

Examining the Technical Efficiency of the Healthcare System in Kenya

¹Ongoro Tom Okoth., ²Dr Yasin Ghabon

¹A Master Candidate, Maseno University-Kenya

²Lecturer Department of Economics, Maseno University, Kenya

DOI: <https://dx.doi.org/10.47772/IJRISS.2025.909000458>

Received: 24 September 2025; Accepted: 30 September 2025; Published: 15 October 2025

ABSTRACT

This study assessed the efficiency of Kenya's health sector by examining the relationship between health system inputs and health outcomes. Guided by a conceptual framework that links health financing, workforce availability, and infrastructure to outputs such as maternal and infant health outcomes and immunization coverage, the analysis used data from the National and County Health Budget Analysis FY 2023/24, the Kenya Health Facility Census 2023, and the Kenya Demographic and Health Survey 2022. Descriptive statistics revealed that health sector allocations remain below the Abuja Declaration threshold of 15%, averaging less than 10% of total government spending, with recurrent expenditure absorbing the largest share. Workforce distribution remains inequitable, with only 12 counties meeting WHO-recommended densities, and bed capacity is concentrated in Level 4 facilities. These disparities were associated with mixed performance in maternal mortality, infant mortality, and immunization coverage, with some counties lagging. The findings underscore the need to optimize existing resources, strengthen health system capacity, and address county-level inequities. Consistent with the Grossman model, the results highlight that investments in health inputs are critical for improving population health and advancing progress toward Universal Health Coverage (UHC).

Keywords: Health financing, efficiency, workforce, health outcomes, maternal and infant mortality, immunization, Universal Health Coverage, Grossman model.

INTRODUCTION

Kenya's healthcare system has undergone significant transformation over the past two decades. The 2010 Constitution introduced devolution, transferring service delivery responsibilities to the 47 county governments while the national government retained functions of policy, regulation, and referral services (Tsofa et al., 2017). Devolution was intended to improve responsiveness, equity, and accountability in healthcare provision, but it also introduced challenges of coordination, uneven capacity, and fiscal fragmentation across counties (Nyikuri et al., 2022).

From a health economics perspective, the efficiency of a health system can be measured in terms of technical efficiency and the system's ability to maximize health outcomes given available inputs such as financing, workforce, and facilities (Farrell, 1957). In resource-constrained settings such as Kenya, achieving high efficiency is critical because additional fiscal space is limited, and much of the population relies on publicly funded services.

A primary benchmark in African health financing is the Abuja Declaration (2001), where governments pledged to allocate at least 15% of total government expenditure to health (WHO, 2011). Kenya, however, has consistently fallen short of this target, averaging 6–9% of the national budget for health in the past decade (Kenya National Treasury, 2022). This underinvestment is further constrained by rising public debt servicing, which now absorbs over 50% of ordinary revenue, leaving less fiscal room for social sectors, including health (World Bank, 2023). The trade-off between debt repayment and healthcare financing raises sustainability concerns, as development and recurrent expenditures in health compete with external obligations.

Despite modest increases in absolute health spending, efficiency remains a pressing concern. Evidence shows that while some counties achieve impressive health outcomes with relatively limited resources, others underperform despite larger allocations (Moses et al., 2021; Barasa et al., 2021). A stochastic frontier analysis estimated the median county technical efficiency at 84% in 2017/18, with poor budget absorption emerging as a critical bottleneck (Moses et al., 2021). Complementary DEA-based analysis found average efficiency of 70%, implying that counties could improve health outcomes by as much as 30% without additional resources if managerial and allocative inefficiencies were addressed (Barasa et al., 2021). Recent evidence further highlights disparities by type of health outcome: while efficiency in immunization services is relatively high (83%), maternal survival remains highly inefficient, with overall efficiency scores as low as 51% (Achoki et al., 2025).

Beyond financial inefficiencies, systemic issues undermine Kenya's progress. Human resources for health remain unevenly distributed, with urban counties and higher-level facilities attracting more staff, leaving peripheral regions underserved (Nyikuri et al., 2022). Governance weaknesses, including delays in fund disbursement, procurement bottlenecks, and corruption, also reduce the impact of available resources (Barasa et al., 2021). Furthermore, the burden of diseases such as HIV/AIDS, tuberculosis, and maternal mortality disproportionately affects efficiency, particularly in low-income and rural counties (Barasa et al., 2021).

This study will apply descriptive statistics to assess efficiency trends in Kenya's healthcare system. The analysis will use input indicators such as health expenditure and the labor workforce per 100,000 population and output indicators such as infant mortality, vaccination coverage, and life expectancy. This approach will provide an aggregate-level perspective on how well Kenya transforms its health resources into health outcomes.

Understanding Kenya's technical efficiency is thus not simply an academic exercise but a policy imperative. With fiscal pressures from debt servicing, limited progress toward the Abuja target, and growing population health needs, improving efficiency represents one of the few viable strategies for achieving better outcomes with the current resource envelope. This journal combines aggregate data (on health expenditure, workforce, and facilities) with health outcome indicators (infant mortality, immunization coverage, life expectancy) and insights from empirical studies to provide a comprehensive assessment of where Kenya's healthcare system stands, why efficiency gaps persist, and how they can be narrowed.

LITERATURE REVIEW

Empirical evidence on Kenya's healthcare efficiency has expanded recently, providing crucial insights into systemic strengths and weaknesses.

Moses et al. (2021) applied stochastic frontier analysis across 47 counties between 2014 and 2018, reporting a median efficiency of 84%, with more than half of the counties showing declining trends. A key driver of inefficiency was poor budget absorption, reflecting delays and bottlenecks in public financial management. Counties with stronger financial accountability structures tended to perform better.

Barasa et al. (2021) employed a two-stage, double bootstrap DEA approach to county-level data from 2018. Their analysis revealed a mean efficiency of 70%, implying that output could increase by 30% using existing resources. Determinants of inefficiency included higher HIV prevalence and low quality of care, while efficiency was positively associated with population density and better budget execution. This underscores the dual role of epidemiological context and managerial performance in shaping efficiency outcomes.

Building on these findings, Achoki et al. (2025) conducted a DEA analysis using 2022 data, disaggregating efficiency into overall technical efficiency, pure technical efficiency, and scale efficiency. They found wide disparities across service areas: while immunization coverage was relatively efficient (83%), maternal survival lagged severely (51%), highlighting the uneven performance across different dimensions of health service delivery. Their study also identified managerial inefficiencies as a critical barrier, with some counties being scale efficient but failing to optimize outputs.

