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Healthcare Financing in Africa and the Role of Development Finance Institutions: Integrating the Perspectives of Cardiac Physiologists

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ABSTRACT: This study explores the intersection of healthcare financing and cardiovascular diagnostics in Africa, with a focus on the often-overlooked role of cardiac physiologists. Despite the growing burden of non-communicable diseases (NCDs), particularly cardiovascular diseases (CVDs), healthcare systems across the continent remain underfunded and heavily reliant on out-of-pocket payments. Development Finance Institutions (DFIs) have emerged as key players in bridging financing gaps, yet their interventions frequently overlook diagnostic professionals who are critical to early detection and disease management. Through a multidisciplinary literature review, this paper examines the challenges of healthcare financing in Africa, evaluates the contributions and limitations of DFI-supported programs, and integrates the clinical perspectives of cardiac physiologists. The findings reveal systemic underinvestment in diagnostic infrastructure and workforce development, misalignment between financing strategies and clinical realities, and a lack of participatory planning in DFI initiatives. The study concludes with policy recommendations aimed at strengthening domestic health financing, expanding insurance coverage, and integrating cardiac physiologists into health systems planning. These insights are essential for designing equitable, sustainable, and clinically responsive healthcare financing models in Africa.

JEL Classification Codes: I15, I18, H51

PLAIN ENGLISH SUMMARY

Many African countries struggle to pay for healthcare, especially for heart-related illnesses. This paper looks at how money is spent on health and how organizations like the World Bank and African Development Bank help. It focuses on cardiac physiologists—specialists who test and monitor heart conditions—but who often lack the tools and support they need. The study shows that most funding goes to infectious diseases, while heart care and diagnostics are overlooked. It also highlights how better planning and investment could improve heart health services. By including the views of cardiac physiologists, the paper suggests ways to make healthcare funding more fair, effective, and focused on real needs.

1. INTRODUCTION

Healthcare financing remains one of the most pressing challenges facing African countries in their pursuit of universal health coverage (UHC). Despite notable progress in health outcomes over the past two decades, many nations continue to grapple with underfunded health systems, high out-of-pocket (OOP) expenditures, and limited access to essential services (Keates et al., 2017; Minja et al., 2022). This financing gap is particularly evident in the management of non-communicable diseases (NCDs), such as cardiovascular diseases (CVDs), which have emerged as leading causes of morbidity and mortality across the continent (Kengne et al., 2013).

Cardiac physiologists—key professionals in the diagnosis and monitoring of heart conditions—are often constrained by inadequate infrastructure, limited training opportunities, and systemic underinvestment in diagnostic services (Bell et al., 2015; Lukhele et al., 2025). These challenges underscore the urgent need for sustainable and equitable healthcare financing mechanisms that can support both preventive and curative services, especially in the area of cardiovascular care.

The current healthcare financing landscape in Africa is insufficient to meet the growing burden of disease, particularly in cardiovascular health. While Development Finance Institutions (DFIs) such as the World Bank, African Development Bank (AfDB), and the Global Fund have increasingly stepped in to support health system strengthening, their interventions often lack alignment with the needs of frontline professionals like cardiac physiologists (Mercer et al., 2019; Minja et al., 2022). This disconnect between financing strategies and clinical realities may hinder the effectiveness of DFI-supported programs and limit their impact on health outcomes (Piamjariyakul et al., 2012; Cargo & Mercer, 2008).

Existing literature highlights the chronic underfunding of health systems in Africa, with many countries failing to meet the Abuja Declaration target of allocating 15% of national budgets to health (Keates et al., 2017). Studies have also documented the dominance of OOP payments, which exacerbate health inequities and limit access to care (Joshi et al., 2008; Abiodun & Olusegun, 2025). Although DFIs have played a significant role in financing health infrastructure, insurance schemes, and capacity-building initiatives, much of this support has historically focused on communicable diseases, with limited attention to NCDs and even less to the diagnostic workforce (Minja et al., 2022; Oladipo et al., 2024).

