Resource Mapping in Surveillance and Pandemic Preparedness Response in Kenya

AFIDEP

African Institute for Development Policy

List of Acronyms and Abbreviations

CBS	Community-Based Surveillance
CDC	Centers for Disease Control and Prevention
CHP	Community Health Promoter
CHW	Community Health Worker
DHIS2	District Health Information Software 2
DRC	Democratic Republic of the Congo
EPR	Epidemic Preparedness and Response
EVD	Ebola Virus Disease
HCW	Healthcare Worker
IDSR	Integrated Disease Surveillance and Response
ILI	Influenza-Like Illness
ICU	Intensive Care Unit
JKIA	Jomo Kenyatta International Airport
KEMRI	Kenya Medical Research Institute
MOH	Ministry of Health (Kenya)
PPE	Personal Protective Equipment
PPPs	Public-Private Partnerships
RVF	Rift Valley Fever
SARI	Severe Acute Respiratory Infection
SOPs	Standard Operating Procedures
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WASH	Water, Sanitation, and Hygiene
WHO	World Health Organisation

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Introduction & context

Overview of pandemic threats in Kenya and the role of surveillance

Kenya's susceptibility to emerging and re-emerging infectious diseases is amplified by its geographical location, rapid urbanisation, and extensive human-animal interactions. The nation has encountered numerous public health challenges, including Corona virus disease (COVID-19), cholera, Rift Valley fever (RVF), yellow fever, and the persistent threat of Ebola virus disease (EVD) (Ministry of Health [MOH], 2022). Kenya's proximity to countries with recurrent Ebola outbreaks, such as Uganda and the Democratic Republic of the Congo (DRC), exacerbates this risk. For instance, in 2022, Uganda reported an outbreak of the Sudan strain of Ebola, with 63 cases and 29 deaths as of October 6 (Nyakarahuka et al., 2023). Climate change has also played a role in the resurgence of vector-borne diseases like RVF, transmitted through infected livestock and mosquito bites (Kenya Medical Research Institute [KEMRI], 2022). These recurring outbreaks underscore the imperative for robust surveillance systems to detect and respond to emerging health threats effectively.

The COVID-19 pandemic exposed critical weaknesses in Kenya's public health infrastructure, including inadequate disease surveillance, limited laboratory capacity, and delays in emergency response (World Health Organisation [WHO], 2023). Although significant progress was made in strengthening digital surveillance and laboratory networks during the pandemic, gaps remain in workforce capacity, funding, and infrastructure. Cholera outbreaks, which have been recorded in multiple counties, also underscore the importance of improving water, sanitation, and hygiene (WASH) systems to prevent the spread of waterborne diseases (United Nations Children's Fund [UNICEF], 2023).

To enhance pandemic preparedness, Kenya has adopted the Integrated Disease Surveillance and Response (IDSR) system, a national framework for monitoring, detecting, and responding to disease outbreaks (MOH, 2022). The IDSR system operates through a decentralized structure, allowing county health officials to collect and report data from local health facilities to national health agencies. Additionally, the District Health Information Software (DHIS2) is used for real-time data reporting and analysis (Centers for Disease Control and Prevention [CDC], 2022). However, challenges such as limited digital integration, inadequate training of surveillance officers, and weak inter-county coordination continue to hinder the system's effectiveness.

Kenya has also invested in community-based surveillance (CBS), which relies on trained Community Health Promoters (CHPs) to identify unusual disease patterns and report cases to health authorities (Kariuki et al., 2021). This approach has been instrumental in the early detection of diseases such as measles and malaria in rural areas. Furthermore, border surveillance measures have been strengthened, especially at Jomo Kenyatta International Airport (JKIA) and key land entry points, to monitor travelers for infectious diseases (WHO, 2023). However, despite these efforts, the country still lacks adequate laboratory diagnostic facilities, with only 47% of counties having functional biosafety level 2 laboratories (KEMRI, 2022).

For Kenya to strengthen its pandemic preparedness and response, it is essential to invest in real-time digital disease monitoring, enhance laboratory infrastructure, and increase funding for disease surveillance programmes.

A multi-sectoral approach involving government agencies, private sector stakeholders, and international health organisations will be crucial in building a resilient public health system capable of detecting and responding to future pandemics effectively.

