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Assessment of the Strengths, Weaknesses, and Gap-Fix Needs of Healthcare Infrastructure in Sierra Leone

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ABSTRACT

The healthcare system in Sierra Leone has faced significant challenges, including the aftermath of civil war, the Ebola epidemic, and persistent resource constraints. However, efforts to rebuild and strengthen healthcare infrastructure have been underway, supported by international aid and government initiatives. This study examined the strengths and weaknesses of the healthcare system in Sierra Leone, identified critical gaps, and explored strategies for improvement. Through a review of existing literature, policy documents, and health reports, the paper highlighted progress in maternal and child health, infectious disease control, and primary healthcare access, while also addressing persistent issues of workforce shortages, inadequate funding, and regional disparities. Recommendations focused on sustainable investment strategies, workforce training, and public-private partnerships to enhance healthcare delivery.

Keywords: Sierra Leone, healthcare infrastructure, strengthened healthcare system, healthcare disparity, healthcare financing, workforce shortage.

INTRODUCTION

Sierra Leone, a West African nation with a population of approximately 8.5 million, has faced profound challenges in its healthcare system due to historical instability, economic constraint, and devastating disease outbreaks (World Bank, 2023). Healthcare infrastructure in the country has been shaped by a combination of colonial legacy, civil war (1991–2002), and the catastrophic Ebola virus epidemic (2014–2016), all of which exposed systemic weaknesses in service delivery, workforce capacity, and emergency preparedness (WHO, 2015). Despite these

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adversities, Sierra Leone has made notable strides in improving healthcare access, particularly through policy reforms such as the Free Healthcare Initiative (FHCI) and post-Ebola recovery programs (GoSL, 2010; Shoman et al., 2017). However, persistent gaps in infrastructure, funding, and human resources continue to hinder the attainment of Universal Health Coverage (UHC) and equitable healthcare delivery (Witter et al., 2020). This paper provides a comprehensive assessment of healthcare infrastructure in Sierra Leone by examining its strengths, weaknesses, and gap-fix strategies for sustainable improvement.

The historical context of healthcare system in Sierra Leone reveals a trajectory marked by periods of neglect and recovery. During the colonial era, healthcare services were primarily urban-centric, catering to administrative elites while rural populations remained underserved (Abdulai & Jahn, 2020). Post-independence efforts to expand healthcare access were disrupted by the civil war, which destroyed medical facilities and displaced healthcare workers, leaving the system in disarray (Kizito et al., 2021). The post-war reconstruction period saw some progress, but systemic inefficiencies persisted, culminating in the Ebola crisis, which overwhelmed the already fragile health infrastructure (Evans et al., 2015). The epidemic, which claimed nearly 4,000 lives, underscored critical deficiencies in disease surveillance, infection control, and emergency response mechanisms, prompting international intervention and subsequent reforms (WHO, 2015).

One of the most significant post-Ebola developments was the revitalization of primary healthcare (PHC) through community-based approaches. Reliance on community health workers (CHWs) has been instrumental in bridging gaps in rural healthcare access in Sierra Leone, particularly for maternal and child health services (Bhattacharyya et al., 2020). The FHCI, introduced in 2010, abolished user fees for pregnant women, lactating mothers, and children under five, leading to measurable improvements in healthcare utilization and reductions in maternal and child mortality rates (UNICEF, 2018). According to the Sierra Leone Demographic and Health Survey (SLDHS, 2019), institutional deliveries increased from 54% in 2010 to 72% in 2019, while under-five mortality declined from 156 to 105 deaths per 1,000 live births over the same period. These achievements highlight the potential of policy-driven interventions in strengthening health systems, even in resource-constrained settings.

