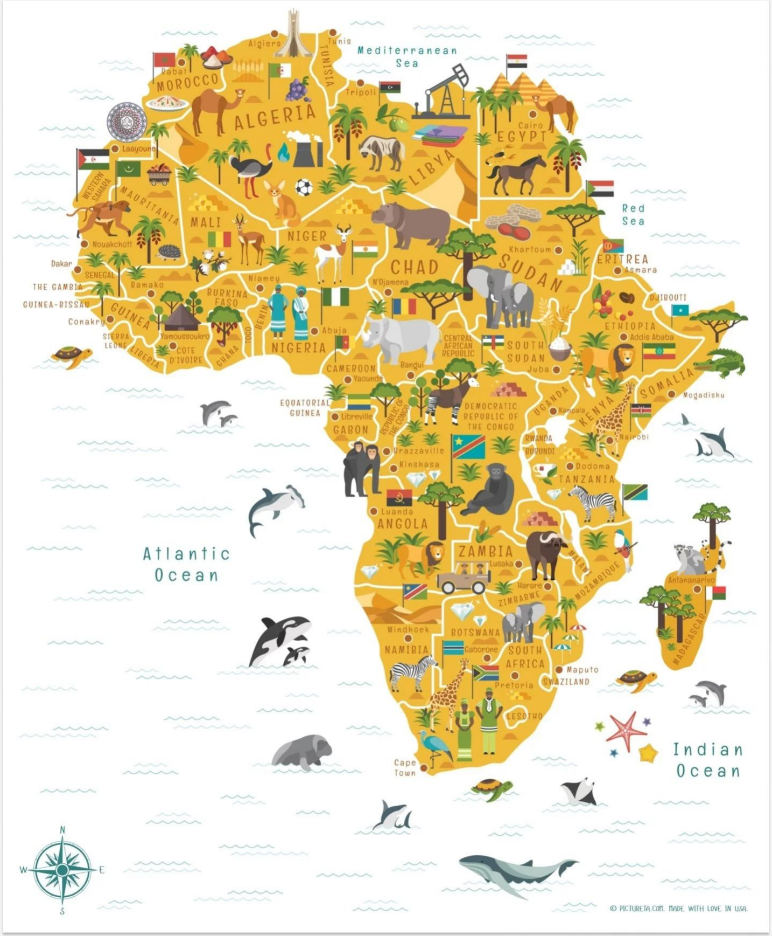
YO.DH
Youth Ownership of Digital Health



Africa's Healthcare System

Leveraging Technology to Strengthen Africa's Healthcare Delivery

By Isaac Ngugi, Lizzy Mukami, Kehinde Muraina & Abdullahi Salaudeen

1.2 Objectives

- To provide an overview of healthcare systems across Africa with emphasis on their structure and evolution in Kenya and Nigeria.
- To compare healthcare delivery and payment systems between Nigeria and Kenya
- To identify major healthcare challenges facing African nations
- To analyze the role of digital health technologies in transforming African healthcare systems
- To highlight opportunities for youth involvement in digital health innovation and ownership
- To present case studies of successful digital health implementations in Africa

1.2) Population & Healthcare Evolution

- Africa's population is projected to reach 1.7 billion by 2030, with 60% under age 25, creating both challenges and opportunities for healthcare delivery (African Development Bank, 2023)
- Historical evolution from colonial medicine systems to post-independence national healthcare structures, with recent transitions toward universal health coverage goals
- Life expectancy in sub-Saharan Africa has increased from 50.9 years in 2000 to 61.5 years in 2023, though still below global average of 73.4 years (WHO, 2024)
- Healthcare spending varies significantly across the continent, with an average of 5.6% of GDP compared to global average of 9.8% (World Bank, 2024)
- Evolution from primarily communicable disease focus to dual burden of communicable and non-communicable diseases (NCDs)
- Digital health adoption accelerated after COVID-19 pandemic, with mobile health applications increasing by 47% between 2020-2024 (PATH, 2024)

1.3) Two Key Dimensions of Healthcare Systems

1.3.1) Healthcare Delivery

- Multi-tiered delivery systems typically including primary, secondary, and tertiary levels
- Public health facilities serve as backbone but face chronic underfunding and staff shortages
- Private sector plays increasingly significant role, providing over 50% of healthcare services in countries like Nigeria (as noted in your document)
- Rural-urban disparities in facility distribution with concentration of specialists in urban centers
- Traditional medicine remains widely utilized, with 80% of rural populations relying on traditional healers in some regions (WHO, 2023)
- Community health workers increasingly integrated to bridge gaps in formal healthcare systems
- Healthcare worker migration ("brain drain") significantly impacts capacity, with over 50% of Nigerian-trained health professionals working abroad (as mentioned in your document)

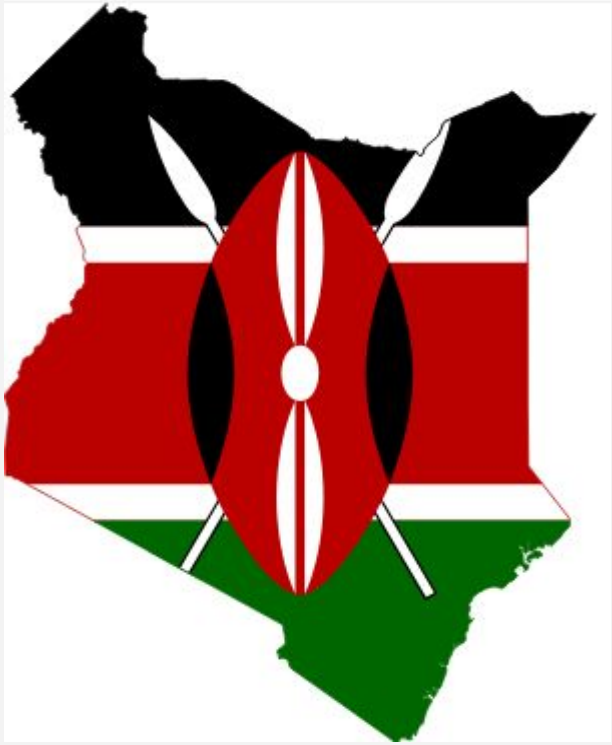
1.3) Two Key Dimensions of Healthcare Systems

1.3.2) Healthcare Payment

- Mixed financing mechanisms including government funding, private insurance, out-of-pocket payments, and donor assistance
- Out-of-pocket payments remain dangerously high, constituting 38% of healthcare costs in Kenya (WHO, 2025) and over 70% in some African nations
- Limited insurance penetration across the continent, with only 25% of Kenyans having health insurance (Kenya Demographic and Health Survey, 2025)
- Mobile money services revolutionizing healthcare payments in some countries (e.g., M-Pesa in Kenya accounts for 60% of healthcare payments) (The Star, 2025)
- Efforts to establish universal health coverage through national insurance schemes and community-based health insurance initiatives
- Public-private partnerships emerging as models to improve healthcare financing and delivery

Part 2: Deep Dive into Kenya & Nigeria’s Healthcare Systems

2) Kenya's Digital Health Landscape



Overview of the Healthcare System

- Kenya's population is projected to reach, with an expected increase to 83.6 million by 2050 (WHO, 2025).
- The healthcare system has transitioned from National Health Insurance Fund to Social Health Authority, improving direct hospital payments and reducing inefficiencies (The Star, 2025).
- The government aims to achieve Universal Health Coverage (UHC) by 2030, focusing on affordability, accessibility, and quality healthcare (Treasury, 2025).

