State of primary health care across six African countries

Insights and opportunities to advance diagnostics and innovation

Gaps, trends, findings, and recommendations for PHC country engagement
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PATH’s Living Labs accelerates the pace of health innovation by co-creating with users—including individuals, health care workers, and decision-makers/influencers—to rapidly design, test, and scale solutions to their long-standing challenges. Combining HCD that prioritizes listening and empowering users with a process led by in-country experts who understand the local healthcare system and users, we are able to mobilize from rapid ideation and prototyping to iterative testing in weeks instead of months or years.

Living Labs engages users from a place of deep empathy, generating many ideas that address their challenges.

We would like to express our sincere gratitude to all individuals and organizations who have contributed to the completion of this comprehensive report on The State of Primary Healthcare across Six African Countries: Insights and Opportunities to Advance Diagnostics and Innovation.

We extend our heartfelt thanks to the stakeholders in Ghana, Kenya, Nigeria, Rwanda, Tanzania, and Zambia including:


Government agencies and Ministries of Health provided data through participating in the key informant interviews and surveys and sharing resources and relevant data to inform this research. Special mention to the Deputy Director General of the Ghana Health Services, Head of the Department of Primary Health Care in Kenya, National Primary Healthcare Development Agency in Nigeria and Permanent Secretary Technical Services of the Ministry of Health in Zambia.

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Research team and colleagues for the dedication and hard work and for tirelessly working to gather and analyze the data, conduct interviews, administer surveys and carry out desk reviews to ensure to the accuracy and depth of our findings.

This report would not have been possible without the collective efforts and collaboration of all those people plus many more that we might have failed to mention above. Thank you all for the important work of advancing primary healthcare in Africa.
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CBV</td>
<td>Community Based Volunteer</td>
</tr>
<tr>
<td>CHA</td>
<td>Community Health Assistant</td>
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<td>CHAZ</td>
<td>Churches Health Association in Zambia</td>
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<tr>
<td>CHC</td>
<td>Community Health Compound</td>
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<tr>
<td>CHN</td>
<td>Community Health Nurse</td>
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<tr>
<td>CHO</td>
<td>Community Health Officer</td>
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<tr>
<td>CHPS</td>
<td>Community-based Health Planning and Services</td>
</tr>
<tr>
<td>CHW</td>
<td>Community Health Worker</td>
</tr>
<tr>
<td>DHIS2</td>
<td>District Health Information Software</td>
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<tr>
<td>DHMT</td>
<td>District Health Management Team</td>
</tr>
<tr>
<td>DRG</td>
<td>Diagnostic related group</td>
</tr>
<tr>
<td>FFARS</td>
<td>Facility Financial Accounting and Reporting System</td>
</tr>
<tr>
<td>GhiLMIS</td>
<td>Ghana Integrated Logistics Management Information Systems</td>
</tr>
<tr>
<td>GDP</td>
<td>Global domestic product</td>
</tr>
<tr>
<td>GHS</td>
<td>Ghana Health Service</td>
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<tr>
<td>GOTHOMIS</td>
<td>Government of Tanzania Health Operation Management Information System</td>
</tr>
<tr>
<td>HCW</td>
<td>Health care worker</td>
</tr>
<tr>
<td>HIS</td>
<td>Health information system</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<tr>
<td>ICT</td>
<td>Information and communication technology</td>
</tr>
<tr>
<td>LMIC</td>
<td>Low- and middle-income countries</td>
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<tr>
<td>MHealth</td>
<td>Mobile health</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
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<tr>
<td>NHI</td>
<td>National Health Insurance</td>
</tr>
<tr>
<td>NHIMA</td>
<td>National Health Insurance Scheme</td>
</tr>
<tr>
<td>NOPs</td>
<td>Networks of practice</td>
</tr>
<tr>
<td>OPD</td>
<td>Outpatient Department</td>
</tr>
<tr>
<td>PHC</td>
<td>Primary health care</td>
</tr>
</tbody>
</table>
PPMED  Policy, Planning, Monitoring and Evaluation Department
RDT    Rapid diagnostic test
SDK    Service delivery kit
SSDM   Supplies, Stores and Drugs Management Division
TB     Tuberculosis
UHC    Universal health coverage
UNICEF United Nations Children’s Fund
WHO    World Health Organization
Executive summary

According to the WHO, primary healthcare (PHC) is “the first level of contact of individuals, the family and community with the national health system, bringing health care as close as possible to where people live and work”. PHC includes essential health services such as maternal and child health care, immunization, nutrition, family planning, prevention and treatment of common diseases and injuries, mental health care, oral health care, and environmental health.

This report presents PATH’s Living Labs synthesis of insights including gaps, trends, findings, and recommendations for primary healthcare in Ghana, Kenya, Nigeria, Rwanda, Tanzania, and Zambia conducted between January and March 2023.

The synthesis utilized a combination of desk reviewing government documentation such as regulatory frameworks, health policies and other relevant documents as well as key informant interviews and surveys with stakeholders, service providers and experts in the field to provide greater qualitative understanding of PHC innovation and delivery. This was done across eight building block including workforce, service delivery model, physical infrastructure, essential medicines and health products, community engagement, governance, digital technologies, and financing.

Unfortunately, current PHC systems are designed to treat the sick, not to keep healthy people healthy. As such, service delivery is reactive and costly. While there is growing emphasis on preventive services as opposed to curative services, numerous barriers exist in performing preventive services effectively such as personnel, maintenance of deployed devices, lack of reagents along with funding.

This report explores how we might advance diagnostics and health technologies to improve PHC across Africa. From the insight gathered the recurring themes highlighted include:

1. Challenges in human resource for health – There is poor and inadequate distribution of health workers in the facilities with an insufficient staff mix at primary level disproportionately affecting the deprived districts/counties, for existing providers, there is a continual skills gap.

2. Service delivery is fragmented into disease centric silos with little coordination – Operations are not harmonized between different service area or levels of health care. This lack of coordination leads to inefficiencies and confusion.

3. Insufficient equipment and infrastructure – Most report the lack of basic equipment to facilitate quality provision of services and furthermore they lack learning centers for continuous medical educations in facility. Access to facilities with basic PHC services is uneven and transport to and from the facility becomes a challenge.

4. Commodities and supplies stock outs – All countries report regular stockouts of medicines and commodities with uncoordinated supply chain systems and lack of forecasting tools.

5. A people centered approach to PHC with Community Healthcare Workers – Community healthcare workers play a vital role in improving health outcomes though they face numerous challenges.

6. Fragmented governance systems – There is lack of support supervision and mentorship from national government to counties/counties/states this means that they lack focal persons to spearhead PHC at the primary level.
7. Few PHC systems take advantage of data and digital technology – Despite recognizing potential to improve healthcare delivery in resource limited settings, there is inadequate ICT infrastructure, lack of coordination among partners, limited funding, and low levels of technical expertise.

8. Lack of adequate financial resources – Across all countries, lack of adequate finances is a major barrier. There are issues around lack of proper utilization of funding, reduced budgetary allocations to health, irregular payments of claims that affect primary healthcare and poor financing systems.

As much as the challenges expressed above are comprehensive in the elements of primary healthcare, in this report we only explore opportunities to advance diagnostics and innovations as that was the interest from our funding partners.

Below are the three opportunities codesigned by stakeholders during our engagement that funders and other partners can leverage on:

• Point of care diagnostic tools - Limited access to diagnostics and lab equipment at lower-level facilities requires patients to travel to higher facilities that often in town or cities. Developing and implementing point-of-care diagnostic tools that are affordable, easy to use and require minimal training can help address these challenges.

>“Sometimes your run into a brand-new equipment not in use because user training was not done properly” – Key Informant

• Establish public-private partnerships for the provision of care. Public–private partnerships can help address service gaps such as provision of diagnostic equipment and offering quality user training.

>“Because procurement process takes long, we often don’t have tools or medicines, so we tend to refer or advice clients to buy from local pharmacies” – Key Informant

• Strengthen community engagement – Digital health technologies to provide health education and promote health seeking behavior. Community health workers can be empowered to use these technologies to reach more people and extend the primary healthcare workforce.

The report underscores the urgent need for holistic and collaborative efforts to address the challenges and capitalize the opportunities in advancing diagnostics and innovation in the six countries across Africa in primary healthcare.
1. Introduction
For over 40 years, PATH has supported local communities through inclusive innovation approaches to ensure that new and updated technologies, tools, and tactics are appropriate, affordable, sustainable, and reflective of local priorities. Understanding the local context, early and often, is critical to understanding how transformative products and services can achieve sustained uptake and adoption to improve health outcomes.

According to the WHO, primary healthcare (PHC) is “the first level of contact of individuals, the family and community with the national health system, bringing health care as close as possible to where people live and work”. PHC includes essential health services such as maternal and child health care, immunization, nutrition, family planning, prevention and treatment of common diseases and injuries, mental health care, oral health care, and environmental health.

However, past approaches to primary health care by the global community have fallen short. For example, some of the factors characterizing previous approaches to PHC include fragmentation of service delivery into disease-centric silos, reactive approaches to treatment at the expense of prevention, and top-down approaches with little or no user engagement.

To close the gaps and advance health equity, we must take a holistic approach to and reimagine PHC.

"The demonstrated links of PHC to better health outcomes, improved equity, increased health security and better cost-efficiency make PHC the cornerstone of health system strengthening. Health systems built on the foundation of PHC are essential to achieve [universal health care]."1

Operational Framework for PHC, Transforming Vision to Action, WHO & UNICEF, 2020

Global Health Labs’ (GH Labs) PHC strategy is advancing health equity by innovating or inventing new technology and tools for use in PHC settings in low-middle income countries (LMIC).

PATH Living Labs partnered with GH Labs to rapidly assess barriers and enablers to advancing PHC across six countries in Africa (Ghana, Kenya, Nigeria, Rwanda, Tanzania, and Zambia) between January and March 2023. This report presents PATH Living Labs’ synthesis of the findings including gaps, trends, insights, and recommendations for PHC.
2. Methods
By leveraging longstanding relationships in each of the six countries, PATH Living Labs successfully engaged key stakeholder groups to gather insights on the status of PHC in their respective countries. The objective of this activity was to identify challenges and opportunities for advancing diagnostics and health technologies to improve PHC across Africa. The four interrelated phases of this activity included landscape, discover, refine, and define (Graphic 1).

**Graphic 1: Process to uncover gaps, trends, and findings**

PATH Living Labs engaged 70 users and stakeholders across the six countries (Ghana, Kenya, Nigeria, Rwanda, Tanzania and Zambia). Users and stakeholders included community health workers, nurses, midwives, laboratory personnel, sub-national and national Ministry of Health officials (Table 1).

**Table 1. Breakdown of users and stakeholders engaged.**

<table>
<thead>
<tr>
<th>Cadres</th>
<th>Titles</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Health Worker</td>
<td>Community Health Volunteer</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Community Health Assistant Director</td>
<td></td>
</tr>
<tr>
<td>Nursing</td>
<td>Nurses</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Midwives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Facility in Charge</td>
<td></td>
</tr>
<tr>
<td>Diagnostics</td>
<td>Laboratory Technician</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Clinical Care and Diagnostics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medical Laboratory Scientists</td>
<td></td>
</tr>
<tr>
<td>Digital Health</td>
<td>Health Information Officer</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Data Manager</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Data Officer</td>
<td></td>
</tr>
<tr>
<td>Sub-national Leadership</td>
<td>District Health Director</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Provincial Nursing Officer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Regional Director of Health</td>
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</tr>
</tbody>
</table>

State of primary health care across six African countries: Insights and opportunities to advance diagnostics and innovation
Key informant interviews

The following lists the key informants that we engaged through in depth interviews and surveys in each of the countries except Rwanda where we were unable to engage any key informant due to access.

Table 2. Key Informant Interviews

<table>
<thead>
<tr>
<th>Country</th>
<th>Key Informants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zambia</td>
<td>• Directorate of Clinical Care and Diagnostics</td>
</tr>
<tr>
<td></td>
<td>• Directorate of Public Health (Community Health Unit and Child Health Unit)</td>
</tr>
<tr>
<td></td>
<td>• Health Promotion Team</td>
</tr>
<tr>
<td></td>
<td>• District Health Directors</td>
</tr>
<tr>
<td></td>
<td>• Health Care Providers</td>
</tr>
<tr>
<td></td>
<td>• Lab Technicians</td>
</tr>
<tr>
<td></td>
<td>• Procurement Officer</td>
</tr>
<tr>
<td></td>
<td>• Churches Health Association in Zambia (CHAZ)</td>
</tr>
<tr>
<td>Tanzania</td>
<td>• Facility in Charge</td>
</tr>
<tr>
<td></td>
<td>• Laboratory Technicians</td>
</tr>
<tr>
<td>Nigeria</td>
<td>• Deputy Director in the Community Health Services Department</td>
</tr>
<tr>
<td></td>
<td>• Data officer</td>
</tr>
<tr>
<td>Kenya</td>
<td>• Division of Primary Health Care</td>
</tr>
<tr>
<td></td>
<td>• Division of Clinical Services</td>
</tr>
<tr>
<td></td>
<td>• MOH Division of Family Health – Division of Newborn and Child Health</td>
</tr>
<tr>
<td></td>
<td>• Division of Health Products and Technologies</td>
</tr>
<tr>
<td></td>
<td>• Division of Primary Health Services and Family Medicine</td>
</tr>
<tr>
<td></td>
<td>• Health Care Providers</td>
</tr>
<tr>
<td></td>
<td>• Community Health Promoters</td>
</tr>
<tr>
<td>Ghana</td>
<td>• Regional Director of Health Services</td>
</tr>
<tr>
<td></td>
<td>• CHPS Coordinator</td>
</tr>
<tr>
<td></td>
<td>• Stores Supplies and Drug Management (SSDM) – Deputy Director, Logistics and</td>
</tr>
<tr>
<td></td>
<td>Warehousing</td>
</tr>
<tr>
<td></td>
<td>• Clinical Engineering Department GHS - Deputy Director</td>
</tr>
<tr>
<td></td>
<td>• Regional health officers</td>
</tr>
<tr>
<td></td>
<td>• Health Information Officer</td>
</tr>
<tr>
<td></td>
<td>• Regional medical Laboratory Scientist</td>
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</tbody>
</table>
Landscape analysis

Living Labs conducted a landscape analysis to understand the current state of PHC in each of the six countries (Ghana, Kenya, Nigeria, Rwanda, Tanzania, and Zambia). The landscape analysis included desk research which focused on understanding the PHC definitions in each of the countries, their health systems, policies and strategies in PHC, burden of diseases, investments in PHC, guiding success metrics for governments and partners, health expenditures related to PHC, digitization of health and the different technologies used at PHC. Living Labs reviewed publications, articles and government policies related to these key areas in each of the countries. Relevant resources from the landscape analysis are appropriately cited and provided in a separate reference document annexed to this report.

Discover

An assessment framework was used to collect data and provide a basis for comparative analysis across the six countries. Using the Miro tool provided a real time update and collaboration tool facilitating the comparative analysis and identifying gaps and questions for further research. The underlying focus of our research, diagnostics and health technology, guided the prioritization of gaps and areas of further research in the subsequent phases.