Cardiac physiologists, whose role is critical in managing the rising burden of CVDs, are rarely featured in health financing discussions, despite their centrality to early detection and disease management (Keates et al., 2017; Bell et al., 2015). Their exclusion from strategic planning and resource allocation limits the potential of diagnostic services to contribute meaningfully to improved cardiovascular outcomes.

This paper aims to conduct a comprehensive literature review on healthcare financing in Africa, with a specific focus on the role of Development Finance Institutions and the integration of cardiac physiologists' perspectives. The goal is to identify gaps, highlight best practices, and propose policy recommendations that align financing strategies with clinical realities in cardiovascular care.

Research Questions

1. What are the current models and challenges of healthcare financing in Africa?
2. What roles do Development Finance Institutions play in supporting health systems on the continent?
3. How do cardiac physiologists perceive and experience the impact of healthcare financing on cardiovascular diagnostics and care?
4. What strategies can be adopted to better align DFI interventions with the needs of cardiovascular health systems?

Given the increasing burden of cardiovascular diseases in Africa and the critical role of cardiac physiologists in managing these conditions, it is essential to examine how healthcare financing mechanisms support—or fail to support—this segment of the health workforce. DFIs are uniquely positioned to influence large-scale health reforms, yet their strategies must be informed by the realities on the ground. This study fills a gap in the literature by integrating clinical insights into the broader discourse on health financing and development assistance.

This study contributes to the growing body of knowledge on sustainable health financing in Africa by offering a multidisciplinary perspective that bridges policy, finance, and clinical practice. By incorporating the voices of cardiac physiologists, it provides a more nuanced understanding of how financing decisions affect service delivery at the point of care. The findings will be valuable to policymakers, DFIs, health economists, and clinical leaders seeking to design more responsive and effective health financing models.

2. MATERIALS AND METHODS

This study is structured around a multidisciplinary literature review approach. This method was chosen to critically examine the intersection of healthcare financing, cardiovascular diagnostics, and the role of cardiac physiologists within African health systems. The study was guided by four research questions that explored current financing models, the strategic roles of

Development Finance Institutions (DFIs), the clinical experiences of cardiac physiologists, and potential strategies for better alignment between financing and cardiovascular care delivery.

To gather relevant data, the authors conducted a search across multiple academic databases including PubMed, Scopus, Web of Science, and Google Scholar. In addition to peer-reviewed literature, grey literature from global health institutions such as the World Bank, African Development Bank (AfDB), Global Fund, and the World Health Organization (WHO) was reviewed to capture policy-level insights and programmatic interventions. The search was conducted using targeted keywords such as "healthcare financing in Africa," "cardiac physiologists," "development finance institutions," "cardiovascular diagnostics," and "non-communicable diseases."

Inclusion criteria for the literature review focused on studies that addressed healthcare financing in African contexts, discussed cardiovascular diseases or diagnostic services, and examined the role or impact of DFIs. The selected literature was thematically analyzed and organized into five domains: healthcare financing challenges and trends, DFI roles and strategic interventions, clinical and operational insights from cardiac physiologists, case studies and best practices, and policy recommendations.

The synthesis of findings involved qualitative analysis of recurring themes, gaps, and strategic opportunities. Tables were developed to summarize regional initiatives and global best practices, offering comparative insights into how different countries structure healthcare financing and diagnostic infrastructure. As the study relied solely on secondary data from publicly available sources, no ethical approval was required. There was no involvement of human participants, and no identifiable personal data were used.

3. HEALTHCARE FINANCING IN AFRICA: CHALLENGES AND TRENDS

3.1 Systemic Underfunding

One of the most persistent challenges in African healthcare systems is chronic underfunding. Despite commitments such as the Abuja Declaration of 2001, where African Union member states pledged to allocate at least 15% of their annual budgets to health, most countries consistently fall short of this target. In fact, many spend less than 5% of their GDP on health, well below the global average. This underinvestment has far-reaching consequences: it limits the availability of essential medicines, weakens health infrastructure, and constrains the recruitment and retention of skilled health professionals, including cardiac physiologists. The result is a fragile health system that struggles to respond to both routine and emergency health needs, including the growing burden of non-communicable diseases (NCDs) such as cardiovascular diseases (CVDs).