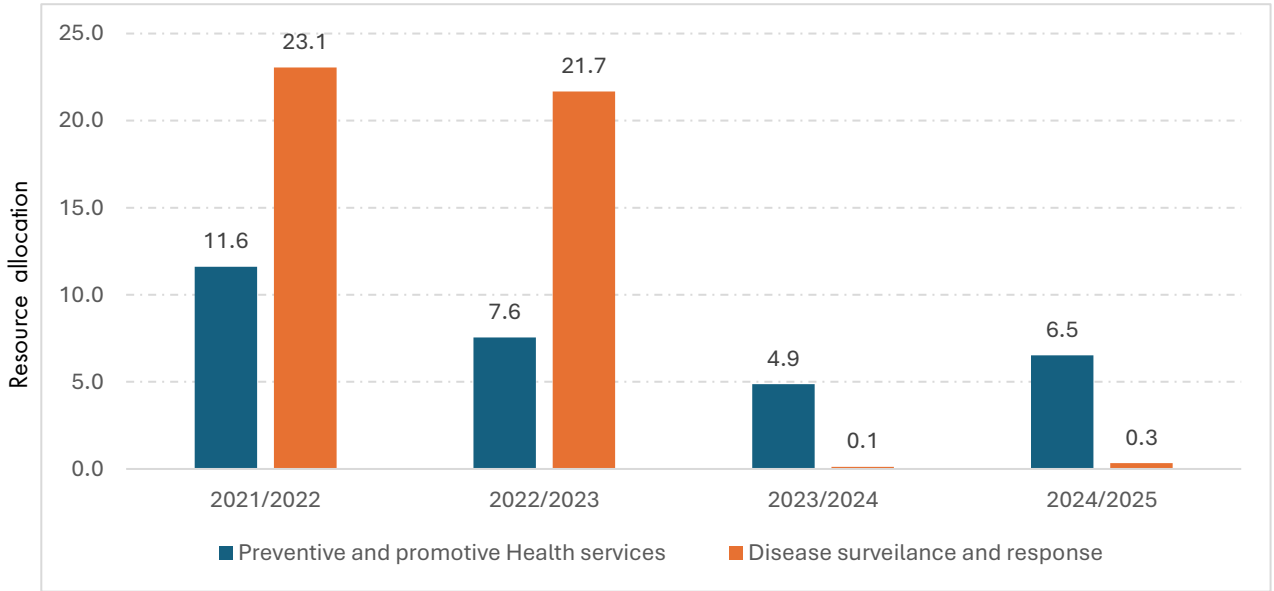
Why resource mapping is essential for preparedness and response

Resource mapping is a vital strategy for strengthening pandemic preparedness and response by ensuring financial, human, and infrastructural resources are identified, documented, and efficiently allocated. In Kenya, public health emergency response is hindered by underfunding, inadequate laboratory capacity, workforce shortages, and weak coordination among stakeholders (Ministry of Health [MOH], 2024). Systematic resource mapping helps address these gaps, enhancing resilience to outbreaks.

A key benefit of resource mapping is improving resource mobilisation and allocation. Only 49 of Kenya's sub-counties have a dedicated budget for Epidemic Preparedness and Response (EPR), and just 26% have structured EPR plans (MOH, 2024). For instance, from Figure 1, there is a significant decline in resource allocation for disease surveillance and response over the years, from 23.1 units in 2021/2022 to only 0.3 units in 2024/2025, while preventive and promotive health services receive relatively stable but lower funding. This sharp reduction in surveillance funding raises concerns about the ability to detect and respond to potential outbreaks or pandemics. Effective resource mapping is crucial to ensure that disease surveillance and pandemic preparedness remain adequately funded, preventing health crises before they escalate. Without proper allocation, health systems risk being underprepared, leading to delayed responses, increased mortality, and economic disruptions

Furthermore, only 43% maintain strategic stockpiles of emergency preparedness commodities, limiting outbreak response. Without a comprehensive resource map, critical areas may not receive timely funds and supplies, increasing the risk of widespread transmission (World Bank, n.d.).