Refine

The Discover phase set the stage to develop a hypothesis and define areas for further research based on the gaps. To validate gaps, we developed structured interview guides with a focus on diagnostics and technology and engaged focal persons in the health sector through key informant interviews and surveys. The interviews and surveys uncovered an interest in defining the product introduction pathway and understanding the process of introducing new medicine or technology to the market. Information from the key informant interviews were vital in the Define phase of the methodology.

Define

In this final phase, we conducted further data synthesis to highlight opportunities in diagnostics and health technology that GH Labs can leverage in their PHC strategy to advance health equity. We also documented similarities and differences across countries to provide a holistic view of the state of health care in the regions. Living Labs generated specific recommendations, including next steps for user engagement and co-creation processes.
3. Insights on elements of primary health care
Across all six countries, we have summarized the insights on elements of PHC including workforce, models of care and service delivery, physical infrastructure, medicines and health products, community engagement, governance and leadership, digital health technologies, and funding and resource allocations.

3.1 Primary health care workforce

PHC workforce encompasses strategic development and deployment of qualified personnel, ensuring a sustainable and responsive health care delivery system (WHO, 2018).

Each of the six countries surveyed has health care personnel requirements at different levels of the health system, but they all share the common challenge of workforce availability and distribution, particularly in rural areas. This report highlights challenges in implementing incentive policies and fostering workforce motivation, resulting in issues such as absenteeism and inadequate knowledge and skills.

In Ghana, for example, the health workforce is below average, with only 0.18 doctors per 1000 inhabitants. The country’s Rural Areas Incentive Policy, which aims to incentivize health care workers in severely and moderately deprived areas, has faced implementation challenges due to a lack of funds. There is a shortage of human resources in addition to inequity in their distribution and level of training, with most sub-district hospitals having only one physician assistant.

In Kenya, the PHC workforce faces many challenges including corruption, lack of essential medical equipment, health worker strikes, and population growth.

Similarly, in Tanzania, the workforce is inadequate at lower levels, and differences in staff availability between rural and urban centers exists.

Nigeria, on the other hand, has specific recommended numbers of workforce per PHC center, but still faces inadequate availability and distribution of workforce between urban and rural areas. As a result, medical officers, community health officers, and nurses are unavailable in most rural primary health care centers.

In Rwanda, there is an unsatisfactory number of physicians, nurses, and managers with sufficient experience to respond to both administrative structures and health facilities.

Lastly, in Zambia, there is an inadequate number of health care workers and inequities in the geographical distribution.

3.2 Models of care and service delivery

Models of care and service delivery reflect the comprehensive and integrated nature of PHC services, including health promotion, disease prevention, and patient-centered care. Barriers that hinder access to health care services include inadequate infrastructure and human resources, and limited access to medical supplies.

One of the major challenges that these countries face is geographic access to health care services. Many of the populations in these countries reside in communities that are a far distance from the nearest health facility. For instance, in Ghana, 70% of the population lives in communities that are over five kilometers from the nearest
health facility, resulting in high childhood mortality rates. Similarly, in Kenya, clients of lower socioeconomic status who cannot afford transportation or those who are bedridden, face challenges accessing health care services.

To address this challenge, the Ghana Health Service (GHS) introduced the Networks of Practice (NOP) model to improve access to health care services. Similarly, Kenya is incorporating Primary Health Care Networks to provide person-centered services closer to communities in need. However, there are still challenges in implementing these networks, including limited understanding by county management, inadequate community gate-keeping mechanisms, and integration of private providers.

Nigeria faces several gaps in service delivery, including poor funding of PHC centers, inadequate medical supplies, and low motivation of service providers. These gaps significantly affect the quality of health care services provided to the population. Rwanda, on the other hand, focuses on preventive measures and health promotion services but still faces gaps in non-harmonized operations of health posts, delayed insurance reimbursements, and limited supervision of health posts.

Tanzania divides service delivery into four levels; community health units, health posts an centers, district hospitals and regional hospitals to ensure access to health care for all. However, there are still gaps in infrastructure, procurement processes, quality of service, and availability of equipment and drugs. The national government requires 200 staff at all district hospitals, 39 staff at health centers, and 15 staff per dispensary to increase the quality of health care services across the country. However, the current workforce at facilities in various levels, does not meet the required threshold by government.

Zambia provides comprehensive and integrated services, but suffers from insufficient funding, limited access to medical supplies, and inadequate human resources. The referral system is also lacking, with inadequate logistics to provide health services. Community-based health workers play a crucial role in identifying and addressing a community’s health care needs, especially in rural areas where access to health care services is limited.

3.3 Physical infrastructure

Physical infrastructure plays a critical role in ensuring equitable access to quality health care services, providing an enabling environment for health professionals and patients alike.

In Ghana, more health facilities need to be established to ensure that quality health care services are accessible to all Ghanaians. The Ghana Infrastructure Investment Fund Act of 2014 aims to address infrastructure gaps in the country including in the health sector. One area of focus includes developing more health facilities since as of 2021, the country only had 1,625 public health facilities.

In Kenya, access and the quality of infrastructure is a major challenge. While the country has achieved a 50% increase in access to energy over the past decade, almost 30% of the population has limited access to electricity, and over half of the rural population lacks access to good roads, which affects their ability to access essential services such as health care. Improving the access and quality of infrastructure has the potential to improve access to health service provision in Kenya.

In Nigeria, physical infrastructure is the foundation on which PHC service delivery is built. The World Health Organization (WHO) recommended that health care infrastructure should be ‘formal and enduring’, requiring a mandated strategic focus that is maintained over time on a sustainable basis². To achieve this and ensure quality service delivery, the Nigerian government needs to ensure adequate water supply, availability of regular power supply and electricity, a sufficient number of functional hospital beds, and good communication facilities.
In Rwanda, the government has continuously worked to reduce the average time it takes to reach a health facility by constructing health posts close to communities. From 2006 to 2020, the walking time was halved to 47 minutes from 95.1 minutes. The government is aiming to bring the walking time to reach a health facility to 24 minutes by 2024, by further improving the infrastructure in the country.

In Tanzania, the government is supporting infrastructure development with a new long-term investment plan for health facilities in all 1,845 wards. However, access to equipment, and qualified personnel, are major challenges to infrastructure development in the country. Addressing these issues will require sustained investment and commitment from the government and other stakeholders.

In Zambia, the Ministry of Health (MOH) has continued to invest in the maintenance, rehabilitation, upgrade and construction of health facilities. Additionally, communities are involved in supporting infrastructure development by providing labor services, financial contributions, and building materials to construct or renovate infrastructures such as mother’s shelters, immunization shelters, and incinerators. However, gaps still exist in proper infrastructure, there is a lack of funding, and stalled projects; which hinder the provision of quality health care services. Continued investment in infrastructure development is necessary to ensure that Zambians have access to quality health services.

3.4 Medicines and health products

Medicines and health products are complemented by technology and resource optimization, support effective health service delivery, and maximize health outcomes while minimizing waste.

Supply chains in different countries are complex and multifaceted, with various stakeholders involved. For example, regulatory bodies in each country play a vital role in ensuring that the products are of high quality and safe for human use, while other stakeholders ensure adequate stock and equipment is available in facilities.

The challenges faced by each country are unique and require tailored solutions. In Ghana, a shortage of essential medicines and inadequate infrastructure and equipment has resulted in stockouts. In Kenya, a lack of equipment and personnel, poor coordination, poor quantification and forecasting, and challenges in distribution were noted. In Nigeria, a shortage of basic drugs and products, inadequate storage facilities, poor quality of products, and high costs of medicines and health products exists.

Rwanda, Tanzania, and Zambia also face challenges such as strict pathways to introduce new drugs and equipment, limited access to essential medicines, insufficient storage, and stockouts of essential medicines.

To address these challenges effectively, a collaborative approach amongst stakeholders such as governments, regulatory authorities, health care workers, and international organizations is required. These stakeholders must work together to bridge the gaps and ensure that essential medicines and medical products reach those who need them the most.
3.5 Community engagement

Community engagement is facilitated through tailored communication strategies to ensure community participation, a sense of ownership and equitable decision-making, accountability, and sustainability of PHC initiatives.

Despite the differences in the approaches to community engagement in each country, common gaps hinder the effectiveness of the strategies such as inadequate resources, lack of training and education, and traditional beliefs that may influence health-seeking behavior. However, community engagement is still considered a vital component of health care services in Africa to promote quality care and improve health outcomes.

In Ghana, a unique strategy was implemented to engage remote and deprived communities by mobilizing the District Health Management Team (DHMT) to construct Community Health Compounds/Clinics (CHC). The community members raised funds and volunteered labor services for the day-to-day running of the CHC, while a Community Health Officer (Nurse) is posted to the CHC and becomes the frontline health care worker in the community. The DHMT is also responsible for gathering feedback from Health Management Committee meetings to address issues and challenges in operating the CHCs. However, unsubstantiated claims made by some traditional and alternative medicine practitioners in the community may be hindering the effectiveness of this approach.

In Kenya, Community Health Volunteers (CHWs) serve as the primary link between the community and health care centers. They are responsible for catchment mapping, defaulter tracing, household visitation, health talks, demand generation, community case management for malaria, and more. However, the large coverage area, lack of mobility, and culture of traditional beliefs in the community pose a challenge for CHWs. They also face financial constraints, inadequate training in family health matters, and a lack of working tools and commodities, which may affect their motivation and effectiveness in their roles.

In Nigeria, the importance of community engagement in decision-making related to their health is recognized. Health committees are key mechanisms for enabling participation of community members in matters related to their health. Village and district development committees are consulted, and the community engagement aims to ensure that communities are involved in making decisions through their respective representatives, mobilizing resources for PHC operations, and managing PHC services. The community engagement approach in Nigeria has been successful in engaging community leaders and members in decision making, but there are still gaps such as poor implementation of standards for community engagement in PHC, desire for renumeration, and low community participation in the health sector.

In Rwanda, established health posts provide basic health services to underserved communities. Community healthcare workers (CHWs), Animatrice de Santé Maternelle (ASM), and male-female pairs of CHWs called a Binôme per village of approximately 50 to 150 households), focused primarily on health promotion and referral activities. Rwanda has taken the lead in the use of innovation and mobile technology by connecting community health professionals with expectant mothers through the RapidSMS initiative. However, challenges in supporting and continuing to build the capacity of CHWs and low community participation in the health sector remain.

In Tanzania, community engagement plays a vital role in promoting quality care among people by enhancing accountability and using health education to advocate for prevention of diseases. Health education focuses on improving the health of the community by creating awareness and improving levels of literacy. The CHWs are critical in health education as they engage in outreach programs and play a liaison role between the people and health facilities. Enhancing accountability ensures people are aware of their constitutional right to access quality health care and budgetary allocation to promote development of infrastructure. However, the lack of awareness on health-related issues among people in the community poses a challenge to this approach.
In Zambia, Neighborhood Health Committees (NHCs) play a significant role in identifying and mobilizing resources and communities to contribute towards the construction of infrastructure in existing health facilities, identifying health needs, and supporting health promotion and education. These committees consist of both health care workers and community members, with community members raising funds and volunteering their labor services. As a result, the NHCs have a powerful influence in facilitating community participation and engagement in improving health care facilities. However, the incentivization of CHWs and the lack of data tools for them remain gaps in the approach.

### 3.6 Governance and leadership

Guided by principles of intersectoral collaboration and evidence-based decision-making, governance and leadership underpin effective healthcare systems, promoting quality, equity, and efficiency.

In Ghana, three layers of governance and leadership exist in PHC, including the DHMT, Sub District Health Management Teams (SDHMT), and CHC. However, weak sub-district leadership is a significant gap in the system that needs to be addressed.

In Kenya, health service delivery and the management of the health workforce have been devolved to the 47 counties, enabling more community involvement in decision-making. However, gaps remain in the system, including a lack of preparedness and knowledge gaps among political leaders and the public on existing policies and guidelines.

Nigeria has different layers of PHC governance, with varying levels of authority and responsibility. The federal MOH provides policy and program direction, while the State Ministry of Local Government Affairs (SMoLG) hires, manages, and directly pays high-level PHC staff. The structure is complex, and both the State Ministry of Health (SMOH) and SMoLG have limited direct control over primary health care centers (PHCs).

In Rwanda, the Ministry of Health governs all health facilities, including public and private ones. The public sector has three levels, each with a defined technical and administrative platform called a minimum package of activities. However, limited coverage of PHC facilities and limited access to special services are significant gaps in the system.

Tanzania’s National Health Policy of 2007, sets out the leadership and governance structure at health facilities at all levels in the country. There are governing structures in 100% of health facilities at the regional level, but there are still gaps in funding to support management committees and differences in urban and rural setups present a challenge in establishing a governance structure in all facilities.

Zambia has a strong sector-wide approach (SWAp) mechanism for coordination of the participation of sector partners in the health sector, which is a significant development towards strengthening the health sector’s leadership and governance. However, difficulty in ideas reaching higher levels of leadership is a significant gap in the system.
3.7 Digital technologies for health

Exemplified by robust Health Information Systems (HIS), digital health technologies can enhance health care delivery and decision-making, improving patient outcomes and facilitating data-driven policy and program development.

The digitization of data management and health services in Ghana, Kenya, Nigeria, Rwanda, Tanzania, and Zambia has significantly improved health care services in these countries. However, there are still significant challenges that need to be addressed to achieve a more effective digital health system. For example, inadequate infrastructure such as poor internet connectivity, lack of electricity, and insufficient access to devices such as laptops, desktops, and tablets. These challenges limit the ability of health care workers to access patient information, medical records, and other essential data required in the provision of quality health care services.

Other major challenges are the lack of coordination among partners, limited funding, and low levels of technical expertise. These challenges affect the implementation of digital health systems and the creation of an enabling environment for the effective use of digital tools in health care. For instance, software systems are not harmonized or developed to be interoperable, inadequate skills of technical teams and support staff to solve challenges locally, lack of transport for supervision to districts and lower level facilities, and lack of funds for quarterly review meetings are also significant challenges.

3.8 Funding and resource allocation

Funding and resource allocation mechanisms are critical components of health care systems, ensuring efficient and equitable distribution of resources, enabling sustainable health care delivery, and fostering innovation and adaptation to changing health care needs.

In Ghana, the National Health Insurance (NHI) is the main funder of PHC activities, but PHC only constitutes 21% of its expenditure.

According to the Regional Director of Health, “90% of the clients are subscribed to the National Health Insurance. We rely heavily on the NHI.”

However, the only free PHC services are programs such as TB, HIV, malaria, and antenatal care. Otherwise, clients either use the NHI card or pay out of pocket. The most funded PHC activities are curative treatments (donor or NHI funded) programs such as malaria, TB, HIV. In Kenya, health expenditures related to PHC have increased from 1.79 billion dollars in 2016/17 to 2.07 billion dollars in 2020/21, but there is still a lack of guidelines for financing and sustainable community health funding. The public management policy guides national allocation of finances to counties.