Two Key Dimensions of Healthcare Systems in Kenya.

Healthcare Delivery

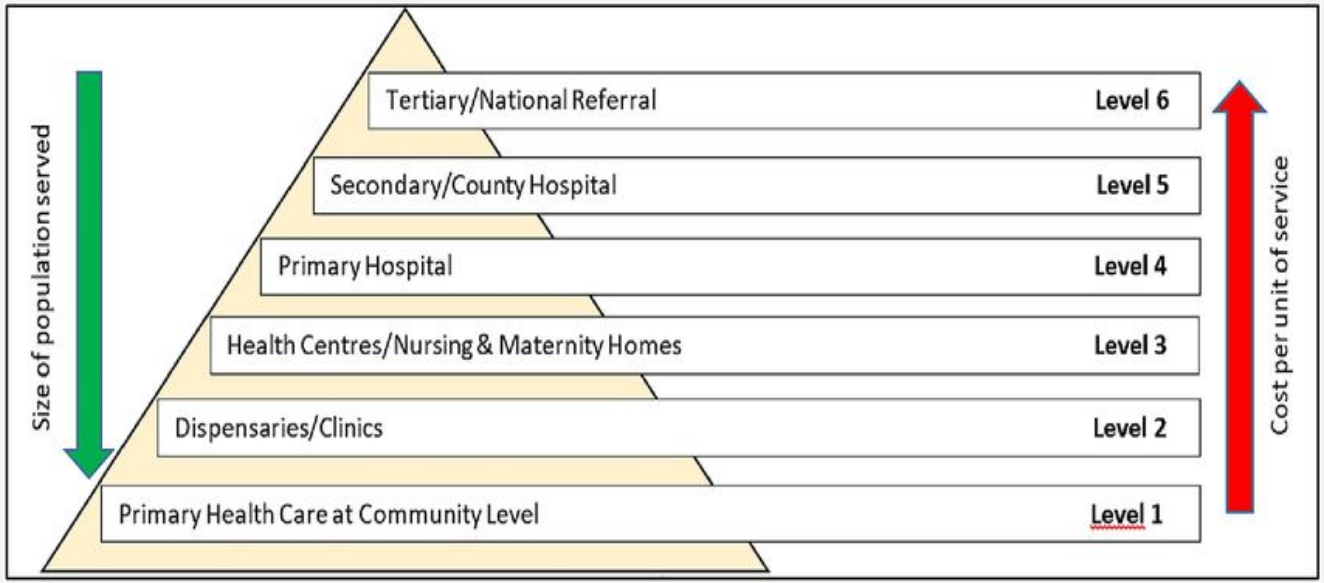
Kenya has 4,800 public health facilities and 1,500 private hospitals, ranging from primary health centers in rural areas to advanced tertiary care in urban centers (WHO, 2025). Kenya has 22.3 nurses per 10,000 population, with higher concentrations in urban areas (Treasury, 2025). Public hospitals provide low-cost or free services, but often face staff shortages and overcrowding. Private hospitals offer higher-quality care, but are expensive, limiting access for lower-income groups.

Healthcare Payment

Healthcare is financed through individual out-of-pocket payments (38%), national and county governments (45%), and private health insurance (17%) (WHO, 2025). M-Pesa (mobile phone-based money transfer service, payments and micro-financing service, launched in 2007 by Vodafone and Safaricom) whose transactions account for 60% of healthcare payments, improving accessibility (The Star, 2025).

2.1) Kenyan Healthcare Hierarchy System

Kenya's healthcare system follows a six-tier hierarchy, ensuring progressive levels of care from community-based services to specialized national hospitals.



Structure of Kenya's health system (Marangu et al., 2021).

2.1) Kenyan Healthcare Hierarchy System.

Level 1: Primary Healthcare at Community Level

Focuses on prevention, early intervention, and education. Community health workers and volunteers operate at this level, conducting health awareness programs, routine immunizations, and malaria screening. They provide essential health education, family planning guidance, and maternal health monitoring. There are no inpatient facilities, and drugs available are limited to basic medications such as painkillers, malaria drugs, and vitamins.

Level 2: Dispensaries & Clinics

Acts as the first formal point of contact for outpatient medical care. These facilities, staffed by nurses and clinical officers, provide vaccinations, simple treatments for common infections, and antenatal care. Laboratory testing is basic, and no surgical procedures are conducted. Most patients at this level receive outpatient treatment, with medications limited to antibiotics, vaccines, and painkillers.

2.1) Kenyan Healthcare Hierarchy System.

Level 3: Healthcare Centers, Nursing & Maternity Homes

Services expand to include inpatient care, minor surgical procedures, maternity services, and emergency stabilization. These facilities are staffed by nurses, midwives, and general practitioners, catering to childbirth cases, chronic disease management, and minor surgical treatments. They are equipped with basic laboratories and emergency care units, providing essential medicines such as maternal health drugs and wound treatment supplies.

Level 4: Primary Hospitals

Serves as county-level healthcare facilities offering both outpatient and inpatient care. They provide specialized services, including laboratory tests, emergency care, and general surgeries. Patients presenting with severe infections, trauma, and chronic diseases are treated here by general doctors, nurses, lab technicians, and specialists. These hospitals have a full range of essential medicines and surgical equipment for minor to moderate procedures.

2.1) Kenyan Healthcare Hierarchy System.

Level 5: Secondary/County Referral Hospitals

Advanced healthcare services become available. These county referral hospitals cater to complex medical conditions such as cancer treatments, advanced surgeries, and intensive care needs. Specialists, anesthetists, and surgeons work in these facilities, ensuring high-level medical care. They are equipped with ICUs, dialysis centers, chemotherapy units, and highly specialized medication for critical illnesses.

