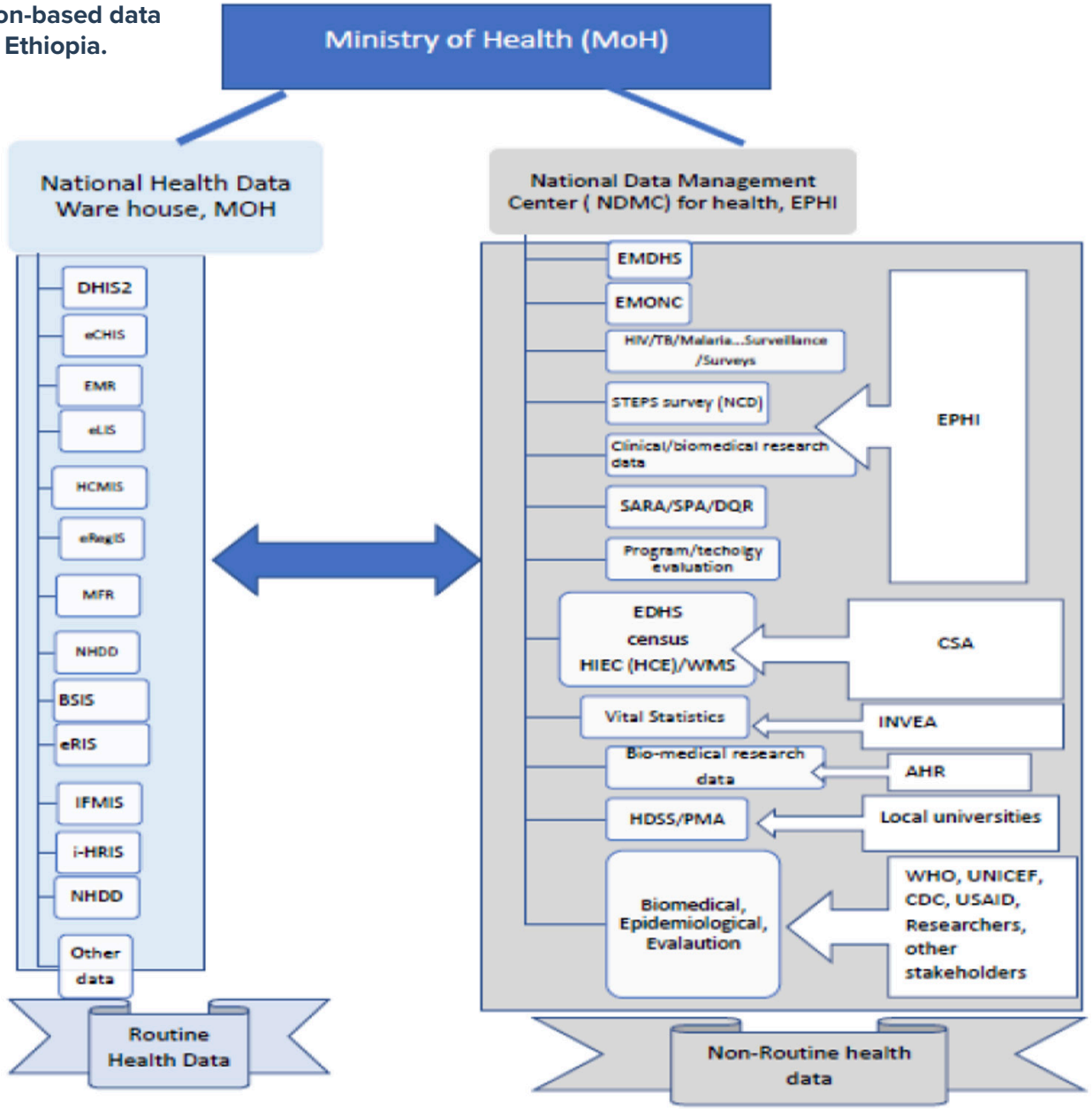


Abbreviations: ASBC, *agent de santé à base communautaire* (community-based health worker); DHIS2, District Health Information System 2; EMR, electronic medical record; EDM, Ecosystème minimum digital, ENDOS-BF, Entrepôt de Données Sanitaires du Burkina Faso (Burkina Faso Health Data Warehouse; FIS, *feuille individuelle de soins* (individual care sheet); MS, Ministère de la sante; NetSIGL2.0, Système d'Information de Gestion Logistique en ligne (online Logistics Management Information System); PCIME, Prise en Charge Intégrée des Maladies de l'Enfant (Integrated Management of Childhood Illness); REC, *registre électronique de consultation* (electronic consultation register); ReDoP, Répertoire des Données du Paludisme (Malaria Data Directory).

Ethiopia

Figure B2 shows the dataflows of routine and population-based data between various systems in Ethiopia.

Figure B2. Schematic flow of routine and population-based data between various sources, platforms, or systems in Ethiopia.



Abbreviations: AHR(I), Armauer Hansen Research Institute; BSIS, Blood Safety Information System; CDC, Centers for Disease Control and Prevention; CSA, Central Statistics Agency; DHIS2, District Health Information System 2; DQR, data quality review; EA, enterprise architecture; eCHIS, electronic Community Health Information System; EDHS, Ethiopia Demographic and Health Survey; eLIS, electronic laboratory information system; EMDHS, Ethiopian Mini-Demographic and Health Survey; EmONC, emergency obstetric and newborn care; EMR, electronic medical record; EPHI, Ethiopian Public Health Institute; eRIS, electronic regulatory information system; HCE, Household Consumption Expenditure (Survey); HCMIS, Health Commodity Management Information System; HDSS, Health and Demographic Surveillance System; HIEC, Household Income, Expenditure, and Consumption (Survey); IFMIS, integrated financial management information system; iHRIS, integrated human resources information system; INVEA, Immigration, Nationality and Vital Events Agency; MFR, Master