Figure 1: Allocations to preventive and promotive health services, and disease surveillance and response in Kenya



Source: Constructed from the budget reports

Resource mapping goes beyond financial allocation, addressing key gaps in healthcare infrastructure. Many counties lack adequate diagnostic laboratories, isolation units, and medical supplies, delaying outbreak containment. With only 25% of respiratory disease outbreaks meeting detection targets due to diagnostic gaps, mapping laboratory resources and cold chain facilities is crucial for targeted investments, faster turnaround times, and improved early detection (MoH, 2024).

Additionally, resource mapping enhances coordination among government agencies, healthcare providers, and international partners. Poor coordination between county and national authorities, along with weak integration between human and animal health sectors, undermines a One Health approach. The absence of standard operating procedures (SOPs) and inconsistent surveillance guidelines further limit response efficiency. Resource mapping improves collaboration, prevents duplication, and streamlines outbreak response.

In terms of disease surveillance, Kenya's 7-1-7 framework aims for outbreak detection within seven days, but only 55% of outbreaks meet detection targets due to diagnostic gaps and workforce shortages (MoH, 2024). Resource mapping supports investments in laboratory expansion, workforce training, and real-time surveillance systems to meet these goals.

At the community level, mapping strengthens surveillance and awareness efforts, leveraging Community Health Promoters (CHPs) and Community-Based Surveillance (CBS) systems. However, cultural barriers and limited awareness hinder their effectiveness, with only 36% of healthcare facilities conducting routine data analysis. Mapping ensures grassroots preparedness for early disease detection.

This policy brief supports pandemic preparedness by identifying and addressing resource gaps, offering evidence-informed recommendations for budget allocation. Strengthening Kenya's resource mapping will improve surveillance, response, and long-term health system resilience, ensuring more effective and equitable interventions during health emergencies.

Existing financial, human, and infrastructural resources for surveillance & pandemic preparedness and gaps

Financial resources and gaps

Kenya has shown financial commitment to pandemic preparedness through various government initiatives. During COVID-19, tax relief measures included a 100% exemption for individuals earning KES 24,000 (USD 228) or less and a reduction in the Pay As You Earn (PAYE) tax rate from 30% to 25% (Government of Kenya, 2020). The government also allocated KSh 10 billion (USD 95 million) to support vulnerable groups, such as the elderly and orphans, and KSh 1 billion (USD 9.5 million) from the Universal Health Coverage (UNC) fund to recruit additional healthcare workers (Ministry of Health, 2021). However, sustainable healthcare financing remains a challenge, with significant gaps in long-term pandemic preparedness funding (WHO, 2022).

In March 2024, the World Bank approved USD 215 million to strengthen Kenya's primary healthcare system and institutional capacity, improving service quality and accessibility (World Bank, 2024).

Despite this support, Kenya's health sector, historically reliant on donor funding, faced setbacks when United States Agency for International Development (USAID) funding was suspended in early 2025, particularly affecting AIDS, tuberculosis, and malaria services in aid-dependent areas like Kisumu and Nairobi (USAID, 2025).

Private sector contributions to health security, while not well-documented, play a vital role in healthcare facilities, supply chains, and service provision. Public-private partnerships continue to improve healthcare infrastructure, particularly in underserved regions (MoH, 2021). However, Kenya faces significant funding shortfalls in disease surveillance and pandemic preparedness. In fiscal year 2024/25, only 6% of the national health budget was allocated to preventive health services, a sharp decline from 11.6% in 2021/22. Funding for disease surveillance dropped even further, from 22% of the health budget in 2021/22 to less than 1% (Kenya Pandemic Preparedness Financing Report, 2025).

Over 90% of surveillance funding comes from external sources such as the Global Fund, World Bank, and USAID (Kenya Pandemic Preparedness Financing Report, 2025), creating sustainability risks as donor priorities shift. Kenya faces a funding shortfall of USD 40–50 million initially, with annual gaps of USD 20–30 million, limiting investment in critical areas like workforce capacity, laboratory infrastructure, and emergency preparedness (Kenya Pandemic Preparedness Financing Report, 2025).

To strengthen its surveillance system, Kenya requires USD 81.55 million between 2022 and 2026, yet budget limitations leave key strategic objectives underfunded. For example, expanding IDSR requires USD 19.92 million, but this remains largely unfunded (Kenya Pandemic Preparedness Financing Report, 2025). Strengthening epidemic preparedness and response, including laboratory testing capacity and multi-agency responder training, requires USD 41.35 million, but funding is insufficient.

