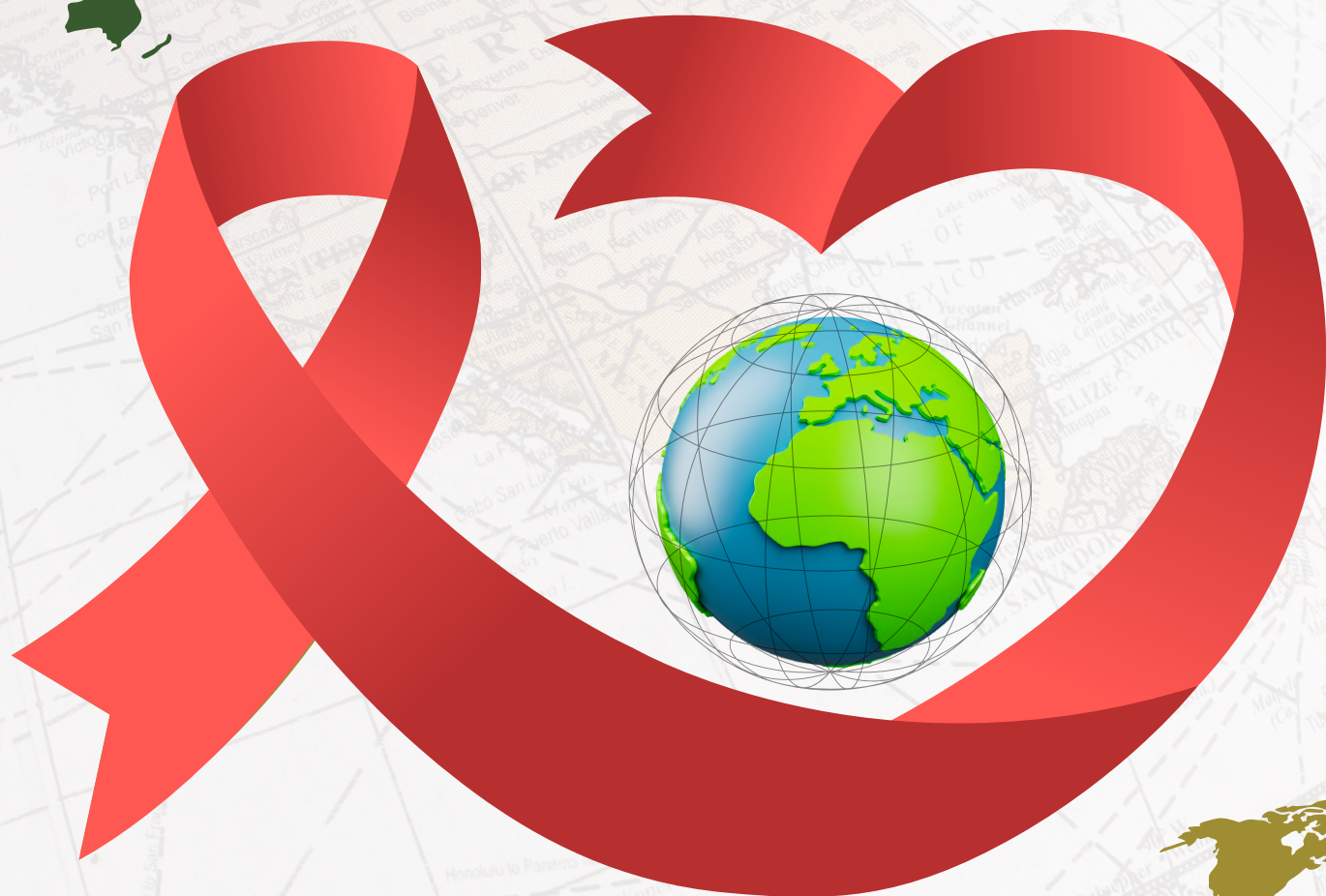




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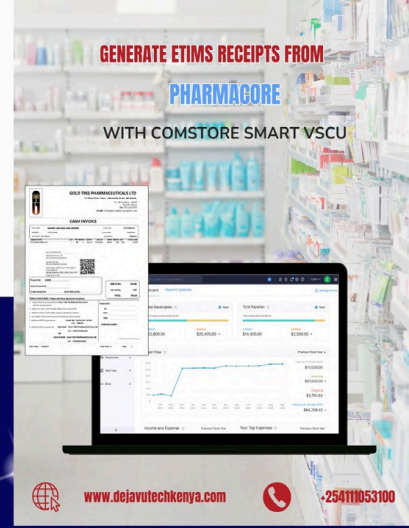
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IMPACT OF KMA – MOH ANTIRETROVIRAL THERAPY TRAINING ON HIV PERCEPTION TODAY



Dr. Simon Kigundu
President, KMA

Has the success of the KMA-MOH AntiRetroviralTherapy training seen Kenyans throw caution to the wind?

I was young medical officer intern rotating in Ward 6 at Machakos District Hospital in the year 2001. This medical ward had a section at dedicated to very sick patients suffering from Acquired Immunodeficiency Syndrome (AIDS). Because it was untreated then, AIDS was a very debilitating disease at the time. AIDS was caused by the Human Immunodeficiency Virus (HIV). The patients in the HIV section of the ward were really wasted and literally waiting to die. When the major ward round reached that section the team would say CT Rx which stood for continue treatment. In 2001 the treatment for HIV patients in a public hospital in Kenya was palliative. It consisted of multivitamins and treatment of the very common opportunistic infections that patients infected with HIV would often contract. Tuberculosis and Pneumocystis Carini Pneumonia (later renamed Pneumocystis Jirovecii) and cryptococcal meningitis were common. Patients with HIV and AIDS would often die from opportunistic infections because their CD4 cell count were totally knocked out by the HIV infection. CD4 cells, also known as helper T cells, are a type of white blood cell that play a key role in the immune system's defense against infection. HIV attacks and destroys CD4 cells, which weakens the immune system

Patients then in Public Hospitals had no access to antiretroviral (ARVs) medication. Infection with HIV thus continuously compromised their immune system, eventually making the body unable to defend itself against infection. ARVs stop the replication of the HIV and allow the body not to lose CD4 cells and actually regenerate them enough to restore and maintain immunity. Without ARVs treatment patients with HIV in public hospitals in Kenya were literally waiting to die.

ARVs were very expensive due to patent issues by the originator companies. Prior to the year 2001 in Kenya ARVs could only be accessed in high end private hospitals in Nairobi. Moreover, very few physicians in Kenya had enough experience with antiretroviral therapy. In the year 2000 - 2001, patient rights groups especially in South Africa, which had a very high burden of HIV infection, fought to have parallel importation of cheaper generic ARVs allowed by their governments. India had produced ARVs that were affordable. The move by rights groups to allow parallel importation of cheaper ARVs by governments, can be considered the greatest lifeline that was given to patients who had contracted HIV and could not afford expensive ARV treatment in the private sector. Once this access program came to Kenya, it was ripe for the training of doctors to actually treat HIV and AIDS.

In 2001 Dr J Aluoch, a past Chairman of KMA and pulmonologist at The Nairobi Hospital organized the Kenya Medical Association HIV Committee to partner with the Ministry of Health of Kenya to conduct countrywide training of doctors on HIV and AIDS treatment using antiretrovirals. Doctors were mobilized by KMA and hosted in various hotels across the country for these intensive one-week ART trainings. As a medical officer stationed at Machakos District Hospital, I received intensive residential ART at a training session at The Blue Post Hotel Thika. I not only enjoyed the training but also the hotel food and accommodation.