Moreover, public health financing is often unpredictable and heavily reliant on external aid, making long-term planning difficult. Budget execution rates are also low in many countries due to weak public financial management systems, leading to inefficiencies and underutilization of allocated funds. This systemic underfunding creates a vicious cycle of poor service delivery, low public trust, and further reluctance to invest in health.

3.2 High Out-of-Pocket Spending

In the absence of robust public financing and comprehensive health insurance schemes, out-of-pocket (OOP) payments remain the dominant mode of healthcare financing in many African countries. On average, over 40% of total health expenditures are paid directly by households at the point of service. In some countries, this figure exceeds 60%, far above the 20% threshold recommended by the World Health Organization (WHO) to protect against financial hardship.

This high reliance on OOP payments disproportionately affects the poor and vulnerable, often leading to catastrophic health expenditures and impoverishment. For patients with chronic conditions such as hypertension or heart failure, the cost of regular diagnostics, medications, and follow-up care can be prohibitive. Cardiac physiologists frequently encounter patients who delay or forgo essential diagnostic tests like ECGs or echocardiograms due to cost, resulting in late-stage presentations and poorer outcomes.

The lack of financial risk protection also discourages preventive care and early diagnosis, undermining efforts to manage the rising tide of NCDs. Without systemic reforms to reduce OOP spending and expand pre-paid, pooled financing mechanisms, equitable access to healthcare will remain elusive.

3.3 Fragmented Donor Support

Donor funding has historically played a significant role in financing health services in Africa. However, this support is often disease-specific and vertically structured, focusing on high-profile communicable diseases such as HIV/AIDS, tuberculosis, and malaria. While these programs have achieved notable successes, they have also contributed to a fragmented health financing landscape that neglects broader system strengthening and the growing burden of NCDs.

Cardiovascular diseases, despite being a leading cause of death in many African countries, receive minimal donor attention and funding. This imbalance leaves critical areas such as diagnostics, rehabilitation, and chronic disease management under-resourced. Cardiac physiologists, for instance, often work in facilities lacking basic equipment or maintenance support, not because of a lack of need, but due to the absence of targeted funding streams.

Furthermore, the vertical nature of donor programs can lead to duplication of efforts, inefficiencies, and misalignment with national health priorities. It also creates dependency and limits the development of sustainable, integrated financing systems. There is a growing consensus that donor support must evolve toward health systems strengthening, with a focus on integrated service delivery, domestic resource mobilization, and long-term sustainability.

Table 1: Summary of Key Challenges and Emerging Trends in Healthcare Financing in Africa

Thematic Area	Key Challenges	Emerging Trends / Responses
1. Public Financing	- Low domestic budget allocation to health - Failure to meet Abuja Declaration (15%)	- Renewed advocacy for increased domestic health spending - Performance-based budgeting
2. External Aid Dependency	- 70% decline in Official Development Assistance (ODA) from 2021 to 2025	- Shift toward blended financing models - Emphasis on donor alignment with national priorities
3. Fiscal Space Constraints	- Rising debt servicing obligations (USD 81B in 2025) - Limited tax base	- Calls for debt relief and health-focused fiscal reforms
4. Health Workforce Financing	- Inadequate investment in training and retention - Brain drain	- Regional workforce strategies - Task-shifting and digital health training
5. Health Insurance Coverage	- Low penetration of national health insurance schemes - High out-of-pocket spending	- Expansion of community-based and digital microinsurance platforms
6. Governance & Accountability	- Fragmented financing systems - Weak public financial management	- Push for integrated health financing strategies - Use of digital tools for transparency
7. Emergency Preparedness	- Underfunded epidemic response systems - Climate-related health shocks	- Creation of emergency health funds - Regional disease surveillance and pooled procurement

Source: Authors' Review of the Literature

4. THE ROLE OF DEVELOPMENT FINANCE INSTITUTIONS (DFIS)

Development Finance Institutions (DFIs) have emerged as pivotal actors in addressing Africa's healthcare financing gaps, particularly in the context of underfunded public systems and the rising burden of non-communicable diseases (NCDs). These institutions—such as the World Bank, African Development Bank (AfDB), International Finance Corporation (IFC), and the Global Fund—provide long-term capital, technical assistance, and policy support to strengthen health systems across the continent.