Complementary national datasets provide further context. The Kenya Demographic and Health Survey (KDHS 2022) reported continued progress in child health indicators, including improved immunization coverage and

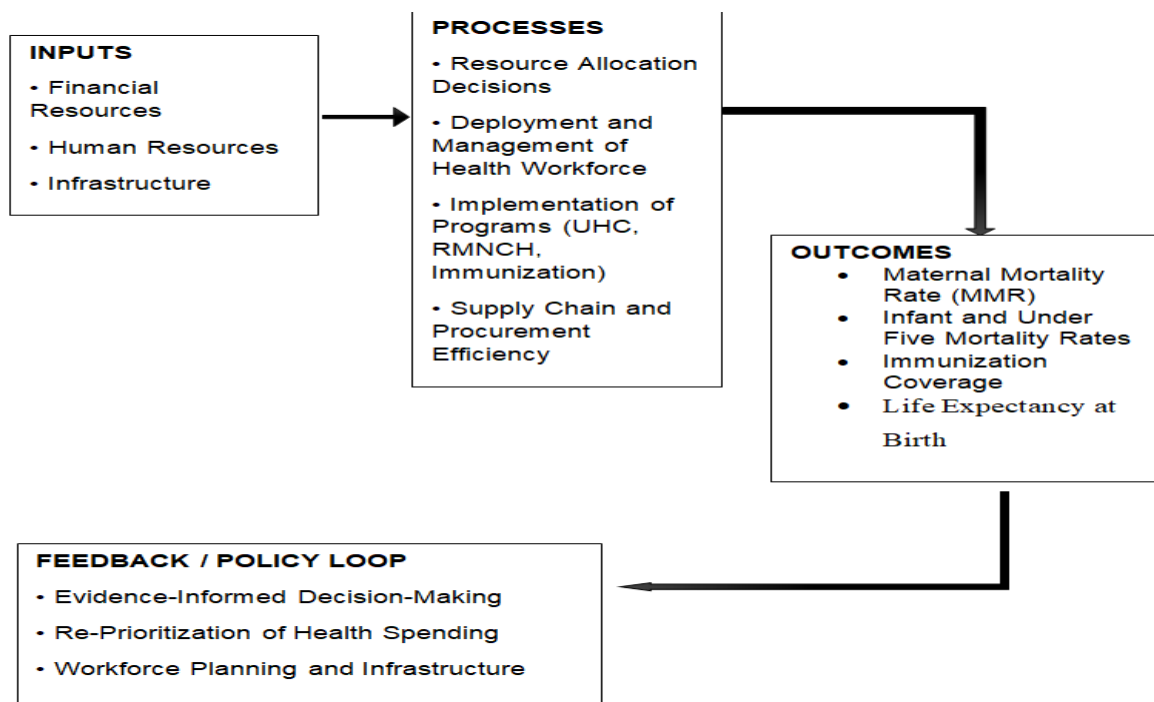
reduced infant mortality. However, maternal mortality remains high (Kenya National Bureau of Statistics, 2023). The Kenya Health Facility Census 2018/2023 highlighted disparities in facility distribution, staffing, and service readiness, particularly between urban and rural counties (Ministry of Health, 2023). These facility-level data underscore the structural inequities that shape efficiency outcomes nationwide.

External reviews also emphasize financing constraints. The Kenya National and County Budget Analysis for FY 2023/24 confirmed that health sector allocations remain below the Abuja target, averaging under 10% of government spending, while debt servicing continues to absorb the bulk of national revenues (Kenya National Treasury & Ministry of Health, 2024). These fiscal realities constrain investments in health infrastructure and human resources, reinforcing the importance of achieving efficiency gains with existing resources.

In summary, the literature illustrates that while Kenya's healthcare system demonstrates moderate levels of efficiency, systemic inefficiencies linked to financing, governance, disease burden, and workforce distribution persist. Addressing these inefficiencies requires increased investment and targeted reforms in financial management, human resource allocation, and service delivery models to ensure equitable and effective use of limited resources.

Conceptual Framework

This study is anchored on a health system efficiency framework that links inputs, including health financing, workforce, and infrastructure, with outputs and outcomes, such as service coverage, maternal and child health indicators, and overall population well-being. The framework illustrates how resource allocation (both recurrent and development), workforce density, and availability of essential infrastructure collectively influence service delivery performance and health outcomes. It also highlights the moderating effect of governance, fiscal space, and debt servicing on resource use efficiency.



Input Indicators

Healthcare Expenditure in Kenya

Healthcare expenditure in Kenya reflects the government's commitment to achieving universal health coverage (UHC) and improving population health outcomes. Over the past decade, Kenya has experienced a steady nominal increase in public spending on health at both national and county levels. However, the proportion of the total government budget allocated to health remains below the Abuja Declaration target of 15% (WHO, 2022).

National and County Government Allocations

Since the implementation of devolution in FY 2013/14, health financing has become a shared function between the national government (through the Ministry of Health) and the 47 county governments. Combined health allocations increased from KES 78 billion in FY 2013/14 to KES 280 billion in FY 2023/24, representing a 258% nominal expansion (National and County Health Budget Analysis FY 2023/24). However, the share of health in the total government budget remains volatile, peaking at 11.1% in FY 2020/21 and declining to 9.7% in FY 2023/24, well below the Abuja target (African Union, 2001).

Table 1:Kenya’s economic outlook FY 2021/22-FY2024/25

Indicator	2021/22	2022/23	2023/24	2024/25	Change
Gross domestic product (GDP) growth	7.6	4.8	5.5	5.7	▲
Fiscal deficit as a % of GDP	6.2	5.6	5.4	4.4	▼
Real GDP	6.2	5.2	5.6	5.9	▲
Total revenue as % GDP	17.3	16.5	18.6	18.9	▲
% of nominal debt to GDP	64.7	69	65.5	63.1	▼
Health sector growth (KES millions)	121	123	141	164	▲

Source: National and County Health Budget Analysis FY 2023/24

At the national level, health accounts for approximately 6% of the total government budget, ranking sixth among the ten government sectors after education, infrastructure, public administration, security, and governance (National and County Health Budget Analysis FY 2023/24).

Ministry of Health (MOH) Budget Trends

The MOH budget has grown steadily, with allocations increasing from KES 114 billion in FY 2020/21 to KES 141 billion in FY 2023/24. The recurrent budget accounts for about 57% of the total, with allocations rising significantly in FY 2023/24 due to increased transfers to semi-autonomous government agencies (SAGAs) and enhanced funding for UHC initiatives (National and County Health Budget Analysis FY 2023/24).