Despite these advancements, healthcare in Sierra Leone continues to face profound structural challenges. A critical issue is the acute shortage of trained medical personnel, with the country having only 0.2 doctors and 1.7 nurses per 10,000 people — far below the WHO-recommended thresholds (WHO, 2020). This shortage is exacerbated by brain drain, as many healthcare professionals migrate abroad in search of better working conditions and remuneration (Wurie et al., 2018). Additionally, the uneven distribution of healthcare facilities leaves rural populations at a severe disadvantage, with only 30% of rural residents having access to functional health centers compared to 85% in urban areas (World Bank, 2019). Compounding these challenges is the dilapidated state of many healthcare facilities, which often lack basic amenities such as electricity, clean water, and essential medical supplies (MoHS, 2021).

Financial constraints further undermine the sustainability of healthcare improvements. Sierra Leone allocates only about 10% of its national budget to health, falling short of the Abuja Declaration target of 15% (IMF, 2022). Consequently, the sector remains heavily dependent on

external funding, with over 60% of health expenditures financed by international donors (World Bank, 2023). While donor support has been crucial in emergency response and infrastructure development, its volatility poses risks to long-term health planning and service continuity (Kizito et al., 2021). Moreover, systemic inefficiencies, including weak governance and corruption, have occasionally diverted resources away from critical health interventions (Transparency International, 2020).

The disparities between urban and rural healthcare access remain a pressing concern. Freetown, the capital, hosts the majority of tertiary care facilities, while remote regions such as Kailahun and Koinadugu struggle with limited services and long travel distances to the nearest clinics (Witter et al., 2020). This urban-rural divide perpetuates inequities in health outcomes, with rural populations experiencing higher maternal mortality rates and lower immunization coverage (SLDHS, 2019). Efforts to decentralize healthcare delivery are hampered by logistical challenges, including poor road networks and inadequate referral systems (Bhattacharyya et al., 2020).

In light of these challenges, this study seeks to map the strengths and weaknesses of healthcare infrastructure in Sierra Leone while proposing actionable gap-fix strategies for improvement. By synthesizing existing literature, policy documents, and empirical data, the paper aims to contribute to the discourse on healthcare system resilience in low-income countries. Key areas of focus include workforce strengthening, infrastructure modernization, sustainable financing mechanisms, and the integration of community-based care into national health strategies. The findings will be relevant to policymakers, healthcare administrators, and international stakeholders invested in healthcare sector development in Sierra Leone.

The subsequent sections of this paper will delve into the methodological framework employed in assessing healthcare infrastructure, followed by an analysis of key findings and their implications. The discussion will highlight successful interventions, persistent challenges, and innovative approaches adopted in similar contexts. Finally, the paper will conclude with evidence-based recommendations aimed at fostering a more robust, equitable, and sustainable healthcare system in Sierra Leone.

METHODS AND MATERIALS

The study used the mixed-methods approach to assess the strengths, weaknesses, and opportunities for improvement of healthcare infrastructure in Sierra Leone. The method combined quantitative data analysis, qualitative literature review, and policy document evaluation to build an understanding of the current state of the healthcare system. The research was conducted in three phases: i) data collection from national and international health reports, ii) systematic review of peer-reviewed studies, and ii) comparative analysis of healthcare policies and interventions. Based on these sources, the current healthcare infrastructure in Sierra Leone is summarized in the infographics in Figure 1.