Level 6: Tertiary/National Referral Hospitals

Represent the highest tier in Kenya's healthcare hierarchy. These institutions handle specialized treatments such as organ transplants, neurosurgery, and rare disease management. Professors, medical researchers, and top specialists lead operations, integrating advanced medical research and training into healthcare delivery. They provide inpatient and outpatient services, with access to specialized drugs, surgical theaters, and state-of-the-art ICUs. Includes Kenyatta National Hospital (KNH), Moi Teaching & Referral Hospital (MTRH), and Kenyatta University Teaching, Referral & Research Hospital (KUTRRH).

2.2) Healthcare Delivery In Kenya (2025).

Kenya's healthcare system varies by sector and location, with public services being government-funded but strained, while private healthcare offers high-quality care at a higher cost. Urban areas have better investment and digital health integration, whereas rural regions face resource limitations and restricted access to advanced technology (Ministry of Health, 2025; PATH, 2024).

Category	Public	Private	Urban	Rural
Funding	Government funded	Out-of-pocket & insurance	Higher investment	Limited resources
Accessibility	Widespread but strained	Selective, high-quality	Numerous facilities	Fewer facilities
Affordability	Subsidized, but inconsistent	Expensive, but reliable	Higher costs	Lower costs but limited services
Technology Use	Emerging digital health tools	Advanced tech adoption	High digital integration	Limited digital access

2.2.1) Healthcare Schemes in Kenya.

1. **Government-Funded Schemes**

- Social Health Authority (SHA) – Replaced NHIF, ensuring universal health coverage through direct hospital payments.
- Emergency, Chronic, and Critical Illness Fund (ECCIF) – Covers high-cost treatments for severe medical conditions.
- Taifa Care Initiative – Expands primary healthcare access for low-income households.

2. **Community-Based Health Insurance (CBHI)**: Low-cost schemes designed for informal workers and rural populations. Operates through local cooperatives and community health units.

3. **Private Health Insurance**

- Employer-sponsored plans – Covers formal sector employees.
- Individual health insurance – Available for self-employed individuals and high-income earners.
- Microinsurance schemes – Affordable plans targeting low-income groups.

4. **Out-of-Pocket Payments**: Direct payments for medical services, common among uninsured individuals. Covers consultations, medications, surgeries, and diagnostic tests.

5. **Public-Private Partnerships (PPPs)**: Collaborations between government and private sector to improve healthcare access. Includes telemedicine platforms, AI-driven diagnostics, and mobile health applications.

2.2.2) Systems of Medicine Practiced in Kenya.

1. **Traditional Medicine – Herbal Remedies & Indigenous Healing:** Traditional medicine remains widely used, especially in rural areas, where 80% of the population relies on herbal remedies for primary healthcare. Indigenous healing practices include herbal treatments, spiritual healing, and acupuncture, often passed down through generations. The Traditional and Alternative Health Practitioners Bill (2022) was introduced to regulate and encourage the sector
2. **Conventional Medicine – Western-based hospital treatments**: Conventional medicine is the dominant healthcare approach in urban areas, with modern hospitals, pharmaceuticals, and surgical procedures. Kenya has 4,800 public health facilities and 1,500 private hospitals, offering specialized treatments, emergency care, and advanced diagnostics (WHO, 2025). Western medicine is fully integrated into Kenya's national healthcare system, supported by government-funded hospitals and private healthcare providers.
3. **Integrative Medicine – Combining traditional and modern approaches**: Integrative medicine is gaining popularity, combining herbal remedies with modern diagnostics to improve patient outcomes. Holistic health approaches, including mindfulness, yoga, and herbal supplements, are increasingly incorporated into mental health treatments and chronic disease management. Kenya's holistic health movement is revolutionizing patient care by addressing physical, emotional, and spiritual well-being.

2.3) Healthcare Payment in Kenya.

Key Stakeholders in Healthcare Payment in Africa

1. **Government Payment:** The Kenyan government funds 45% of healthcare costs, primarily through tax revenue and the Social Health Authority (SHA) (Ministry of Health, 2025). Primary healthcare services are now fully tax-funded, ensuring access for vulnerable populations.
2. **Private Insurance:** Private health insurance covers 17% of healthcare costs, but penetration remains low due to high premiums and complex policies (Step By Step Insurance, 2025). Employer-sponsored insurance is the most common form of private coverage.
3. **Individual/Out-of-Pocket Payment:** Out-of-pocket payments account for 38% of total healthcare spending, placing a financial burden on households (BMJ Global Health, 2025). 9 out of 10 Kenyans still pay for medical expenses out of pocket, despite SHA reforms (Step By Step Insurance, 2025).

2.3.1) Key Drivers of High Out-of-Pocket Payments.

1. **Limited Insurance Coverage** – Only 25% of Kenyans have health insurance, leaving the majority to pay for medical expenses directly (Kenya Demographic and Health Survey, 2025). Many informal workers and low-income households remain uninsured.
2. **High Cost of Private Healthcare** – Private hospitals charge five times more than public hospitals, making specialized care unaffordable for many (Treasury, 2025). This forces patients to rely on out-of-pocket payments for essential treatments.
3. **Delayed Government Reimbursements** – Hospitals struggle with SHA payment delays, forcing patients to pay upfront for services (Ministry of Health, 2025). This issue affects both public and private healthcare providers, leading to financial strain.
4. **Expensive Medication & Diagnostic Tests** – The cost of prescription drugs and laboratory tests has increased by 30% since 2023, making routine healthcare visits costly (Business Daily, 2025). Many patients skip tests or delay treatment due to high costs.
5. **Limited Public Healthcare Infrastructure** – Rural areas face severe shortages of doctors and medical equipment, forcing patients to travel long distances or seek expensive private care (WHO, 2025). This increases transportation and treatment costs.
6. **Hospital Debt & Patient Detention** – Some hospitals detain patients who cannot pay their bills, leading to financial distress for families (Step By Step Insurance, 2025). This practice highlights the urgent need for health care financing reforms.

2.3.2) Impact of High Out-of-Pocket Payments in Kenya (2025).

On Poor Patients

1. **Pushes families into poverty** – Most Kenyans fall below the poverty line due to medical expenses, making healthcare unaffordable for many households.
2. **Reduces healthcare access** – Many patients avoid treatment due to high costs, leading to worsened health conditions and increased mortality rates.

On the Health Delivery System

3. **Overcrowding in public hospitals** – Patients unable to afford private care overwhelm public facilities, leading to longer wait times and strained resources.
4. **Delayed treatment** – Patients postpone medical care, resulting in advanced disease progression and higher treatment costs.