Table 2: MOH allocations to recurrent and development budgets, FY 2020/21-FY 2023/24

Budget	2020/21	2021/22	2022/23	2023/24	% Change (2022/23 → 2023/24)
Recurrent	KES 64.5 billion (57%)	KES 64.9 billion (54%)	KES 68.5 billion (56%)	KES 80.6 billion (57%)	+17.7%
Development	KES 49.6 billion (43%)	KES 56.2 billion (46%)	KES 54.0 billion (44%)	KES 60.6 billion (43%)	+12.1%

Source: National and County Health Budget Analysis FY 2023/24

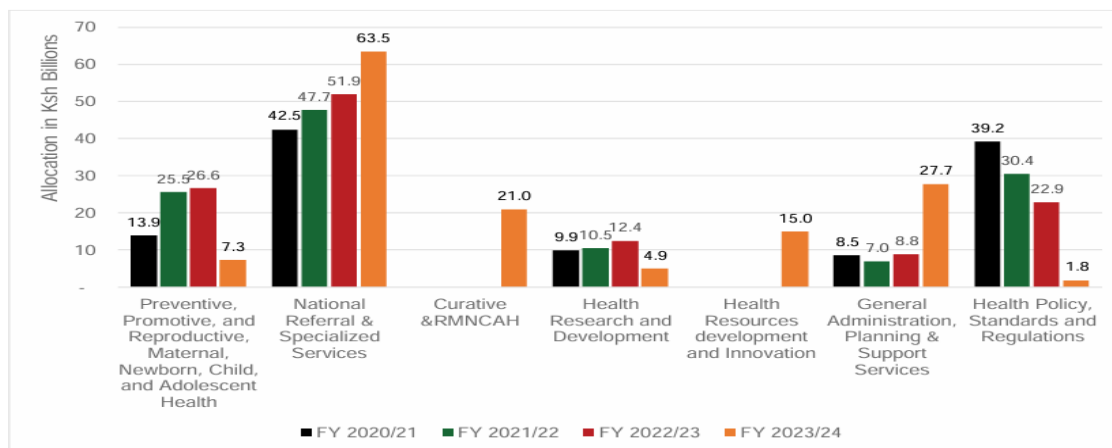
The development budget, which finances capital investments and donor-supported programmes, reached an all-time high of KES 60.6 billion in FY 2023/24. While donor loans and grants still play a key role in financing strategic programmes (HIV, TB, Malaria, and RMNCAH), their share of the development budget has been declining, indicating a gradual transition towards domestic financing (National and County Health Budget Analysis FY 2023/24).

Allocations to Strategic Health Programmes

Funding for strategic services such as HIV, TB, Malaria, and RMNCAH has shown consistent growth. Between FY 2020/21 and FY 2023/24, allocations for HIV increased by 106%, TB by 49%, Malaria by 16%, and RMNCAH by 12% (National and County Health Budget Analysis FY 2023/24). This reflects a sustained prioritization of high-burden diseases and maternal-child health outcomes.

Programme-Based Budgeting

Figure 1: MOH budget allocations to PBB programmes, FY 2020/21-FY 2023/24



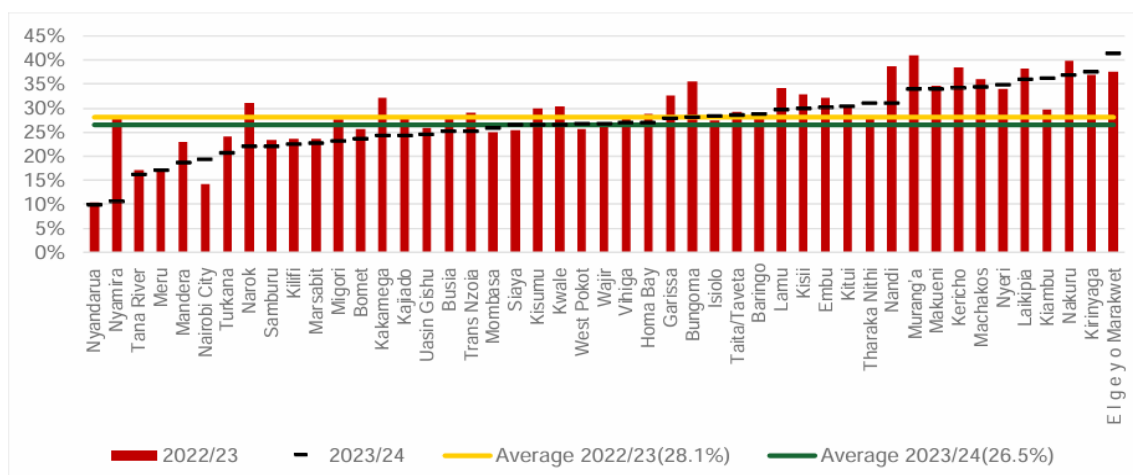
Source: National and County Health Budget Analysis FY 2023/24

The MOH allocates resources across seven programme areas under programme-based budgeting (PBB). In FY 2023/24, national referral and specialized services and curative & RMNCAH programmes accounted for 60% of the total health budget, signaling prioritization of tertiary care and curative interventions over preventive and promotive services (National and County Health Budget Analysis FY 2023/24).

County Health Allocations

At the county level, health budgets increased from KES 135.4 billion in FY 2020/21 to KES 140.9 billion in FY 2023/24. However, the share of county budgets dedicated to health declined from 29.2% in FY 2020/21 to 26.5% in FY 2023/24, suggesting deprioritization of the sector despite nominal growth (National and County Health Budget Analysis FY 2023/24).

Figure 2: Allocations to health as a percentage of total county budget, FY 2022/23 and FY 2023/24