In Nigeria, the Local Government Areas (LGAs) have direct control over the PHCs but are not directly responsible for providing funds for running the PHCs. The LGAs receive funds from the federation account through the channel of the state. As a result, financial and political constraints at the state level may lead to uncertainty in the flow of funds to LGAs. Often, LGAs receive just enough funding to pay staff salaries, leaving little to no resources for drugs, supplies, and maintenance. PHC financing thus depends primarily on state government and the willingness of the state governor and in part on the LGA chairman for allocating the budget for health. In addition,
LGAs have limited revenue generation prospects on their own. Thus, the end result can often be low levels of funding for PHC at the LGA level. Donor funding is also an important source of funding for PHC in Nigeria.

In Rwanda, health financing strategies include risk pooling, efficiency, and an increase in domestic resources. Risk pooling is achieved through community-based health insurance, social health insurance, and voluntary health insurance. Efficiency is achieved through performance-based financing, decentralization, and a performance contract system. Rwanda has also increased domestic resources through community health cooperatives, public-private and community partnerships, and self-sustaining health facilities. However, Rwanda still faces some gaps, such as limited access to insurance at the community level and a lack of public-private partnerships for medical infrastructure.

In Tanzania and Zambia, funding is a major challenge for the health sector. In Tanzania, facilities rely heavily on the government to get funds for infrastructure development and purchase of new equipment, which leads to delays and poor quality of services. The government is urging people to register for the National Health Insurance Fund (NHIF) in a bid to provide services to people who cannot afford costly insurance schemes. In Zambia, despite the observed nominal increase in financing to the health sector, the share of health funding to the total public budget decreased. Limited funding of non-communicable diseases and insufficient funding for the community are also gaps in the health system.

3.9 Health system summary

The table below shows the type of facilities under each level of care for the countries. All countries have a similar structure of the facilities with level 1 and 2 having facilities at community level and level 5 and 6 being advanced facilities.

Table 3. Health system summary

<table>
<thead>
<tr>
<th>Country</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
<th>Level 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghana</td>
<td>Community Health Planning and Services (CHPS)</td>
<td>Sub district facilities</td>
<td>District facilities</td>
<td>Regional facilities</td>
<td>Tertiary facilities</td>
<td></td>
</tr>
<tr>
<td>Kenya</td>
<td>Community Health Units</td>
<td>Dispensary Clinics</td>
<td>Health centers Maternity Nursing homes</td>
<td>Sub-county hospitals Medium-sized private hospitals</td>
<td>County referral hospitals Large private hospitals</td>
<td>National referral hospitals Large private teaching hospitals</td>
</tr>
<tr>
<td>Nigeria</td>
<td>Primary health care: Health centres in LGA, communities, wards, villages, clinics, dispensary</td>
<td>Secondary Healthcare facilities: General Hospitals, Comprehensive health centres, District Hospitals and specialists and general hospitals</td>
<td>Tertiary healthcare facilities: Teaching Hospitals, Federal medical centres, national laboratories</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td>Level 1</td>
<td>Level 2</td>
<td>Level 3</td>
<td>Level 4</td>
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<tr>
<td><strong>Rwanda</strong></td>
<td>Community Health Units</td>
<td>Health posts</td>
<td>Health centers</td>
<td>District Hospitals</td>
<td>Tertiary hospitals</td>
<td></td>
</tr>
<tr>
<td><strong>Tanzania</strong></td>
<td>Community Health Units</td>
<td>Dispensaries Clinics</td>
<td>Health Centers</td>
<td>District Hospitals</td>
<td>Regional Hospitals</td>
<td>Tertiary MOH Specialty facility</td>
</tr>
<tr>
<td><strong>Zambia</strong></td>
<td>Community Health Units</td>
<td>Health posts</td>
<td>Facility centers Mini Hospitals</td>
<td>First Level Hospitals District hospitals Special hospitals</td>
<td>Provincial Hospitals Second level hospitals</td>
<td>Third level hospitals MOH Specialty</td>
</tr>
</tbody>
</table>
4. Validation of assumptions and hypotheses
The following is a list of the assumptions and hypothesis that were validated during the user engagement and desk research process. The Living Labs team together with the GH labs team came up with these assumptions and hypotheses as a way to guide the research process.

**Top-down approaches to service delivery designed at global or national level have poor user uptake and sustainability.**
Our initial hypothesis was based on our understanding that such approaches tend to be less adaptable to local contexts and may not always effectively meet the needs of end users. Unfortunately, our research was limited by the low level of user engagement in the countries we were studying, and we were therefore unable to validate our hypothesis.

**Service delivery is fragmented into disease-centric silos with little coordination.**
According to our research, there seems to be a lack of coordination in the delivery of health care services leading to inefficiencies and confusion. While no clear evidence suggests that service delivery is fragmented into disease-centric silos, we did find unharmonized operations between the different levels of health care.

**A people-centered approach to PHC is more likely to improve health. Most PHC systems treat all people the same.**
To implement a people-centered approach, it is necessary to utilize community health workers who play a vital role in improving the health outcomes of communities. However, CHWs face numerous challenges that hinder their effectiveness.

**Most current PHC systems are designed to treat the sick, not to keep people healthy. Service delivery is reactive in a costly manner due to this**
Recent research shows there is growing emphasis on preventive services as opposed to curative services. However, there are numerous barriers to performing preventive services effectively including lack of reagent, lack of sustainability of deployed devices, personnel shortages, and lack of funding.

**Few current PHC systems take advantage of data and digital technology.**
PHC systems have not fully utilized data and digital technology, despite recognizing their potential to improve health care delivery in resource-limited settings. Challenges such as inadequate infrastructure, lack of coordination among partners, limited funding, and low levels of technical expertise continue to hinder implementation.

**Annual budgets in LMICs are stretched thin between competing demands.**
Our research shows that while some countries, such have implemented innovative health financing strategies, others lack guidelines for financing and sustainable community health funding and the government heavily relies on federal allocations for primary healthcare funding, which often leads to inadequate funding.
5. Opportunities for Impact
This section highlights the overall opportunities for investments in the six countries by taking a look at the insights from user engagement activities and reviewing the policies and guidelines in each of the countries.

5.1 Overall opportunities

**Develop and implement point-of-care diagnostic tools.**  
Limited access to essential medicines and equipment is a significant challenge to PHC delivery. Developing and implementing point-of-care diagnostics tools that are affordable, easy to use, and require minimal training, can help address this challenge.

**Establish public-private partnerships for the provision of medical infrastructure.**  
Funding and resource allocation gaps are significant challenges to PHC delivery. Establishing public-private partnerships can help address these gaps by leveraging private sector resources and expertise to support the provision of medical infrastructure. For example, private sector companies can support the construction of health care facilities and the provision of diagnostic equipment.

**Strengthen community engagement.**  
Digital health technologies, such as mobile health (mHealth) applications to provide health education and promote health-seeking behavior, are one way to improve community engagement. For example, by developing culturally appropriate and language-specific mHealth applications that are accessible and user-friendly. Additionally, community health workers can be trained to use these technologies to reach more people and provide better care.

“Sometimes you run into brand new equipment not in use because user training was not properly handled and this applies to equipment like infant ventilators and CPAPS. At the polyclinic and district level, you may find Incubators not in use.” – Deputy Director for Clinical Engineering from Ghana

“Because the procurement process takes so long, we often don’t have tools or medicines and so we tend to refer or advise clients to buy from local pharmacies”. – CHW from Zambia

“Some of the obstacles I face are lack of enough resources such as HIV test kits which sometimes run out of stock.” – CHW from Kenya
5.2 Opportunities from policies, strategies and guidelines

This section takes a look at the main current policies, guidelines and strategies in primary health care existing in the six countries. It summarizes the areas we see GH labs channeling their innovative efforts with a focus on diagnostics and technology. The insights gathered are grouped according to the elements of primary healthcare.

Commodities and supplies

- Ghana is prioritizing the production and promotion of quality medicines.
- Kenya implementing tracer mechanism for commodities at the community level to assist with forecasting and quantification to reduce stock outs.
- Ghana wants to implement recapitalization and provision of service delivery kits to curb the challenge of forecasting and quantification.
- Zambia’s focus is to establish a sustainable laboratory supplies system by establishing a laboratory management information system that is both electronic and paper based.

Information systems

- In Ghana and Kenya, strengthening, automating, and standardizing LMIS systems is a priority. This should allow PHC facilities to link to regional and central medical stores, improving the visibility of stocks and consumptions.
- In Zambia and Kenya, both countries are planning to implement and strengthen the health information systems at the community level and link the systems to all levels of the health system.
- In Ghana, their strategy is to rationalize the software, hardware, and ICT for diagnostics and information processing for ease of consistency and integration. Additionally, Ghana plans to integrate the private sector into the routine information system.

Telehealth

- Due to the geographical divide between patients and specialists, Kenya and Zambia are establishing, embracing, and promoting the use of telehealth is a priority in the delivery of PHC.
- In Tanzania, there is a large focus on mHealth due to the increase in access to mobile phones.

Data management

- In Ghana, priorities include consolidating all the data available in the health sector and from other sectors that influence health to one data set and to maximize modern technology in data management.
- Zambia seeks to create an electronic medical equipment database and promote use of energy efficient technologies.
Digital platforms

- Ghana is prioritizing the development of an e-registry to enhance registration of births and deaths, improving the real time data collection, access and use, expansion of electronic records and application of digital health platforms. Additionally, they are prioritizing harmonizing, digitizing and integration of patient registers and record books.

- MOH and Rwanda Information Society Agency (RISA) are jointly implementing a plan for the digital transformation of health care in Rwanda.

- Ghana is seeking to empower the healthcare workers with mobile and portable devices, digitizing patient registers and record books. Ghana plans to rationalize the software for diagnostics for both the public and private sectors and integrate into the routine information system.

- Kenya is strategizing on how to develop a health profiling platform for targeted interventions.

- Tanzania is prioritizing how to improve the application of digital health technologies to deliver high quality services through workforce digital literacy and ICT infrastructure.

- Zambia and Kenya plan to implement and strengthen community health information systems and link to all levels of the health system. Also, establishing embracing and promoting use of telehealth is a priority in delivery of PHC to overcome the distance between patients and specialists.

Health products and technologies

- In Ghana and Kenya, they have included appraisal and assessment mechanisms to inform the selection and procurement of health products and technologies.

- Zambia’s priority is to create an electronic medical equipment database and they are strategizing on developing a framework for identifying and scaling innovations that enhance community health systems and service delivery models while promoting the use of energy efficient technologies.

- Ghana is also focusing on ensuring the appropriateness and value for money for purchased products and services while empowering the health care workers with mobile and portable devices.

- Kenya is focusing on promoting local production and research and innovations of essential health products and technologies.

Service delivery

- Tanzania is focusing on service delivery where they are prioritizing on equipping the health workforce with digital literacy skills, and improving the infrastructure and financing schemes to increase access to services.

- Ghana is focusing on mapping out health services, facilities and professionals, promoting rehabilitative and palliative care services, and exploring ways to strengthen and combat antimicrobial resistance.

Gender inclusion

- Zambia’s strategy is to develop a framework of innovations for enhancing gender sensitive community health systems and service delivery models.
Syntheses for each of the six countries includes elements of primary health care including workforce, models of care and service delivery, physical infrastructure, medicines and health products, community engagement, governance and leadership, digital health technologies, and funding and resource allocations.
6.1 Ghana synthesis

Ghana is considered one of the more stable countries in West Africa with an estimated population of 32.1 million and a life expectancy of 65 years for women and 63 years for men. As of 2021, 19,038,233 people live in urban areas; about 57.98% of the population. Most of the population is in the south of the country and the urban population is concentrated in the capital, Accra.

The Ghana Health Service (GHS) is an agency of the MOH. The GHS mandate and objective is to provide and manage comprehensive and accessible health care with an emphasis on PHC. There is no explicit PHC policy or strategy in Ghana, but the universal health coverage roadmap serves as the strategy for achieving PHC in Ghana.

There are three different levels of health care in Ghana: national, regional, and district level. PHC is structured at the district level and is also organized at three levels: level one is referred to as Community Health Planning and Services (CHPS); level two is the sub-district level including health centers and maternity homes; and level three is the district level with district hospitals.

Primary health care workforce

An empowered and adequate workforce is one of the drivers of quality care in health service delivery. In Ghana, the recommended and required cadres at each level are as follows:

- **CHPS**: community health nurse/officer, traditional birth attendants, community health volunteers, traditional healers, private midwives, and chemical sellers.
- **Sub-district level**: medical assistants, midwives, lab technicians, nutritionists, public health officer, and general nurses.
- **District level**: physician assistants, general nurses, midwives, lab technicians, nutritionists, and public health officer.

A community health officer is a community health nurse with additional training to undertake extra roles in the community. They are considered agents of change in the community. For instance, they may also mobilize community projects like planting trees.

The health system in Ghana falls short of providing adequate and empowered workforce. Pressing gaps include inadequate knowledge and skills, inadequate workforce numbers and inequities in distribution. Most of the sub-district hospitals have only one physician assistant. One of the complaints from lab technicians is that there is no functional laboratory policy. To prepare the workforce to effectively perform diagnostic duties, the laboratory unit
in the GHS periodically undertakes intensive training programs for clinical staff at all levels, which includes the HCWs in PHC.

“All capacity building efforts must be based on data. One has to empirically identify specific weaknesses. For instance, you want to undertake a training program, you should do a pre training assessment of your workforce and then empirically identify the gaps in knowledge and skill and competence.” – Deputy director for clinical engineering

The Rural Areas Incentive policy on incentivizing health care workers in severely and moderately deprived areas has faced implementation challenges; mostly lack of funds. There is also inadequate logistics support for the management at the district level to visit PHC facilities for monitoring and supervision. Community health nurses are also not adequately supported with transport to transverse communities to provide health care.

Service delivery

PHC coverage in Ghana has improved greatly through the construction of Community Health Compounds. However, geographic distance is still a barrier to health care access since 70% of the population resides in communities that are over five kilometers from the nearest health facility. Childhood mortality is 40% higher in such communities. Unequal distribution of health services in hard-to-reach areas is a major concern in equity in health. These regions are deprived of human resources, infrastructure, and equipment. Infant mortality is 60% higher in rural areas than in urban areas. Community members in rural areas may go to urban areas to access some laboratory services.

Networks of Practice

To ensure that quality health service is made accessible and close to clients as possible, is important to strengthen and improve services in the health centers (sub-district) to improve access to PHC. Since 2021, GHS is scaling up a primary care network called the Network of Practice (NOPs), where a group of facilities in a given geographic area connect as hubs and spokes. In the NOP there are a number of CHPS (the spokes) that are connected to a health center (the hub) in the sub-districts. The health center should be well equipped to run services 24/7 and be connected to the district hospital. This network maximizes functionality efficiency and improves the referral system. The model also seeks to leverage technologies like telemedicine to improve access to services at doorstep locations.