We returned to various public hospitals in the country these doctors who were trained immediately initiated antiretroviral therapy on patients who previously were on palliative care. The results of ART were dramatic. The AIDS wards disappeared. Robust Comprehensive Care Clinics (CCCs) popped up in the public hospitals across the country. ART transferred HIV patients away from AIDS wards to being useful Kenyan taxpayers attending CCCs on lifelong ART basically living a normal life.

Within a few years the numbers of patients with the typical wasting syndrome as AIDS was called had fallen dramatically. HIV testing and treatment became common. Current medical students may not see a patient with full blown AIDS in the wards now due to success of ART.

On Prevention of Mother-To-Child transmission (PMTCT) of HIV, PMTCT was initially started as monotherapy with zidovudine. In 2006 participated in the WHO PMTCT

randomized controlled study called the Kesho Bora Study that recommended that the ART for PMTCT from Zidovudine monotherapy to Triple ARVs Therapy that the study demonstrated to be superior. This study helped reduce the mother-to-child transmission of HIV significantly.

The success of ART has transformed HIV from a visible disease to an invisible disease. HIV is still a huge burden and mainly sexually transmitted especially among teenagers. The younger generation that did not experience the visible scourge of AIDS in Kenya may not have a very clear picture of what HIV is and may take it's prevention lightly and may engage in behavior that may predispose them to HIV infection.

And hence I ask, 'Could the Success of ART be a reason why caution may have been thrown to the wind?'

In this World AIDS Day 2024 KMA needs to continue educating Kenyans of the realities of HIV infection

Dr Simon Kigundu is the President of Kenya Medical Association



KENYA MEDICAL ASSOCIATION (KMA) PERSPECTIVE ON GLOBAL HEALTH AND HIV/AIDS



Dr. Diana Marion
Secretary General , KMA

The Kenya Medical Association (KMA), as a thought leader in health matters, recognizes its critical role in addressing the persistent challenges posed by HIV/AIDS. Guided by a vision to contribute to a healthier Kenya and region, KMA's approach aligns with global health priorities while addressing context-specific needs to ensure sustainable impact.

A Holistic Approach to HIV/AIDS Management

KMA's HIV Committee has been at the forefront of advocacy, empowerment, and community engagement in combating HIV/AIDS. Over the years, the committee has championed:

1. Policy Advocacy: Actively engaging stakeholders to shape HIV/AIDS policies that prioritize equity, accessibility, and effectiveness.
2. Health Workforce Empowerment: Partnering with institutions to equip healthcare professionals with the knowledge and skills required for effective HIV prevention, care, and management.
3. Community Engagement: Conducting awareness campaigns to dispel myths, reduce stigma, and encourage testing and treatment adherence.

Innovative Pathways for Addressing HIV/AIDS

As the world evolves, so must our strategies. To amplify its impact, KMA envisions the HIV Committee working collaboratively with the Public Health Committee to adopt

innovative approaches

1. Addressing Social Determinants of Health: Recognizing the interplay of poverty, education, gender inequality, and access to healthcare, KMA advocates for multi-sectoral collaborations to tackle these underlying drivers of HIV/AIDS.

2. Digital Health Solutions: Embracing technology to enhance care delivery, KMA champions:

- *The adoption of digital tools for real-time monitoring and management of HIV cases to improve patient outcomes.*
- *The use of telemedicine to provide counseling, education, and remote care, especially for marginalized populations.*

Healthcare Financing Reforms and HIV/AIDS in Kenya

Kenya's healthcare financing reforms, including the Primary Health Care Fund, the Social Health Insurance Fund (SHIF), and the Emergency, Chronic, and Critical Illness Fund under the Social Health Authority, present transformative opportunities for addressing HIV/AIDS. The Primary Health Care Fund enhances access to essential HIV services at the community level, ensuring prevention, testing, and early treatment are readily available and integrated into routine care. The SHIF alleviates financial barriers, offering comprehensive coverage for diagnostics, treatment, and follow-up care, while the Emergency, Chronic, and Critical Illness Fund provides critical support for advanced HIV cases and related co-morbidities, reducing the financial burden on affected families.

These reforms reflect Kenya's commitment to sustainable healthcare financing, strengthening Kenya's resilience in combating HIV/AIDS, and aligning with the Universal Health Coverage (UHC) agenda to ensure no one is left behind.

Aligning with Global Health Priorities

KMA remains steadfast in its commitment to the Sustainable Development Goals (SDGs), particularly SDG 3: Good Health and Well-being. By aligning with international frameworks such as UNAIDS' 95-95-95 targets, we aim to:

- Ensure that 95% of individuals living with HIV know their status.
- Achieve 95% treatment coverage for those diagnosed.
- Sustain viral suppression for 95% of those on treatment.

A Call to Action

As a professional body, KMA is uniquely positioned to influence health outcomes through partnerships, evidence-based advocacy, and capacity building. We call on policymakers, health institutions, and community stakeholders to join hands in prioritizing the fight against HIV/AIDS. Together, we can leverage innovations,

address social determinants, and create an environment where the burden of HIV/AIDS is significantly reduced.

Through bold leadership, collaboration, and a shared vision, KMA reaffirms its dedication to driving transformative health solutions for Kenya and the region.



Global Health & HIV/AIDS



ABCs OF HIV PROGRAMMING: AN INTRODUCTORY GUIDE FOR THE KENYAN GP

By Dr. Eric Mugambi

Working in a public health facility, you're likely familiar with some activities of the HIV program. Often termed "vertical", this program is characterized by its stand-alone focus on a single disease, employing strategies and activities that are not yet fully integrated within the healthcare system.

Programs bring together teams of highly skilled professionals, each specializing in critical components such as data analysis, clinical management, and logistical coordination. These experts tackle pre-specified critical tasks over a defined period, utilizing a finite set of resources. Detailed reporting systems communicate progress over time and across various locations, enabling recalibration of efforts and tactics to correct any deviations in trajectory.

Initially led by international partners during the emergency phase of the HIV response, these programs have transitioned to indigenous partners. Recent consolidation efforts are aimed at enhancing the capacity of county governments to manage HIV programs. Now, high-performing county departments directly receive grants to support HIV activities at designated sub-counties.

The US government, through the President's Emergency Plan for AIDS Relief (PEPFAR), is the largest donor for HIV activities globally. PEPFAR was launched in 2003 by President George W. Bush with an initial allocation of USD 110 billion. It has saved approximately 25 million lives and prevented millions of new infections in more than 50 countries. Currently in its third phase, PEPFAR focuses on sustained epidemic control. Alongside PEPFAR, the Global Fund is a significant contributor. Additionally, domestic funding sources have become increasingly crucial, with the Kenyan government committing to increase domestic financing for HIV programs to 50% by 2025.

PEPFAR has been authorized four times since inception by the US Congress which allocates funds to the Office of the Global AIDS Coordinator (OGAC). OGAC channels funds to implementing agencies—USAID, HHS/CDC, DoD, DOL, and the Peace Corps. In supported countries and regions, these agencies form PEPFAR mission teams that oversee implementing partners.

Government oversight and advocacy are provided by the Ministry of Health through

the National Syndemic Disease Control Council (NSDCC), while the technical aspects of HIV programming are led by the National AIDS/STI control program (NASCOP).

Funds are channelled to implementing partners through a competitive award process, published on grants.gov as RFAs (request for application) or NOFOs (notice of funding opportunity). The prime awardee may then award smaller sub-awards to other implementers for specific deliverables. The prime is answerable to US government (USG) agencies for all activities under the award through a rigorous reporting cycle. “Beneficiaries” are the recipients of targeted prevention, treatment, and care interventions within formal health facilities and the community.