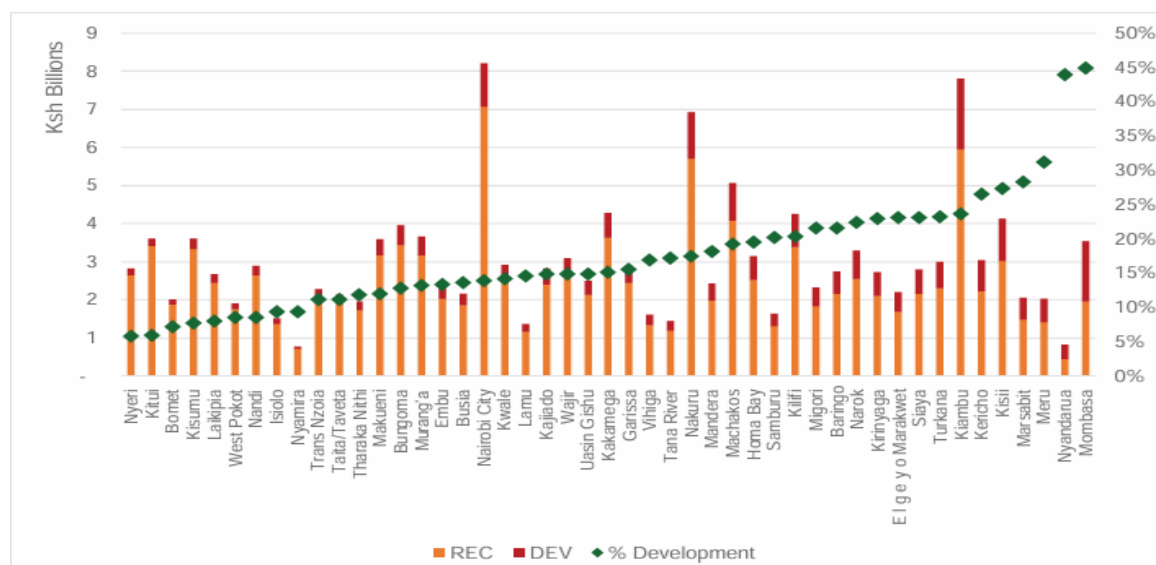


Source: National and County Health Budget Analysis FY 2023/24

The chart shows a slight overall decline in the share of county budgets allocated to health from FY 2022/23 to FY 2023/24, with the national average dropping from 28.1% to 26.5%. While a few counties, such as Elgeyo Marakwet, Kirinyaga, and Nyeri, allocated relatively higher proportions of their budgets to health in FY 2023/24, the majority of counties either maintained or reduced their allocations, as shown by the clustering of bars below the previous year's average. Conversely, counties such as Nyandarua, Nyamira, and Tana River recorded the lowest proportional health allocations, highlighting persistent prioritization gaps. Overall, the data indicate uneven commitment to health across counties, with widening disparities between high and low allocators.

Crucially, county budgets remain heavily skewed towards recurrent expenditure, averaging over 82% across the four years under review. Only three counties met the recommended threshold of allocating at least 30% to development, per the Public Finance Management Act (National and County Health Budget Analysis FY 2023/24). This implies limited investment in infrastructure, medical equipment, and long-term system strengthening.

Figure 3: Allocations to recurrent and development activities by county, FY 2023/24



Source: National and County Health Budget Analysis FY 2023/24

Among the counties, Mombasa (55.1%) and Nyandarua (56%) have the highest health budgets allocated to development, demonstrating more substantial investment in health infrastructure. Conversely, counties such as Nyeri (94.2%), Kitui (94.2%), Bomet (92.9%), and Kisumu (92.3%) allocate over 90% to recurrent spending, leaving minimal fiscal space for development (National and County Health Budget Analysis FY 2023/24).

This pattern highlights a broader structural challenge: while recurrent expenditure sustains service delivery (salaries, drugs, maintenance), inadequate capital spending constrains expansion of facilities and limits long-term capacity building, a critical issue for achieving UHC targets.

Health Workforce

The health workforce is a cornerstone of any healthcare system and one of the most significant determinants of technical efficiency. Adequate numbers of trained health professionals, equitably distributed across the country, are essential for delivering quality and timely health services (WHO, 2020). The World Health Organization (WHO) recommends a minimum threshold of 44.5 physicians, nurses, and midwives per 10,000 population to achieve Universal Health Coverage (UHC) targets (WHO, 2016). Kenya, however, continues to face shortages and maldistribution of health workers, with most counties falling below this recommended density (Ministry of Health, 2023).

Human resources for health (HRH) are also one of the most significant cost drivers in the sector, accounting for more than 50% of recurrent health expenditure in many counties (National and County Health Budget Analysis

FY 2023/24). This makes HRH a critical input and a significant determinant of system efficiency. Oversupply without commensurate outputs can signal inefficiency, while undersupply may constrain service delivery despite adequate funding.

In the context of devolution, county governments hold the primary mandate for recruiting, deploying, and remunerating most healthcare workers. This has improved local responsiveness but also led to disparities between counties, with some experiencing persistent workforce gaps due to fiscal limitations or delayed recruitment (Nyikuri et al., 2022). Consequently, analyzing workforce density, composition (including doctors, nurses, clinical officers, and other cadres), and distribution across counties provides key insights into health system efficiency.

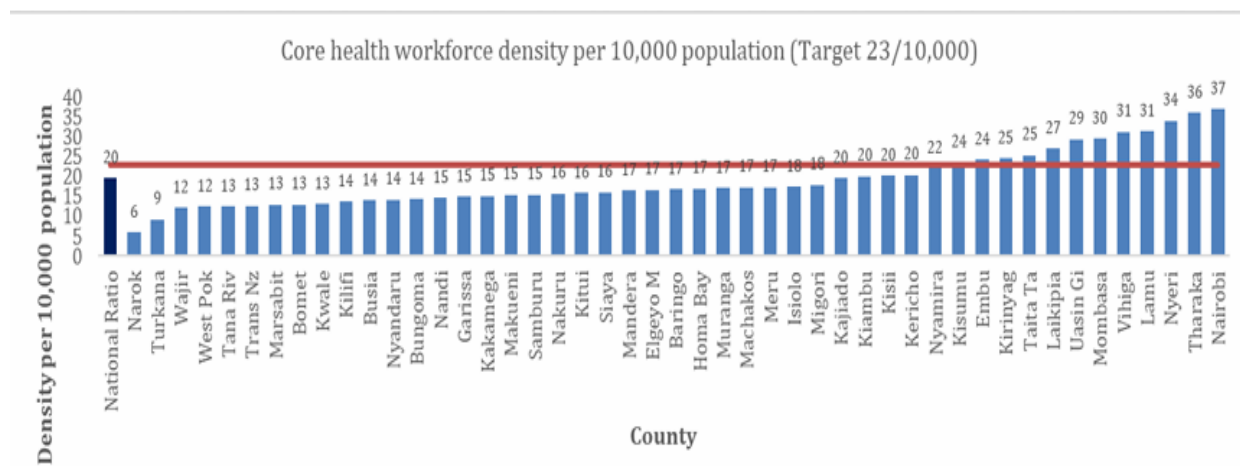
The 2023 Kenya Health Facility Census provides an updated view of health worker availability, distribution, and employment patterns, revealing persistent gaps that significantly affect the technical efficiency of the system.

Workforce Density and Geographic Disparities

Kenya's core health workforce density is 20 per 10,000 population, below the WHO-recommended minimum of 23 per 10,000 population required for basic service coverage (WHO, 2006; Ministry of Health, 2023). As shown in Figure 4, county-level disparities are striking: Better-performing counties, such as Nairobi (37), Tharaka Nithi (36), Nyeri (34), and Laikipia (31), exceed the recommended threshold. Underserved counties such as Narok (6), Turkana (9), West Pokot (12), and Tana River (13) fall far below, with less than half the recommended density.