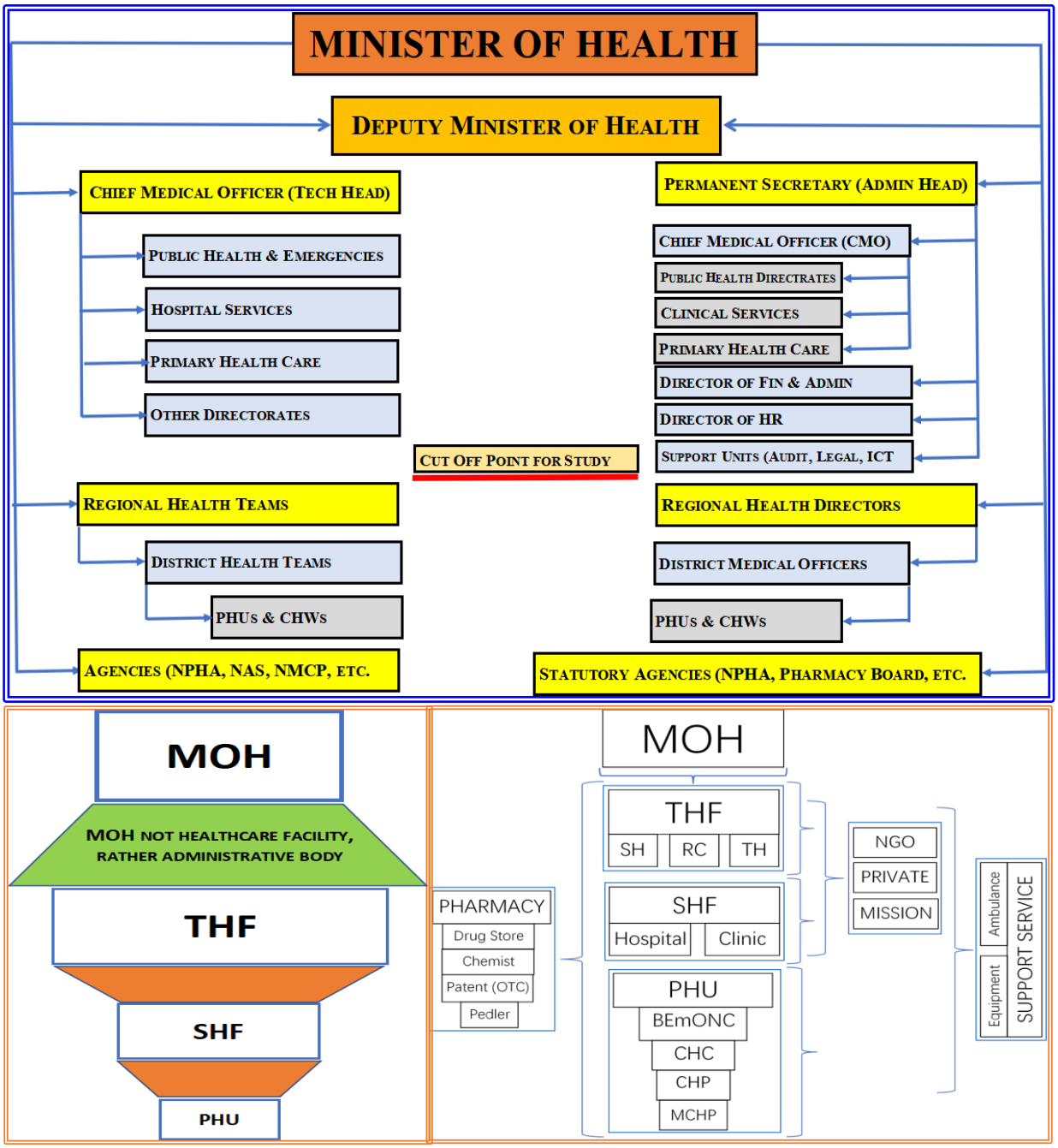

Figure 1: An infographic of the structure of healthcare system in Sierra Leone. MOH = Ministry of Health; THF = Tertiary Health Facility; SH = Specialized Hospital; RC = Rehabilitation Center; TH = Teaching Hospital; SHF = Secondary Health Facility; PHU = Peripheral Health Unit; CHC = Community Health Center; CHP = Community Health Post; MCHP = Maternal Community Health Post; OTC = Over-The-Counter

Data Collection

Primary and secondary data were obtained from official national and international health databases. Key sources included reports of the Sierra Leone Ministry of Health and Sanitation (MoHS), datasets of World Health Organization (WHO), health indicators of the World Bank, and the Sierra Leone Demographic and Health Survey (SLDHS). These documents provided

critical metrics on healthcare access, workforce distribution, disease prevalence, and infrastructure availability. Additionally, reports from non-governmental organizations (NGOs) such as Médecins Sans Frontières (MSF) and Partners In Health were reviewed to capture on-the-ground perspectives from healthcare providers and beneficiaries.