Aligned with the Kenya AIDS Strategic Framework (KASF II) and PEPFAR-country operational plans (COP), the goal of ART programs is to achieve and maintain epidemic control of HIV using high-quality, evidence-based, patient-centered HIV prevention and treatment models.

Six key strategies underpin programmatic objectives. The first strategy focuses on strengthening County health systems to ensure a smooth transition to sustainable HIV service delivery. This involves collaboratively developing transition plans with clear milestones. Counties receive targeted training in financial, procurement, and grant management, while regional indigenous technical assistance (TA) hubs are established to enhance localized support.

The second strategy aims to identify and link People Living with HIV (PLHIV) through targeted, innovative approaches. These include training testers on ethical practices, recency testing, and HIV self-testing while strengthening eligibility screening at health entry points. Peer-led linkage activities and deploying electronic HTS (HIV testing services) tools ensure improved identification and seamless connections to care.

To enhance treatment outcomes, the third strategy focuses on providing quality, client-centered ART and addressing co-morbidities such as tuberculosis (TB) and non communicable diseases (NCDs). Health care providers are trained in advanced HIV management, TB integration, and the latest antiretroviral (ART) guidelines. Differentiated Service Delivery (DSD) models cater to diverse groups, while adherence counseling and psychosocial support improve client engagement. Mechanisms for viremia management, decentralizing drug delivery, and strengthening community ART groups further optimize treatment delivery.

The fourth strategy prioritizes comprehensive PMTCT interventions to prevent mother-to-child transmission. Dual HIV and syphilis testing, optimizing early infant diagnosis, and strengthening sample referral systems are key activities. Mentor

mothers and community health workers raise demand for maternal and neonatal services, while male engagement strategies and adolescent girl and women (AGYW) friendly service models foster inclusivity.

Evidence-based HIV prevention for key and priority populations forms the fifth strategy. Comprehensive prevention services, including Pre-exposure prophylaxis (PrEP), voluntary medical male circumcision (VMMC), and sexual and gender-based violence (SGBV) support, are complemented by stigma reduction training for providers and mapping key population estimates. Community advisory boards engage stakeholders like police, KPs, and private partners, ensuring an integrated response.

The sixth strategy supports orphans, vulnerable children (OVC), and AGYW by addressing vulnerabilities through in-depth needs assessments, targeted linkages to support programs, and provision of core service packages. Strengthened referrals between HIV clinics and OVC/DREAMS (determined, resilient, empowered, AIDS free, mentored and safe) programs ensure continuity of care and retention.

To sustain diagnostic quality, the seventh strategy focuses on optimizing HIV and TB diagnostics and lab networks. Activities include training lab personnel in new diagnostic techniques, improving laboratory information management systems (LIMS) and sample referral systems, and introducing multiplexing platforms for HIV, TB, and related conditions.

Lastly, the eighth strategy strengthens HIV data collection, reporting, and utilization. This includes training M&E staff, updating tools and registers, adopting electronic medical recording (EMR) systems, and enhancing data quality assurance. Case based surveillance (CBS) activities like recency testing and behavioral surveys are expanded to provide actionable insights for epidemic control.

Together, these strategies and their corresponding activities create a comprehensive framework to sustain high-quality HIV service delivery and achieve epidemic control.

Suggested Reading

1. The urgency of now: AIDS at a crossroads. Geneva: Joint United Nations Programme on HIV/AIDS; 2024. Licence: CC BY-NC-SA 3.0 IGO.

“

“PEPFAR was launched in 2003 by President George W. Bush with an initial allocation of USD 110 billion. It has saved approximately 25 million lives and prevented millions of new infections in more than 50 countries. Currently in its third phase, PEPFAR focuses on sustained epidemic control.”

-Dr. Eric Mugambi



DR. ERIC MUGAMBI IS A SEASONED INTERNIST, ENDOCRINOLOGIST, AND PUBLIC HEALTH SPECIALIST WITH OVER 17 YEARS OF EXPERIENCE. HE IS A LECTURER AT KENYATTA UNIVERSITY MEDICAL SCHOOL, SPECIALIZING IN CLINICAL PRACTICE, CURRICULUM DEVELOPMENT, AND RESEARCH.

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SILENT EPIDEMIC: KENYA'S COURAGEOUS FIGHT AGAINST HIV/AIDS

By Dr. Andrew Waititu

Breaking the Chains: A Nation's Struggle for Survival

Kenya stands at the forefront of a critical battle against HIV/AIDS, a silent enemy that has challenged the nation's social fabric, economic stability, and human potential. This research unveils the stark realities, remarkable resilience, and transformative strategies driving Kenya's comprehensive response.

Epidemic at a Glance: The Harsh Numbers

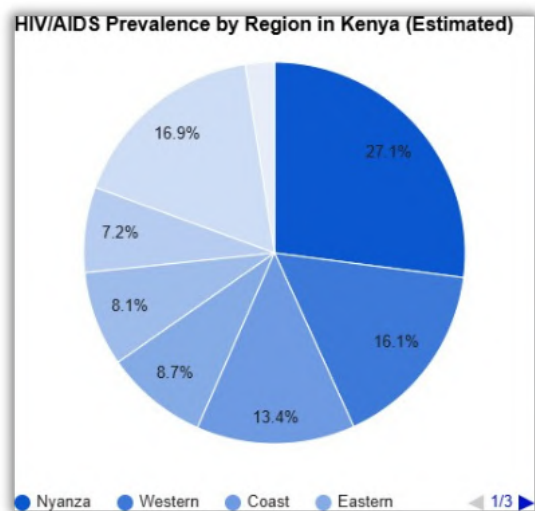
Devastating Impact

- 1.5 million Kenyans living with HIV
- 27,000 new infections annually
- 21,000 AIDS-related deaths per year
- National HIV prevalence: 4.5%

Geographical Battleground

Infection Hotspots

- Nyanza Province: 13.1% prevalence
- Nairobi County: 8.2% infection rate
- Coast Province: 6.5% HIV concentration



Demographic Vulnerability

Who Suffers Most?

- Women: 6.2% prevalence (compared to 3.8% in men)
- Youth (15-24 years): 25% of new infections
- Urban populations: Higher transmission risks

Revolutionary Interventions

Strategic National Response

- Comprehensive prevention programs
- Free antiretroviral therapy (82% coverage)
- Mother-to-child transmission prevention
- Community-based testing services

Economic Warfare

The Hidden Cost

- Annual healthcare expenditure: \$500 million
- Productivity losses: \$1.2 billion annually
- Intergenerational economic impact

Technological Breakthrough

Innovative Solutions

- Mobile health tracking platforms
- Digital adherence monitoring
- Community health worker networks
- Integrated sexual health services

Barriers and Challenges

Persistent Obstacles

- Deep-rooted cultural stigma
- Limited rural healthcare infrastructure
- Economic constraints
- Gender inequality

Future Vision: Hope and Strategy

Transformative Recommendations

1. Targeted youth intervention
2. Enhanced gender-responsive programs
3. Infrastructure development
4. Community empowerment initiatives

Conclusion: A Resilient Nation's Promise

Kenya's fight against HIV/AIDS is more than a medical challenge—it's a testament to human resilience, strategic innovation, and unwavering hope. Each intervention, each life saved, represents a step toward national healing and global progress.