Government Initiatives to Reduce Out-of-Pocket Payments

5. **Social Health Authority (SHA)** – Replaced NHIF to improve real-time claims processing, ensuring faster reimbursements for hospitals.
6. **Government subsidies** – Cover healthcare costs for low-income households, improving access to essential medical services.
7. **Digital payment integration** – M-Pesa transactions streamline healthcare payments, reducing financial barriers for uninsured patients.

Government Healthcare Budget (2025)

8. **Healthcare budget increased**, prioritizing primary healthcare and digital health, ensuring better funding for public hospitals.
9. **SHA funding ensures direct hospital payments**, reducing inefficiencies and delays in medical reimbursements.

2.3.3) Challenges in Health Insurance Market in Kenya.

1. **Low Insurance Penetration** – Only 25% of Kenyans have health insurance, ranking among the lowest in Sub-Saharan Africa (Kenya Demographic and Health Survey, 2025). Many informal workers and rural populations remain uninsured.
2. **High Premiums** – Private health insurance remains unaffordable for most Kenyans, with 71% citing cost as the main barrier to enrollment (Khusoko, 2025). Employer-sponsored plans dominate, leaving self-employed individuals with limited options.
3. **Delayed Reimbursements** – Hospitals struggle with insurance claim processing delays, leading to financial strain and service disruptions (Ministry of Health, 2025). This issue affects both public and private healthcare providers.
4. **Limited Awareness & Trust Issues** – 20% of Kenyans lack awareness of health insurance benefits, and many distrust insurers due to past claim denials and policy complexities (Business Daily, 2025). Consumers often struggle to obtain policy documents after purchase.
5. **Regulatory & Policy Challenges** – Kenya's insurance sector faces strict capital requirements, limiting the number of providers and reducing competition (Step By Step Insurance, 2025). This results in higher costs and fewer affordable plans.
6. **Exclusion of Pre-Existing Conditions** – Many insurers refuse to cover pre-existing conditions, forcing patients to pay out-of-pocket for chronic disease management (Khusoko, 2025). This disproportionately affects low-income and elderly populations.

2.4) Digital Healthcare Innovations in Kenya (2025).

Kenya's healthcare system continues to embrace **technology-driven solutions**, improving **efficiency, accessibility, and patient outcomes**.

Evolution of Digital Health in Kenya

Kenya’s digital health sector has evolved significantly over the years:

- **2010-2015**: Introduction of **mHealth applications** for basic health education.
- **2016-2020**: Expansion of **telemedicine platforms** and **EHR pilot programs**.
- **2021-2025**: Full-scale **AI-driven diagnostics**, **digital insurance**, and **government-backed digital health regulations**.

2.4.1) Key Areas Shaping Digital Health Kenya (2025).

1. Digital Health Regulations & Policy Framework: The Digital Health Regulations 2025 establish a national patient registration system, enhance health data security, and prevent fraud in insurance claims. These reforms aim to create an interconnected healthcare network for seamless patient care (Ministry of Health, 2025).

2. Telemedicine & AI-Powered Remote Healthcare: The expansion of telemedicine platforms now connects patients with specialists in underserved regions, cutting travel costs by 40% (BMJ Global Health, 2025). AI-driven diagnostics further reduce misdiagnoses and accelerate treatment decisions.

3. Electronic Health Records (EHRs) & Data Management: Kenya is implementing interoperable EHR systems, eliminating redundant tests and ensuring efficient patient tracking (Treasury, 2025). These digital systems improve record accuracy, benefiting hospitals, insurers, and policymakers.

4. Mobile Health (mHealth) & AI Innovations: mHealth applications like AfyaYangu simplify appointment scheduling, medication tracking, and insurance claims processing (MedTech Africa, 2025). AI tools are advancing predictive analytics for disease prevention, improving early detection and patient engagement.

5. Public-Private Partnerships & Digital Health Investments: Strategic funding from government-backed programs, venture capitalists, and digital health incubators accelerates healthcare digitization (Step By Step Insurance, 2025). Partnerships with tech firms and hospitals drive innovation, boosting health accessibility across Kenya.

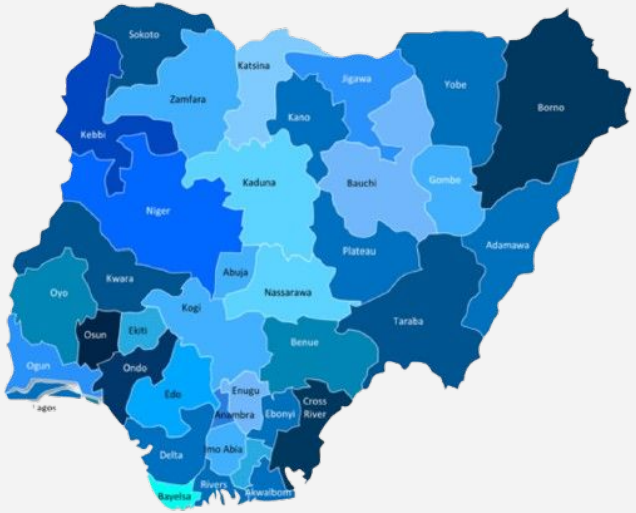
2.4.2) Impacts of digital health investments in Kenya (2025).

1. **Expanded Healthcare Access in Remote Regions** – Digital health solutions, including telemedicine and mobile health applications, have improved access to specialists in rural areas, reducing travel costs by 40% (Ministry of Health, 2025).
2. **Lower Patient Costs Due to AI-Powered Early Diagnostics** – AI-driven diagnostics have cut misdiagnosis rates by 30%, leading to earlier disease detection and lower treatment costs (Health Business Kenya, 2025).
3. **Improved Hospital Efficiency Through Digital Record-Keeping** – The adoption of Electronic Health Records (EHRs) has eliminated redundant tests, reducing hospital wait times by 25% and enhancing patient data management (Doctors Explain Medical Magazine, 2025).
4. **Faster Insurance Claims Processing** – AI-powered health insurance platforms have shortened payment cycles by 95%, ensuring quicker reimbursements for hospitals and patients (Health Business Kenya, 2025).
5. **Enhanced Public-Private Collaboration in Healthcare** – Investments from government-backed programs, venture capitalists, and digital health incubators have accelerated healthcare digitization, fostering innovative solutions (Ministry of Health, 2025).
6. **Better Patient Monitoring & Data Security** – AI-driven real-time monitoring systems now prevent duplicate treatments, detect anomalies, and flag high utilization, improving healthcare efficiency (Health Business Kenya, 2025).