Desired changes in service delivery include having tropical labs within designated areas to improve the quality of care and having diagnostic equipment in the labs that can diagnose more than one disease, and adding human resource capacity, both administrative and services at the sub district hospital. Such equipment is also recommended at the sub-district level to support the NOP model.

Physical infrastructure

The Ghana Infrastructure Investment Fund Act, 2014 seeks to address the infrastructure gaps in the country. In health, one of the focus areas is the development of health facilities. As of 2021, the number of public health facilities in Ghana was 1,625.
The Estate Management of the Ghana Health Service has compiled a document that provides guidelines on physical infrastructure of hospitals. This includes building arrangements, departments, and cost estimates. The facilities described are clinics, health centers, polyclinics, and district hospitals.\(^\text{10}\)

In remote and deprived communities, community members volunteer labor services and raise revenue to construct Community Health Compounds/Clinic (CHCs). The government targets to build 6,000 CHPS zones.

**Medicines and health products**

A service delivery kit including vaccine fridges, laptops, desktop computers, motorbikes, pickup vehicles, OPD furnishing and Combined printer and transport requirements, is recommended for facilities at all levels. The MOH, through the Ghana National Drugs Program has compiled an essential medicines list to cater for priority health care needs.\(^\text{11}\)

**Procurement**

At the subdistrict level, it is mandatory that the head of these facilities (e.g., a physician assistant or a midwife) is a signatory of all purchases and monetary accounts. The head has the authority to make purchase decisions. However, in most of the subdistrict facilities, the head of that facility is bypassed, making the district director and the accountant the only signatories.

At the CHPS level, HCWs to do not have the authority to make purchases for their facilities, and instead, this decision is made by the district director to whom they make procurement requests. Generally, PHC facilities, through the district hospital, make medicines and non-medicines requisitions to the regional medical stores through the Ghana Integrated Logistics Management Systems (GhiLMIS). The district hospital, at the apex of the PHC manages and processes procurement requests for Level 1 and 2 facilities according to the maximum spending amount allowed at each level. Procurement that exceeds the maximum amount is processed by the MOH and the GHS.

Entities involved in the coordination of medicines supply include: GHS; MOH Procurement & Supply Chain Directorate; Supplies, Stores and Drugs Management (SSDM) Division; deputy regional director of administration and support services; and the regional chief pharmacist.

**Introducing new products**

For a product to get approved for use at PHC facilities, a needs assessment is required. That is, the equipment is either listed on the essential packages list for that level or the Family Health Division identifies a clinical need in health. The two regulatory authorities are the Food and Drugs Authority and the Ghana Standards Authority.

**Framework contract**

The framework contract is a procurement model that leverages bulk negotiation. The MOH negotiates about 60 essential medicines with suppliers for an agreed cost. The Regional Medical Stores procure the medicines at this agreed cost and health facilities then procure from the Regional Medical Stores. Implementation has been flawed resulting in health facilities buying from non-framework contract medicine suppliers when they get paid through health insurance. Framework contractors often lower the bid to win the contract and after they win the bid, raise prices. Facilities do not buy any medicines that are at a cost higher than the health insurance refund price. Thus, availability of the medicine at the facilities is erratic. Another challenge is that the health insurance does not refund facilities regularly. Therefore, the facilities are not able to pay the suppliers in good time resulting in huge interests on the debts.

Challenges in medicines and products availability include stock outs, inadequate provision of recommended service delivery kits for health facilities, irregular refunds by the NHI, inflation, price fluctuations by suppliers, long
wait times for procurement approvals, unavailability of products, delays in product delivery, and the fact that CHCs do not have bank accounts so funds are managed by the district hospitals thus further delaying the procurement processes.

**Diagnostics at PHC**

The MOH, through the Ghana National Drugs program complied standard treatment guidelines. At the CHPS level, prioritized diagnostic tools include rapid diagnostic test (RDT) kits. The diagnostic tools are limited to very basic clinical laboratory investigations such as hematology, basic chemistry such as blood sugar levels, basic microbiology/microscopy for infections, hemoglobin concentration, and anemia. At sub-district level, the tools include point-of-care tools and RDT kits, portable ultrasound scanners used by midwives. Some facilities may have microscopy for malaria, stool, and urine tests. At the district level, tools include point-of-care tools and RDT kits at the sub-district level and x-ray imaging, chemistry analyzers, and hematology analyzers.

For communicable diseases, the prioritized diagnostic kits include HIV tests, malaria tests, parasite skin snips tests, x-rays, Hepatitis tests, and sputum test for TB.

For non-communicable diseases, blood pressure apparatus are available at all levels. Blood sugar blood strips are more common than urine tests at CHPS and sub-district level. Chemical analyzers are used at district level. Lipid profiles are only available in regional hospital levels and a few district-level hospitals due to high cost of reagents. Pap smears are available at district levels but they have to send the sample to the regional levels for analysis. At health centers, midwives are trained to do visual inspection with acetic acid for cervical cancer. Histopathologists are not available at district level thus samples for pap smears and punch biopsy are sent to the regional level for analysis.

There is observed increase in noncommunicable diseases particularly for hypertension and diabetes among the general population. Antimicrobial resistance has become a huge problem because of unregulated over-the-counter drugs purchases. There is a pressing need to prioritize microbiology lab equipment for culture and sensitivity tests. Moreover, services in microbiology labs lack equipment and reagents for these tests. Another barrier is a lack of skillset. Thus, HCWs (especially at the district level) cannot prescribe for a particular antibiotic.

“At the lowest level, we are seeing a need to include some targeted diagnostics for children with fevers. This is because Malaria infections have greatly reduced (because of vaccination efforts), so at CHPS and sub-districts level, if a child tests negative for Malaria, then they are given a general antibiotic because there is a deficiency of targeted diagnostics. We do not want to introduce antimicrobial resistance to children.” – Deputy Director General (Ghana Health Service)

**Funding**

The payer and mode of payment (mostly the NHI) has a huge influence over the diagnostic tools that are provided and prioritized at the different levels of PHC. The NHI refunds claims for diagnostics as bundles services called Diagnostic Related Group (DRG). Thus, even if the hospitals deploy targeted diagnostics, it is not cost effective for the facility since they won’t be compensated accordingly. The biggest barrier to availing culture and sensitivity tests at the district level is the cost; where the NHI will only refund the amount for the bundled DRG and not for a targeted diagnostic like Bio Gam for pneumonia. There are no bundled diagnostics at the CHPS and sub-district levels due to cost implications.
**Efforts in digital diagnostics**

Digital diagnostics are common at the highest PHC level, district hospitals. Some common digital diagnostics include medical imaging and hematology analyzers. Most of these devices have the capability to connect to a laboratory information management system. The government is pursuing the agenda of e-health and software is being deployed nationally to enable the transmission of data within the hospitals and from different levels to support the referral system and the NOP service delivery model. The use is not widespread yet but there is incremental progress.

**Community engagement**

The GHS has leveraged an effective means of utilizing African traditions of social organization and leadership to organize and promote health services at doorstep locations. The District Health Management Team (DHMT) is influential in mobilizing remote and deprived communities to construct Community Health Compounds/ Clinics (CHC). It is a partnership between the health care workers and the community members where community members raise funds for the construction and volunteer labor services for the day to day running of the CHC. A CHO, who is a nurse, is then posted to the CHC and becomes the frontline health-care worker in the community.

One of the community accountability structures to provide feedback on PHC is that the zone’s Health Management Committee, whose members are community members, meet quarterly to address the issues and challenges in running the Community Health Compounds (CHCs). During the meeting, they also use score cards to score services offered at the CHCs.

**Governance and leadership**

There are three layers of governance and leadership in PHC and some of their overall responsibilities include:

- **DHMT** monitor and ensure proper utilization of resources, are responsible for improving service delivery at the community level, and mobilize fund drives to construct CHCs.

- **Sub-district health management teams (SDHMT)** draw up programs for health education in the subdistrict, collect health data and volunteer programs, and write reports to the DHMT.

- **CHC** forge partnerships between healthcare providers and community members, recruit volunteers, plan programs for health education on various issues affecting the community, visit household and community gatherings to distribute health commodities and pass health information, and meet quarterly to address the issues/challenges in running the (CHCs)

Overall, the management system at the sub-district is weak, thus often bypassed by the Business Management Centre (BMC) at the district level during procurement.

**Digital health technologies**

The Ghana e-health strategy serves as the national digital health strategy. The goal of the e-health strategy is to harness the potential of ICT to improve the health outcomes of people living in Ghana. With the introduction of digital tools, data management in the facilities has improved. Data is more visible and available for decision making.

The Policy, Planning, Monitoring and Evaluation Department (PPMED) and GHS IT division regulate health information systems. For introduction of a new health information system, the sponsor needs to collaborate with the PPMED to assess the capabilities, uniformity, and interoperability of the new system with the existing systems.
Health Information Systems (HIS) currently in use include:

- District Health Information Management System 2 (DHIMS2) serves as the main data repository for the GHS covering all programs and divisions and is integrated at all levels. University of Oslo provides training and technical support in the deployment of DHIMS2.

- Maternal and Child Health e-Tracker, introduced by GHS, is a digitized form of the registers used at the facility level to improve the quality of data in DHIMS2. Key functionalities of the tracker include the ability to generate monthly reports and push the reports into the aggregate DHIMS2 system seamlessly. The e-Tracker is being deployed to health centers and CHPS across the country. Currently, only five regions have fully trained workers at all the CHPS and health centers. Some tablets have also been deployed to some CHPS zones and compounds to capture transactional data straight into DHIMS on a pilot basis. USAID is providing support for the deployment of the MCH e-Tracker to other regions. The Global Fund also supports the deployment of the TB/HIV tracker.

- Inpatient Morbidity and Mortality Linelist (EVENTS) captures inpatient data.

- Medical Certificate of Cause of Death (CoD) captures deaths in hospitals.

- Lightwave Health Information Management System (LHIMS) is being introduced by the MOH for clinical care services in all public health hospitals. LHIMS is currently deployed at the teaching, regional, and district hospitals.

- Human Resource Information Management System (HRIMS) captures human resource data and is managed by the human resource division.

- Ghana Integrated Logistics Management Information System (GhiLMIS) is used for logistics management by the SSDM division.

- Planning & Budgeting Management Information System (PBMIS) captures financial data including incomes and expenditures and is managed by the planning and budgeting department.

DHIMS2, e-Tracker, EVENTS and CoD are managed by the DHIMS2 Technical Team and PPMED-GHS.

The current challenges observed in implementing the e-health strategy are resource availability (i.e., computers/mobile devices), Internet connectivity where the facility uses online system, inadequate technical capacity at lower levels, inadequate number of data managers (HIOs) at the district and hospital levels, and HISs are not harmonized and interoperable.

Funding and allocation of resources

A parallel funding mechanism exists in Ghana — one for clinical care and the other for public health. Clinical care is mainly funded through the health insurance and out pocket payments. About 6% of the country’s GDP is spent on health care. Public health (e.g., immunization, outreaches, health education, surveillance) are funded by the government or donor funding (multilateral, bilateral). Financing most public health interventions was stable until recently, when several development partners began transitioning out with change in development status of the country as an LMIC.

The NHI is the biggest funder of PHC activities. However, PHC only constitutes 21% of the insurance scheme’s expenditure. Sixty-nine percent of the population is subscribed to the NHI. The only free PHC services are those under funded programs like TB, HIV, malaria and ANC. Otherwise clients either use the NHI card or out of pocket cash. The most funded PHC activities are curative treatments (donor or NHI funded) programs such as malaria, TB, HIV.
6.2 Kenya synthesis

Kenya is one of the most populous countries in Africa with an estimated population of 53.8 million people as of 2020\textsuperscript{13}. The population is projected to grow to 92.6 million by 2050. Kenya has a diverse population, composed of over 40 different ethnic groups, as well as international migrants, refugees, and asylum seekers\textsuperscript{14}. The urban population faces challenges such as poverty, unemployment, crime, slums, and environmental degradation.

Health care in Kenya has been decentralized, with the counties handling supervision, management and delivery of services. Kenya has made progress in increasing access to PHC services through various initiatives such as free maternal health care, universal health coverage pilot program, community health strategy, and devolution of health services to county governments; but is still facing many challenges.

Some of the challenges that hinder PHC delivery in Kenya include:

- Inadequate funding and resources
- Shortage and uneven distribution of health workers
- Low quality and efficiency of services
- Weak referral systems and coordination among different levels of care
- Inequity and disparities in access and utilization of services among different regions and groups
- High burden of communicable and non-communicable diseases

Primary health care workforce

The health care workforce in Kenya is diverse and includes clinical officers, nurses, specialist nurses, rehabilitative staff, dental staff, health promotion officers, medical social work, nutrition staff, community health service staff, and more. According to the Kenya Essential Package for Health (KEPH), it outlines the staffing requirements for PHC, the cadre of staff for level one is the CHW, level two has the nurse and the clinical officers, while level three has medical officers, clinical officers, nurse, laboratory technicians, and pharmacy technicians.

The primary health care providers in Kenya have a busy schedule that involves managing hospital operations, providing health services, and participating in managerial functions. They have to deal with a wide range of challenges that limit their effectiveness and quality of service delivery. These challenges include staff shortages, financial issues, and a lack of medical supplies and facilities.

Despite these challenges, healthcare providers in Kenya are dedicated to providing preventive, promotive, curative services to promote holistic care to patients and caregivers. They have multiple roles and responsibilities, such as providing nursing services to patients, managing the maternity ward, conducting deliveries, family planning services, antenatal and postnatal services, and immunizations. They also supervise, organize, and plan
daily activities in the maternity unit, ensuring the smooth running of maternal and child /outpatient department (MCH/OPD) services. These services are critical in ensuring that the population in Kenya has access to quality healthcare services.

**Service delivery**

Primary health care facilities offer a range of services including:

- Preventive services such as immunization, health promotion services, and treatment and rehabilitation services
- Outpatient and inpatient services
- Comprehensive maternity care, including MCH services, 24-hour outpatient services, and specialized clinics in pediatrics, medicine, dermatology, and gynecology
- Neonatal care for sick and premature babies
- Family planning services, ANC, CWC, FP, and other reproductive health services.
- PMTCT services, HIV testing and counseling, adherence counseling, and laboratory services for under-fives and antenatal mothers
- Vaccination services for children and adults, as well as proper referrals to different departments in the hospital
- Cervical cancer screening, minor outpatient services, and specialized care

Community health care workers play a crucial role in the referral system at the community level using MOH 100 forms that describe the reason for referral. One copy of the from remains with the clinician while the other is taken back to the CHW for follow up.

The nurses and community health workers ideas on how to solve the challenges they encountered in service delivery are through financing, digitalizing some services, offering stipends to CHWs, and partnerships.

The challenges Kenya faces in service delivery include:

- Clients have to be referred to higher level facilities for services such as imaging and to the newborn unit for premature babies and patients who require surgical procedures.
- Some cases that should be referred go unreported, such as children under five who default on immunization.
- Referrals of clients with lower socioeconomic status who can’t afford transport, those who are ill and/or bedridden, and the elderly.
- Staff shortages.
- Inadequate supply of commodities.
- Poor system for client follow up.
- Overworked staff leading to burnout, lack of motivation, and heavy workload.
- For CHWs, lack of incentives, heavy paperwork, and financial issues.