Facility Registry; NHDD, National Health Data Dictionary; PMA, Performance Monitoring for Action; SARA, Service Availability and Readiness Assessment; SPA, Service Provision Assessment; TB, tuberculosis; USAID, US Agency for International Development; WHO, World Health Organization; WMS, Welfare Monitoring Survey.

Source: Ministry of Health (MOH). *National Health Data Access and Sharing Guideline.* MOH; 2021: 21. https://www.scribd.com/document/820155865/National-Health-Data-Access-and-Sharing-Guideline-2021#page=31

APPENDIX C
Data reporting tools for primary data collection countries

Burkina Faso

Tables C1 shows the paper-based data recording tools used at the community level in Burkina Faso, including the type of data (by health system pillar) captured in each tool. Table C2 shows the digital data recording tools used at the community level. Tables C3 and C4 show the paper-based and the digital data recording tools used at the facility level, respectively.

Table C1. Paper-based data recording tools used at the community level in Burkina Faso.

NO.	NAME OF THE TOOLS	PURPOSE (TYPE OF DATA)						
		Financial data	HR data	Supplies data	Equipment data	Facility / infrastructure data	Service delivery data	Other
1.	Consultation register						●	
2.	Integrated community case management sheet						●	
3.	Community register						●	
4.	Referral sheet						●	
5.	Monthly activity report						●	
6.	Stock register			●				
7.	Personal tools			●			●	

Table C2. Digital data recording tools used at the community level in Burkina Faso.

NO.	NAME OF THE TOOLS	PURPOSE (TYPE OF DATA)						
		Financial data	HR data	Supplies data	Equipment data	Facility / infrastructure data	Service delivery data	Other
1.	CPS form						●	
2.	LLIN form (DHIS2)						●	
3.	eSanteCom			●			●	
4.	Consultation register						●	

Abbreviations: CPS, *chimioprevention du paludisme saisonier* (seasonal malaria chemoprevention); DHIS2, District Health Information System 2; LLIN, long-lasting insecticidal net.

Table C3. Paper-based data recording tools used at the facility level in Burkina Faso.