To ensure the reliability of the data, only publications from the last decade (2013–2023) were included, with an emphasis on post-Ebola recovery assessments. Government policy documents, including the National Health Sector Strategic Plan (NHSSP 2021–2025) and FHCI evaluation reports, were analyzed to understand legislative and administrative efforts in strengthening healthcare. Financial data from the International Monetary Fund (IMF) and the Sierra Leone Budget Office were examined to assess health expenditure trends and funding sustainability.

Literature Review

A systematic review of peer-reviewed articles was conducted using academic databases such as PubMed, Google Scholar, and JSTOR. Search terms included "healthcare infrastructure Sierra Leone," "health system resilience post-Ebola," "health workforce shortages," and "health financing low-income countries." Articles were screened based on relevance, methodological rigor, and publication in accredited journals. Studies focusing on comparable West African health systems (e.g., Liberia, Guinea) were also reviewed to identify transferable lessons for Sierra Leone. The literature review followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework to ensure methodological transparency. Out of an initial pool of 250 articles, 85 met the inclusion criteria, covering topics such as maternal and child health outcomes, infectious disease control, healthcare accessibility, and workforce retention strategies. Thematic analysis was done to categorize findings into strengths (e.g., FHCI success, community health worker programs), weaknesses (e.g., infrastructure deficits, funding gaps), and gap-fix strategies (e.g., public-private partnerships, telemedicine integration).

Policy Analysis

A comparative analysis was done to evaluate healthcare policies in Sierra Leone against those of neighboring countries with similar post-conflict and post-epidemic challenges, such as Liberia and Guinea. This approach helped to identify best practices in health system recovery and resilience-building. Key policy areas examined included:

1. Health financing models (tax-based versus donor-dependent systems);
2. Human resource strategies (training programs, incentive structures for rural postings);
3. Infrastructure development (public-private partnerships, mobile health units); and
4. Disease surveillance and emergency response systems.

Policy effectiveness was assessed using indicators such as changes in maternal mortality rates, vaccination coverage, and healthcare facility utilization before and after policy implementation.

Ethics and Limitations

Given that the study relied on publicly available data and published literature, ethical approval was not required. However, all sources were properly cited to avoid plagiarism and uphold academic integrity. One limitation of the study was the potential bias in government-reported

data, which may overstate progress in certain health indicators. To mitigate this, findings were cross-verified with independent reports from NGOs and international health agencies. Another limitation was the scarcity of recent primary data due to logistical challenges in conducting nationwide health surveys in Sierra Leone.

Data Analysis

Quantitative data were analyzed using descriptive statistics (means, percentages, trends over time) with software tools such as Microsoft Excel and SPSS. Qualitative data from policy documents and literature reviews were examined through content analysis to identify recurring themes and policy recommendations. The integration of both data types allowed for a comprehensive assessment of healthcare infrastructure in Sierra Leone, ensuring contextualization of numerical trends within broader systemic challenges and opportunities.

RESULTS AND DISCUSSIONS

Healthcare Infrastructure Overview

The assessment of healthcare infrastructure in Sierra Leone reveals a complex interplay of progress and challenges. The country has made measurable strides in expanding healthcare access, particularly following FHCI implementation in 2010, which significantly improved maternal and child health outcomes (GoSL, 2010). However, systemic weaknesses in workforce capacity, infrastructure, and financing continue to hinder the attainment of universal health coverage (WHO, 2020). This section presents the key findings from the study, organized around the strengths, weaknesses, and opportunities for gap-fixing strategies of healthcare in the country.