2.2) Nigeria's Digital Health Landscape

Nigeria at a Glance

The Nigerian healthcare system is a multi-tiered structure involving federal, state, and local government involvement, with the private sector playing a significant role. It faces challenges including inadequate infrastructure, a shortage of healthcare professionals, and issues with financial sustainability and access, particularly in rural areas. The system is organized into primary, secondary, and tertiary levels of care



Africa's Giant

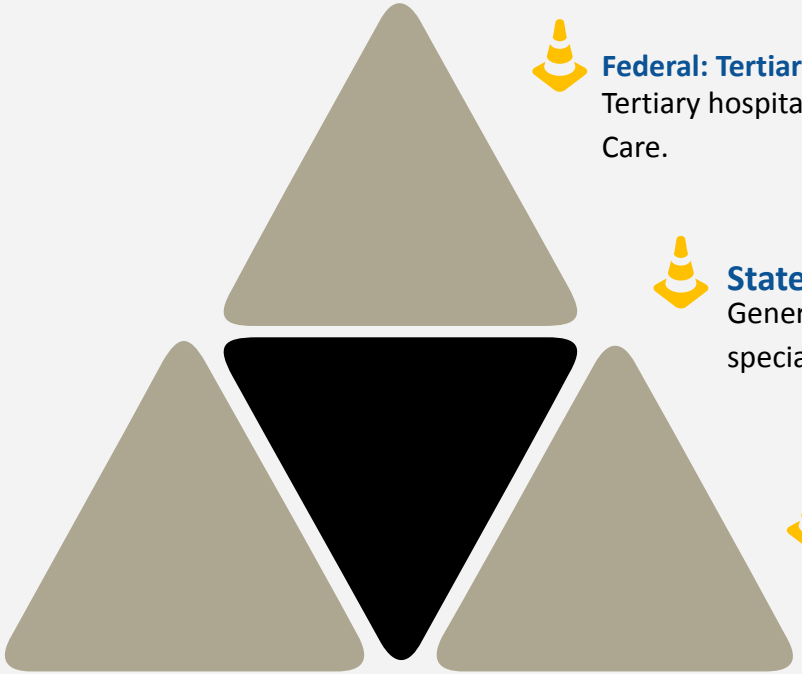
- Population exceeding 220 million (Largest in Africa).
- Diverse economy with significant potential, but facing developmental challenges

Health Indices

- Life expectancy at birth – 52.8
- MMR (in 100,000 live births) – 1 in every 200 live births (2025)
- Fertility rate (per woman) – 4.5 / SSA – 4.3 (World Bank 2023)

Nigeria’s Healthcare System: Overview

Nigeria operates a 3-tiered health system mandated by the constitution



Federal: Tertiary care
Tertiary hospitals and Federal Medical Centres - Policy, Regulation, Complex Care.

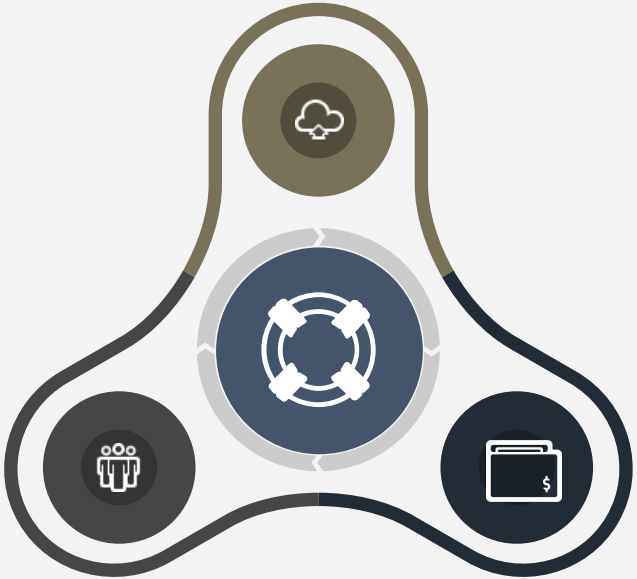
State: Secondary Care
General Hospitals and specialized services. Handles referrals and more specialized services than PHC.

Grassroot: Primary Health Care
First point of contact for basic care and services

Nigeria’s Healthcare System: Overview (Cont’d)

Disease Burden

Still high prevalence of infectious diseases (Malaria, TB, HIV/AIDS) coupled with a rising burden of Non-Communicable Diseases



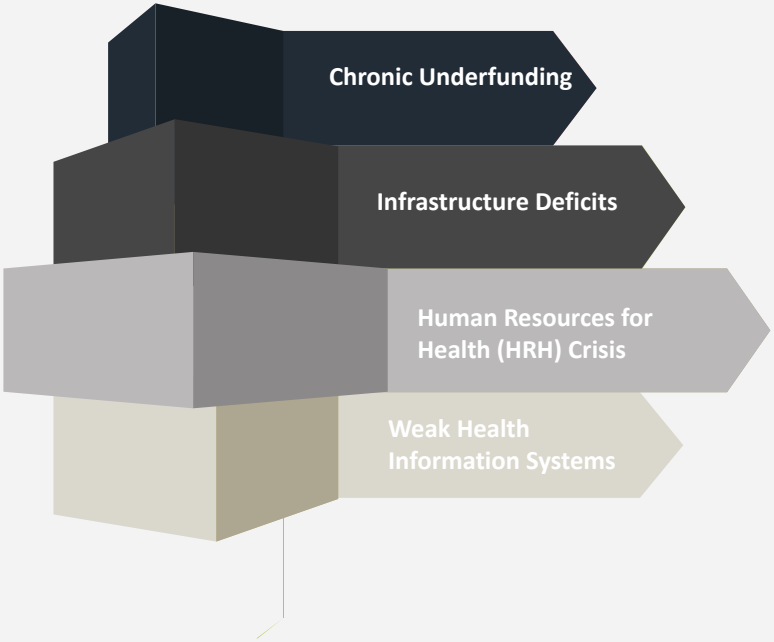
Health Indices

Persistently high Maternal Mortality Ratio (MMR) and Under-5 Mortality Rate compared to global averages. Life expectancy lags.