4.1 Strategic Financing and Infrastructure Development

DFIs have historically focused on large-scale infrastructure investments, including the construction and rehabilitation of hospitals, laboratories, and diagnostic centers. For instance, the World Bank's Health Systems Strengthening projects in countries like Nigeria, Ethiopia, and Rwanda have contributed to improved access to essential services and diagnostics. These investments are particularly relevant for cardiac physiologists, whose work depends on the availability of functional diagnostic equipment such as ECG machines, echocardiography systems, and stress testing facilities (Keates *et al.*, 2017; Minja *et al.*, 2022).

However, while infrastructure development is critical, DFIs are increasingly recognizing the need to go beyond bricks and mortar. There is a growing shift toward integrated health systems financing, which includes support for health insurance schemes, digital health platforms, and supply chain management systems (Mercer *et al.*, 2019). These integrated approaches are essential for ensuring that investments translate into improved service delivery and health outcomes.

4.2 Catalyzing Health Insurance and Risk Pooling Mechanisms

One of the most transformative roles DFIs play is in catalyzing the development of national and regional health insurance schemes. Through blended finance models and technical assistance, institutions like the IFC and AfDB have supported the expansion of risk-pooling mechanisms that reduce out-of-pocket (OOP) expenditures and enhance financial protection for vulnerable populations (Abiodun & Olusegun, 2025). This is particularly important in cardiovascular care, where the cost of diagnostics and long-term management can be prohibitive for many patients.

By supporting the design and implementation of health insurance frameworks, DFIs help create sustainable financing pathways that benefit both patients and providers. For cardiac physiologists, this translates into more consistent patient flow, earlier diagnosis, and better adherence to treatment protocols—factors that are critical for reducing morbidity and mortality from cardiovascular diseases (Joshi *et al.*, 2008).

4.3 Addressing Workforce Gaps and Capacity Building

Despite their central role in health systems, diagnostic professionals such as cardiac physiologists are often overlooked in DFI-supported programs. Most workforce development initiatives have historically focused on physicians and nurses, with limited attention to allied health professionals. This oversight contributes to persistent gaps in diagnostic capacity, particularly in rural and underserved areas (Lukhele *et al.*, 2025).

Encouragingly, some DFIs are beginning to address this imbalance. For example, the AfDB's "Jobs for Youth in Africa" strategy includes components aimed at strengthening health workforce training institutions. Similarly, the Global Fund has supported laboratory technician training as part of its broader health systems strengthening agenda. Expanding these efforts to include cardiac physiologists and other diagnostic specialists is essential for building a resilient and responsive health system.

4.4 Promoting Innovation and Digital Health

DFIs are also playing a growing role in promoting innovation in healthcare financing and delivery. Investments in digital health platforms, telemedicine, and mobile diagnostics are helping to bridge access gaps and improve efficiency. These innovations are particularly relevant in cardiovascular care, where remote monitoring and digital ECG interpretation can extend the reach of cardiac physiologists and improve continuity of care (Oladipo *et al.*, 2024).

Moreover, DFIs are increasingly supporting **results-based financing** and **impact investment models** that reward measurable improvements in health outcomes. These models align incentives across stakeholders and encourage data-driven decision-making—an approach that can enhance the visibility and value of diagnostic services within the broader health system.

4.5 Aligning DFI Interventions with Clinical Realities

Despite these positive developments, a disconnect often remains between DFI strategies and the day-to-day realities of clinical practice. Cardiac physiologists, for example, may work in facilities that have received DFI-funded equipment but lack the training, maintenance support, or consumables needed to operate them effectively. Bridging this gap requires more inclusive planning processes that incorporate the perspectives of frontline professionals (Piamjariyakul *et al.*, 2012; Bell *et al.*, 2015).

Participatory approaches to health financing—where clinicians, administrators, and community representatives are involved in the design and evaluation of DFI-supported programs—can enhance relevance, ownership, and sustainability (Cargo & Mercer, 2008; Gilson, 2003). DFIs must also invest in monitoring and evaluation systems that capture the impact of their interventions on diagnostic capacity, service quality, and patient outcomes.