NO.	NAME OF THE TOOLS	PURPOSE (TYPE OF DATA)						
		Financial data	HR data	Supplies data	Equipment data	Facility / infrastructure data	Service delivery data	Other
1.	Inventory sheet				●	●		
2.	Stock sheet			●				
3.	Cash booklet	●						
4.	Free report	●						
5.	Leave schedule		●					
6.	Job description sheet		●					
7.	Custodial register		●					
8.	Staff TLOH		●					
9.	Consultation register						●	
10.	Observation register						●	
11.	Vaccination register						●	
12.	PMTCT/HIV register						●	
13.	Delivery log (births)						●	
14.	CPN log (pregnancy follow-up data)						●	
15.	Postnatal consultation log						●	
16.	Family planning register						●	
17.	Infant consultation register (child growth monitoring)						●	
18.	Referral register						●	
19.	Counter-referral register						●	
20.	Post-abortion care register						●	
21.	Acute malnutrition registers						●	
22.	PECIME register						●	

Abbreviations: HR, human resources, PECIME, Programme d'Extension de la Couverture Maladie Universelle (Universal Health Coverage Extension Program); TLOH, Telegramme de Liaison des Observations de la Santé (Telegram of Liaison of Health Observations).

Table C4. Digital data recording tools used at the facility level in Burkina Faso.

NO.	NAME OF THE TOOLS	PURPOSE (TYPE OF DATA)						
		Financial data	HR data	Supplies data	Equipment data	Facility / infrastructure data	Service delivery data	Other
1.	Financial eFlow	●						
2.	FIS	●					●	
3.	NetSiGL	●		●				
4.	TLOH Excel		●		●	●		
5.	Inventory sheet (Excel)				●			
6.	GEMAO						●	
7.	REV (DHIS2)						●	

Abbreviations: DHIS2, District Health Information System 2; FIS, feuille individuelle de soins (individual care sheet); GEMAO, Gestion des Établissements de Santé et d'Activités de Soins (Management of Health Establishments and Healthcare Activities); HR, human resources, NetSIGL, Système d'Information de Gestion Logistique en ligne (online Logistics Management Information System); REC, *registre électronique de consultation* (electronic consultation register); REV, relevé des événements vitaux (vital events record); TLOH, Telegramme de Liaison des Observations de la Santé (Telegram of Liaison of Health Observations).

Ethiopia

Table C5 shows the paper-based data recording tools used at the community level in Ethiopia, including the type of data (by health system pillar) that is captured in each tool. In Ethiopia, eCHIS is the only digital data recording tool used at the community level (Table C6). Tables C7 and C8 show the paper-based and digital data recording tools used at the facility level, respectively, in Ethiopia. Burkina Faso.

Table C5. Paper-based data recording tools used at the community level in Ethiopia.

NO.	NAME OF THE TOOLS	PURPOSE (TYPE OF DATA)						
		Financial data	HR data	Supplies data	Equipment data	Facility / infrastructure data	Service delivery data	Other
1.	Family Health Card / Family Folder						●	
2.	Hygiene and Sanitation Card						●	
3.	Integrated Maternal and Child Care Card						●	
4.	Family planning						●	
5.	Integrated Communicable Disease Card						●	
6.	Comprehensive Integrated Nutrition Card						●	
7.	Nutritional Screening Register						●	
8.	Growth Monitoring Register						●	
9.	Integrated community case management						●	
10.	Community-Based Newborn Care						●	
11.	Immunization Register						●	
12.	Service tally sheets						●	
13.	Field book						●	
14.	Health post malaria register						●	
15.	TB suspect form						●	
16.	Malaria monitoring chart						●	
17.	EPI monitoring chart						●	
18.	Pregnant women register						●	

Abbreviations: EPI, Expanded Program on Immunization; HR, human resources; TB, tuberculosis.

Table C5. Paper-based data recording tools used at the community level in Ethiopia (cont.)