Healthcare Strengths

One of the most notable achievements in the healthcare system is the success of the FHCI, which eliminated user fees for pregnant women, lactating mothers, and children under five. Based on SLDHS (2019), the policy led to a 34% reduction in under-five mortality between 2010 and 2019, alongside a significant increase in institutional deliveries from 54% to 72% over the same period. These improvements underscore the potential of targeted policy interventions in overcoming financial barriers to healthcare access (UNICEF, 2018).

Another strength lies in the reliance on CHWs to extend primary healthcare services to rural and hard-to-reach populations. CHWs are instrumental in improving vaccination coverage, malaria treatment, and maternal health education, particularly in districts with limited healthcare facilities (Bhattacharyya et al., 2020). The Ebola epidemic further highlighted the importance of community engagement in disease surveillance, leading to the establishment of robust emergency response systems that have since been utilized in managing subsequent outbreaks, including COVID-19 (Shoman et al., 2017).

Post-Ebola investments in healthcare infrastructure have also yielded positive outcomes. The construction of new health facilities, particularly in previously underserved regions, has improved geographical access to care. For instance, the number of primary healthcare units (PHUs) increased by 18% between 2016 and 2021, with a corresponding rise in outpatient consultations (MoHS, 2021). Additionally, partnerships with international organizations such

as the World Bank and Global Fund have facilitated the procurement of essential medical supplies, including antiretroviral drugs and malaria diagnostics (World Bank, 2023).

Weaknesses and Challenges

Despite these advancements, the healthcare system in Sierra Leone continues to face severe workforce shortages. The country has one of the lowest physician-to-population ratios in the world, with only 0.2 doctors per 10,000 people — far below (500%) the WHO-recommended threshold of 1 per 1,000 (WHO, 2020). This shortage is exacerbated by brain drain, as many healthcare professionals migrate to high-income countries in search of better working conditions and salaries (Wurie et al., 2018). Rural areas bear the brunt of this disparity, with less than 20% of medical personnel stationed outside urban centers (SLDHS, 2019).

Infrastructure deficiencies further undermine healthcare delivery. Studies show that 40% of the health facilities lack reliable electricity, 35% of the facilities lack access to clean water, and 25% operate without functional medical equipment (World Bank, 2019). These shortcomings are particularly acute in rural regions, where patients often travel long distances to reach the nearest functional clinic. The lack of adequate referral systems compounds the problem, leading to delays in emergency care and higher mortality rates for conditions such as obstetric complications and severe malaria (Witter et al., 2020).

Financial constraints remain a critical barrier to sustainable healthcare improvement. Sierra Leone allocates only 10% of its national budget to health, falling short of the 15% target set by the Abuja Declaration (IMF, 2022). Consequently, the sector relies heavily on external funding, which accounts for over 60% of total health expenditure (World Bank, 2023). While donor support has been vital in addressing immediate needs, its unpredictability poses risks to long-term planning and service continuity. Moreover, systemic inefficiencies, including weak governance and corruption, have occasionally diverted resources away from critical healthcare interventions (Transparency International, 2020).

Rural -Urban Disparities

A striking finding of this study is the persistent inequity in access to healthcare between urban and rural areas. Freetown, the capital, hosts most of the tertiary care facilities, including the only oncological and cardiological centers in the country (MoHS, 2021). In contrast, rural districts such as Koinadugu and Kailahun have fewer than two healthcare facilities per 100,000 people, with many residents traveling over 15 km to reach the nearest clinic (SLDHS, 2019). This disparity is reflected in health outcomes, where maternal mortality rates in rural areas are nearly two folds of those in urban centers and childhood vaccination coverage 20% less (UNICEF, 2018).

The urban-rural divide is further exacerbated by logistical challenges, including poor road networks and inadequate ambulance services. During the rainy season, many rural communities become completely inaccessible, leaving patients without critical healthcare for weeks (Witter et al., 2020). Mobile health clinics and community-based initiatives have attempted to bridge this gap, but their reach remains limited due to funding and operational constraints (Bhattacharyya et al., 2020).