5. CARDIAC PHYSIOLOGISTS: CLINICAL AND OPERATIONAL INSIGHTS

Cardiac physiologists are essential yet often underrecognized members of the cardiovascular care team. Their expertise spans a range of diagnostic and therapeutic procedures, including electrocardiography (ECG), echocardiography, stress testing, Holter monitoring, and pacemaker follow-up. In the African context, where cardiovascular diseases (CVDs) are rising rapidly, the role of cardiac physiologists is increasingly critical (Keates *et al.*, 2017; Kengne *et al.*, 2013). However, their clinical effectiveness and operational efficiency are significantly influenced by the broader healthcare financing environment.

5.1 Clinical Role and Scope of Practice

Cardiac physiologists serve as the frontline in diagnosing heart conditions. Their work enables early detection of arrhythmias, structural heart diseases, ischemic heart conditions, and heart failure. In many African countries, they often operate in resource-constrained settings, performing multiple roles due to workforce shortages. Their ability to deliver accurate and timely diagnostics is vital for initiating appropriate treatment and improving patient outcomes (Joshi *et al.*, 2008).

Despite their importance, cardiac physiologists are frequently excluded from strategic planning and policy discussions. Their contributions are often overshadowed by physicians and nurses, leading to a lack of investment in their training, equipment, and career development. This marginalization limits the potential of cardiac diagnostics to contribute meaningfully to the fight against CVDs (Minja *et al.*, 2022).

5.2 Operational Challenges

Several operational barriers hinder the effectiveness of cardiac physiologists in Africa:

- **Inadequate Equipment and Infrastructure**: Many facilities lack basic diagnostic tools such as ECG machines, echocardiography systems, and defibrillators. Even when equipment is available, maintenance and calibration are often neglected due to budget constraints (Manuel *et al.*, 2025).
- **Training and Professional Development Gaps**: There are limited opportunities for specialized training and continuing professional development. Few institutions offer accredited programs in cardiac physiology, and international training is often inaccessible due to cost and visa restrictions (Lukhele *et al.*, 2025).
- **Workforce Shortages and Maldistribution**: Cardiac physiologists are concentrated in urban tertiary hospitals, leaving rural and peri-urban areas underserved. This geographic imbalance exacerbates health inequities and delays diagnosis in remote populations.
- **Lack of Recognition and Career Pathways**: In many health systems, cardiac physiologists are not formally recognized as a distinct cadre. This affects their remuneration, job security, and motivation, contributing to brain drain and attrition (Bell *et al.*, 2015).

5.3 Financing Gaps and Implications

The underfunding of diagnostic services directly impacts cardiac physiologists. Without adequate financing:

- Patients bear the cost of diagnostics, leading to delayed or missed diagnoses (Abiodun & Olusegun, 2025).
- Facilities cannot procure or maintain equipment, reducing diagnostic accuracy and throughput.

- Training programs remain underdeveloped, perpetuating skill gaps and limiting innovation.

These challenges are compounded by the fact that most Development Finance Institution (DFI) investments prioritize infrastructure or communicable diseases, with limited earmarking for diagnostic services or allied health professionals (Minja *et al.*, 2022).

5.4 Opportunities for Integration into Financing Models

To enhance the role of cardiac physiologists and improve cardiovascular outcomes, several strategies can be adopted:

- **Inclusion in DFI-Supported Workforce Development**: DFIs should explicitly include cardiac physiologists in health workforce strengthening initiatives. This includes funding for training institutions, scholarships, and professional exchange programs (Lukhele *et al.*, 2025).
- **Investment in Diagnostic Infrastructure**: Financing should go beyond building hospitals to include procurement, maintenance, and digital integration of diagnostic equipment. Mobile diagnostic units and telecardiology platforms can extend services to underserved areas (Oladipo *et al.*, 2024).
- **Support for Professional Associations**: Strengthening national and regional associations of cardiac physiologists can enhance advocacy, standard setting, and peer learning. DFIs can support these bodies through grants and technical assistance.
- **Data-Driven Planning**: Health financing models should incorporate data on diagnostic service utilization, workforce distribution, and patient outcomes. This evidence can guide resource allocation and highlight the value of cardiac physiologists in achieving health system goals (Piamjariyakul *et al.*, 2012).
- **Public-Private Partnerships (PPPs)**: DFIs can catalyze PPPs that support diagnostic services, including leasing models for equipment, training partnerships with private providers, and outcome-based financing for diagnostic accuracy and coverage.