Approximately 80% of counties (34 out of 47 in available data) fall below the WHO target, meaning that only a small fraction of counties have sufficient staffing to meet basic health service needs. This maldistribution, rather than absolute shortage, is a major contributor to inefficiency, as it leaves some facilities in low-density counties underutilized while others face workforce congestion in urban centers.

Figure 4



Source: Kenya Health Facility Census September 2023

Terms of Employment and Workforce Stability

Workforce stability is equally critical to efficiency. According to the census, over 92,800 health workers (52%) are employed on permanent and pensionable terms, providing a relatively stable foundation for service delivery. However, nearly 48% (over 86,400) are engaged on contract terms, including 6,542 on Universal Health Coverage (UHC) contracts. Additionally, 17,878 health workers are employed as casual skilled professionals (Ministry of Health, 2023).

While contract-based employment has allowed counties to fill staffing gaps rapidly, it raises concerns about turnover, continuity of care, and administrative costs due to repeated recruitment cycles. The fragmented nature

of HRH employment with counties, NGOs, and donor-funded projects engaging different workforce segments complicates remuneration harmonization and long-term workforce planning (Barasa et al., 2021).

Health Facilities

Health facilities form the backbone of Kenya's health service delivery system and are critical in measuring technical efficiency. According to the Kenya Health Facility Census 2023, a total of 14,883 facilities were assessed nationwide, achieving 104% coverage of the Kenya Master Health Facility List (KMHFL), which indicates the existence of additional facilities not yet formally captured (MoH, 2023). Of these, 83% were complete assessments, 5% were incomplete, and 10% of facilities were closed at the time of assessment. Only 1% of facilities denied access, reflecting relatively strong participation rates (MoH, 2023).

Distribution by Kenya Essential Package for Health (KEPH) level shows that Level 2 facilities (dispensaries and clinics) comprise 71% of all facilities, followed by Level 3 health centers at 21%. Level 4, 5, and 6 hospitals collectively account for less than 10%, with Level 6 facilities entirely government-owned (MoH, 2023). Ownership is relatively balanced, with 47% of public facilities, 46% private, and 8% faith-based or NGO-operated, with private ownership dominant at Level 4 and 5 facilities (MoH, 2023).

In terms of service capacity, Kenya reported a total of 140,466 functional beds, over half of which are concentrated at Level 4 hospitals, the mainstay of inpatient care. However, critical care capacity remains limited: fewer than 1,000 adult ICU beds nationwide, and pediatric ICU and HDU beds are even scarcer (MoH, 2023). These gaps are more pronounced in arid and semi-arid land (ASAL) counties, where geographic access is already constrained.

County-level analysis shows substantial variation. While some counties (e.g., Kisumu, Vihiga, Kwale) achieved over 100% enumeration coverage, others (e.g., Bomet) had completion rates below 50%, suggesting weak reporting systems or operational challenges (MoH, 2023). Bed-to-population ratios remain below the WHO's recommended 25 beds per 10,000 population, particularly in high-density urban counties, reflecting capacity shortfalls (WHO, 2018).

Trends Over Time

Kenya has experienced a steady increase in operational health facilities since 2017, primarily driven by expanding primary health care facilities under devolved county systems (MoH, 2021). Level 4 facilities have grown moderately as counties upgrade health centers to sub-county hospitals, but Level 5 and 6 facilities have remained constant, limiting growth in tertiary care access (MoH, 2021).

Despite these gains, growth in bed capacity has not kept pace with population growth, leading to declining per-capita availability in several high-population counties (MoH, 2023). This raises concerns about service readiness, especially for inpatient and critical care. Counties such as Nairobi, Nakuru, and Kiambu hold a disproportionately large share of available beds, creating referral pressure from neighboring counties. In contrast, underserved regions like Turkana and Marsabit remain below the national average (MoH, 2023).

Kenya is improving geographical access but still faces significant inequities in capacity distribution and a widening gap between demand and supply of inpatient services. This is a key factor when measuring efficiency and planning future investments (MoH, 2023; WHO, 2018).

Output Indicators

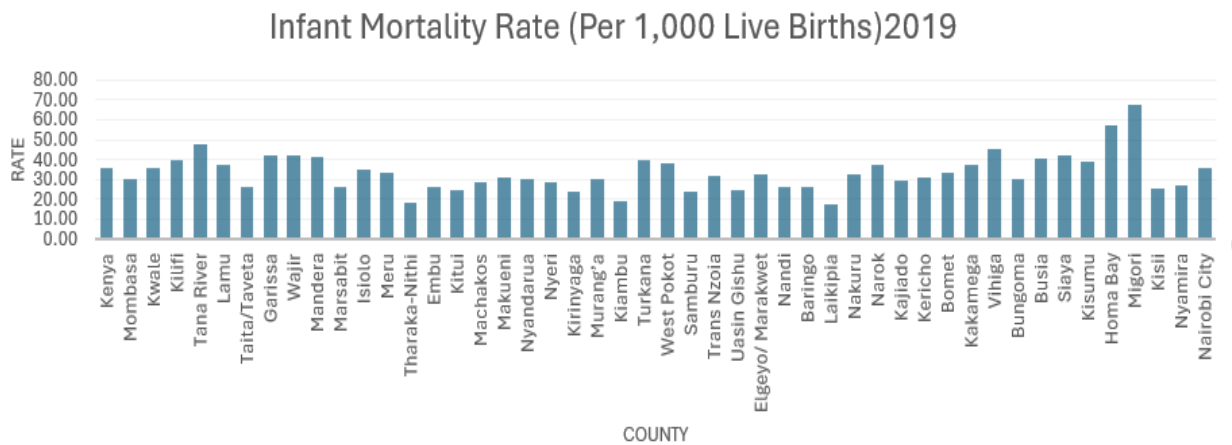
Infant and Maternal Mortality Outcomes

Infant and maternal mortality are among the most critical health system performance indicators, reflecting the accessibility, quality, and effectiveness of reproductive, maternal, newborn, and child health (RMNCH) services. They also serve as sentinel measures for broader socioeconomic development and equity in health service delivery (WHO, 2023).