DR. ANDREW WAITITU IS A PHARMACIST AND RESEARCHER AT THE MINISTRY OF HEALTH IN KENYA, SPECIALIZING IN PHARMACOGENOMICS. HE HOLDS A CERTIFICATION IN GENOMICS AND BIOINFORMATICS FROM STELLENBOSCH UNIVERSITY. AS THE FIP LIAISON FOR THE PHARMACEUTICAL SOCIETY OF KENYA AND HEAD OF THE MENTORSHIP COMMITTEE FOR THE YOUNG PHARMACISTS GROUP, HE FOCUSES ON COLLABORATION AND PROFESSIONAL DEVELOPMENT IN PHARMACY.



GLOBAL HEALTH AND HIV/AIDS

By George Amolo

All nations face the critical issue of global health, with HIV/AIDS remaining a serious threat affecting millions. Data from the Kenyan Ministry of Health (MOH) and the World Health Organization (WHO) show that HIV/AIDS remains prevalent in sub-Saharan Africa.

HIV/AIDS remains a major public health concern in Kenya, affecting 1.5 million people. While progress has been made in recent years, the HIV prevalence rate remains at 4.9%, highlighting the need for persistent efforts to fight the virus. The MOH has been working to ensure access to testing, treatment and care for people living with HIV/AIDS, while also putting prevention programs in place to decrease new cases.

According to the WHO, there are over 38 million people living with HIV, and about 1.7 million new infections are reported every year. Sub-Saharan Africa remains the most affected region, with around 25.7 million people living with HIV in the area. The WHO highlights that scaling up HIV prevention, testing and treatment services is crucial to achieving the goal of ending the epidemic by 2030.

The WHO advocates starting antiretroviral therapy (ART) as soon as possible for everyone with HIV/AIDS, as it has transformed the fight against the disease. ART not only improves the health and quality of life of those living with HIV, but also plays a crucial role in reducing transmission rates. The MOH in Kenya has been working to ensure obtaining ART services across the country, making it more accessible to those in need.

The fight against HIV/AIDS is hampered by obstacles like stigma, discrimination, and insufficient healthcare resources. Collaborative efforts involving governments, healthcare providers, NGOs and community groups are essential to address these challenges and achieve sustainable results. Educational and awareness campaigns are vital for clearing up HIV/AIDS myths, promoting testing and treatment, and encouraging safe practices.

In conclusion, global health and the fight against HIV/AIDS require a collective and integrated approach to overcome the challenges at hand. By prioritizing prevention, testing, treatment and support services, we can work towards a future where HIV/AIDS is no longer a threat to public health. The efforts of the MOH in Kenya, in partnership with the WHO and other stakeholders, are crucial in achieving this vision and ensuring the well-being of populations affected by HIV/AIDS worldwide.

“

According to the WHO, there are over 38 million people living with HIV, and about 1.7 million new infections are reported every year. Sub-Saharan Africa remains the most affected region, with around 25.7 million people living with HIV in the area.”

-George Amolo



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REGISTRY OF EMERGENCY
MEDICAL TECHNICIAN).
PROFESSIONAL INTEREST
INCLUDE MEDICINE IN
MOTOR SPORT, FOOTBALL
MEDICINE,
PREHOSPITAL RESEARCH.



THE UNSEEN BATTLES: THE HUMAN COST OF HIV IN SUB-SAHARAN AFRICA

By Akwii Maurine



Sub-Saharan Africa bears the highest burden of HIV/AIDS, accounting for nearly two-thirds of global cases. Within this region, women and young people are mostly affected, carrying the weight of a disease that not only destroys lives but fractures entire communities. Coming from Kenya, a country deeply rooted in this epidemic, I have witnessed firsthand the far-reaching social, health, and economic impacts of HIV.

The Stigma That Silences and Kills

Stigma and discrimination cast a long shadow over the fight against HIV, driving many away from lifesaving treatment. These barriers prolong the spread of the virus and result in untimely deaths, shattering families and communities. Young people, in particular, bear the impact of this stigma. Fear of being labeled keeps many from accessing preventive measures like PrEP (pre-exposure prophylaxis) and PEP (post-exposure prophylaxis), leaving them vulnerable.

Poverty and Risky Behaviors: A Deadly Cycle

In my community, poverty exacerbates the crisis. Many young people come from low-income families, struggling to meet basic needs. This dire situation has pushed some, especially young girls, into transactional sex—a desperate attempt to survive. For many, it has proven fatal. In 2020, I lost a close friend to AIDS. Her story was one of countless others—a young girl forced into risky behaviors to make ends meet, only to lose her life to a preventable disease.



The Mental Health Toll of HIV

Beyond the physical toll, the mental health burden of HIV is devastating. Stigma and discrimination isolate victims and their families, while the financial strain of treatment weighs heavily. The emotional burden can become unbearable. During my clinical practicum as a medical student, I encountered a patient who ended his life after a HIV diagnosis. The pain he carried was overwhelming, and his tragic death highlighted the silent suffering endured by so many.

Barriers to Treatment and Care

The challenges don't end there. Access to treatment is filled with obstacles. The high cost of treatment, coupled with a lack of resources, has created a system that fails those who need it most. Test kits run out, HIV clinics lack confidentiality, and trained healthcare workers are few. These barriers prevent timely diagnosis and treatment, leaving countless lives at risk.



A Call to Action

These stories are not unique—they are the lived realities of countless individuals across Kenya and Sub-Saharan Africa. HIV is not just a medical issue; it is a human tragedy that reflects systemic failures in healthcare, education, and societal support.

It doesn't have to be this way. No one should die from AIDS, a preventable and treatable disease. Governments, policymakers, and communities must come together to address the root causes of this crisis. We must dismantle the stigma, ensure access to resources, and prioritize education and economic empowerment.



Every lost life is a reminder of the work still to be done. The fight against HIV is not just about medicine—it is about humanity. We owe it to the millions affected to build a world where no one is left behind.

“

“In 2020, I lost a close friend to AIDS. Her story was one of countless others—a young girl forced into risky behaviors to make ends meet, only to lose her life to a preventable disease.”

-Akwii Maureen



AKWII MAUREEN, BORN IN 2002, IS A DEDICATED YOUTH ADVOCATE AND GLOBAL HEALTH ENTHUSIAST WITH A DEEP PASSION FOR READING, STORYTELLING, AND ENGAGING WITH YOUNG PEOPLE. SHE CURRENTLY SERVES AS THE COMMUNICATION AND COMMUNITY ENGAGEMENT OFFICER AT TINADA YOUTH ACTION AFRICA, WHERE SHE PLAYS A PIVOTAL ROLE IN EMPOWERING COMMUNITIES AND ADVOCATING FOR YOUTH INVOLVEMENT IN POLICY-MAKING AND DECISION-MAKING PROCESSES.

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THROUGH HER ADVOCACY EFFORTS, AKWII CONTINUES TO CHAMPION YOUTH REPRESENTATION, GENDER EQUALITY, AND INCLUSION, MAKING SIGNIFICANT STRIDES TOWARD CREATING A MORE INCLUSIVE AND EQUITABLE FUTURE FOR ALL.



KENYA AND GLOBAL EFFORTS TO COMBAT HIV/AIDS

By Michael Ouma

Challenges, Progress, and a Hopeful Future

Introduction

HIV/AIDS remains a critical global health challenge, affecting millions and straining healthcare systems. While significant progress has been made in treatment, prevention, and care, gaps remain, particularly in sub-Saharan Africa, where socio-economic issues exacerbate the epidemic's toll. This article examines the global landscape of HIV/AIDS, Kenya's role in addressing the epidemic, and the progress made in combating the virus.