5.5 Case Examples and Best Practices

- **Rwanda's Health Systems Strengthening Project** (supported by the World Bank) included investments in diagnostic equipment and training, indirectly benefiting cardiac physiologists.
- **Nigeria's Basic Health Care Provision Fund (BHCPF)**, though not specific to diagnostics, has potential for integration of cardiac services if aligned with state-level priorities.
- **South Africa's National Health Laboratory Service (NHLS)** provides a model for centralized diagnostic support that could be adapted for cardiovascular diagnostics across the continent.

Table 2: Case Studies and Best Practices in Healthcare Financing and Diagnostic Infrastructure Across Africa

Country	Initiative / Program	Focus Area	Supporting Institution(s)	Sub-region
Rwanda	Health Systems Strengthening Project	Diagnostic equipment and training	World Bank, AfDB	East Africa
Nigeria	Basic Health Care Provision Fund (BHCPF)	Primary care financing, potential for diagnostics	Government of Nigeria, AfDB	West Africa
South Africa	National Health Laboratory Service (NHLS)	Centralized diagnostics	Government of South Africa	Southern Africa
Ghana	Ghana Heart Initiative	CVD management, diagnostics, training	GIZ, Ghana MoH, AfDB	West Africa

Country	Initiative / Program	Focus Area	Supporting Institution(s)	Sub-region
Kenya	M-TIBA Digital Health Wallet	Mobile health financing and diagnostics	PharmAccess, Safaricom	East Africa
Ethiopia	Primary Health Care Expansion	Infrastructure and workforce development	AfDB, WHO	East Africa
Senegal	Health Infrastructure PPPs	Hospital and diagnostic infrastructure	AfDB, Government of Senegal	West Africa
Uganda	Healthy Heart Africa Program	Hypertension screening and management	AstraZeneca, MoH Uganda	East Africa
Tanzania	JAMII Health Insurance Platform	Digital microinsurance and diagnostics	Vodacom, Government of Tanzania	East Africa
Zambia	PHIT Partnership for Health Systems Strengthening	District-level diagnostics and training	Doris Duke Foundation	Southern Africa
Mozambique	Integrated Health Systems Strengthening	Diagnostics and maternal health	FHI360, AfDB	Southern Africa
Malawi	Health Infrastructure Development	Rural diagnostic access	AfDB, UNICEF	Southern Africa
Cameroon	Diagnostic Infrastructure Expansion	Imaging and cardiac diagnostics	AfDB, Government of Cameroon	Central Africa
Côte d'Ivoire	National Health Insurance Scheme Rollout	Risk pooling and diagnostic access	AfDB, Government of Côte d'Ivoire	West Africa
Morocco	Hospital Modernization Program	Cardiovascular diagnostics	AfDB, Government of Morocco	North Africa
Tunisia	Health Infrastructure PPPs	Specialized diagnostic centers	AfDB, Government of Tunisia	North Africa
Algeria	National Cardiovascular Strategy	CVD prevention and diagnostics	Government of Algeria	North Africa
Burkina Faso	Community Health Worker Expansion	Diagnostics in rural areas	WHO, AfDB	West Africa
Namibia	Telemedicine for Cardiovascular Care	Remote diagnostics	Government of Namibia, WHO	Southern Africa
Sierra Leone	Post-Ebola Health Systems Recovery	Diagnostic infrastructure	AfDB, World Bank	West Africa

Source: Authors' Compilation

The above table 2 demonstrates the geographic diversity, institutional partnerships, and diagnostic relevance of healthcare financing initiatives across Africa.