Funding Landscape

- **Public:** Dominated by government spending, but consistently underfunded. Health allocation often below 5% of the national budget,
- **Private**: often >70% of total health expenditure
- **Insurance:** Aims to cover all Nigerians, including vulnerable groups via the Basic Health Care Provision Fund (BHCPF) - NHIA

Major Healthcare Challenges & Gaps



Insufficient budget allocation leads to dilapidated infrastructure, drug shortages, and poorly motivated staff

Many facilities (especially PHCs) lack basic amenities like reliable power, clean water, and modern diagnostic equipment. Significant urban-rural divide in facility availability and quality

- **Shortage:** Doctor-to-patient ratio significantly below WHO recommendation (e.g., 1:600), worsened by ratios as high as 1:5000 in some areas. Acute shortage of nurses and specialists too.
- **Brain Drain:** Large numbers of Nigerian-trained health professionals emigrate for better opportunities ("Japa" syndrome). Over 50% estimated to work abroad.
- **Motivation**: Poor remuneration, lack of equipment, insecurity, and difficult working conditions lead to low morale and frequent industrial actions (strikes).

Fragmented, paper-based systems hinder effective data collection, management, and use for planning, monitoring, and outbreak response.

Levels of Care & Public – Private Interaction

Moving beyond simple partnerships to deeper integration (bringing private sector efficiencies into public structures) is key for sustainability and scale.

Primary Health Care (PHC)

- The bedrock, managed by 774 LGAs. Constitutes ~85% of facilities.
- **Challenge:** Vast network, but chronic underfunding, staffing gaps, and lack of essentials mean only a fraction are fully functional. Leads to system inefficiency as patients bypass PHCs for higher-level care.

Secondary & Tertiary Care

- Managed by State & Federal governments respectively.
  - ❑ Handle referrals and more complex cases.
  - ❑ Often overcrowded due to weak PHC system.
  - ❑ Concentrated in urban areas.

The Vital Role of the Private Sector

- **Significant service provision**: Estimated >50% of Nigerians seek care here.
- **Diverse**: Ranges from high-end hospitals to small clinics, pharmacies, labs, diagnostics, and increasingly, digital health providers.
- Fills critical gaps left by the public sector but can be expensive and quality varies.

Public-Private Partnerships (PPPs) & Integration

- Recognized as essential for achieving UHC.
  - ❑ **Examples**: Contracting private providers to manage public PHCs (e.g., Delta State pilot showed increased utilization, insurance enrolment, improved maternal outcomes, job creation).

Opportunities for Health System Strengthening

Enhanced Policy & Political Will

- **NHIA Act (2022):** Provides legal framework for mandatory health insurance – potential game-changer if effectively implemented.
- **BHCPF**: Dedicated funding (~1% of Consolidated Revenue Fund + donor funds) specifically for basic services and vulnerable groups via NHIA & NPHCDA gateways. Requires robust governance and accountability.
- **Health Sector Renewal Initiatives**: Recent government focus indicates potential for increased prioritization and reform.

Leveraging the Private Sector

Strategic engagement through well-structured PPPs and integration models can inject efficiency, innovation, and capital. Focus on improving quality and affordability in the private space.

The Digital Health Revolution

Technology offers a unique opportunity to leapfrog traditional infrastructural limitations and fundamentally reshape healthcare delivery. This is the focus for the rest of the presentation.

Digital Health: The Opportunity

Digital Health: Broad category encompassing eHealth, mHealth (mobile health), Telemedicine/Telehealth, Health Information Technology (HIT) including Electronic Health Records (EHRs), Wearables, Big Data Analytics, AI, IoT in healthcare. Digital health isn't just about convenience; it's a strategic tool to re-engineer inefficient processes and extend the reach of limited resources in the Nigerian context.

Why It's Crucial for Nigeria - Addressing Key Gaps

Data & Surveillance
Real-time data collection via digital tools improves disease surveillance (e.g., Malaria tracking), outbreak response, and health system planning.

Patient Empowerment
Mobile apps provide health information, enable self-monitoring (e.g., for chronic diseases), facilitate communication with providers.

Workforce Support
Digital tools offer platforms for remote training, continuous medical education (CME), clinical decision support, and reducing burnout by optimizing workflows

Access
Telemedicine platforms connect patients (especially rural/remote) with doctors and specialists, overcoming distance barriers.

Cost
Potential to reduce travel costs for patients and optimize resource use within the system. Some platforms offer low-cost subscription models.

Efficiency
Efficiency: EHRs reduce fragmentation, improve data accuracy, and support clinical decisions. mHealth automates reminders, data collection, reducing administrative burden.

Digital Health Adoption & Ecosystem

Current landscape

- Rapidly growing market, catalyzed significantly by the COVID-19 pandemic which necessitated remote solutions
- Driven by high mobile phone penetration and increasing internet access (though gaps remain).
- Vibrant startup scene attracting local and international investment.

Critical Challenges to Scalability:

- **Infrastructure:** Limited/unreliable internet connectivity (especially outside major cities), inconsistent power supply.
- **Cost & Affordability:** Cost of devices, data, and services can be prohibitive for low-income populations.
- **Digital Literacy:** Gap in skills/comfort with technology among both patients and some healthcare workers.
- **Policy & Regulation:** Need for clearer national digital health strategy, data privacy/security laws (like NDPR), interoperability standards, and guidelines for telemedicine practice
- **Integration & Interoperability**: Lack of seamless data exchange between different digital platforms and with existing health systems hinders efficiency.

Case study – Maternal Health

Nigeria bears a disproportionately high burden of global maternal deaths. MMR remains extremely high (Latest estimates often place it over 800-1000 per 100,000 live births, though figures vary).

The Case: Maternal mental health (Postpartum Depression - PPD, anxiety) is a major, often hidden, co-morbidity contributing to poor outcomes for mother and child

Contributory factors -

- **Access to Skilled Care:** Lack of access to skilled birth attendants (doctors, midwives), particularly in rural areas. Weak referral systems for obstetric emergencies.
- **Antenatal Care (ANC):** Late initiation and insufficient number/quality of ANC visits. Missed opportunities for screening and risk identification.
- **Financial Barriers:** Cost of services, transport prevents timely care seeking.
- **Infrastructure**: Poorly equipped facilities for managing complications.
- **Mental Health:** Lack of routine screening for PPD/anxiety, limited trained mental health professionals, high stigma associated with mental illness.
- **Data:** Poor tracking of pregnancies and outcomes hinders targeted interventions.