“Some clients don’t go to the facility even after I have referred them.” – CHW in Kenya.
Primary healthcare networks

The Kenya MOH is incorporating Primary Health Care Networks (PCN) as an integral part of PHC. These networks will help achieve the universal access to health care by availing person-centered services closer to communities in need and assure quality, continuity, and sustainability of health care.

A PCN is defined as an administrative health region comprising of a PHC referral facility (Hub) and other several PHC facilities (spokes) and community health units (CHUs).\textsuperscript{15}

Challenges on PCN establishment that Kenya currently faces include:

- Limited understanding by county management of the importance of PCNs which limits the resource mobilization and allocation towards PHC programme (County Governors, County Executive County Health Assemblies).
- Uncoordinated partner engagement to streamline PHC.
- Inadequate capital to realize efficient health care service delivery system.
- Lack of fully digitalized health information systems.
- Inadequate community gate keeping mechanisms.
- Integrating private providers in PCNs.

Physical infrastructure

Kenya is facing several challenges in terms of infrastructure development, particularly with regards to the access and quality of infrastructure, and emergency care remains under-developed, under-equipped, and unsophisticated. Despite having achieved a 50% increase in access to energy over the past decade, the country still has a long way to go in providing reliable electricity to all its citizens.

According to the World Bank (2021), around 30% of the population in Kenya still has limited access to electricity. Additionally, the latest Rural Access Index shows that over half of the rural population lacks access to roads in fair condition, which affects their ability to access essential services such as health care. While mobile subscriptions have a penetration rate of close to 100%, only 23% of the population in Kenya has access to internet services (World Bank, 2021).

Given these gaps, improving the access and quality of infrastructure has the potential to play an important role in improving health service provision in Kenya.\textsuperscript{16}

Medicines and health products

Kenya has the Kenya Essential Medicine List (2019) that is used to promote access to essential medicines and serves as a guide for the investment of health care funds to finance the most appropriate medicines to achieve therapeutic aims in response to prioritized public health needs.

The Kenya Medical Supplies Authority (KEMSA) is the state corporation from where all the facilities are required to procure their medicine. An LMIS allows the procurement of medicines and health products and KEMSA has a large capacity to supply commodities. Any equipment that needs to be restocked is purchased by the county MOH and they are responsible for ensuring that the equipment is of good quality and is delivered on time.

As for the reagents, drugs and non-pharmaceuticals products are procured by the facility. At the PHC level, the CHAs and facility pharmacies are involved in restocking process, using a FIFO method to ensure no expired supplies are used.
Kenya faces many challenges in medicines and health products such as lack of equipment and personnel, shortage of reagents, machines are often broken, lack of coordination between various departments and authorities to ensure timely and effective procurement of supplies, poor quantification and forecasting, and challenges with distribution.

**Diagnostics at PHC**

Health care providers and CHWs have access to a range of diagnostic tests and equipment. The majority of the HCWs have been trained on conducting tests while only some have been trained to perform diagnostics such as electrocardiogram (ECG) and ultrasound scans.

Tests often referred to other facilities due to unavailability are:

- Biochemistry tests, such as full hemogram, HbA1c, urea and electrolyte, and blood group tests.
- Imaging services, such as mammograms, X-rays, computerized tomography (CT) scans, and Magnetic Resonance Imaging (MRI).
- Viral load tests, DU tests, and other tests that require specific machines and reagents that may not be available.
- Malaria tests, such as microscopy and MRDTs, and tests for complicated malaria cases.
- TB and HIV tests, sputum specimens for MTB/RIF (genexpert), sputum for culture and sensitivity, and other tests that require specialized facilities and equipment.
- Cancer tests, such as biopsies and histology tests.
- Other tests, such as ultrasound tests, H. Pylori tests, and pregnancy tests.

In addition to the above tests, health care providers expressed the need for more modern equipment to improve diagnosis and decision-making times. Challenges health care providers face include a lack of equipment and personnel, shortage of reagents, and machines often break and maintenance takes time.

**Community engagement**

CHWs are the primary link between community and health centers and facilities. Under this responsibility they also perform other roles:

- Catchment mapping of households, pregnant mothers, under five children biannually.
- Defaulter tracing for immunization, ART, TB, ANC.
- Household visitation and health talks via play box sessions.
- Demand generation including referring people for different health service needs.
- Community case management for malaria including malaria (3T) testing, treatment, and tracking.
- Mobilization of Community Health Dialogues and Health Action Days.
- TB contact screening.
- Attending and counselling the palliative patients/care givers.
- Timely referrals for skilled delivery.

CHWs experience some obstacles while performing their roles including:

- Large coverage area.
- Lack of mobility to the different communities.
- Manually reporting is tiresome and exhausting.
- Weather-related challenges.
• No communication between the household and CHW on sudden changes to the agreed visitations (e.g., CHWs often finds members have gone for a funeral).
• Lack of working tools and commodities.
• Culture challenges such as traditional beliefs in the community.
• Financial challenges such as low compensation.
• Referrals only happen with support such as clients don’t have means to reach facility, so they give them fare.
• Inadequate training in family health matters.
• Malaria Kits are not replenished.
• Unplanned activities cropping in through phone from CHA or from subcounty.
• Lack of motivation.

Governance and leadership

Kenya devolved health service delivery including the management of the health workforce in the 47 counties enabling more community involvement in decision making. The challenges in governance and leadership are a lack of preparedness and a knowledge gap by the political leaders and the public on existing policies and guidelines in PHC.

At the national level, the Director of Medical services heads the following directorates
• Directorate of Preventive and Promotive Health
• Directorate of Public Health and Sanitation
• Directorate of Health Standards, Regulations and Quality Assurance
• Directorate of clinical services
• Directorate of Health financing
• Directorate of Digital Health, informatics, Policy and Research
• Directorate of Health Products and Technologies

Digital health technologies

The Kenya National eHealth Policy (2016-2030) objectives include enhance interaction between client and health service provider, accelerate achievement of universal health coverage, and enhance electronic exchange of health data and information.

The country developed a National Community Health Digitization Strategy (2020-2025) with the following objectives to strengthen eCHIS governance and leadership for enhanced coordination and implementation of Community Health Services, to enhance data use for informing policy- and evidence-based planning for community health services, to provide standardized quality of service delivery occasioned by defined workflows, create a standard platform for data collection and reporting for community health services by 2023, to improve the capacity of the community health workforce to generate and use quality data that sustains the Community Health Services, and to improve the quality of community health services through monitoring and evaluation of key performance indicators.

Currently the common digitized tools for community healthcare workers are:
• Community Health Toolkit (CHT) is an open-source technology designed to support community health systems and frontline health teams delivering care in the hardest-to-reach communities.
• M-Jali – Mobile – Jamii Afya Link, is AMREF Enterprises Limited (AEL)’s innovative solution for improving collection, analysis and dissemination of community data.

• Kobo Collect is based on the open source ODK Collect app and is used for primary data collection in humanitarian emergencies and other challenging field environments.17

• AMREF LEAP is a mobile learning solution for training healthcare workers, wherever they are, whenever you need it using their mobile device. It uses regular updates and peer-to-peer communication to strengthen the skills of health workers.

• DHIS2 Tracker is an application within the DHIS2 platform for the collection of individual-level (or case-based) transactional data, such as medical records for individual patients, confirmed and suspected cases during a disease outbreak, logistical information on specific commodities or school records for students.18

• Empower Health is a program by Medtronic that is nationally scaled program for data-driven community healthcare delivery in Kenya. It uses SPICE, the open-source technology platform that supports outcomes – focuses patient care.

• Toto Health used by communities to improve health outcomes by sending out educative SMSs on nutrition, breastfeeding, child development, vaccination and family planning. It can also be used to track vaccination schedules, get reminders on prenatal and postnatal clinic visits.

• cStock connects community health volunteers to facilities and promotes demand-based resupply, ensuring greater product availability in communities. This leads to better management of inventory and demand planning by CHVs supervisors, facility staff and subcounty and county managers.

• MDharura is a mobile health solution that enables Community Events-Based Surveillance (CEBS).

There is a range of digitized processes in the facilities, including inventory of equipment, LINDA MAMA, outpatient services, admission process, medical records, pharmacy, fee and billing sections, NHIF services, drug ordering, and laboratory services.

Some facilities use manual methods to capture data, while others use digital tools. However, there is need for more efficient and effective data capturing tools.

Most of the healthcare workers do not have access to devices such as laptops, desktops, and tablets, which makes it difficult to provide quality services since it limits their ability to access patient information and medical records outside of their facility.

Areas that require improvements in the digital space include patient referral systems, pharmacy orders, ordering equipment and installation of an EMR system.

Some of the gaps seen in digital technologies include low adoption of digital tools due to lack of resources and infrastructure in some areas, low literacy levels, inadequate technical expertise, unreliable power supply, limited funding, and lack of government involvement on most eHealth projects.

**Funding and allocation of resources**

Health expenditures related to PHC increased from 1.79 billion dollars in 2016/17 to 2.07 billion dollars in 2020/21. The proportion of PHC spending to current total health expenditure has reduced from 63.4% to 53.9% in the same period. Domestic government funding for PHC increased from 37.2% 670 million dollars to 39.4% 820
million dollars of total PHC spending between 2016/17 and 2020/21 while external funding reduced from 28.3% 510 million dollars to 23.9% 500 million dollars over the same period.\textsuperscript{19}

The public management policy guides national allocation of finances to counties. The gaps seen in this facet include low resource allocation to PHC, lack of guidelines for health care financing to counties, and lack of sustainable community health funding.
6.3 Nigeria synthesis

Nigeria is an LMIC situated on the western coast of Africa (sub-Saharan region) with a total population 206,139,587 people per the World Bank data 2020\(^{20}\). The sustainable development score for Nigeria is 54.3, indicating a 54% achievement of the United Nations Sustainable Development Goals (SDGs), ranking 139 out of 163 countries. Goal 3 of the SDGs, “ensuring good health and wellbeing”, remains a major challenge and the SDG 2022 score indicates that maternal, neonatal, and mortality rates under-five have stagnated\(^ {21}\).

PHC is defined as the cornerstone of the health policy in Nigeria and is the first point of contact for most Nigerians requiring health care services\(^ {22}\). PHCs are expected to contribute to the attainment of Goal 3 of SDGs. Currently, service delivery areas for PHC are political wards with an estimated coverage population of 10,000 to 20,000\(^ {23}\).

The challenges faced in Nigeria include:

- High Maternal Mortality Ratio (MMR) of 512 deaths per 100,000
- Neonatal Mortality Rate of 39 deaths per 1,000 live births
- Under-5 Mortality Rate of 12 deaths per 1,000 live births
- PHCs not meeting the minimum standards for service delivery
- Fragmented governance system and poor financing system
- Indirect payment for services that are supposed to be free (accessibility)
- Poor and dilapidated health facilities
- Low income to meet health needs of the populace

Primary health care workforce

Nigeria recommended specific numbers of workforce per PHC facility. The required workforce in a PHC according to the minimum standards and actual number of workforce are available in Table 4.

Table 4. Results of an assessment of availability of staffing in 10 LGAs of Edo state review:\(^ {24}\)

<table>
<thead>
<tr>
<th>Health Personnel</th>
<th>Recommended</th>
<th>Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical officer (if available)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>CHO (must work with standing order)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Nurse/Midwife</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>CHEW</td>
<td>3</td>
<td>10</td>
</tr>
</tbody>
</table>
Some of the challenges Nigeria faces in workforce include inadequate availability and distribution of workforce between urban and rural areas; medical officers, CHO’s, and nurses are not available in most rural PHCs; low workforce motivation; absenteeism especially in rural PHCs; and poor knowledge and skills\textsuperscript{25}.

### Service delivery

According to the Minimum Service Package for PHCs, the following are minimum priority set of services:

- Health promotion
- Routine home visits and outreach
- Maternal, Newborn and Child Health care
- Family planning services (counseling and methods provision)
- Proper nutrition activities
- Immunization
- HIV/AIDS
- Referral
- Community mental health

The HRH project in Nigeria implemented an incentive system and a Population Council and WHO study conducted a study on it in the rural communities of Bauchi and Cross River states.\textsuperscript{26} The study reported the following incentives:

- Rural posting allowance (66%)
- Stipends for ad hoc jobs such as immunization (20%)
- Loans (20%)
- Per diem for conference attendance (35%) or trainings (40%)
- Reimbursements for transport fare and money for referrals respectively as financial incentives (3%)

The gaps in service delivery include poor funding of PHCs, limited financial access to some essential MNCH services by patients, shortage of essential drugs and medical supplies for service delivery, poor quality service, cultural beliefs, and poor motivation of service providers\textsuperscript{27}.
Physical infrastructure

Nigeria faces several infrastructure challenges including lack of pipe borne water or boreholes for portable water supply, poor connection to the national grid for power supply, insufficient number of beds and bed linens, and a poor communication system that hinders referrals.

Medicines and health products

Nigeria lists essential drugs that a PHC must have to be classified as operating within the minimum standards. The categories of drugs include:

- Anesthetics
- Analgesics
- Anti Allergic
- Anti-convulsant
- Antidotes
- Anti-infective drugs
- Anti septic and disinfectants
- Dermatological drugs
- Diagnostic agent (Tuberculin)
- Dressing and medical devices
- Ear, Nose and Throat drugs
- Gastro-intestinal drugs
- Oxytocic
- Vitamins and minerals
- Others

Associated formulation for the essential drugs are also stated in the minimum standards.

The challenges Nigeria faces under medicines and health products include non-availability of basic drugs and products, poor storage facilities for vaccines, poor quality of the products in many cases, and high cost of medicines and health products.

Diagnostics at PHC

The following diagnostic services are offered in a PHC facility:

- Preliminary diagnoses of tuberculosis
- Malaria (RTD)
- Hypertension
- Uncomplicated visual problem
- Peptic ulcer
- Upper respiratory infections

Where Laboratory Technicians are available, they are trained to conduct the above diagnosis. According to a study done by the University of Benin Teaching Hospital, only 30% of PHCs had basic diagnostic equipment.24
Community engagement

The minimum standards package for PHC in Nigeria identified needs to institutionalize community engagement in the management system of PHCs. The minimum package recognizes that health committees are key mechanisms for enabling participation of community members in decision-making on matters related to their health. This includes:

- Village and district development committees are constituted
- Representatives of at LGA level PHC management committee include ward development committee, women, youth and religious bodies
- The community engagement therefore aimed at ensuring that communities through their representatives are involved in making decisions and creating enabling environment for the integration of PHC service delivery, including endemic, communicable diseases (HIV/AIDS/STD, TB, Malaria, Onchocerciasis, etc.)
- Mobilize resources for PHC operations
- Plan and manage PHC services

The challenges Nigeria faces in community engagement include desire for remuneration, level of engagement often after citing health facilities, poor level of engagement in decision making, and poor implementation of standards for community engagement in PHC. ²⁸

“In few cases where the health care workers don’t have accommodation, community leaders and members make provision for them. Rich community members have also supported in the procurement of drugs for PHCs and made minor renovations...Women and youth groups have been supportive in mobilization of community members including pregnant women and youth to attend health facilities...In some cases, communities have engaged the support of road transport workers to transport patients needing referral since many of the CHC have no functional ambulances.” – Deputy Director Community Health Services

Governance and leadership

There are different layers of PHC governance in Nigeria including the federal, state, local government area, and community levels.