NO.	NAME OF THE TOOLS	PURPOSE (TYPE OF DATA)						
		Financial data	HR data	Supplies data	Equipment data	Facility / infrastructure data	Service delivery data	Other
19.	Various meetings minute books						●	
20.	Health education register						●	
21.	Bin card						●	
22.	Health post monthly report and resupply form			●				
23.	Models 19 and 22			●				
24.	Onchocerciasis register			●				
25.	Referral Format						●	
26.	Self-developed inventory forms				●		●	
27.	Financial transaction documents including Model 17, Model 64, Model 65, MAHI 11	●						
28.	Self-developed formats with order descriptions and attachment letters				●	●		
29.	Integrated Disease Surveillance and Response forms						●	
30.	Ledger books			●				
31.	Vaccine Request Format			●				
32.	Temperature monitoring forms							●

Abbreviations: EPI, Expanded Program on Immunization; HR, human resources; TB, tuberculosis.

Table C6. Digital data recording tools used at the community level in Ethiopia.

NO.	NAME OF THE TOOLS	PURPOSE (TYPE OF DATA)						
		Financial data	HR data	Supplies data	Equipment data	Facility / infrastructure data	Service delivery data	Other
23.	eCHIS						●	

Abbreviations: eCHIS, electronic Community Health Information System; HR, human resources.

Table C7. Paper-based data recording tools used at the facility level in Ethiopia.

NO.	NAME OF THE TOOLS	PURPOSE (TYPE OF DATA)						
		Financial data	HR data	Supplies data	Equipment data	Facility / infrastructure data	Service delivery data	Other
1.	EPI monitoring chart						●	
2.	Malaria trend monitoring chart						●	
3.	Key performance monitoring chart						●	
4.	Different minute books						●	
5.	Different checklists						●	
6.	Liaison referral in/out register						●	
7.	Integrated management of childhood illness register						●	
8.	Growth monitoring and under-5 nutrition screening register						●	
9.	Outpatient Therapeutic Program register (malnutrition)						●	
10.	Stabilization Center register (malnutrition)						●	
11.	Comprehensive laboratory register						●	
12.	EPI register						●	
13.	TB register						●	
14.	TB contact register						●	
15.	Delivery register						●	

Abbreviations: EPI, Expanded Program on Immunization; HR, human resources; TB, tuberculosis.

Table C7. Paper-based data recording tools used at the facility level in Ethiopia (cont.)

NO.	NAME OF THE TOOLS	PURPOSE (TYPE OF DATA)						
		Financial data	HR data	Supplies data	Equipment data	Facility / infrastructure data	Service delivery data	Other
16.	Cervical cancer screening register						●	
17.	Family planning register						●	
18.	Comprehensive abortion care service register						●	
19.	Emergency register						●	
20.	Inpatient register						●	
21.	Central register						●	
22.	EPI tally sheet						●	
23.	Antenatal Care Register						●	
24.	Delivery Register						●	
25.	Postnatal Care Register						●	
26.	Family Planning Register						●	
27.	Bin card			●			●	
28.	Stock card			●			●	
29.	Family Planning Referral Form						●	
30.	Exempted health care service register						●	
31.	Youth-friendly registers						●	
32.	Women Card Form						●	
33.	Reproductive Health Card						●	
34.	Postnatal Care Card						●	
35.	Comprehensive lab request form						●	
36.	Long-Acting Contraceptive Family Planning Register						●	

Abbreviations: EPI, Expanded Program on Immunization; HR, human resources; TB, tuberculosis.

Table C7. Paper-based data recording tools used at the facility level in Ethiopia (cont.)

NO.	NAME OF THE TOOLS	PURPOSE (TYPE OF DATA)						
		Financial data	HR data	Supplies data	Equipment data	Facility / infrastructure data	Service delivery data	Other
37.	Family planning tally sheet						●	
38.	Central Register						●	
39.	Master Patient Index Card						●	
40.	Comprehensive abortion care service register						●	
41.	Adult outpatient department register						●	
42.	Adult inpatient department register						●	
43.	Internal referral form						●	
44.	Hypertension and diabetic screening tally sheet						●	
45.	Hypertension and Diabetic Treatment Register						●	
46.	Liaison referral in/out register						●	
47.	Mental, neurological, and substance use disorder treatment register						●	
48.	Emergency Register						●	
49.	Drug-dispensing register						●	
50.	Credit Register						●	
51.	Community-based health insurance register						●	
52.	Immunization Register						●	
53.	Vaccine and other EPI supply recording and stock monitoring book						●	
54.	Vitamin A Supplementation and Deforming Register						●	
55.	Therapeutic feeding register						●	

Abbreviations: EPI, Expanded Program on Immunization; HR, human resources; TB, tuberculosis.