Case Study - Digital Health Solutions for Maternal Health

Leveraging Technology to Save Mothers and Newborns: Digital tools offer targeted solutions to address critical gaps in maternal healthcare delivery in Nigeria

Telemedicine for ANC & Specialist Support

Remote consultations for routine ANC, connecting rural midwives/CHWs with specialists (e.g., obstetricians) for advice on high-risk cases, virtual monitoring.

mHealth for Engagement & Monitoring

SMS/App reminders for ANC appointments, medication adherence (e.g., iron/folate supplements), danger sign alerts. Mobile platforms for disseminating health education (nutrition, birth preparedness, PPD awareness

Digital Tools for Maternal Mental Health

Mobile apps (e.g., FriendnPal, offering PPD screening questionnaires, self-help resources (meditation, CBT-lite), anonymous chatbots for immediate support, connection to teletherapy/counselling services

Electronic Health Records & Data Management

Digital records tracking patient history, risk factors, ANC visits, delivery details, and postnatal follow-up across different care points. Data aggregation for monitoring trends and outcomes

Training & Decision Support

E-learning platforms for training/upskilling health workers (esp. midwives, CHWs) on essential maternal/newborn care protocols (e.g., Helping Babies Breathe, EmONC). Mobile decision-support

Supply Chain Management

Digital tools (like those used by Drugstoc/Medsaf) adapted to track and manage essential maternal health commodities (oxytocin, magnesium sulfate, test kits) ensuring availability at PHCs

Part 3: Emerging Trends

3.1) Healthcare Structure (Table of Nigeria VS Kenya)

Aspect	Nigeria	Kenya
Population	220+ million (largest in Africa)	Projected to reach 83.6 million by 2050 (WHO, 2025)
Healthcare Tiers	3-tier system (primary, secondary, tertiary)	6-tier system (community to national referral)
Governance	Federal (tertiary), State (secondary), Local (primary)	National government and 47 county governments
Key Policy Frameworks	NHIA Act (2022), Basic Health Care Provision Fund	Social Health Authority (replaced NHIF), Universal Health Coverage by 2030
Healthcare Facilities	Significant public-private mix with >50% seeking private care	4,800 public health facilities and 1,500 private hospitals (WHO, 2025)
Traditional Medicine	Widely practiced alongside conventional medicine	80% of rural population relies on herbal remedies (WHO, 2025)
Digital Health Policy	Emerging but fragmented regulations	Digital Health Regulations 2025 establishing national standards

3.2) Healthcare Delivery (Table of Nigeria VS Kenya)

Aspect	Nigeria	Kenya
Access	Significant urban-rural disparities, inadequate PHC coverage	Urban access significantly higher than rural; total of 6,300 facilities nationwide
Health Worker Density	Doctor-to-patient ratio as high as 1:5000 in some areas, far below WHO recommendation of 1:600	22.3 nurses per 10,000 population, higher concentrations in urban areas (Treasury, 2025)
Infrastructure	Many facilities lack basic amenities (power, water), especially in rural areas	Urban facilities better equipped; rural facilities face significant resource constraints
Quality of Care	Highly variable between private and public sectors	Public hospitals provide low-cost services but face staff shortages; private hospitals offer higher quality but at premium costs
Medical Tourism	Significant outflow for specialized care (estimated $1 billion annually)	Growing medical tourism hub for East Africa
Telemedicine Adoption	Growing rapidly post-COVID, centered in urban areas	Widespread telemedicine platforms connecting rural areas to specialists, reducing travel costs by 40% (BMJ Global Health, 2025)
Mobile Health Integration	Vibrant startup scene with numerous mHealth applications	Advanced mHealth applications like AfyaYangu for appointment scheduling and medication tracking (MedTech Africa, 2025)

3.2) Healthcare Delivery (Table of Nigeria VS Kenya)

Aspect	Nigeria	Kenya
Government Funding	Consistently underfunded (<5% of national budget)	Government funds 45% of healthcare costs through tax revenue and SHA (Ministry of Health, 2025)
Out-of-Pocket Payments	>70% of total health expenditure	38% of total healthcare spending (BMJ Global Health, 2025)
Health Insurance Coverage	Limited coverage through NHIA, aiming expansion through BHCPF	25% of population covered, primarily through employer-sponsored plans (Kenya Demographic and Health Survey, 2025)
Payment Innovations	Digital wallets and payment platforms emerging	M-Pesa accounts for 60% of healthcare payments (The Star, 2025)
Premium Costs	High premiums limit private insurance access	Private health insurance remains unaffordable with 71% citing cost as main barrier (Khusoko, 2025)
Public-Private Integration	PPP models emerging but limited scale	Strategic PPPs accelerating healthcare digitization (Step By Step Insurance, 2025)
Financial Protection	Catastrophic health expenditure affects approximately 25% of households	SHA reforms aiming to reduce financial burden but 9 out of 10 Kenyans still pay out-of-pocket (Step By Step Insurance, 2025)

3.3) Major Healthcare Challenges in Africa (CD and NCD)

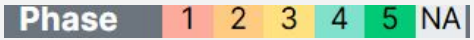
1. **Dual Disease Burden:** Malaria remains leading cause of death with 240 million cases annually in Africa (WHO, 2024). Diabetes prevalence increased by 129% since 2000, affecting 24 million Africans (International Diabetes Federation, 2023). Mental health conditions largely untreated with fewer than 1 psychiatrist per 100,000 people in most African countries (WHO, 2024)
2. **Healthcare Workforce Shortages:** Africa has 3% of world's health workers but 24% of global disease burden (WHO, 2024). Migration of healthcare professionals ("brain drain") with over 75,000 skilled health workers emigrating from Africa annually (African Union, 2023). Inadequate training infrastructure with only 169 medical schools across the continent (African Medical Schools Association, 2024)
3. **Financing and Accessibility Gaps:** Catastrophic health expenditure pushes 100 million Africans into poverty annually (World Bank, 2023). Low insurance penetration with less than 10% coverage in many countries (African Insurance Organization, 2024). Rural-urban inequities with 75% of doctors concentrated in urban areas serving 35% of the population (WHO, 2023)
4. **Weak Health Information Systems:** Fragmented data collection systems hampering evidence-based policy making. Limited interoperability between digital health platforms (PATH, 2024). Inadequate civil registration with only 44% of births registered across sub-Saharan Africa (UNICEF, 2023)
5. **Supply Chain and Infrastructure Deficiencies:** Frequent stockouts of essential medicines affecting 65% of public health facilities (Management Sciences for Health, 2024). Unreliable electricity limiting medical equipment functionality in 68% of rural facilities (African Development Bank, 2023). Poor road infrastructure extending emergency response times by 300% compared to global standards (WHO, 2024)

3.4) Accelerating Digital Health Adoption in Africa

- Mobile phone penetration reached 85% across Africa by 2024, creating foundation for digital health expansion (GSMA, 2024)
- Africa's digital health market projected to reach $11 billion by 2025, growing at 25% annually (McKinsey, 2023)
- Over 5,000 digital health startups launched across Africa since 2020, with 40% focused on primary care solutions (Disrupt Africa, 2024)
- Telehealth consultations increased by 700% between 2020-2024, catalyzed by COVID-19 pandemic (Deloitte, 2024)
- Government support growing with 26 African nations adopting formal digital health strategies by 2025 (WHO Africa, 2025)
- Public-private partnerships driving innovation, with over $2.3 billion invested in African digital health ventures since 2021 (Africa Health Business, 2024)
- Youth involvement accelerating with digital health innovation hubs established in 14 African countries, training over 50,000 young developers (African Union, 2024)