At the federal MOH, direction is provided on policy and programs, in which the minister of state for health is in charge of PHC. The National Primary Health Care Development Agency is responsible for implementing policies and programs in coordination with the Federal Ministry of Health. ²⁹

At the state level, the state governor exercises significant authority over major health policy and financing issues. The State Ministry of Local Government Affairs (SMoLG) hires, manages, and directly pays high-level PHC staff (through the State Local Government Service Commission). ³⁰ The State Ministry of Health (SMOH) is responsible for policy and program direction but in practice has limited power, with little direct authority over funding, which is the authority of SMoLG. At the local government area level, the LGA chairman directly oversees the LGA PHC department (instead of SMoLG or SMOH) and controls the local budget for PHC. ²⁹ The LGA PHC department, headed by the LGA PHC coordinator, is responsible for LGA-level program management (i.e., budgeting, measurement and evaluation, and supervision).
At the community level, the ward and village development committees are the primary bodies for community involvement in PHC. They can provide accountability on behalf of end users. However, they are not in place in all communities and are not always functional.

The challenges Nigeria faces in governance and leadership including very complex leadership system and fragmented governance with bottle-necks. The states MOH has responsibility for policy and programme direction but are not involved in hiring for PHCs which is the responsibility of SMoLG. The structure is also complex at the LGA level where the chairman oversees the affairs of the LGAs but the LGA PHC coordinator is responsible for preparing budget. Both SMOH and SMoLG have no direct control over PHCs, they can only coordinate.

**Digital health technologies**

In Nigeria, there is an existing National Health Strategic ICT Framework (2015-2020) which is yet to be revised. The objectives are to:

- Improve access to health services through the effective use of telemedicine and other ICTs for health worker training and support.
- Improve coverage of health services through the effective use of Civil Registration and Vital Statistics (CRVS), National Identity Management System (NIMS), Human Resource Management Information Systems (HRIS), National Health Management Information System (NHMIS) and Logistic Management Information System (LMIS) for tracking demand and supply of health services and commodities.
- Increase uptake of health services through the effective use of mobile messaging and cash transfer incentives for demand creation.
- Improve quality of care through the effective use of ICT for decision support within the continuum of care.
- Increase financial coverage for health care services through the effective use of ICT for the national health insurance scheme (NHIS) and other health-related financial transactions.
- Increase equity in access to and quality of health services, information, and financing through the effective use of ICTs for delivering appropriate health services for those who need them.

Some of the efforts to digital health technology in Nigeria are:

- LifeBank Nigeria developed an online platform that enables hospitals to connect and purchase blood from local blood banks an fulfilled those orders through an around the clock team of dispatch riders. They use the WHO-recommended cold chain infrastructure.
- Omomi app was launched by MOBicure. The app aims to provide pregnant women and mothers with access to life-saving maternal and child health information, as well as access to doctors with the touch of a button.
- Safermom delivers vital maternal health information to new and expectant mothers using innovative, interactive, personalized low-cost mobile technologies (SMS and voice call in local languages) to rural areas with the optimal goal of reducing maternal and infant mortality rates in Nigeria.
- Find-A-Med is a mobile medical directory that allows people to find the closest health and medical centres around then, complete with turn-by-turn directions.
- Kangpe is a mobile healthcare startup that has a platform that the public can easily receive answers to their health questions by chatting up verified doctors by SMS, mobile app or on their website at any time of the day.
• Drugstoc is an eHealth drug procurement platform that eliminates challenges in pharmaceutical supply chain such as sourcing and distribution by linking drug companies with institutions such as hospitals and pharmacies.\textsuperscript{33}
• Mobidoc is a mobile app that enables remote consultations, storage of electronic medical records and medication prescribing.\textsuperscript{33}
• Doctoora eHealth is a healthcare startup that connects patients, consumers and professionals to quality healthcare practitioners and services on a pay-per-use basis.\textsuperscript{33}
• Cardium is a drug counselling mobile application designed to improve medication adherence and the health literacy of non-medical professionals.\textsuperscript{33}
• Mentally Aware Nigeria Initiative offers 24/7, free and confidential support and information over the phone.\textsuperscript{33}

The challenges Nigeria faces with digital health technologies include uncoordinated efforts, most of the development is not widely disseminated and deployed, the wrong perception of people is used, unskilled workforce, infrastructure deficit, resistance to change, poor electricity supply/internet services, and huge financial commitment and sustainability problem.

\textbf{“It will be great to have a platform that permit people to access services anywhere in the country without enrolling as a new client. This will make it possible for service providers to trace health history of a client anywhere the client present himself/herself for treatment.”} – Data Officer

\textbf{Funding and allocation of resources}

The LGAs have direct control over the PHCs but are not directly responsible for providing funds for running the PHCs. The LGAs receive funds from the federation account channeled through the state. As a result, financial and political constraints at the state level may lead to uncertainty in the flow of funds to LGAs.\textsuperscript{29}

Often, LGAs receive just enough funding to pay staff salaries, leaving little to no resources for drugs, supplies, and maintenance. PHC financing thus depends primarily on state government and the willingness of the state governor and in part on the LGA chairman for allocating the budget for health.

In addition, LGAs have limited revenue generation prospects on their own. Thus, the end result can often be low levels of funding for PHC at the LGA level. Primary Health Care Financing Forum (recent development) and the Nigeria Governors’ Forum have made a commitment to fund PHCs.\textsuperscript{34}

The main challenge that Nigeria faces is the over dependency on federal allocation for PHC funding. Funding mechanism are through public and private funding, bracket funds, and donor investment. Public funding investments included annual budgetary allocation, tax revenue funding, health Insurance, and grants and loans. Bracket funds exist in selected states (Zamfara and Kano states).\textsuperscript{34} Private funding investments exist through user fees, employers financed schemes, and insurance schemes (employee or individual paid).
6.4 Rwanda synthesis

As of 2022, Rwanda has a population of 13.2 million according to a recent study by the fifth Population and Housing Census.

In 1985, Rwanda adopted a health development strategy based on decentralized management and district level care. During the genocide, the development of the health system was completely disrupted as much of the infrastructure, equipment, personnel, and health system itself was destroyed.\textsuperscript{35} Since then, steps have been taken towards restructuring and decentralizing management.

In the last two decades, Rwanda has registered significant progress towards universal health coverage through setting up primary health care. The major contributing factor to this success is the successful scale up of community-based health insurance (CBHI) for the informal sector, in which 90% of the population is covered by the health insurance.\textsuperscript{36}

Rwanda also recently restructured the national health system to align with the national decentralization policy, that sought to achieve three main goals: promotion of good governance, poverty reduction; and efficient, effective and accountable delivery of services. The public sector provides roughly 64\% of the health services, followed by faith-based organizations at 28\%, and the private sector at 8\%.

**Primary health care workforce**

PHC services are offered through medicalized health centers, health centers, health posts and community services. At the community level, community health workers (CHWs) are an important link between the community and the facilities. Insufficient trainings, supervision and workload are among the pressing challenges faced by CHWs. At the health post level, Rwanda has general nurses and midwives. At health center level, physicians including Obstetrics & Gynecology, Pediatrics, and Internal Medicine practices; and midwives. Medicalized health centers are health centers in which medical doctors from the district hospitals are availed on a rotational basis. The staffing for a medicalized health center includes a medical doctor, ophthalmology technician, dental therapist, radiology technician, mental health nurse, and nutritionist. Health centers also have a leadership and management team comprising of a quality manager, human resources, finance manager, procurement and logistics management, data management, and customer care.

The health workforce was also affected by the genocide in 1994 due to the many deaths and others went in to exile. Although the country has been steadily recovering from the workforce gap, the number of physicians is not satisfactory due to some of them shifting from the public sector to the private sector. As of 2018, the World Bank averaged the number of physicians per 1,000 people at 0.118.\textsuperscript{37} In addition to physicians, there is also an unsatisfactory number of nurses and managers with sufficient experience to respond to both administrative structures and health facilities.
Service delivery

In Rwanda, PHC mostly focuses on preventive measures and health promotion services. Commendable efforts in health care service delivery have seen Rwanda become one of the few African countries on its way to availing UHC to all its citizens. This progress is primarily attributed to national scale up of the community-based health insurance (CBHI) and construction of health posts in the communities.

CHWs are crucial in identifying a community’s health care needs. They also support health centers and health posts in case finding, disease prevention and treatment.38 Health posts are divided into two categories; First Generation Health Posts (FGHPs) and Second-Generation Health Posts (SGHPs). FGHPs provide primary care such as annual general checkups and screening, family planning, HIV voluntary counselling and testing, primary curative consolation, management of communicable and non-communicable diseases (e.g., influenza, malaria, diarrhea), integrated management of childhood illnesses, follow up of malnutrition cases, postnatal consultation, palliative care and management. SGHPs have an upgraded service package that includes maternity, ophthalmology, dental, and circumcision. At the health center level, the health center offers oversight to the PHC activities. Health centers offer health promotional, preventive, and curative activities.

Health posts face a challenge of non-harmonized operations where some are managed by health centers whereas others are managed by public-private partnerships. This has resulted in limited supervision of health posts. A pressing need in service delivery is the delayed insurance reimbursement.

Physical infrastructure

Rwanda is ranted as the world’s third country when it comes to public investment. In 2019, the country invested 13% of its GDP to the public.39 The government has continuously worked to reduce the average time it takes to reach a health facility by constructing health posts close to communities. From 2006 to 2020, the walking time was halved to 47 from 95.1 minutes through the construction of 1,160 new health posts. The government aims to bring the walking time to reach a health facility to 24 minutes by 2024.40 The Covid-19 pandemic disrupted progress of some construction interventions.

Medicalized health centers are required to have an equipped laboratory, operation theatre, and a pharmacy according to the service package.

Medicines and health products

The Ministry of Health has defined the service packages and standard list for public health facilities that defines the clinical interventions, human resources, medicinal and non-medical equipment and supplies for all levels of healthcare.41 This is meant to meet the basic community health needs, access to drugs and availability of health care providers. There is a separate national list of essential medicines for adults and for pediatrics.42,43

Every month, public health facilities in the district receive pharmaceuticals supplies and essential medicines form the Rwanda Medical Supply (RMS) branches. RMS negotiates and imports health products for the public health sector. Health facilities obtain their medicines from the RMS district stores. Normally, the stock levels for these products should not fall below the minimum and emergency stock levels. Any new product requests from the facilities should be based on historical data on consumption and stock availability. The Food and Drugs Authority regulates medicines and health products. It was established in 2018 to minimize the proliferation of fake medicines and health products. The FDA is in nascent stages; its capacity, policies, guidelines and operationalization are still not well established. Some of the challenges in provision of medicines and health products are funding, long procurement lead times and shortages at PHC facilities.
Community engagement
The MOH has established health posts that provide basic health services nationwide to underserved communities and they have also established.

Rwanda has three CHWs (one Animatrice de Santé Maternelle [ASM] and one male-female pair of CHWs called a Binôme) per village of approximately 50 to 150 households. These CHWs focused primarily on health promotion and referral activities.44

The ASM focuses on labor and delivery while the Binômes focus their activities on diagnosis and treatment of childhood illnesses, malaria diagnosis and treatment, malnutrition screening and referral and provision of contraceptives and TB treatment.45

Some of the core health information systems currently in use at the community level include:

- The electronic logistics management system
- Human resource information system
- Integrated disease surveillance systems,
- SMS-based system for real-time reporting

By connecting community health professionals with expectant mothers through the RapidSMS initiative, Rwanda has taken the lead in the use of innovation and mobile technology, enabling monitoring of antenatal care and referrals in an emergency. Furthermore, births and deaths are reported using the system.

There are challenges in supporting and continuing to build the capacity of CHWs., low community participation in the health sector, and strong influence of traditional beliefs and traditional medicine.

Governance and leadership
The MOH serves as the overall administration which governs all health facilities, both public and private. Health services in Rwanda are provided through public sector, government-assisted health facilities (GAHFs), private health facilities, and traditional healers.

The public sector is organized in three levels, each have a defined technical and administrative platform called a minimum package of activities. Each level coordinates with each other.

The Public Sector levels include the:

- Central level which develops health policy, strategic and technical frameworks, and manages the national referral facilities.
- Intermediary level is made up of referral and teaching hospitals and hosts the public health department of Kigali city.
- Peripheral level consists of district health offices which have an administrative office (district health unit), a district hospital and a network of health centres, health posts, and CHWs.

The main challenge in governance and leadership in Rwanda is coverage of PHC facilities and access to special services are both limited.

Digital health technologies
Rwanda’s National Digital Health Strategic Plan (2018-2023) and Smart Rwanda Master plan includes the following objectives:

- Strengthen integration and interoperability of health information systems
• Improve health service delivery and accessibility through digital health
• Improve access to health information and digital services for citizens
• Improve collection, management, and use of data at all levels of care
• Strengthen the management of critical resources in the health sector by enhancing the following systems: human resource, supply chain, financial resource management, quality improvement, and performance-based financing systems
• Improve ICT infrastructure and software support in the health sector
• Improve the legal and regulatory framework for security, confidentiality and controlled access to information
• Leverage technology to build the capacity of the health workforce, offer decision-support, and prepare health workers at all levels to manage and use the full range of digital health technologies
• Promote research and development to adapt innovations and the use of emerging technologies in the health sector

In collaboration with the USAID Global Health Bureau, United States Global Development Lab, and USAID Bureau for Africa, the regional health program of USAID/Kenya and the USAID East Africa Mission engaged MEASURE Evaluation to provide technical support to EASTECO to conduct an EAC regional digital health readiness assessment by taking into account aspects of systems interoperability and the cost of investing in eHealth in the EAC region.

Gaps identified by the MEASURE Evaluation assessment team included eHealth TWG has not met in over a year and that the digital health strategy and policy have been on draft since 2018, and there is lack of human resource capacity for some of the highly technical aspects of interoperability.

As part of the SMART Rwanda Initiative, the MOH and Rwanda Information Society Agency (RISA) recently worked with Microsoft to develop a plan for the digital transformation of health care in Rwanda. It is built on the key aims of the Rwanda health system.46

**Funding and allocation of resources**

Rwanda has the following health financing strategies:

• Risk pooling – health insurance
  o Community-based health insurance based on the ability to pay
  o Social health insurance such as the Rwanda Social Security Board, Rwanda Health Insurance Fund (for public servants) and Military Medical Insurance
  o Voluntary Health Insurance: CORAR, SORAS, Radiant, UAP etc.