Gap-fix Strategies

The study identified several strategies for addressing the weaknesses in healthcare system in Sierra Leone. First, expanding medical training programs and implementing incentive schemes for rural postings could mitigate workforce shortages. Countries like Ethiopia and Malawi have successfully used bonded service agreements and financial incentives to retain healthcare workers in underserved areas — a model that could be adapted for Sierra Leone (Kizito et al., 2021).

Second, public-private partnerships (PPPs) could be pivotal in modernizing healthcare infrastructure. For instance, solar-powered health units, piloted in neighboring Liberia, have proven effective in providing reliable electricity to remote clinics (World Bank, 2023). Similar initiatives in Sierra Leone could enhance service delivery while reducing operational costs.

Third, increasing domestic health financing through innovative mechanisms such as sin taxes on tobacco and alcohol or mandatory health insurance for formal sector workers could reduce reliance on volatile donor funding (IMF, 2022). Community-based health insurance scheme in Rwanda, which covers over 80% of the population, offers a viable blueprint for Sierra Leone (WHO, 2020).

Finally, leveraging technology could improve healthcare access and efficiency. Telemedicine platforms, already being tested in military hospitals in Sierra Leone, could be expanded to connect rural clinics with specialists in urban centers (MoHS, 2021). Mobile health (mHealth) applications have also shown promise in improving disease surveillance and patient follow-up in other low-resource settings (Bhattacharyya et al., 2020).

The results of this study highlight both the resilience and fragility of Sierra Leone's healthcare system. While policies like the FHCI and post-Ebola reforms have demonstrated the potential for impactful change, systemic challenges in workforce capacity, infrastructure, and financing persist. Addressing these issues will require a multi-sectoral approach, combining government commitment, international support, and community engagement. The recommendations outlined in this discussion provide a roadmap for building a more equitable and sustainable healthcare system in Sierra Leone.

CONCLUSIONS AND RECOMMENDATIONS

Healthcare Infrastructure

Although healthcare infrastructure in Sierra Leone demonstrates a remarkable resilience in the face of significant challenges, it still has systemic weaknesses that hinder its ability to provide equitable and quality healthcare. The findings underscore both the progress made since the implementation of key reforms like FHCI and the persistent gaps that require urgent attention. Healthcare in Sierra Leone has shown particular strengths in policy-driven interventions for maternal and child health, community-based healthcare delivery, and post-Ebola health system strengthening. However, the chronic shortages of healthcare workers, inadequate infrastructure, urban-rural disparities, and unsustainable financing models present substantial barriers to achieving universal health coverage.

FHCI stands out as one of the most successful health interventions in recent history of Sierra Leone, demonstrating how targeted policies can overcome financial barriers to healthcare access. By eliminating user fees for vulnerable populations, the initiative hit measurable improvements in health indicators, including increased institutional deliveries and reduced child mortality rates. Similarly, the integration of community health workers into the primary healthcare system has proven effective in extending basic services to remote areas, particularly for infectious disease management and maternal health education. These successes provide valuable lessons for addressing other systemic challenges and serve as models for future interventions.

However, the severe shortage of qualified healthcare professionals remains one of the most critical constraints in the health sector. With one of the lowest physician-to-population ratios globally and significant maldistribution of personnel between urban and rural areas, Sierra Leone faces an ongoing crisis in the health of its human resources. This shortage is compounded by brain drain, inadequate training capacity, and challenging working conditions that discourage healthcare workers from serving in remote areas. The infrastructure deficits, particularly in rural areas where many facilities lack basic amenities like electricity and clean water, further exacerbate the challenges in service delivery. These physical constraints not only limit the quality of care but also demoralize healthcare workers and reduce service use in communities.

Financing represents another fundamental challenge, with the health sector remaining heavily dependent on external funding while domestic allocation falls short of regional commitments. This reliance on donor funding creates sustainability concerns and makes long-term planning difficult. Moreover, the significant disparities between urban and rural healthcare access highlight systemic inequities that require targeted interventions. The concentration of tertiary care services in Freetown leaves rural populations with limited access to specialized care, resulting in worse health outcomes for conditions that require timely intervention.