Global Digital Health Monitor 2024

Parameters	India	Kenya	Nigeria
Overall Digital Health Phase	4	4	3
Leadership & Governance	4	4	4
Strategy & Investment	5	3	3
Legislation, Policy, & Compliance	5	4	3
Workforce	NA	2	2
Standards & Interoperability	4	5	3
Infrastructure	3	4	3
Services & Applications	NA	4	3



https://monitor.digitalhealthmonitor.org/map

3.5) Impact of Digital Health Innovations in Africa

Positive Impacts

1. **Expanded Healthcare Access -** Telemedicine platforms connect patients in remote areas to specialists, reducing geographical barriers. Kenya's telemedicine initiatives cut patient travel costs by 40% (BMJ Global Health, 2025). Mobile health applications provide first-line healthcare support to over 30 million Africans previously without access (PATH, 2024)
2. **Improved Efficiency and Quality -** AI-driven diagnostics reduced misdiagnosis rates by 30% in Kenyan hospitals (Health Business Kenya, 2025). Electronic Health Records decreased duplicate testing and improved coordination across health facilities. Digital clinical decision support tools increased protocol adherence by 62% (Doctors Explain Medical Magazine, 2023)
3. **Cost Reduction and Financial Protection -** Digital health insurance platforms shortened payment cycles by 95% in Kenya (Health Business Kenya, 2025). Mobile money integration reduced transaction costs by 84% for healthcare payments (The Star, 2025). Predictive analytics helping prevent disease outbreaks, saving millions in emergency response costs
4. **Data-Driven Decision Making -** Real-time health surveillance improving epidemic response times by 65% (Africa CDC, 2024). Aggregated health data enabling more targeted resource allocation and policy implementation. Digital disease mapping helping prioritize interventions in high-burden areas
5. **Youth Employment and Innovation -** Digital health sector created over 100,000 jobs for young Africans since 2020 (African Development Bank, 2024). Youth-led health startups received $450 million in funding during 2023-2025 (Disrupt Africa, 2025). Digital health accelerators training new generation of African health entrepreneurs

3.5) Impact of Digital Health Innovations in Africa

Negative Impacts

1. **Digital Divide and Inequity -** Urban-rural technological gap widening healthcare disparities with rural adoption rates 76% lower than urban areas (WHO Africa, 2024). Affordability barriers limiting access to digital health solutions among lower-income populations. Limited digital literacy excluding vulnerable populations, particularly elderly and less educated groups
2. **Data Privacy and Security Concerns -** Inadequate regulatory frameworks for health data protection in 62% of African countries (Privacy International, 2024). Increased cybersecurity incidents targeting healthcare facilities, with 340% rise since 2021 (Cybersecurity Africa, 2024). Potential for unauthorized data sharing with commercial entities without patient consent
3. **Over-reliance on External Funding -** 78% of digital health initiatives fail within three years when donor funding ends (Gates Foundation, 2024). Sustainability challenges with many projects unable to transition to local ownership. Foreign technology dependencies creating vulnerability in health systems
4. **Quality Assurance and Regulation Gaps -** Proliferation of unregulated health apps providing potentially harmful medical advice. Limited quality standards for digital health tools leading to inconsistent performance. Regulatory frameworks lagging behind technological innovations in most countries
5. **Human-Centered Care Concerns -** Potential diminishing of human touch in healthcare delivery. Over-automation risking misdiagnosis in complex cases requiring clinical judgment. Technology sometimes implemented without adequate health worker training or buy-in

References

1. African Development Bank. (2023). *Africa's population growth and healthcare challenges*. African Development Bank. https://www.afdb.org
2. African Medical Schools Association. (2024). *Healthcare workforce and training gaps in Africa*.
3. African Union. (2023). *Migration of healthcare professionals from Africa*.
4. Africa Health Business. (2024). *Investment trends in Africa's digital health sector*.
5. BMJ Global Health. (2025). *Healthcare financing and patient payment trends in Kenya*.
6. Business Daily. (2025). *Economic impact of healthcare costs in Kenya*.
7. Cybersecurity Africa. (2024). *Rising cybersecurity threats in Africa's healthcare sector*.
8. Deloitte. (2024). *Telehealth adoption and growth in Africa post-COVID*.
9. Disrupt Africa. (2025). *Funding trends for youth-led health startups in Africa*.
10. Gates Foundation. (2024). *Challenges in sustaining donor-funded digital health initiatives*.
11. GSMA. (2024). *Mobile penetration and digital health expansion in Africa*.
12. Health Business Kenya. (2025). *AI-driven diagnostics and healthcare accessibility in Kenya*.
13. International Diabetes Federation. (2023). *Diabetes prevalence trends in Africa*.
14. Kenya Demographic and Health Survey. (2025). *Health insurance coverage and accessibility trends in Kenya*. Ministry of Health, Kenya.
15. Khusoko. (2025). *Challenges in Kenya's private health insurance market*.
16. Management Sciences for Health. (2024). *Stockouts of essential medicines in African public health facilities*.
17. McKinsey. (2023). *Africa's digital health market projections*.
18. MedTech Africa. (2025). *mHealth applications and healthcare innovation in Africa*.
19. Ministry of Health. (2025). *Healthcare financing and policy strategies in Kenya*. Government of Kenya.
20. PATH. (2024). *Digital health adoption and healthcare transformation in Africa*.
21. Privacy International. (2024). *Health data protection regulatory gaps in Africa*.
22. Step By Step Insurance. (2025). *Private insurance and healthcare affordability in Kenya*.
23. The Star. (2025). *M-Pesa's role in healthcare payments in Kenya*.
24. Treasury. (2025). *Budget allocation and financial reforms in Kenya's healthcare sector*. Government of Kenya.
25. UNICEF. (2023). *Birth registration rates in sub-Saharan Africa*.
26. World Bank. (2023). *Healthcare financing challenges and catastrophic health expenditures in Africa*.
27. World Health Organization. (2023). *Doctor distribution and rural-urban healthcare inequalities in Africa*.
28. World Health Organization. (2024). *Dual burden of communicable and non-communicable diseases in Africa*.
29. World Health Organization. (2025). *Out-of-pocket health expenditures and financial risk in African healthcare systems*. https://www.who.int