Infant Mortality Rate (IMR)

Kenya's national infant mortality rate (IMR) stood at 32 deaths per 1,000 live births in 2022, a decline from 39 per 1,000 in 2014, indicating steady but uneven progress (KNBS & ICF, 2023). County-level data, however, reveal significant disparities

Figure 5



Source: KNBS

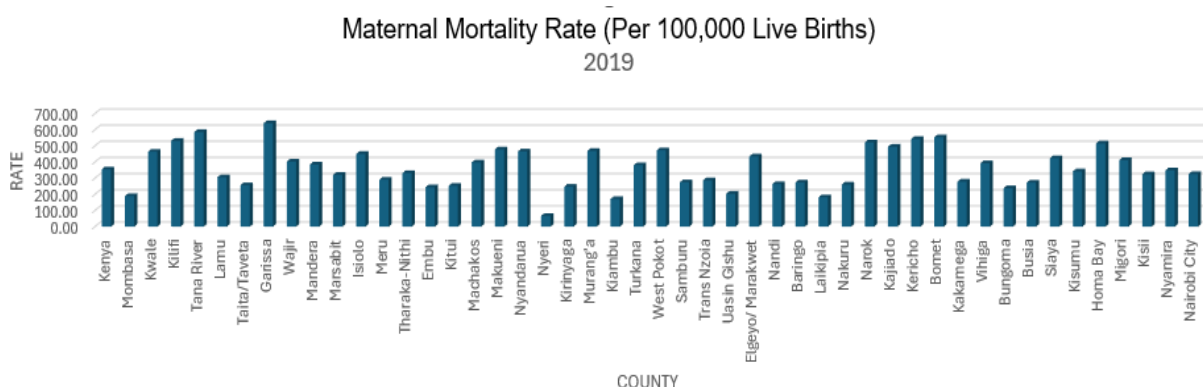
Counties such as Homa Bay, Migori, and Tana River exhibit some of the highest IMRs, exceeding 60 per 1,000 live births, while counties such as Laikipia, Kiambu, and Tharaka-Nithi report rates below 20 per 1,000 live births.

These disparities are closely associated with variations in health workforce density, facility readiness, and household socioeconomic status, with counties in the former Nyanza and Coast provinces experiencing a disproportionate burden of infant deaths (Barasa et al., 2021). Neonatal deaths contribute more than 60% of infant deaths nationally, highlighting gaps in essential newborn care, including resuscitation, management of neonatal sepsis, and availability of skilled birth attendants (KNBS & ICF, 2023).

Maternal Mortality Rate (MMR)

Maternal mortality remains a significant public health challenge despite notable improvements over the last two decades. The national maternal mortality ratio (MMR) is currently estimated at 355 deaths per 100,000 live births, down from 488 in 2008–09 (KNBS & ICF, 2023). However, like infant mortality, county-level variation is wide.

Figure 6



Source: KNBS

Garissa, Wajir, and Mandera record some of the highest MMRs, with rates above 600 per 100,000 live births. In contrast, counties such as Nyeri and Kiambu report much lower levels, often below 200 per 100,000 live births.

The three delays often drive high maternal mortality rates:

- Delay in seeking care – due to low awareness, cultural factors, and financial barriers.
- Delay in reaching care – poor transport infrastructure and long distances to comprehensive emergency obstetric care facilities.
- Delay in receiving adequate care – shortages of skilled personnel, essential drugs, blood transfusion services, and functioning theatres (MoH, 2023).

The combined IMR and MMR data underscore a dual challenge for Kenya's health system: while national averages show gradual improvement, county-level inequalities persist, with certain regions remaining hotspots for preventable maternal and infant deaths. This suggests that efficiency analyses measure overall health system outputs and examine how well resources are distributed relative to need. Counties with below-average health workforce density and low development budget allocations (as highlighted earlier) tend to be the same counties with worse mortality outcomes, pointing to systemic underinvestment and weak service readiness.

Life Expectancy at Birth

Life expectancy at birth is a comprehensive measure of population health, capturing the cumulative effect of disease burden, mortality rates, and health system performance over time (UNDP, 2023). In Kenya, steady improvements have been observed over the past two decades, reflecting progress in both communicable and non-communicable disease control.

According to the Kenya National Bureau of Statistics (KNBS) and WHO Global Health Observatory data, life expectancy at birth in Kenya increased from 58.8 years in 2010 to 67.6 years in 2022, representing nearly a decade of gains in just over a decade (KNBS, 2023; WHO, 2023). This progress is mainly attributable to:

- Declining HIV/AIDS mortality following the scale-up of ART programs.
- Child survival improved, as shown by reduced infant and under-five mortality rates.
- Increased immunization coverage and better control of vaccine-preventable diseases.

Gender Differences

Kenya, like most countries, exhibits a gender gap in life expectancy, with women living longer than men. In 2022, life expectancy was estimated at 69.7 years for females compared to 65.4 years for males (KNBS, 2023). This gap is partly driven by higher male mortality from injuries, road traffic accidents, and behavioral risk factors such as tobacco and alcohol use (IHME, 2023).

Regional Disparities

County-level data reveal significant variation in life expectancy. Nairobi, Nyeri, and Mombasa record life expectancy above 70 years, while Turkana, Marsabit, and Mandera remain below 62 years. These differences correlate with disparities in health workforce density, facility distribution, poverty levels, and access to safe water and sanitation (KNBS, 2023).

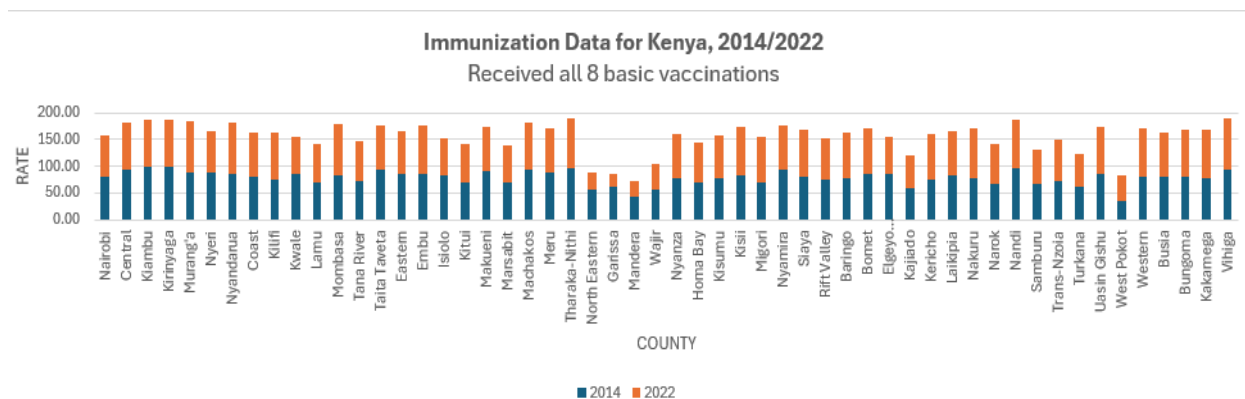
Rising life expectancy signals improving health outcomes nationally, but persistent geographic and gender disparities highlight inefficiencies in equitable service delivery. Counties with shorter life expectancies may require targeted interventions addressing preventable deaths from infectious diseases, maternal causes, and injuries to close the gap with higher-performing regions.