At the county level, financial constraints are even more severe. Only 17% of sub-counties have a dedicated budget for epidemic preparedness and response, and fewer than 50% of counties have funds for essential personal protective equipment (PPE) and case management protocols for priority diseases (IDSR Evaluation Report, 2024). These underfunding delays outbreak responses and hampers efforts to control disease spread.

Human resources and gaps

Kenya's healthcare workforce faced significant strain during the COVID-19 pandemic due to shortages of personnel, PPE, and testing kits. In response, the government hired additional healthcare workers, but concerns about workforce sustainability remain. Kenya still needs a substantial expansion of its health workforce and continuous training in emergency preparedness and disease surveillance to strengthen health security (Njenga et al., 2022). Moreover, the suspension of USAID funding in 2025, which affected around 41,500 health workers involved in public health programmes like AIDS prevention, further strained healthcare delivery (Financial Times, 2021). Addressing workforce shortages is crucial for pandemic preparedness.

As of 2020, Kenya's health workforce included about 189,932 workers, with 66% employed in the public sector. Nurses made up 58%, clinical officers 13%, and doctors 7%. However, the country faces a shortage of specialised healthcare professionals, such as epidemiologists, laboratory technicians, and surveillance officers, limiting its ability to conduct effective disease surveillance and respond quickly to public health threats (MoH, 2020). Strengthening this workforce is vital for improving pandemic preparedness and response.

To address workforce shortages, Kenya has expanded training initiatives. From 2006 to 2015, the number of nursing schools increased by 32.5%, and international collaborations have been key. For instance, in 2022, the UK government provided £15 million to support workforce planning and capacity-building, improving healthcare delivery and preparedness (UK Government, 2022).

Community health workers (CHWs), especially in rural areas with limited access to formal healthcare, are essential to Kenya's healthcare system. They provide health education, basic medical care, and referrals, and play a crucial role in disease surveillance and early outbreak detection (WHO, 2021). Investing in CHWs and integrating them into national strategies will enhance Kenya's ability to manage future public health emergencies.

However, a shortage of trained personnel in disease surveillance and response remains a barrier to effective outbreak management. Only 11% of healthcare workers in Kenya have been trained in IDSR, and many were trained over five years ago (IDSR Evaluation Report, 2024). Training 60% of healthcare workers in IDSR guidelines would require USD 4.83 million, but funding for this remains insufficient (Kenya Pandemic Preparedness Financing Report, 2025). Additionally, high turnover rate, particularly in private healthcare, further undermine Kenya's disease surveillance system

The workforce development gap, estimated at USD 5–10 million, is needed for recruiting and training epidemiologists and field officers (Kenya Pandemic Preparedness Financing Report, 2025). Staff burnout is also a critical issue, as minimal personnel are forced to cover multiple roles, reducing efficiency and morale. Community Health Promoters (CHPs), key players in grassroots disease detection, remain underutilised due to lack of structured integration into national surveillance systems (IDSR Evaluation Report, 2024).

Inconsistent training programmes across counties worsen these human resource challenges. While some counties offer field epidemiology training, others lack structured capacity-building initiatives, resulting in disparities in surveillance effectiveness across the country (Kenya Pandemic Preparedness Financing Report, 2025).

Infrastructural resources and gaps

Kenya's healthcare infrastructure faced significant challenges during the COVID-19 pandemic, revealing gaps in care capacity, such as shortages of intensive care unit (ICU) beds and ventilators. While efforts were made to strengthen infrastructure, including expanding ICU capacity, upgrading isolation units, and enhancing laboratory capabilities, many health facilities still lack sufficient resources to manage large-scale outbreaks (Ministry of Health [MoH], 2022).

Although the government's Economic Stimulus Package provided funding to support the sector, long-term investments are needed, especially in rural and underserved areas, to improve healthcare infrastructure (Development Initiatives, 2023).

Kenya has also invested in digital surveillance systems to improve disease monitoring. The integration of electronic health records and mobile health technologies enables real-time data collection and analysis, crucial for timely responses to health threats (MoH, 2022). Strengthening these surveillance systems is vital for early outbreak detection and rapid containment.