To provide a comparative perspective and highlight global best practices, table 3 presents case studies from 15 developed countries. These examples illustrate how advanced economies have structured healthcare financing and diagnostic infrastructure to support cardiovascular care and allied health professionals.

Table 3: Case Studies and Best Practices in Healthcare Financing and Diagnostics in Developed Countries

Country	Initiative / Program	Focus Area	Supporting Institution(s)	Region
Australia	PPP Diagnostic Services Expansion	Imaging and lab diagnostics	IFC, Government of Australia	Oceania
Canada	Pan-Canadian Health Infrastructure Strategy	Integrated diagnostics and digital health	Government of Canada, provincial health bodies	North America
United States	Million Hearts Initiative	CVD prevention and diagnostics	CDC, HHS, AHA	North America
United Kingdom	NHS Diagnostic Hubs	Community-based diagnostic access	NHS England, UK Government	Europe
Germany	National Cardiovascular Disease Strategy	CVD diagnostics and prevention	German Federal Ministry of Health	Europe
France	Regional Diagnostic Networks	Imaging and lab integration	French Ministry of Health	Europe
Italy	PPP Laboratory Services	Clinical diagnostics	IFC, Italian Government	Europe
Japan	Smart Hospital Initiative	AI-driven diagnostics	Japanese Ministry of Health	Asia
South Korea	National Health Insurance Diagnostic Expansion	Universal diagnostic access	Korean NHIS, Government of Korea	Asia
Sweden	Digital Health and Remote Diagnostics	Telemedicine and mobile diagnostics	Swedish eHealth Agency	Europe
Norway	National Cardiovascular Registry	Data-driven diagnostics and outcomes tracking	Norwegian Directorate of Health	Europe
Finland	Health Village Digital Platform	Online diagnostics and patient education	Finnish Ministry of Social Affairs and Health	Europe
Netherlands	PPP Imaging Services	Radiology and pathology services	Dutch Government, Private Providers	Europe
Switzerland	Integrated Diagnostic Financing Models	Bundled payments for diagnostics	Swiss Federal Office of Public Health	Europe
New Zealand	National Health IT Infrastructure	Diagnostic data sharing and access	Ministry of Health NZ	Oceania

Source: Authors' Compilation

This table complements the African case studies by showcasing how developed nations leverage PPP models, national strategies, and digital innovations to strengthen diagnostic infrastructure and healthcare financing.

6. POLICY RECOMMENDATIONS

To address the systemic challenges in healthcare financing and to better integrate the role of cardiac physiologists in cardiovascular care across Africa, the following policy recommendations are proposed:

6.1 Strengthen Domestic Health Financing Commitments

Governments must prioritize health in national budgets by meeting or exceeding the Abuja Declaration target of allocating at least 15% of annual budgets to health (Keates *et al.*, 2017). Increased domestic funding is essential for reducing dependency on external aid and ensuring sustainable investment in diagnostic infrastructure and workforce development (Minja *et al.*, 2022).

6.2 Expand Health Insurance Coverage and Risk Pooling

Policymakers should accelerate the development and implementation of national and community-based health insurance schemes. These schemes should include comprehensive coverage for non-communicable diseases (NCDs), particularly cardiovascular diagnostics and treatment. Risk pooling mechanisms can reduce out-of-pocket expenditures and improve access to essential services for vulnerable populations (Abiodun & Olusegun, 2025; Joshi *et al.*, 2008).

6.3 Prioritize Diagnostic Workforce Development

Health workforce strategies must explicitly include cardiac physiologists and other allied health professionals. This includes:

- Establishing accredited training programs in cardiac physiology.
- Providing scholarships and continuous professional development opportunities.
- Creating clear career pathways and professional recognition frameworks.

Such investments will help address workforce shortages, improve service quality, and reduce urban-rural disparities (Lukhele *et al.*, 2025; Bell *et al.*, 2015).

6.4 Align DFI Investments with Clinical Realities

Development Finance Institutions (DFIs) should adopt participatory planning approaches that involve frontline professionals, including cardiac physiologists, in the design and evaluation of health programs. Funding should be directed not only toward infrastructure but also toward:

- Equipment maintenance and calibration.
- Supply of consumables.
- Training and mentorship programs.