Immunization Coverage

Immunization coverage remains one of the most reliable indicators of health system performance, reflecting the ability to deliver essential primary health care services equitably and consistently (WHO, 2023).

Analysis of KDHS data reveals that Kenya's full immunization coverage, defined as children aged 12–23 months receiving all eight basic antigens, improved marginally from 79% in 2014 to 80% in 2022 (KNBS & ICF, 2023). This stability is notable given the disruptions of the COVID-19 pandemic, health worker strikes, and recurrent commodity stockouts in recent years. However, the minimal improvement suggests that Kenya has reached a plateau in coverage, requiring new strategies to close the gap toward the 90% national target and the WHO Global Vaccine Action Plan (GVAP) goal.

Figure 6



Source: KNBS

As shown in Figure 6, coverage has improved across most counties between 2014 and 2022, yet significant disparities persist.

County-level analysis from Figure 6 highlights both progress and inequality:

- High-performing counties such as Vihiga, Bungoma, and Kakamega recorded the most significant increases, surpassing 90% coverage in 2022, demonstrating effective county-level immunization strategies.
- Lagging counties, particularly Mandera, Wajir, and Turkana, remain below 60%, highlighting persistent access and demand-side barriers that must be addressed to prevent vaccine-preventable disease outbreaks.
- Despite higher facility density, urban counties such as Nairobi and Mombasa underperform relative to expectations, indicating possible issues with service fragmentation and vaccine hesitancy (KNBS & ICF, 2023; MoH, 2023).

Kenya's immunization programme shows resilience but requires renewed effort to overcome stagnation and close regional gaps. The trends shown in Figure 6 demonstrate that targeted strategies can achieve near universal coverage, as seen in high-performing counties, but more investment is required in:

- Last-mile delivery systems use outreach and mobile vaccination campaigns, particularly in ASAL counties.
- Defaulter tracing mechanisms, linking immunization services with growth monitoring and maternal health services.
- Community engagement to address hesitancy and boost demand for vaccination.

The findings from this analysis present a comprehensive picture of Kenya's health sector performance, revealing critical insights into resource allocation, workforce availability, infrastructure capacity, and key health outcomes. While overall health sector financing has expanded in absolute terms, there are persistent inefficiencies in the balance between recurrent and development spending, and county-level disparities remain pronounced. Health workforce density continues to fall below the WHO recommended threshold in most counties, with significant gaps in the equitable distribution of skilled personnel. Similarly, variations in infant and maternal mortality rates and immunization coverage highlight uneven progress toward universal health coverage and the Sustainable Development Goals (SDGs). These results underscore the need for targeted, evidence-based interventions to address systemic bottlenecks and ensure more equitable and efficient utilization of resources across counties. The subsequent discussion section synthesizes these findings, explores their implications for health system efficiency, and proposes policy measures to strengthen Kenya's pathway toward achieving UHC and improved population health outcomes.

DISCUSSION

The results of this study reveal a mixed picture of Kenya's health sector performance, marked by significant progress in some areas and persistent inefficiencies in others. The analysis of inputs, particularly health expenditure, workforce, and infrastructure, shows that while absolute allocations to health have grown over the past four fiscal years, the balance between recurrent and development spending remains skewed. More than 80% of county health budgets are still directed toward recurrent costs, leaving limited fiscal space for investments in infrastructure, equipment, and other capital-intensive interventions essential for long-term system strengthening (National and County Health Budget Analysis FY 2023/24). The Abuja Declaration's recommended threshold of 15% of national budgetary allocation to health has not yet been achieved, with allocations hovering below 10% in most years (WHO, 2023). This underinvestment, coupled with the rising burden of debt servicing that crowds out social sector spending, suggests that Kenya's fiscal commitment to health remains constrained, potentially limiting its ability to accelerate progress toward Universal Health Coverage (UHC).

From a human resource perspective, the health workforce density remains below the WHO-recommended minimum of 44.5 health workers per 10,000 population, with only 12 counties meeting the required ratios (Kenya Health Facility Census, 2023). The workforce is numerically insufficient and unevenly distributed, with urban counties generally better staffed than rural and remote areas. This maldistribution exacerbates disparities in access to quality health services and undermines equity. The predominance of permanent and pensionable employment terms provides stability but also imposes a heavy recurrent wage bill, potentially constraining the hiring of additional personnel under resource-limited county budgets. Contract-based recruitment under the UHC initiative has partially mitigated shortages, but these contracts are often short-term and may affect workforce morale and retention.

Infrastructure and service capacity, as measured by the number of health facilities, beds, and critical care capacity, show significant progress but also raise concerns about adequacy relative to population growth and disease burden. The facility census indicates that most health facilities are at Level 2 and 3, which are crucial for primary health care but often face resource limitations. Higher-level facilities (Levels 4–6), which carry the bulk of inpatient and specialized care, remain fewer in number and concentrated in select counties, creating access bottlenecks. Kenya currently has about 140,466 functional beds nationally, but the distribution is highly skewed, with Level 4 hospitals alone accounting for over 57,000 beds (Kenya Health Facility Census, 2023). Critical care capacity (HDU and ICU beds) remains extremely limited, with only 919 HDU beds and fewer than 1,500 combined ICU beds nationwide, raising concerns about health system preparedness for emergencies such as pandemics or mass casualty incidents.

The results of comparing inputs to outputs reveal that health outcomes have improved but remain below national and global targets. The Kenya Demographic and Health Survey (KDHS 2022) shows a decline in infant mortality to 32 per 1,000 live births and a maternal mortality ratio of 362 per 100,000 live births, an improvement from previous survey rounds but still above the SDG target of fewer than 70 maternal deaths per 100,000 live births (KNBS, 2023). Immunization coverage, a key marker of primary health system performance, remains relatively high nationally, with DPT3/Penta3 coverage above 80%. However, some counties still fall below the 90% target, exposing children to preventable diseases and leaving room for outbreaks (UNICEF & WHO, 2023).

The widening disparity between high and low-performing counties is a key observation across all indicators. Wealthier or better-governed counties like Elgeyo Marakwet, Nyeri, and Kirinyaga often report higher allocations to health, better workforce-to-population ratios, and stronger outcome indicators. Conversely, counties such as Nyandarua, Nyamira, and Tana River struggle with lower health budget allocations, workforce shortages, and poor maternal and child health indicators. This uneven performance risks deepening inequities and could undermine the national goal of equitable UHC coverage if left unaddressed.