To enhance emergency preparedness, Kenya has expanded healthcare infrastructure by constructing and upgrading hospitals and clinics. Emergency response units have also been established to ensure rapid deployment of resources during health crises (World Bank, 2023). Additionally, maintaining an efficient cold chain system is essential for vaccine efficacy and medical supply distribution. Kenya has made improvements in logistics infrastructure to ensure proper storage and transportation of vaccines and medical supplies, which is crucial for immunisation programs and pandemic response efforts (WHO, 2023).

Despite these advancements, Kenya's disease surveillance infrastructure remains inadequate, particularly in rural areas. Only 60% of counties have reliable diagnostic capacity, and 40% of health facilities are excluded from national surveillance reporting (Kenya Pandemic Preparedness Financing Report, 2025). Limited laboratory capacity and a lack of diagnostic tools delay disease detection and response, increasing the risk of uncontrolled outbreaks. To improve laboratory-based surveillance data management, an estimated USD 30,000 is needed, but progress remains slow due to funding shortages (Kenya Pandemic Preparedness Financing Report, 2025).

Another gap is the weak digital integration of surveillance data. Only 20% of health facilities use electronic medical records (EMRs), with many relying on informal reporting methods like WhatsApp and paper-based systems, compromising data accuracy (IDSR Evaluation Report, 2024). Establishing a governance framework for IDSR data and improving reporting indicators require USD 1.48 million, but investment remains insufficient (Kenya Pandemic Preparedness Financing Report, 2025). The country needs USD 20–30 million to upgrade surveillance systems and enhance real-time data collection (Kenya Pandemic Preparedness Financing Report, 2025).

Emergency preparedness infrastructure is also lacking. Only 17% of health facilities have preparedness plans, and fewer than 24 counties allocate budgets for epidemic preparedness. The country faces an annual funding gap of USD 7–10 million for critical supplies such as PPE, diagnostic kits, and medications (Kenya Pandemic Preparedness Financing Report, 2025). Quarantine centres and isolation wards are inadequate, further hindering Kenya’s ability to manage public health emergencies effectively. Strengthening epidemic preparedness in all 47 counties requires USD 25.69 million, but current funding is insufficient (Kenya Pandemic Preparedness Financing Report, 2025).

These gaps in funding, personnel, and infrastructure undermine Kenya’s ability to detect, respond to, and prevent disease outbreaks. Addressing these challenges requires increased domestic investment, a strengthened workforce, and improved digital surveillance systems.

Without sustained funding, Kenya remains vulnerable to future pandemics and health threats. Targeted investments in areas such as healthcare worker training, event-based surveillance, and laboratory and data management systems are crucial for building a resilient health surveillance framework

Table 1 presents the summary of costed resource mapping . A costed resource mapping for surveillance and pandemic preparedness estimates that Kenya requires USD 96.38 million between 2022 and 2026. The funding is distributed across key areas as follows:

Strategic Area	Key Issues Identified	Objective	Estimated Cost (USD Million)
Integrated disease surveillance	Insufficient budget for surveillance and preparedness	Expand event-based surveillance, train HCWs, improve lab data	19.92
Epidemic preparedness & response	Limited emergency response funds at county levels	Strengthen outbreak preparedness, improve lab testing, train responders	41.35
Vaccine - preventable diseases	Need to maintain polio-free status and strengthen measles and rubella surveillance	Maintain polio-free status, strengthen measles and rubella surveillance	6.53
Influenza & Respiratory Surveillance	Weak diagnostic capacity for respiratory illnesses	Strengthen ILI and SARI surveillance, expand lab capacity	4.79
Data management & ICT	Weak digital integration of surveillance data	Establish IDSR data governance, improve reporting indicators	4.2
Coordination & resource mobilisation	Over-reliance on donor funding	Establish coordination frameworks, strengthen funding mechanisms	4.76
Human resource gaps	Shortage of trained personnel in disease surveillance	Need to train 60% of HCWs on IDSR guidelines	4.83
Infrastructure gaps	Inadequate emergency response infrastructure	Improve infrastructure for emergency preparedness	10
Total estimated cost			96.38

Source: MoH, Division of Disease Surveillance and Response Strategic Plan, 2022 -2026

The largest portion of the budget, USD 41.35 million, is allocated to epidemic preparedness and response, emphasising the urgent need to improve outbreak management and laboratory testing capacity. Integrated disease surveillance follows with a significant allocation of USD 19.92 million, focusing on enhancing event-based surveillance and training healthcare workers. Infrastructure gaps, particularly in emergency response, require an estimated USD 10 million, while data management, ICT, and human resource development each require additional targeted funding.