• Efficiency – value for money
  o Performance-based financing that links measurable indicators with financial incentives
  o Decentralization by shifting job positions and related budget to the health facility level
  o Performance contract system (imihigo) where commitments are made to deliver on key development projects

• Increase of domestic resources
  o Community health cooperatives, performance-based financing
  o Public, private and community partnerships (PPCPs)
  o Self-sustaining health facilities
Tanzania synthesis

Tanzania is positioned to be the next business hub in East Africa because of intensive efforts by the government to develop infrastructure and create a conducive business environment. The country has a population of 63,588,334 people. The SDGs of 2025 are guiding growth in the country with an aim to make it an economic hub in the region. The SDG score of the country is 57.4% which shows that achievement of the 17 facets is at that level, but more areas are doing better compared to others. The growing population of the country provides a workforce that is driving various development agendas. Health is an issue of great concern in the SDG of 2025 as a vibrant economy must have a positive correlation with a healthy nation. The country has a financing strategy and policies that govern the health sector to provide guidelines and growth prospects in various areas.

The health sector strategic plan of Tanzania is on its 5th iteration (HSSP V) and provides the blueprint that guides all matters health in the country. The HSSP evolved since 1999, to embrace changes in the development goals in the country and various growth objectives and guidelines of WHO. The HSSP focuses on UHC but has various strategies that promote PHC in the country. There is a drive to promote access to health care at low levels of the community and encourage preventive approaches as opposed to curative practices at health facilities.

Despite these efforts by the government, the disease burden is still high among people in the society, and there are challenges in achieving various goals in the HSSP V. Finance is an area of concern in the country as donors are pulling their funds after Tanzania was declared a low-middle income country. The government is upbeat about overcoming these challenges and achieving various goals and objectives.

Primary health care workforce

Tanzania is investing heavily in the education of its health workforce with partners coming in to support them in various areas of interest. Technology is redefining the training process as new equipment is developed to help in performing various tasks at health facilities. UHC is the primary basis for growth and development, but PHC is domiciled at health centers, dispensaries, and community units. The MOH requires the following cadres to be present at a facility to meet the minimum threshold to offer PHC services.

Personnel:

- Clinical Officer/Clinical Assistant (Health Center & Dispensary)
- Registered Nurses Enrolled Nurses and Nurse Midwives
- Medical Attendants
For support staff, security guards are required.

Service delivery

The health system in Tanzania has different levels that provide various services to ensure that people at the smallest units of the society have access to PHC. These levels include national, regional, district hospitals, health centers, dispensary services, and community-based health services. A support system exists built from the district hospital going to the dispensary level to support services, and offers referral systems. The current system aims to ensure that people can access quality services at a low cost.

The national government requires that all district hospitals have 200 staff, 39 at health centers, and 15 per dispensary. The local government provides guidelines and funds the dispensaries and health centers. This has increased the quality of health that people receive across the country. The system works on a referral basis. If a lower level cannot tackle a case, it passes the case to a higher level where there are more qualified practitioners and equipment.

Physical infrastructure

The SDG goals of 2025 focus on infrastructure development as the key driver to economic growth and transforming the country to be a business hub in East Africa. To support the economy, the government has invested in making all major roads accessible and of high quality. This has made it possible for people to access various regions and provide health services to remote areas in Tanzania. Health infrastructure is helping to ensure that PHC reaches people in all units in the community.

The HSSP IV framework was instrumental in guiding Tanzania’s health infrastructure development. The government has heavily invested in infrastructure with a new plan long term investment plan for health facilities in all 1,845 wards. The government is focusing on developing health infrastructure in new health facilities, rehabilitation of existing facilities, improving access to equipment and information and communication technology, and research and innovation to ensure that there is quality service and access to healthcare in the country.

Tanzania Development Vision 2025 is in line with the need to build infrastructure that will complement health services and increase the quality of life among people in the society.

Medicines and health products

Availability of medicines and health products play a vital role in the process of ensuring that health facilities offer quality services to patients. Medicines and health products such as diagnostic tools are highly regulated in Tanzania. All public facilities can only purchase drugs from the medical stores department. If drugs are unavailable, they must borrow from facilities within their locality as they wait for orders to be filled. In case this is not possible, they will be referred to prequalified vendors who can sell them the required drugs.

The private sector also follows guidelines made the MOH in all its operations and are also regulated and monitored by the Tanzania Medicines and Medical Products Authority. The product introduction pathway
specifies that any foreign entity that wants to introduce a new medical product, will need to have it registered by a Tanzanian national. The focal person will be responsible for the drug and it will undergo testing by MOH before it is approved into the market. The government is keen to ensure that all medical products being used in the country are frequently audited to ensure that people are not exposed to any harmful substances.50

Community engagement

Community engagement plays a vital role in promoting quality care among people by enhancing accountability and using health education to advocate for prevention of diseases.

Health Education in Tanzania focuses on improving the health of community by creating awareness and improving levels of literacy. Communities should be aware of their health, health risks, and environmental factors influencing health. Community health workers engage in outreach programs and play a liaison role between the people and health facilities.49

Accountability focuses on making people aware of their rights according to the Tanzania constitution to access quality health care and budgetary allocation to promote development of infrastructure. They can engage their leaders on various issues affecting health care infrastructure in the community or policies that are affecting accessibility.

Governance and leadership

The HSSP V focuses on establishing independent health systems that can offer quality services to people in the society. It sets out a framework of governance at facilities and plans to ensure that all hospitals have a committee that manages its activities. This process will help in promoting transparency and ensure there is a reporting structure that enforces accountability.

The National Health Policy of 2007 that is being redrafted, sets out the leadership and governance structure at health facilities at all levels in the country. Each region has a regional referral hospital, a hospital at each council, health center at each ward, and a dispensary in each village. Currently, there are 6 cities, 20 municipalities, 22 town councils, and 137 district councils. In addition, there are 3,956 wards and 12,319 villages.49

Nearly all functioning public health facilities have hospital boards, a Council Health Services Board (CHSB) or Health Facility Governing Committee for health centers and dispensaries. In addition, there are 21 Regional Referral Hospitals with functional advisory boards. By 2019, the government had established governing structures in 100% of health facilities at the regional level, 65.8% at the council level, 23% the wards, and 58.8% at the villages.49

Digital health technologies

The National Digital Health Strategy (NDHS) 2019–2024 was developed and launched in the year 2019.51 The strategy aligns with the Tanzania Development Vision 2025 and the ongoing draft Health Policy 2020 that aims to facilitate the realization of government priorities to achieve UHC.49 The digital strategy will be taken into consideration in guiding the HSSP V digital health initiatives that aim to improve outcomes in health and achieve UHC.

Policies guiding the digital scope of health care in Tanzania are continuously changing and the TDHS 2019-2024 outlines various strategic goals that promote digital technology including.51

- Strengthened digital health governance and leadership.
- Standardized information exchange.
• Improved client experience through efficient provision of quality health services
• Health service providers and managers empowered to take evidence-based actions.
• Sustained availability of health resources

These objectives are in line with the needs of facilities as a facility in charge points out.

“The facility has no robust systems to support ICT infrastructure, and there is a need to have training on new technologies at the facility when the product is launched or attend a workshop for induction on new equipment and devices.” – Facility in Charge.

Facilities in rural areas do not have access to ICT infrastructure due to lack of internet and competing priorities at the facility.

Digital health technology at the community level includes:

• MHealth mobile health technology is being used in healthcare and is becoming a huge contributor in delivering healthcare information. People in Tanzania, who are in desperate need for healthcare, but face major obstacles such as poverty, lack of infrastructure and government corruption. These people cannot pay for healthcare and are unable to travel to locations where adequate healthcare is available. Mobile health makes people receive information in real time allowing people to address health issues much earlier.

• District Health Information software (DHIS2) is an open-source flexible, web-based health management information system (HMIS). Functionalities include aggregating the people training in FP, immunization doses given, recording events such as clinical visits, facility assessments, and tracking patients, equipment, drugs and households.

• Government of Tanzania Hospital Management Information System (GOTHOMIS) is an electronic information system intended to collect and report facility level clinical information and support health facilities in service delivery management.

• Facility Financial Accounting and Reporting System (FFARS) is an accounting and reporting system which helps to consolidate, improve and link current accounting and reporting activities through a strengthened and comprehensive system.

Funding and allocation of resources

The health care system in Tanzania is still developing with multiple areas calling for direct funds to facilitate growth and stability. The government is also straining to raise funds for the health sector due to competing priorities. The health care system is still weak as facilities are unable to raise enough revenue to sustain their operations. Research shows that 60% of all health facilities are operated by the government while private and/or faith-based organizations accounting for the rest. There are various areas of interest such as child mortality, maternal mortality, HIV/AIDS, malaria, and pneumonia that are a challenge to health care.

Budget allocation in the year 2020/2021 was 387.9 million dollars and 155.5 million dollars will go to development projects. These projects will help the government to meet its health care goals and ensure people in the society have access to quality health care. Budget allocation for the year 2022/2023 is 471 million dollars. This shows a steady rise in funding, but the government is yet to meet the Abuja declaration which requires member countries to remit 15% of the budget to health care.
However, 40% of the country’s budget is funded by international donors. This is helping the country to grow and deliver services that are out of their financial capacity. The listing of Tanzania as a low-middle income country puts this funding in jeopardy as donors are pulling out as countries at this level are expected to fund their health needs. The financing of health care in Tanzania is of interest to many players as it has a direct impact on the quality of services people receive in the country.

Funding is not only a challenge at the national level, but people in the community and health facilities also encounter challenges when it comes to resources. Patients are unable to meet the cost of treatment and medicine during their visit to health facilities. The government is urging people to register for NHIF in a bid to provide services for people who cannot afford costly insurance schemes.

“The patient’s inability to pay affects their ability to serve, as people in their region believe that services are free”. – Facility in charge of Mwenge dispensary.

Facilities rely heavily on the government to fund infrastructure development and purchase of new equipment. This dependance leads to delays and poor quality.

“In my facility, one room is used to provide three different services which are ultrasound, photocopying, and treatment. Patients have to wait in line for the room to be free and receive treatment and the other services.” – Facility in Charge of Sandali Dispensary

Funding has a direct impact on quality and accessibility to services at the facility. PHC is fairly new in the country and does not have adequate funding, but it provides a solution that will have a long-term positive impact in the country.
Zambia aims to achieve UHC by 2030 by providing comprehensive essential PHC services to its growing population, which has increased from 13.1 million in 2010, to 18.4 million in 2021. Despite the government’s efforts to address the country’s high burden of communicable diseases and maternal, neonatal, and child morbidity and mortality; these challenges persist. To improve health care, Zambia has developed policies such as the National Strategic Plan 2017-2021 and the National Health Strategic Plan 2022-2026, which focus on strengthening PHC. Additionally, the government has increased budget allocation to the health sector and established the National Health Insurance Scheme (NHIMA) to ensure affordable and equitable access to quality health care.

**Primary health care workforce**

The health workforce in Zambia remains a major concern in terms of numbers, quality, and equity. The Ministry has emphasized the need to ensure availability of adequate, competent, and well-distributed health workforce across the country. According to the 2020 WHO report, the Zambia doctor-to-patient ratio was at 1 to 12,000, compared to the ideal ratio of 1 to 5,000. Furthermore, the report revealed the nurse-to-patient ratio was 1 to 14,960, compared to the ideal ratio of 1 to 700. The clear implication is that despite efforts towards attaining the WHO health worker to patient ratio, the recruitment of competent and adequate health staff needs to continue and be scaled up (National Health Strategic Plan 2022-2026).

The PHC workforce in Zambia is made up of various cadres, including medical officers, clinical officers, registered nurses/midwives, environmental health technicians, pharmacists, lab technicians, health information management officers, accountants, procurement officers and mortuary attendants. These healthcare workers are responsible for providing essential healthcare services to the Zambian population at the district, health facility, and dispensary levels.

However, Zambia still faces a shortage of health care workers, particularly in rural areas. This shortage poses a significant challenge to the country’s efforts to achieve UHC and improve health outcomes. Although the MOH has made efforts to ensure that communities have access to basic health care services within a five-kilometer radius, there remains an unequal distribution of health facilities throughout the country, with many health posts in rural areas remaining unstaffed. In addition to the formal health care workforce, there are Community Health Workers (CHW), Community Health Assistants (CHA) and Community- Based Volunteers (CBV) who are trained in various health topics by MOH with support from partners. According to the National Health Policy 2012, the
ratio of community health workers should be 1 per 500 people. CHAs who serve at a ratio of 1 per 3,500 in urban areas and 1 per 7,000 people in rural areas, and are responsible for disease prevention control and PHC.

To address this shortage, the Zambian government recruited 11,200 health workers in 2022, with plans to continue recruitment in 2023. The NHSP 2017-2021, has a goal to increase availability of skilled, motivated, equitably distributed staff and effective support services to contribute to the effective delivery of health services. Despite the efforts to recruit and train health care workers, the workforce continues to face various challenges due to inadequate funding, unequal geographical distribution of healthcare workers, poor working conditions and a lack of essential equipment and tools. Health care workers in rural areas face additional challenges such as transportation and proper accommodation, which further compound the shortage of health care workers in these areas.

**Service delivery**

Zambia has a health care model based on equity, community participation, and accessibility. Zambia provides comprehensive services that include preventive services such as immunizations, health education, family planning, maternal and child health services, as well as curative services which include diagnosis and treatment of communicable and non-communicable diseases. Additionally, rehabilitative services like counselling and therapy, and promotive services like community health programs, including WASH (Water, Sanitation and Hygiene) and disease prevention are also provided at PHCs.

The provision of health care services at PHCs is impacted by various factors, resulting in a complex service delivery situation. Challenges such as inadequate logistics, geographical access barriers and referral systems limit access to proper service delivery particularly in rural areas. To mitigate some of these challenges, health facilities collaborate with CBVs to provide services to the door steps communities.

The health care workforce composition varies across districts and facilities depending on factors like population demographics, local health needs, and facility size. Triangulation of diagnostic tools and types needed is done at provincial and district levels. Referrals start from the community level where CBVs refer clients to the health facility after identification and analysis. Facilities that do not have equipment, medication or personnel trained to offer a particular service refer either to another facility or higher-level hospital.

> “Because procurement processes take long, we often don’t have tools or medicines so we tend to refer or advise clients to buy from local pharmacies”. – CHW from Zambia

The government has implemented several policies and initiatives aimed at improving service delivery and expanding access to health care for all citizens. For instance, the NHSP 2017-2021 targets promoting UHC, strengthening the health system, improving health service quality, and increasing access to health services, especially for the vulnerable and marginalized populations.

Similarly, the plan provides a roadmap for achieving the National Health Policy objectives, including improving maternal and child health reducing communicable and non-communicable disease burden, and strengthening health systems and service delivery.
Physical infrastructure

The government has implemented several policies aimed at improving the physical infrastructure of the health care system. The country’s NHSP 2017-2021 outlines one of its key priorities as the need to establish management systems for improving the availability and accessibility of infrastructure and medical equipment at all levels. The policy also emphasizes the need for access to health services through the construction and rehabilitation of health facilities in order to facilitate equity of access to quality health services.54

“The government has also been intentional about allocating a portion of the budget to healthcare infrastructure development. The funding has been used for the renovation and construction of health facilities, procurement of equipment and tools as well as health facility housing".