In summary, Kenya's health sector is advancing, but the efficiency of input utilization remains questionable. Large recurrent allocations, workforce imbalances, and infrastructure gaps dilute the potential impact of available resources. Health outcomes are improving, but not at the pace required to meet the SDG targets or the aspirations of Kenya's Health Sector Strategic Plan. This calls for increased investments and smarter, more efficient allocation and use of resources, supported by evidence-based planning and continuous monitoring.

Policy Implications and Recommendations

The results of this study highlight the urgent need to reorient Kenya's health financing and service delivery toward greater efficiency and equity. Health sector allocations remain persistently below the Abuja Declaration commitment of 15% of total government expenditure, with the FY 2023/24 allocation at only 9.9% of the total national and county budgets (National and County Health Budget Analysis FY 2023/24). This shortfall is further compounded by nearly 70% of ordinary revenue consumed by public debt servicing, leaving limited fiscal space for critical social sectors. These findings underscore the importance of ring-fencing health financing within the Medium-Term Expenditure Framework and exploring innovative domestic revenue sources, such as earmarked health taxes, to supplement allocations and ensure predictable funding for universal health coverage.

The imbalance between recurrent and development expenditure is another key policy concern. The analysis reveals that "counties' health sector budgets continued to be dominated by recurrent activities, making up 81.5% in FY 2020/21, 81.9% in FY 2021/22, 83.8% in FY 2022/23, and 82.5% in FY 2023/24" (National and County Health Budget Analysis FY 2023/24, Table 3). This trend limits long-term investments in infrastructure and service readiness, perpetuating structural weaknesses in the system. A gradual but deliberate shift toward the Public Finance Management Act's recommended 30% allocation for development spending would strengthen facilities, expand critical care capacity, and modernize diagnostic services.

County-level disparities call for targeted corrective action. As the budget analysis notes, "county government allocations to the health sector as a percentage of total county budgets decreased from 29.2% in FY 2020/21 to 26.5% in FY 2023/24", showing declining prioritization of health despite rising service demand. Per capita allocations remain highly unequal, with Lamu allocating KSh 8,668 per person compared to Nyandarua's KSh 1,157 per person in FY 2023/24 (National and County Health Budget Analysis FY 2023/24). Such stark inequities point to the need for a more progressive and equity-sensitive revenue-sharing formula by the Commission on Revenue Allocation and the National Treasury, rewarding counties prioritizing health while supporting those lagging to scale up investments.

The distribution of the health workforce also presents a major efficiency challenge. The Kenya Health Facility Census (2023) reports that only 12 counties meet the recommended core health worker-to-population ratio, with access lowest for dental officers and pharmacists. Most health workers (92,840) are on permanent and pensionable terms, but counties still face critical gaps that compromise service delivery. A coordinated national redistribution plan, supported by incentives such as hardship allowances, housing support, and professional development programs, is essential to address these disparities. Expanding task-shifting arrangements and recruiting additional contract staff under UHC programs can also enhance service coverage, particularly in underserved counties.

Infrastructure expansion is necessary to address glaring gaps in critical care capacity. Kenya currently has only 919 high dependency beds and 899 adult ICU beds nationally, with the majority concentrated in a handful of counties (Kenya Health Facility Census, 2023). Development budgets should prioritize the establishment of regional ICU hubs, rehabilitation of Level 4 facilities, and investment in modern diagnostic equipment to improve equity in service access.

Finally, improving budget absorption and accountability is critical. Delayed procurement processes and underutilized development funds remain key bottlenecks. Strengthening public financial management systems at national and county levels, including real-time financial tracking and automated reporting, will ensure that allocated funds translate into tangible improvements in service delivery. Publishing county health scorecards and performance reviews will enhance transparency, enable peer benchmarking, and foster a culture of accountability. Sustained investment in primary health care, community health strategies, and immunization outreach is necessary to consolidate gains in maternal, child health, and disease prevention outcomes.

CONCLUSION

This study shows that Kenya's health system has progressed but remains below optimal efficiency. National health allocations are still under the Abuja target, with recurrent spending dominating at the expense of development, limiting long-term system strengthening (National and County Health Budget Analysis FY 2023/24). County-level disparities remain stark: only 12 counties meet the WHO-recommended health worker density, with Nairobi (37/10,000) and Nyeri (34/10,000) leading, while Turkana (6/10,000) and West Pokot (9/10,000) lag significantly (Kenya Health Facility Census, 2023). These inequalities correlate with health outcomes, as high infant and maternal mortality persist in counties with low workforce density and infrastructure, such as Homa Bay, Garissa, and Migori, compared to better-performing counties like Nyeri and Kiambu (KNBS, 2023).

Immunization coverage has improved nationally, but gaps remain in some ASAL counties, reflecting persistent service delivery challenges. According to the Grossman health production model, efficient financial, human, and infrastructural resource allocation can "produce" better health outcomes without increasing total spending. Closing efficiency gaps could yield up to 30% more health output with current resources, accelerating progress toward UHC and improving population productivity.

REFERENCES

1. Barasa, E., Manyara, A. M., Molyneux, S., & Tsofa, B. (2021). Level and determinants of county health system efficiency in Kenya: Data envelopment analysis. *BMJ Global Health*, 6(4), e004707. <https://doi.org/10.1136/bmjgh-2020-004707>
2. Grossman, M. (1972). On the concept of health capital and the demand for health. *Journal of Political Economy*, 80(2), 223–255. <https://doi.org/10.1086/259880>
3. Kenya National Bureau of Statistics (KNBS). (2023). Kenya Demographic and Health Survey 2022: Key Indicators Report. Nairobi: KNBS.
4. Kenya National Bureau of Statistics (KNBS). (2022). Economic Survey 2022. Nairobi: KNBS.
5. Ministry of Health (MOH). (2023). Kenya Health Facility Census 2023: Summary Report. Nairobi: MOH.
6. Ministry of Health (MOH). (2024). National and County Health Budget Analysis FY 2023/24. Nairobi: MOH.
7. Ministry of Health (MOH). (2020). Kenya Health Policy 2014–2030. Nairobi: MOH.
8. National Treasury & Planning. (2023). Budget Policy Statement 2023. Nairobi: Government of Kenya.
9. United Nations. (2001). Abuja Declaration on HIV/AIDS, Tuberculosis and Other Related Infectious Diseases. Abuja: United Nations.
10. World Bank. (2022). Kenya Public Expenditure Review 2022: Enhancing Efficiency and Equity in Public Spending. Washington, DC: World Bank.
11. World Health Organization (WHO). (2021). Tracking universal health coverage: 2021 Global Monitoring Report. Geneva: WHO.