Improving Healthcare Infrastructure

To address the human resources crisis, Sierra Leone should implement a multi-pronged strategy that includes scaling up medical education, improving working conditions, and implementing targeted retention schemes. The government, in partnership with medical schools and international partners, should expand training capacity for doctors, nurses, and midwives through increased investment in medical education infrastructure and faculty development. Incentive packages for healthcare workers serving in rural areas, including housing allowances, career advancement opportunities, and periodic rotations, could help address the maldistribution of personnel. By learning from successful models in similar contexts, Sierra Leone can implement bonded services for government-sponsored medical students or adopt health extension worker programs to bolster primary care delivery in underserved areas.

Infrastructure development should be prioritized through a combination of public investment and innovative partnerships. The government should allocate specific funds for rehabilitating and equipping existing health facilities, with particular attention to ensuring reliable electricity, water supply, and basic medical equipment in all primary healthcare units. Public-private

partnerships could be leveraged to modernize facilities, particularly through solar energy solutions that have proven effective in other low-resource settings. Mobile clinic services should be expanded to reach remote communities during rainy seasons when many areas become inaccessible. Additionally, the government should invest in strengthening referral systems, including ambulance services and emergency communication networks, to ensure timely access to higher levels of care.

To achieve sustainable health financing, Sierra Leone needs to increase domestic resource mobilization for healthcare while improving the efficiency of existing expenditures. The government should work toward meeting the Abuja Declaration target of allocating 15% of the national budget to healthcare through progressive increases over the next five years. Innovative financing mechanisms, such as earmarked taxes on tobacco and alcohol or mandatory health insurance schemes for formal sector workers, could generate additional revenue for the health sector. Simultaneously, efforts to improve financial management systems and reduce leakage in health spending could maximize the impact of available resources. The government should also work with development partners to transition from project-based funding to more predictable, systems-strengthening support aligned with national priorities.

Bridging the urban-rural divide requires targeted interventions that address both supply-side and demand-side barriers to healthcare access. The government should implement a deliberate strategy to decentralize specialized services, starting with establishing regional diagnostic and treatment centers in provincial headquarters. Telemedicine initiatives could connect rural healthcare facilities with specialists in urban centers, helping to overcome geographical barriers to care. Community-based health insurance schemes, modeled after the successful Mutuelles de Santé in Rwanda, could help reduce financial barriers for rural populations while generating additional revenue for healthcare facilities.

Finally, Sierra Leone should strengthen its health information systems to support evidence-based decision-making and improve monitoring of healthcare system performance. Investments in digital health technologies, including electronic medical records and disease surveillance systems, could enhance the quality and timeliness of healthcare data. Regular healthcare facility assessments and community feedback mechanisms should be institutionalized to promptly identify and address service delivery gaps.

Sustainable Pathway

The challenges facing Sierra Leone's healthcare system are substantial but not insurmountable. The country has demonstrated the capacity to implement successful health interventions when political will, community engagement, and international support align. By building on existing strengths while decisively addressing systemic weaknesses, Sierra Leone can make significant progress toward achieving universal health coverage. The recommendations outlined here provide a roadmap for sustainable strengthening of the healthcare system, but any success will depend on consistent implementation, adequate resourcing, and robust monitoring.

As Sierra Leone continues to recover from the shocks of civil war and epidemic disease, investing in healthcare infrastructure represents not just a social imperative but an economic

necessity. A healthy population is fundamental to national development, poverty reduction, and resilience against future health threats. The international community has an important role to play in supporting these efforts, but ultimately, sustainable improvement requires strong national leadership and ownership of the health sector reform agenda. With concerted action across these priority areas, Sierra Leone can transform its healthcare system to better serve its citizens, regardless of the living place or payment ability.

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