GLOBAL LANDSCAPE OF HIV/AIDS: Prevalence and Ongoing Impact

Globally, approximately 39 million people were living with HIV as of 2023, with 1.7 million new infections reported annually, according to USAID. Sub-Saharan Africa continues to bear the brunt of the epidemic, home to nearly two-thirds of those affected. Vulnerable groups—such as women, children, men who have sex with men, people who inject drugs, and sex workers—are disproportionately impacted by HIV due to social stigma and discrimination, which hinder access to prevention and treatment.

While HIV-related deaths have decreased by over 60% since 2004, largely due to the widespread availability of antiretroviral therapy (ART), access to this life-saving treatment remains a challenge, especially in low-income countries. Despite these challenges, efforts to reduce new infections have seen success. Since 2010, new HIV infections globally have declined by 23%.

Global Efforts

The global response to HIV/AIDS has evolved significantly. Organizations like UNAIDS, the World Health Organization (WHO), and PEPFAR have led efforts through a combination of prevention, treatment, and care strategies. ART has been a transformative development, turning HIV from a fatal disease into a manageable condition for millions, with over 28 million people receiving ART by 2023. In addition to treatment, prevention strategies such as pre-exposure prophylaxis (PrEP), condom distribution, and harm reduction for people who inject drugs have gained ground.

Programs targeting the prevention of mother-to-child transmission (PMTCT) have

been particularly successful, leading to a notable reduction in new infections among children. The 90-90-90 targets set by UNAIDS in 2014 have been a central focus. These goals aim for 90% of people living with HIV to know their HIV status, 90% of those diagnosed to receive ART, and 90% of those on ART to achieve viral suppression. By 2023, over 70% of people living with HIV globally were diagnosed, over 65% were on ART, and nearly 60% had achieved viral suppression.

KENYA'S ROLE IN GLOBAL HEALTH: Response and Achievements

Kenya's national strategy for HIV/AIDS is guided by the Kenya National AIDS Strategic Plan (KNASP), which aims to reduce new infections, improve access to treatment, and address the social determinants of health. Key achievements in Kenya include expanded access to HIV testing, ART, and PMTCT services. Integrating HIV services into primary healthcare has broadened service coverage and improved comprehensive care delivery. A poignant example of the success of these efforts is the story of Monica, a 32-year-old woman from a rural village in western Kenya. Diagnosed with HIV during a routine pregnancy checkup, Monica initially felt overwhelmed and fearful. However, community health workers provided her with emotional and practical support, helping her start ART and connect with support groups. Today, she is healthy and advocates for other women in her community, emphasizing that HIV does not define a person's future. Community health workers (CHWs) have played a vital role in Kenya's response to HIV. They educate communities, offer HIV testing, and help link people to care, which has reduced stigma and expanded access to services. Kenya's collaboration with international partners like PEPFAR and UNAIDS has also been key in scaling up prevention and treatment programs. Kenya's progress in meeting global HIV/AIDS targets, particularly the 90-90-90 framework, serves as an example of the impact of community-based healthcare and international cooperation.

Local and Global Challenges in the Fight Against HIV/AIDS

Despite progress, challenges remain. In 2023, 1.7 million new HIV infections were reported globally, showing the need for continued focus on prevention. Access to care remains unequal, especially in low and middle-income countries, where 40% of people living with HIV lack access to ART. In Kenya, disparities exist between urban and rural areas, with only 56% of individuals in rural regions on ART compared to higher rates in cities. Stigma, lack of education, and limited healthcare resources continue to impede progress. Addressing these barriers is essential for achieving further success in the fight against HIV/AIDS. The Future of HIV/AIDS: Innovations and Hope Looking forward, the future of HIV/AIDS treatment and prevention is promising. Innovations such as long-acting injectable ART, which offers a more convenient form of treatment, are set to improve adherence. Additionally, ongoing research into HIV vaccines and gene-editing technologies holds the potential for a

future cure. The focus is shifting toward universal access to HIV services, particularly for marginalized populations. With sustained funding and political commitment, the goal of eliminating new infections, AIDS-related deaths, and stigma is within reach. National strategies, combined with global initiatives like the 90-90-90 targets, will continue to guide efforts in the coming decades. In Kenya, future prospects are also optimistic. With improved ART access, a growing network of community-based health services, and a continued focus on reducing stigma, Kenya is poised to make further strides in HIV prevention and care. The country's progress is an inspiration for other nations in sub-Saharan Africa and beyond.

CONCLUSION: Continued Global Cooperation and Call to Action

While HIV/AIDS remains a global health challenge, significant progress has been made through advances in treatment, prevention, and care. The widespread availability of ART and PrEP, alongside successful local initiatives like Kenya's integration of HIV services into primary healthcare, demonstrates the power of comprehensive strategies in combating the epidemic. To build on this progress, continued global collaboration, including public-private partnerships, is crucial. Efforts must focus on overcoming barriers to care, addressing stigma, and ensuring sustainable funding. The fight against HIV/AIDS is ongoing, but with collective action, the dream of an AIDS-free generation is within reach. Governments, healthcare providers, and individuals must continue working together toward a world where HIV/AIDS is no longer a global health crisis



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GLOBAL HEALTH AND HIV/AIDS: THINK REGIONAL, ACT LOCAL, IMPACT GLOBAL

By Esther Murunga

Although the concept of global health is widely recognised, particularly among medical and health professionals, it remains challenging to define and conceptualise meaningfully. A significant solution for this lies in understanding global health through the lens of regional health. This perspective offers a context-specific representation of broader global health trends allowing stakeholders to gain actionable insights.

Why Thinking Regionally Works

1. Contextual Relevance

Regional health showcases the unique demographic, economic, social, and environmental factors shaping health outcomes in specific areas. These local contexts clarify how global health priorities play out in real-world scenarios. For example:

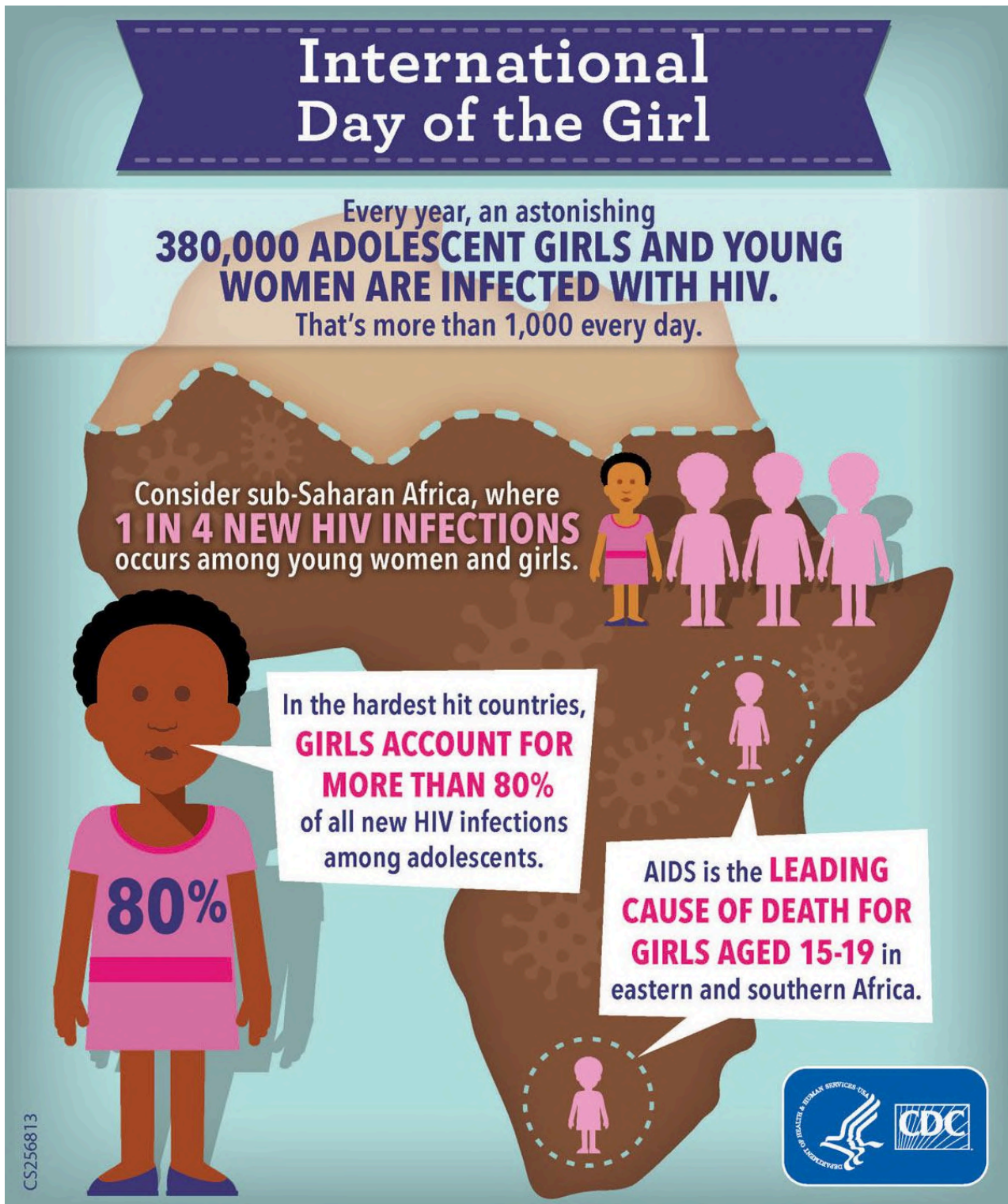
- In sub-Saharan Africa, where nearly 70% of global HIV cases are concentrated, challenges such as limited healthcare infrastructure, stigma, and poverty shape the epidemic's trajectory and responses.
- In Eastern Europe and Central Asia, rising HIV cases linked to intravenous drug use draw attention to the need for harm reduction and targeted prevention strategies.



Courtesy: The Guardian

2. Localized Data and Patterns

While global statistics provide a macro view of the HIV epidemic, regional data uncovers specific trends, such as age demographics of new infections, gender disparities, or treatment adherence rates. For instance, in sub-Saharan Africa, adolescent girls and young women account for a disproportionately high number of new infections, guiding efforts toward gender-sensitive prevention programs.



Courtesy: CDC

3. Cultural and Social Determinants

Cultural practices and social norms, such as early marriage, gender inequality, and religious beliefs, significantly influence HIV transmission and treatment adherence. A regional perspective ensures interventions are culturally appropriate, such as integrating HIV education into community events or working with faith-based organisations to combat stigma.

4. Lessons from Policies and Interventions

Successful regional policies provide valuable lessons for scaling up. For instance, the widespread use of community health workers to deliver antiretroviral therapy (ART) in rural areas of Southern Africa has demonstrated the importance of decentralizing care to improve access and adherence.

5. Bridging Global-Local Disparities

Focusing on regional aspects of HIV/AIDS helps highlight disparities in access to prevention, testing, and treatment services. For example, while ART coverage in sub-Saharan Africa has improved, disparities persist between urban and rural populations, emphasizing the need for equitable resource distribution.

HIV/AIDS Through a Regional Lens: Global Data, Local Impact

HIV/AIDS remains a significant global health challenge, with stark regional disparities reinforcing the need for tailored interventions. Here's a closer look at the global and regional burden of sexually transmitted HIV/AIDS in 2019 as sourced from the study "Global, regional, and national burdens of HIV/AIDS acquired through sexual transmission 1990–2019: an observational study." by Wu et al., (2024).

1. Key Global Metrics

- Deaths: ~695,800 deaths globally (uncertainty interval [UI]: 628,000–811,300).
- Years of Life Lost (YLLs): ~33.0 million (UI: 28.7–39.9 million).
- Years Lived with Disability (YLDs): ~3.4 million (UI: 2.4–4.6 million).
- Disability-Adjusted Life Years (DALYs): ~36.4 million (UI: 32.2–43.1 million).

Significance:

- High YLLs indicate that too many people are still dying early from HIV/AIDS despite progress in medical science.
- Substantial YLDs show that HIV/AIDS is a lifelong condition for many, requiring sustained medical, social, and psychological support.
- The staggering DALYs underline the dual challenge of reducing mortality while improving the quality of life for those living with HIV/AIDS.

Global HIV data

	2000	2005	2010	2020	2022	2023
People living with HIV	27.2 million [24.6 million–30.4 million]	29.4 million [26.6 million–32.9 million]	32 million [29.0 million–35.8 million]	38.7 million [35.0 million–43.2 million]	39.5 million [35.8 million–44.2 million]	39.9 million [36.1 million–44.6 million]
New HIV Infections	2.8 million [2.3 million–3.6 million]	2.5 million [2.0 million–3.2 million]	2.1 million [1.7 million–2.7 million]	1.5 million [1.2 million–1.9 million]	1.4 million [1.1 million–1.7 million]	1.3 million [1.0 million–1.7 million]
AIDS related deaths	1.8 million [1.4 million–2.3 million]	2 million [1.6 million–2.6 million]	1.3 million [1.0 million–1.7 million]	730 000 [570 000–940 000]	670 000 [530 000–870 000]	630 000 [500 000–820 000]
New HIV Infections (Adults, aged 15+)	2.3 million [1.9 million–3.0 million]	2 million [1.6 million–2.6 million]	1.8 million [1.5 million–2.4 million]	1.3 million [1.1 million–1.7 million]	1.2 million [980 000–1.6 million]	1.2 million [950 000–1.5 million]
New HIV Infections (Children, aged 0–14)	530 000 [380 000–760 000]	470 000 [340 000–680 000]	300 000 [220 000–440 000]	150 000 [110 000–210 000]	130 000 [94 000–190 000]	120 000 [83 000–170 000]
People accessing antiretroviral therapy	510 000 [450 000–530 000]	1.9 million [1.7 million–2.0 million]	7.7 million [6.7 million–8.0 million]	26.2 million [23.1 million–27.3 million]	29.3 million [25.7 million–30.4 million]	30.7 million [27.0 million–31.9 million]
Resource availability	US\$ 5.1 billion	US\$ 9.3 billion	US\$ 16.7 billion	US\$ 21.5 billion	US\$ 20.8 billion	US\$ 19.8 billion

Courtesy: UNAIDS

2. Regional Burden of HIV/AIDS

The greatest burden of HIV/AIDS lies in sub-Saharan Africa, emphasizing the need for region-specific interventions.

- Southern sub-Saharan Africa: 11,350.94 DALYs per 100,000.
- Eastern sub-Saharan Africa: 3,530.91 DALYs per 100,000.
- Western sub-Saharan Africa: 2,037.74 DALYs per 100,000.

Significance:

- Sub-Saharan Africa accounts for the majority of global HIV/AIDS cases, making it the epicentre of the epidemic.
- Many individuals die young, which impacts families and economies.
- Survivors often face chronic health conditions due to HIV/AIDS, emphasizing the need for long-term care and support.