This alignment will enhance the effectiveness and sustainability of DFI-supported interventions (Piamjariyakul *et al.*, 2012; Cargo & Mercer, 2008).

6.5 Promote Integrated and Digital Health Solutions

Governments and DFIs should support the integration of digital health technologies, such as telecardiology, mobile diagnostics, and electronic health records. These tools can extend the reach of cardiac physiologists, especially in remote areas, and improve continuity of care. Investments in digital infrastructure should be accompanied by training and regulatory frameworks to ensure quality and data security (Oladipo *et al.*, 2024; Mercer *et al.*, 2019).

6.6 Foster Public-Private Partnerships (PPPs)

Public-private partnerships can mobilize additional resources and expertise for cardiovascular diagnostics. Governments should create enabling environments for PPPs through:

- Transparent procurement processes.
- Incentives for private sector investment in diagnostic services.
- Outcome-based financing models that reward quality and accessibility (Minja *et al.*, 2022).

6.7 Enhance Monitoring, Evaluation, and Accountability

Robust monitoring and evaluation systems are critical for tracking the impact of health financing reforms. Indicators should include:

- Diagnostic service availability and utilization.
- Workforce distribution and retention.
- Patient outcomes in cardiovascular care.

Transparent reporting and community engagement can build trust and ensure accountability in the use of public and donor funds (Gilson, 2003).

7. CONCLUSION

The pursuit of universal health coverage in Africa is inextricably linked to the continent's ability to reform and strengthen its healthcare financing systems. As this paper has shown, the current landscape is marked by chronic underfunding, high out-of-pocket expenditures, and fragmented donor support, all of which undermine access to quality care—particularly for non-communicable diseases such as cardiovascular diseases (Keates *et al.*, 2017; Kengne *et al.*, 2013).

Development Finance Institutions (DFIs) have emerged as critical actors in bridging financing gaps, offering strategic investments in infrastructure, insurance schemes, and digital health innovations (Mercer *et al.*, 2019; Abiodun & Olusegun, 2025). However, their impact can be significantly enhanced by aligning their interventions with the realities of frontline healthcare delivery. Cardiac physiologists, as key diagnostic professionals in cardiovascular care, exemplify the disconnect between high-level financing strategies and operational needs on the ground (Minja *et al.*, 2022; Piamjariyakul *et al.*, 2012).

To achieve meaningful progress, healthcare financing models must be inclusive, equitable, and responsive. This includes recognizing and investing in the diagnostic workforce, integrating digital health solutions, and fostering participatory planning processes that elevate the voices of clinicians and patients alike (Cargo & Mercer, 2008; Gilson, 2003). Only through such holistic and context-sensitive approaches can Africa build resilient health systems capable of addressing both current and emerging health challenges.

Ultimately, the integration of cardiac physiologists' perspectives into healthcare financing discourse is not merely a matter of professional recognition—it is a strategic imperative for improving cardiovascular outcomes and advancing health equity across the continent.

List of Abbreviations

- **UHC** – Universal Health Coverage
- **NCDs** – Non-Communicable Diseases
- **CVDs** – Cardiovascular Diseases
- **DFIs** – Development Finance Institutions
- **OOP** – Out-of-Pocket (Expenditures)
- **AfDB** – African Development Bank
- **WHO** – World Health Organization
- **IFC** – International Finance Corporation
- **CDC** – Centers for Disease Control and Prevention
- **HHS** – U.S. Department of Health and Human Services
- **AHA** – American Heart Association
- **PPP** – Public-Private Partnership

- **NHLS** – National Health Laboratory Service
- **MoH** – Ministry of Health
- **NHIS** – National Health Insurance Scheme
- **ECG** – Electrocardiography

Declarations

- **Ethics approval and consent to participate**

  Not applicable. This study is based on a literature review and does not involve human participants or primary data collection

- **Consent for publication**

  Not applicable. No individual data or identifiable information is included in this manuscript.

- **Availability of data and materials**

  All data supporting the findings of this study are derived from publicly available literature and are cited appropriately in the reference section

- **Competing interests**

  The authors declare that they have no competing interests

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