The gaps in funding, personnel, and critical infrastructure significantly undermine Kenya's capacity to detect, respond to, and prevent disease outbreaks. Addressing these challenges requires increased domestic investment, strengthened workforce capacity, and improvements in digital surveillance systems. Without sustained and targeted funding, Kenya remains vulnerable to future pandemics and emerging health threats. Investing in costed resource mapping priorities, such as training healthcare workers, expanding event-based surveillance, and improving laboratory and data management systems, is crucial for building a resilient health surveillance framework.

Policy recommendations for equitable & efficient budget allocation

Increase domestic financing for pandemic preparedness

1. **Establish a dedicated budget line for surveillance:** mandate the inclusion of a specific surveillance budget in national and county budgets by the next fiscal cycle, ensuring a minimum allocation of 5% of total health sector funding.
2. **Strengthen PPPs :** develop a national framework for PPPs by MoH within six months, facilitating investment in healthcare infrastructure and digital surveillance technology.
3. **Create county-level emergency response funds:** require each county to allocate at least 2% of their health budget to an emergency response fund by the next budget review cycle to enable rapid outbreak response.

Strengthening human resource capacity

1. **Scale up training for healthcare workers & surveillance officers:** launch a nationwide training program within the next year, ensuring that at least 60% of healthcare workers receive updated IDSR training, given that only 26% of healthcare workers had received any form of training on IDSR.
2. **Implement retention incentives for skilled professionals:** Introduce a policy within six months to offer competitive salaries, housing allowances, and career progression opportunities for public health professionals in rural and high-risk areas.
3. **Deploy community-based surveillance teams:** recruit and train at least 5,000 Community Health Promoters (CHPs) within the next two years to enhance early disease detection and reporting at the grassroots level.

Enhance infrastructure for surveillance & response

1. **Invest in digital health infrastructure:** Fully integrate electronic disease surveillance systems across all healthcare facilities within three years, with the MoH overseeing implementation and monitoring.
2. **Expand laboratory networks & diagnostic capacity:** Upgrade at least 50% of county-level laboratories to biosafety level 2 within the next three years, with priority given to underserved regions, given that about 33% (15 out of 47 counties) had functional BSL-2 laboratories.
3. **Improve healthcare logistics & supply chains:** establish a centralized health logistics management system within two years to streamline the procurement, storage, and distribution of medical supplies, PPE, and vaccines.

Conclusion & call to action

Kenya's pandemic preparedness efforts face critical gaps in financing, human resources, and infrastructure. The country remains heavily dependent on donor funding, with only a small portion of the national health budget allocated to disease surveillance and emergency response. Strengthening laboratory capacity, improving healthcare workforce retention, and enhancing real-time digital surveillance systems are urgent priorities for bolstering outbreak preparedness.

The risks of inaction are severe, with potential economic losses, increased mortality, and prolonged healthcare system disruptions. Studies indicate that insufficient investment in pandemic preparedness can lead to GDP losses of up to 5% due to extended economic shutdowns (World Bank, 2024). A clear roadmap for implementation is essential, with short-term goals such as training 60% of healthcare workers in disease surveillance within one year and long-term objectives like establishing county-level emergency response funds by 2026 (MOH, 2024).

The recommendations outlined provide a strategic framework to address these challenges. Increasing domestic financing, investing in surveillance infrastructure, and providing targeted training for healthcare workers will significantly enhance Kenya's ability to detect and respond to pandemics effectively. Implementing these measures within the proposed timelines is critical to building a resilient health system.

Policymakers must act now to institutionalise resource mapping as a core component of pandemic preparedness. Sustainable funding allocation, integration of community-based surveillance teams, and improved coordination between national and county health departments are essential to ensuring an equitable and efficient health response system. Additionally, stakeholder collaboration is crucial—government agencies must lead policy development, the private sector should contribute funding and technology, and international organisations, including WHO and USAID, must support capacity-building and infrastructure development (WHO, 2023).

The time to act is now. Delays will only heighten vulnerabilities and put lives at risk. Immediate action and sustained commitment are essential to safeguarding Kenya's public health future

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