Regional data – 2023

	People living with HIV	New HIV Infections	New HIV Infections (Adults, aged 15+)	New HIV Infections (Children, aged 0–14)	AIDS-related deaths
Global	39.9 million [36.1 million–44.6 million]	1.3 million [1.0 million–1.7 million]	1.2 million [950 000–1.5 million]	120 000 [83 000–170 000]	630 000 [500 000–820 000]
Asia and the Pacific	6.7 million [6.1 million–7.5 million]	300 000 [270 000–370 000]	290 000 [260 000–350 000]	10 000 [7600–14 000]	150 000 [110 000–200 000]
Caribbean	340 000 [280 000–390 000]	15 000 [9900–21 000]	13 000 [9000–19 000]	1300 [900–1900]	5 100 [3500–7400]
Eastern and southern Africa	20.8 million [19.2 million–23.0 million]	450 000 [360 000–580 000]	400 000 [310 000–520 000]	50 000 [34 000–79 000]	260 000 [210 000–330 000]
Eastern Europe and central Asia	2.1 million [1.9 million–2.3 million]	140 000 [120 000–180 000]	140 000 [120 000–180 000]	1300 [1100–1700]	44 000 [35 000–54 000]
Latin America	2.3 million [2.1 million–2.6 million]	120 000 [97 000–150 000]	110 000 [93 000–140 000]	3900 [3000–4700]	30 000 [27 000–42 000]
Middle East and North Africa	210 000 [170 000–280 000]	23 000 [16 000–35 000]	21 000 [15 000–32 000]	1900 [1300–2800]	6200 [4100–9400]
Western and central Africa	5.1 million [4.5 million–5.9 million]	190 000 [130 000–280 000]	140 000 [89 000–230 000]	48 000 [36 000–83 000]	130 000 [100 000–170 000]
Western and central Europe and North America	2.3 million [2.0 million–2.7 million]	56 000 [45 000–87 000]	56 000 [45 000–87 000]	... [...–...]	13 000 [9400–17 000]

3. Global Trends (1990–2019)

- Regions with the fastest-growing burden of sexually transmitted HIV/AIDS include:
 - Oceania (EAPC: 17.20).
 - South Asia (EAPC: 9.00).
 - Eastern Europe (EAPC: 7.09).

3. Global Trends (1990–2019)

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 - South Asia (EAPC: 9.00).
 - Eastern Europe (EAPC: 7.09).

Significance:

- In regions like Oceania and South Asia, the rapid increase suggests that prevention and treatment programs may be insufficient or not reaching high-risk populations effectively.
- In Eastern Europe and South Asia, HIV/AIDS transmission may be linked to increased injecting drug use, changing sexual behaviours, and lack of education about safe practices.

From Regional Action to Global Impact

Addressing HIV/AIDS requires a dual approach:

1. *Local Interventions:* This entails tailored prevention, treatment, and care strategies in high-burden regions. For example, in sub-Saharan Africa, where HIV transmission is primarily through heterosexual contact, programs targeting safe sex education, condom distribution, and voluntary circumcision can help reduce transmission rates. In contrast, regions experiencing increasing rates of HIV among injecting drug users, like parts of Eastern Europe, may require more targeted harm reduction measures, such as needle exchange programs.
2. *Global Collaboration:* Sharing lessons and scaling effective practices globally. For example, the successful roll-out of antiretroviral therapy (ART) in South Africa has become a model for other high-burden regions.

The fight against HIV/AIDS serves as a reminder that our interconnected world demands solutions that respect diversity while fostering unity.

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ESTHER IS PASSIONATE ABOUT USING HER SKILLS IN PROGRAM DEVELOPMENT, STAKEHOLDER ENGAGEMENT, AND DIGITAL ADVOCACY TO CREATE POSITIVE CHANGE IN AFRICAN COMMUNITIES.

A conceptual image of the Earth as a globe hanging from a chain, set against a dark blue space background filled with stars. The globe is tilted, showing the Americas. A bright light source on the right creates a strong highlight on the globe's surface.

Health Systems

STRENGTHENING HEALTH SYSTEMS THROUGH EMOTIONAL INTELLIGENCE

By Sicily Kariuki, EGH; Dr. Ndirangu Wanjuki; Arch. Vicky Karuga

Idea in Brief

Research shows that only 10–15% of people are truly self-aware, despite 95% believing otherwise. Emotional intelligence, comprising self-awareness, self-management, social awareness, and relationship management, is essential for effective leadership, which is much needed in healthcare. Leaders in this field must balance technical expertise with relational acumen, as Emotional intelligence provides the foundation for navigating crises, fostering collaboration, resolving conflicts, and building trust. Addressing challenges in the health sector demands empathy and adaptability. Leaders who prioritize self-care not only enhance their resilience but also model practices that promote well-being across their teams, creating an environment conducive to innovation and sustained success. As Daniel Goleman emphasizes, leadership transcends intellect, relying on Emotional intelligence to navigate emotions and inspire teams. In the health sector, leaders who apply Emotional intelligence can drive systemic changes that enhance population health outcomes.

The Leadership Glue

Research by organizational psychologist Tasha Eurich reveals a striking disparity: while 95% of people believe they are self-aware, only 10–15% actually are [1]. This lack of self-awareness—the foundational skill of emotional intelligence—can significantly undermine team success. These findings highlight the critical role of emotional intelligence, particularly in high-stakes environments like healthcare.

According to Daniel Goleman, Emotional intelligence comprises 12 competencies across four domains: Self-Awareness (emotional self-awareness), Self-Management (emotional self-control, adaptability, achievement orientation, positive outlook), Social Awareness (empathy, organizational awareness), and Relationship Management (influence, coaching and mentoring, conflict management, teamwork, inspirational leadership) [2]. These competencies enable individuals to develop self-regulation, empathy, and collaborative abilities essential for effective personal and professional relationships.

Effective leadership is essential for achieving population health outcomes in the health sector. Ronald Humphrey, a member of the Emotional Intelligence Consortium, describes leadership as an emotional process in which leaders recognize, evoke, and influence followers' emotional states [3]. To be effective,

leaders in the health sector must wield a range of tools, including vision and innovation, strategic planning, industry expertise, financial acumen, communication, cultural competence, decision-making, performance management, continuous improvement, adaptability, stakeholder engagement, accountability, resilience, and, finally, emotional intelligence, which is like the glue that holds these skills together.

This article outlines six practical applications of emotional intelligence for leaders in the health sector.

1. Leading Under Pressure

Consider leading a team through a crisis—whether it's a disease outbreak, financial crisis, a safety issue, or team conflict. In these situations, effective leaders can stay centered through mindfulness, which enhances self-awareness, helping leaders recognize their emotions and the influence these emotions have on their teams. Self-management enables leaders to maintain composure, stay calm and optimistic, and adapt to pressure. They manage impulses, using rational judgment to shape decisions and blend intuition with strategic thinking. Social awareness allows leaders to guide and inspire their teams empathetically, constructively resolve conflicts, and promote collaboration. This approach nurtures relationships, creating an environment of trust, psychological safety, flexibility, and autonomy.

2. Handling Tough Feedback

Receiving unpleasant feedback can be challenging. Think of a time you received tough feedback after a significant mistake. How did it impact you emotionally? Did you feel frustrated, enlightened, anxious, or determined to improve?

A reactive response—defensiveness, blame-shifting—damages trust and diminishes team effectiveness. In contrast, a responsive approach that embraces and processes feedback constructively enhances trust and team cohesion. Leaders should model this behavior, using 360-degree feedback mechanisms to foster an environment where feedback is valued as a growth tool.