Table C7. Paper-based data recording tools used at the facility level in Ethiopia (cont.)

NO.	NAME OF THE TOOLS	PURPOSE (TYPE OF DATA)						
		Financial data	HR data	Supplies data	Equipment data	Facility / infrastructure data	Service delivery data	Other
56.	TB microscopy registration						●	
57.	Comprehensive lab register						●	
58.	Ledger book	●						
59.	Cash book	●						
60.	Models 19 and 22	●						
61.	Receipts (hemo)	●		●	●			
62.	Staff Time Sheet		●					
63.	Staff file folder		●					

Abbreviations: EPI, Expanded Program on Immunization; HR, human resources; TB, tuberculosis.

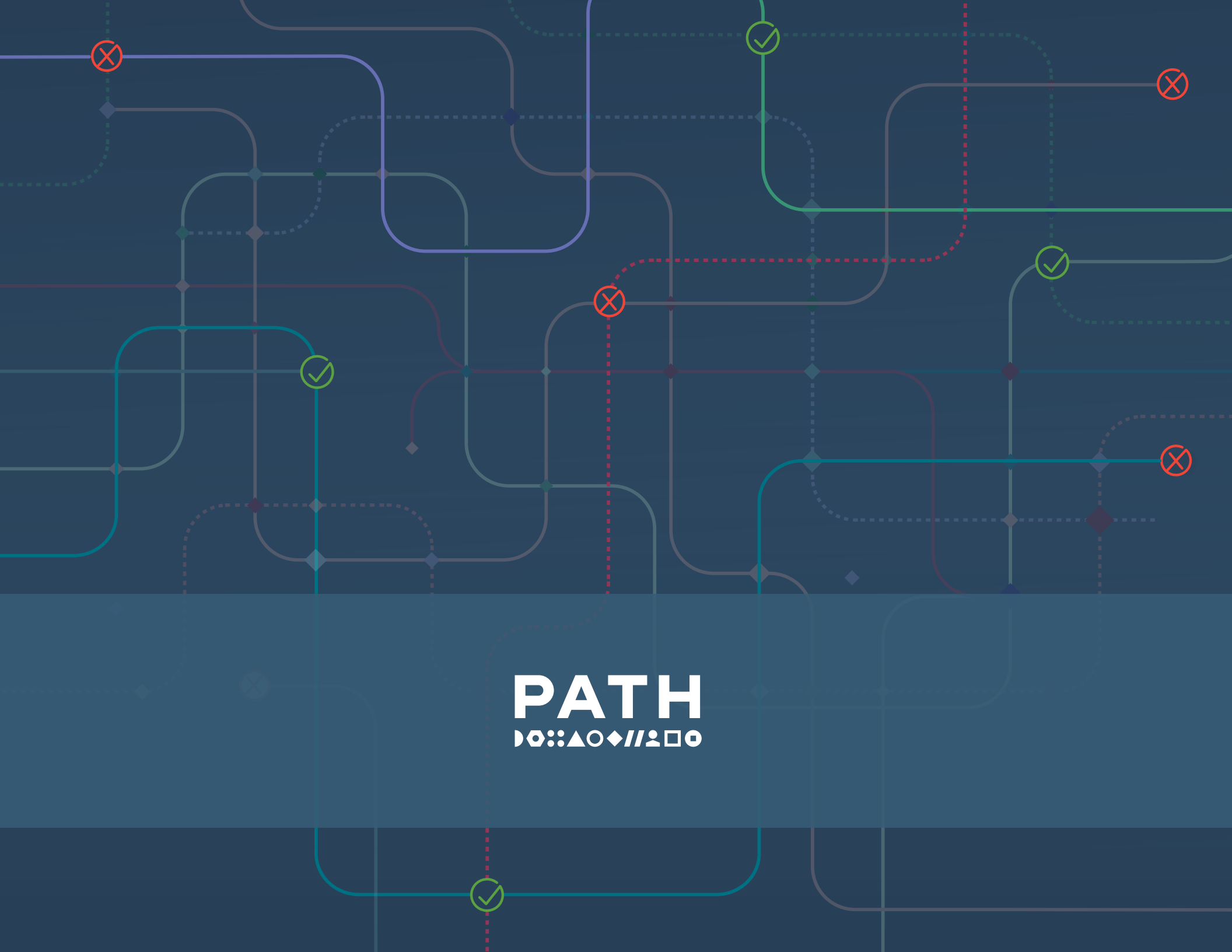
Table C8. Digital data recording tools used at the facility level in Ethiopia.