– Community Health Unit-MOH

Another key factor is community involvement in supporting infrastructure development. Community members often collaborate with health care workers to renovate or build health facility buildings including mother’s shelters, immunization shelters, and incinerators by providing building material, labor, or money. The partnership between communities and health care workers helps to identify priority areas for infrastructure development that meets specific needs.

“Communities and MOH work with organizations like WaterAid and World Vision and these organizations provide technical assistance and funding”.

– HCW from Zambia

Medicines and health products

The government has made significant steps towards improving the availability of medicines and health products in the country. Availability of quality medicines has been a challenge particularly in rural areas. For instance, there have been times where the country has been sold counterfeit drugs. However, the government has addressed these issues by implementing stricter regulations such as establishing the Zambia Medicines Regulatory Authority (ZAMRA) whose sole purpose is to regulate the importing, manufacturing, and distribution of medicines and the Zambia Medicines and Medical Supplies Agency (ZAMMSA) who is responsible for the procurement, storage, and distribution of these products.

The procurement process for health care commodities in Zambia varies significantly between facilities, with some receiving their requested items in as little as two weeks while others wait close to two months. The process begins at the facility level, where a requisition is submitted through the NAVISION system, as well as a hard copy of the request to the sub-district who then submits it to the District Health Office (DHO) through ELMIS in cases of stock out. DHO compiles all requests from facilities and forwards them to the Provincial Health Office (PHO), also through ELMIS. Once PHO submits the requests to MOH headquarters using ELMIS, the requests are compiled and sent to ZAMMSA, whose procurement processes are linked to both ELMIS and Navision. The entire process involves multiple levels of bureaucracy and can be time-consuming, leading to variations in the amount of time it takes for facilities to receive their requested commodities.

The government has also implemented a number of initiatives to address issues of medicine affordability and accessibility including the introduction of a NHI Scheme to provide affordable health care to all Zambians and the improvement of storage capacity across the country through the establishment of seven regional hubs as of 2021. However, the problem of stock-outs of essential medicines and medical supplies has not yet been resolved and
needs urgent attention. People in rural areas still struggle with this as they are told to buy medicines from private pharmacies which becomes costly for them.

“To ensure a sufficient supply of reagents, consumables, and test kits, the country procures these items on an annual basis and the National Focusing and Quantification Report outlines the number of diagnostics tools and types required at PHC centers across the country”. – Clinical Care and Diagnostics-MOH

The National Medicines Policy serves as a framework for the procurement, storage, distribution, and use of medicines in Zambia. Additionally, the Essential Medicines List (EML) which is based on WHO model list identifies essential medicines for the treatment of common health conditions such as malaria, TB, non-communicable diseases, HIV/AIDS, and maternal and child health conditions. The EML is used to guide the procurement and distribution of medicines.

Community engagement

Neighborhood Health Committees (NHCs) play a significant role in identifying and mobilizing resources and communities to contribute towards the construction of infrastructure in existing health facilities, identifying health needs, and supporting health promotion and education. These committees consist of both health care workers and community members, with community members raising funds and volunteering their labor services. As a result, the NHCs have a powerful influence in facilitating community participation and engagement in improving healthcare facilities.

Governance and leadership

The International Health Partnerships (IHP+) provides a framework for analyzing the governance of the health sector by focusing on broader issues of policy, legislation, coordination, equity, effectiveness and efficiency, transparency and accountability, intelligence and information, and ethics. An important development towards strengthening the health sector’s leadership and governance in Zambia has been the existence of a strong Sector-wide Approach (SWAp) mechanism, for coordination of the participation of the sector partners in the health sector. Decentralization of health systems and services will form part of the main focus of the repositioning of the health sector, to deliver UHC to the people of Zambia.

The leadership and governance structure of community health is at various levels; community health has a unit at the national level where all activities are coordinated through the Ministry leadership, provincial, district, and facility levels. The structures are extended to the communities through the Health Centre Committees (HCCs) and Neighbourhood Health Committees (NHCs). The NHCs are the lowest governance structure in the Ministry of Health system and provide a link between the facility and communities.

Digital health technologies

From 2017 to 2021, significant efforts were made to strengthen the Health Management Information System (HMIS) in response to program needs. However, further enhancement and harmonization of health information systems are necessary to improve access and utilization of quality and timely health information (NHSP 2022-2026).
“Any new product or technology should undergo evaluation by a technical working group (TWG) to assess its cost-effectiveness and interoperability. The participation of ICT and monitoring and evaluation departments is crucial in this process”. – Community Health Unit-MOH

Various initiatives have been implemented in PHC such as smartcare, ELMIS, logistimo, DHIS2, HMIS, MVACC, Dynamics, and Navision. Nonetheless, the limited access to some of these systems poses a challenge to those who require them to perform their duties but do not have authorization. One of the goals of Zambia’s eHealth strategy for 2017-2021 is interoperability, which aims to enable all systems to interoperate through a National Health Information Exchange. This will be achieved by conducting stakeholder consultations, establishing a technical working group, developing a road map or blueprint, and creating an implementation plan.

**Funding and allocation of resources**

During the implementation period of the NHSP 2017-2021, one key achievement was the development of the National Health Care Financing Strategy (2017 - 2027), whose goal is to attain adequate, sustainable, and predictable financing through existing and new sources. Another major achievement was the successful introduction of the National Health Insurance Scheme (NHIS). The 2017-2021 NHSP targeted to achieve the Abuja target of 15% of the national budget.

“At the facility level, the minimum 10% allocation from government grants to community health activities is often inadequate due to the small absolute figures and communities are generally unaware of the 10% allocation and how to access it”. – Community Health Unit-MOH

However, despite the observed nominal increase in financing to the health sector, the share of health funding to the total public budget decreased from 8.9% in 2018 to 8.1% in 2021, and remained far below the Abuja target. There is still a significant financing gap requiring renewed commitment and effort from the government and its cooperating partners. Furthermore, the National Health Accounts (NHA) 2016 report reveals that the health sector was heavily dependent on external assistance, with an annual average of 42% (US$22.58 per capita) of the total per capita health expenditure from donors and 41% (US$25.04 per capita) from the Government in 2016. A large proportion of donor funding was made off-budget (MOH Action Plan 2017-2021).
Annex 1. Data collection tools

Overview of data collection tools. How were they developed and used?

Assessment framework

The assessment framework is a tool that was used to map out the current state of play in primary healthcare across the six countries. The tool includes questions to pursue, the sources of information and the responses. Below are the questions captured in the tool.

Definitions of primary health care, primary health care settings, burden of disease:

1. How does government define PHC?
   a. What are the levels of the health system and what services, and cadres are available at level?
   b. Is there a current government PHC strategy- what are the main objectives?
   c. Is labor and delivery (“L&D”) included at primary health care in these settings? If PHC has multiple levels, where is L&D available?

2. What is the national burden of disease? (Top 10-15 causes of morbidity and mortality). a. What are the most common diseases and conditions (patient footfall) seen at PHC?

3. What is the estimate of the number of PHC visits seen across the country?
   a. Per year (overall total)
   b. Per person/per year
   c. ANC visits/per year

4. What are the major investments in PHC in these countries- national government investments and donors etc.

5. What PHC activities are being funded?

6. How are government and donors defining the metrics of the investment success?

7. What outcomes (health, performance, system etc.) are being measured?

8. What are the perceived obstacles to attaining the success metrics?

9. Which are the main local and international organizations involved in implementation/service delivery/training/research/ at PHC etc.?
   a. Who is being trained?
   b. What is the training on?
10. Are there priority districts in these countries?
   a. How are the districts chosen?
   b. What activities are being implemented in these districts?

11. What are the major efforts for addressing neonatal and under five (5) mortality at the national level – and if relevant – at the priority district level?
   a. Describe the different technology that is being used in these interventions?
   b. Describe any gaps in technology for these interventions?
   c. Is any of this technology locally developed and/or manufactured?

12. Is there a national digital health strategy?
   a. What are the main objectives?
   b. What are the main efforts around ‘digital’?
   c. Who is doing what?
   d. What gaps remain?
   e. What are the health information system(s) that are currently in use at community/clinic levels?

**Diagnosis and treatment**

13. Is there a national essential diagnostic list?
   a. What diagnostics are expected to be found at PHC?
      i. What are the most diagnosed conditions at PHC (where diagnostics are used vs. syndromic management)?
   b. What is the estimate of the number # of diagnostics that are needed per year per PHC facility type (for example at a level 1 - what is the estimate; level 2 what is the estimate etc.)
      i. What diagnoses are typically referred up to the next level of the health care system because diagnostic testing cannot be done at PHC? Why can’t they be done at PHC? is it availability? Is it suitability for use at PHC? is it a lack of training?
      ii. What is the referral pathway? Are samples collected at PHC and sent or is it the patient who must travel to the facility for diagnosis?

14. What treatment is provided at PHC? a. What technologies/tools/equipment are available for treatment at the different levels of PHC (for example oxygen, incubators etc.)

15. New product introduction pathway: how do new products/technologies get into PHC (including regulatory framework; MOH procurement; pilot introduction requirements etc.)

**Quality of care:**

16. How is quality of care defined?
   a. for overall PHC
   b. for maternal health
   c. for newborn health
The questions above have been answered largely in the report and grouped according to the element of PHC, if you wish to dive deeper into the questions above please assess the assessment framework through this link.

**Interview guides and surveys**

Interviews guides were used during the key informant sessions, we developed the interview guides after conducting the desk review so as to act as a source of more information and allowed us to focus on our area of interest in enhancing diagnostics and innovations. The interview guides were customized for each country to adapt to commonly used words and phrases for each country to allow for user friendly interaction while conducting the remote interviews.

Below is a sample of the guide.

**Stakeholder profile**

1. What organization do you work for?
2. What is your title/role?
3. Please tell us more about your role and responsibilities.
4. How many years have you been in your current role?
5. What does your day-to-day work look like, from the time you wake up?
6. Do you face any obstacles in performing your duties? If yes, kindly tell me about them.
7. Would you please tell me more about yourself?

**Procurement of diagnostic tools and deployment**

1. Could you briefly describe the procurement process for medical/diagnostic equipment in PHC facilities in Nigeria? *(Probe: Who is involved, what documents are needed, turnaround time.)*
2. Is there a national essential diagnostics list currently being developed based on the World Health Organization Essential Diagnostics List?
3. What diagnostics are expected to be found at the PHC level?
4. Do health workers at the PHC level (consider community health extension workers/community health officers too) have authorization to make decisions in terms of procurement of diagnostic kits, equipment, or reagents? If yes:
   a. Do they have funds available for local procurement or buying decisions?
   b. What can they buy with these discretionary funds?
   c. What is the limit amount available for the different levels of PHC?
5. How do new products, equipment, or technologies that are being introduced into the health care system and services for the first time get approved for use at the PHC level?
6. What are some of the guiding regulations and policies? (Probe: Regulatory framework, Ministry of Health [MOH]/Ghana Health Service [GHS] procurement, pilot introduction requirements, who covers the cost, etc.)

7. What are the different entities involved in the coordination of medicines and diagnostic equipment supply?

8. What challenges are faced with the implementation of contracts?

9. What other challenges do you face in your work that you would like addressed?

Please view the extensive interview guide through this link.

List of experts to interview

This is a comprehensive list of key stakeholders that were identified by MOH officials and PATH PHC experts. The stakeholders helped the team fill in information gaps around the state of PHC in the country.

Due to time and financial constraints, not all identified stakeholders were engaged.

**Tanzania**
Facility in Charge and the Laboratory technician in dispensaries.

**Zambia**
- Directorate of Clinical Care and Diagnostics
- Directorate of Public Health (Community Health Unit and Child Health Unit)
- Health Promotion Team
- District health directors
- Health care providers
- Lab technicians
- Procurement officer
- CHAZ

**Kenya**
- Division of Primary Healthcare
- Division of Clinical Services
- MOH Division of Family Health—Division of Newborn and Child Health
- Division of Health Products and Technologies
- Division of Primary Health Services and Family Medicine
- Health care providers
- Community health care workers

**Ghana**
- Director, PPME (Policy, Planning, Monitoring, and Evaluation), GHS
  - Deputy Director General
- Deputy Director, Center for Health Information Management
- Director, ICD/PH
- Biomedical Engineering Department
- Regional Director of Health Services
- Director, MOH Procurement and Supply
School of Public Health, University of Ghana, Legon
National Coordinator, Newborn and Child Health, Family Health Division-GHS
Director, Central Region
Director, Human Resource Division, National CHPS Coordinator under PPME
Director, PPME, GHS
National CHPS Coordinator
Director, Human Resource Division
Director, Family Health
Deputy Director, Maternal Health
Program Officer, Safe Motherhood
Director, Human Resource, MOH and GHS
Registrar, Ghana Medical and Dental Council
Rector, Ghana Nurses and Midwifery Council
Director, Ghana Pharmacy Council
CEO, Ghana Food and Drugs Authority
GHS Ethics Review Committee
MOH Ghana National Drug Program
Stores Supplies and Drug Management
National Health Insurance Authority
Central and Regional Medical Stores
Regional Director, Western North Region
Biomedical Engineering Department MOH
Clinical Engineering Department of GHS
Clinical Engineering Department of GHS, Stores Supplies and Drug Management

**MIRO Board**

The MIRO Board is a virtual collaboration tool that we used to facilitate rapid brain dump of insights generated from the key informant interviews and to strengthen the collaboration between team members.

*Figure 1: Miro board used for synthesis.*
Annex 2. References

References to government documentation such as regulatory frameworks, health policies, and other relevant documents about the state of the PHC system in the countries listed. Begin with the “global” section and then subdivide by country.

Global References

4. What is “PHC” and why is everyone talking about it? | PATH. https://www.path.org/articles/what-is-primary-health-care/.

Ghana References


Kenya References

Nigeria References


27 Chinawa J. Factors militating against effective implementation of primary health care (PHC) system in Nigeria, 2015.


Rwanda References


40 World Health Organization (WHO). Rwanda’s Primary Health Care Strategy Improves Access to Essential and Life-Saving Health Services. WHO; February 17, 2022.


Tanzania References


51 PATH. Tanzania digital health strategy 2019-2024.


Zambia References


References to Government Documentation

Ghana

Kenya

**Nigeria**


**Rwanda**

38. Rwanda’s primary health care strategy improves access to essential and life-saving health services. [Link]

39. Rwanda Information Society Authority. Essential Medicines List for Adults. [Link]

40. Rwanda Information Society Authority. Essential Medicines List for Pediatrics. [Link]

41. Rwanda’s Community Health Worker Program. [Link]

42. Overview of health system in Rwanda. [Link]

43. East African Community Digital Health and Interoperability Assessment. [Link]


45. Tanzania


47. PATH. Tanzania digital health strategy 2019-2024. [Link]


53. Zambia