NO.	NAME OF THE TOOLS	PURPOSE (TYPE OF DATA)						
		Financial data	HR data	Supplies data	Equipment data	Facility / infrastructure data	Service delivery data	Other
1.	DHIS2						●	
2.	Medexis			●				
3.	Training profile (excel)		●					
4.	Dagu			●				

Abbreviations: DHIS2, District Health Information System 2; HR, human resources.

REFERENCES

1. World Health Organization. Primary health care. Accessed September 17, 2025. https://www.who.int/health-topics/primary-health-care#tab=tab_1
2. World Health Organization. Countries. Accessed September 20, 2025. https://www.who.int/countries
3. Directorate-General of Studies and Sectoral Statistics. Annuaire Statistique 2024. Burkina Faso Ministry of Health and Public Hygiene; 2025. https://www.sante.gov.bf/fileadmin/annuaire_2024_ms__signe___18062025.pdf
4. Ethiopian Public Health Institute (EPHI), Ethiopia Ministry of Health (MOH), and ICF. Ethiopia Service Provision Assessment 2021–22: Final Report. EPHI, MOH, and ICF; 2023. https://dhsprogram.com/publications/publication-SPA36-SPA-Final-Reports.cfm
5. Republic of Kenya Ministry of Health (MOH). Kenya Health Facility Census Report. MOH; 2023. https://www.health.go.ke/sites/default/files/2024-01/Kenya%20Health%20Facility%20Census%20Report%20September%202023.pdf
6. Sustainable Energy for All, Power Africa. Deep dive #2 – data insights. In: Powering Healthcare – Nigeria Market Assessment and Roadmap. Sustainable Energy for All, Power Africa; 2022. https://www.seforall.org/system/files/2022-06/Nigeria_data_insights_0.pdf
7. National Primary Health Care Development Agency. Nigeria PHC dashboard. Accessed September 20, 2025. https://phc.nphcda.gov.ng/infographic
8. World Health Organization. National Health Workforce Accounts Data Portal. Accessed September 20, 2025. https://apps.who.int/nhwaportal/
9. World Health Organization. The Global Health Observatory. Accessed September 20, 2025. https://www.who.int/data/gho
10. Portulans Institute. Network Readiness Index 2024. Accessed September 22, 2025. https://networkreadinessindex.org/
11. Gavi, the Vaccine Alliance, health.enabled. Ethiopia's electronic community health information system: a tool to achieve universal health coverage. Gavi; 2024. https://www.gavi.org/sites/default/files/programmes-impact/our-impact/eCHIS-Ethiopia-Case-Study-EN---final.pdf
12. Ethiopia Ministry of Health (MOH). Annual Performance Report 2013 EFY (2020/2021). MOH; 2022. http://repository.iphce.org/handle/123456789/1648
13. Biru A, Birhan D, Melkamu G, et al. Pathways to improve health information systems in Ethiopia: current maturity status and implications. Health Research Policy and Systems. 2022;20(1):78. https://doi.org/10.1186/s12961-022-00860-z
14. Salam DR, Kolawole IO, Ohaeri B, Babarimisa O. Electronic health record: an underutilized tool in Nigeria's healthcare system. Continental Journal of Applied Sciences. 2023;18(2):40–51. https://doi.org/10.5281/ZENODO.8352514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