3. Promoting Collaborative Decision-Making

Health systems are interconnected functions comprising financial management, workforce, medicines, equipment, community engagement, multi-sectoral action, service delivery, leadership, governance, digitization and digitalization, and feedback loops. These components must function cohesively to achieve optimal outcomes, as the strength of a health system lies in its ability to operate as a unified entity. Consider Kenya's maternal health scenario. Despite 9 out of 10 women opting to deliver in a health facility, maternal mortality remains high due to quality-of-care gaps. To address such challenges, leaders must apply adaptive leadership—with empathy—to encourage inclusive dialogue among stakeholders, foster collaboration,

and promote an environment of learning that allows solutions for system-wide change to emerge and thrive.

4. Conflict Resolution Among Stakeholders

In the health sector, stakeholder conflict can have severe repercussions. For instance, maternal mortality spiked during Kenya's 56-day doctors' strike in early 2024. Addressing stakeholder concerns early on can prevent such crises. Leaders who use emotional intelligence to understand stakeholder perspectives, communicate openly, and apply proactive conflict resolution can help prevent escalations that disrupt service delivery.

When stakeholders make challenging demands, leaders can leverage empathy, stay calm, and focus on solutions that build goodwill and commitment. This diplomatic approach builds trust and strengthens the health system. Without empathy, communication breaks down under the weight of misunderstanding, leading to unproductive conflict that might nucleate around personalities. This may completely derail an otherwise well-intentioned process.

5. Building Trust in Interpersonal Relationships

Reflect on moments in your career when you felt undervalued or overlooked. Such experiences can affect commitment and morale. Emotional intelligence enables leaders to connect genuinely with their teams, fostering trust and mutual respect.

One-on-one meetings provide an opportunity for leaders to demonstrate self-awareness, authenticity, and empathy. Leaders who actively listen, motivate through encouragement, provide constructive feedback, and celebrate achievements build strong team relationships. These leadership practices encourage transparency and alignment between team and organizational goals.

6. Self-Care and Wellbeing for the Leader

The World Health Organization defines burnout as relentless stress causing exhaustion, detachment, and diminished professional efficacy [4]. Health sector leaders face a unique risk of burnout and compassion fatigue, often exacerbated by "surface acting"—maintaining a pleasant demeanor in the face of rudeness or unreasonable demands. This constant strain depletes emotional, cognitive, and physical energy, impacting leadership effectiveness.

Prioritizing self-care is crucial for resilient and effective leadership. Self-care is as unique as a fingerprint and is grounded in self-awareness. Leaders benefit from focusing on personal well-being practices—exercise, quality sleep, balanced nutrition, boundary-setting, mindfulness, financial stability, and continuous learning. Such practices equip leaders with the resilience needed to cultivate psychological

safety and foster resilience within their teams. Sometimes, this may require implementing certain practices, even if they feel unconventional, such as encouraging regular breaks or beginning meetings by asking, "How are we showing up today?"

Concluding Reflections

Strengthening health systems to enhance population health requires integrating emotional intelligence within leadership competencies. Emotional intelligence offers substantial benefits not only to individuals but also to entire organizations. As Daniel Goleman illustrated in *Emotional Intelligence: Why it Can Matter More than IQ*, emotions often hold greater influence than intellect. Successful leadership extends beyond logic and strategy; it relies on managing both personal emotions and motivations and those of others [4].

Cultivating emotional intelligence enables leaders to operate effectively under pressure, embrace feedback, foster collaboration, build trust, manage stakeholder relationships with diplomacy, and prioritize self-care. Effective leadership is not about achieving perfection but about learning, growth, and authenticity. Health sector leaders, in particular, must understand the impact of their emotions and actions on those around them. By honing emotional intelligence, these leaders can drive meaningful change within their organizations and improve outcomes in the communities they serve

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RE-IMAGINING HEALTH SYSTEMS IN THE 21ST CENTURY: PRECISION POPULATION HEALTH TOOLS FOR ADVANCING PRIMARY HEALTH CARE: PART 1 OF 2

By Dr. Ndirangu Wanjuki

Idea in Brief

The 2023 Universal Health Coverage (UHC) global monitoring report highlights the critical need to reorient health systems through a primary health care (PHC) approach to accelerate progress toward the 2030 UHC goals. This article proposes precision population health as a compelling pathway to achieving this reorientation. It defines precision population health, explores its potential to address systemic inefficiencies, introduces practical tools for its implementation, and concludes by highlighting common pitfalls to avoid.

This article is the third piece in a series advocating health systems redesign. The first article, accessible [here](#), introduced the Health Systems 2.0 framework, rooted in three theoretical foundations to inform health systems evolution. The second article, available [here](#), outlined eight practices for development practitioners to actualise the Health Systems 2.0 philosophy.

This third article explores precision population health, a practice introduced in the second article. It outlines the foundational pillars or principles of precision population health and provides examples of tools designed to reorient health systems toward a PHC approach.

Precision population health is based on five foundational pillars: identifying at-risk demographic groups; utilizing routine proximate impact data; ensuring that insights are strategically accessible through user-friendly platforms; driving lean ecosystem improvements; and promoting health equity by addressing social factors, including gender, age, and economic status.

Precision population health tools are categorized into six thematic areas: data analytics and governance, ecosystem engagement, lean models, strategic purchasing, public health security, and soft skills and mindsets. This article focuses on the first three categories, with the remaining three to be addressed in a subsequent publication. The examples provided are intended as an initial toolkit to encourage practitioners to innovate and share additional tools, fostering collaboration and learning, particularly in resource-constrained contexts.

Development agencies and philanthropic organizations are urged to prioritize technical assistance that supports government-led efforts to scale precision population health tools and enhance local system efficiency and resilience.

What is Precision Population Health?

Achieving UHC by 2030 demands a decisive reorientation of health systems, shaped by the primary health care (PHC) approach championed by the World Health Organization (WHO) [1]. Precision population health provides a strategic framework for this reorientation.

Precision population health uses routine impact data to inform the design and deployment of resource-efficient strategies that equitably improve health outcomes for at-risk demographic groups.

The family of precision health includes the youngest sibling, precision medicine; the middle sibling, precision population health; and the oldest sibling, precision public health. As discussed by various authors, the related disciplines of precision medicine and precision public health aim to replace one-size-fits-all strategies with tailored approaches [2, 3, 4, 5, 6]. Precision medicine focuses on individualizing treatments using genetic or molecular data, primarily in clinical settings. Precision public health broadly safeguards entire populations by targeting sub-groups based on epidemiologic risk, often in contexts like public health security or communicable disease elimination. As aptly defined above, precision population health applies a depth approach, systemically focusing on specific demographic subgroups as a means to optimize PHC for advancing UHC.

Precision population health is grounded in five foundational pillars: identifying at-risk demographic groups, using routine proximate impact data such as facility deaths or complications, ensuring insights are strategically accessible through user-friendly platforms, driving lean ecosystem improvements, and promoting health equity by considering social factors such as gender, age, and economic status.

To contextualize the definition of precision population health and provide practical insights into its application, consider the example of children under five who are particularly vulnerable to pneumonia.

1. Demographic group: Targeting a specific at-risk demographic subgroup ensures the efficient allocation of limited resources. For example, children under the age of five face a heightened risk of mortality due to pneumonia caused by *Streptococcus pneumoniae* or *Haemophilus influenzae*.

2. Proximate population health data: Effective action should be directly guided by insights from causal analysis of proximate population health or impact data. For example, monthly data on facility-based pneumonia deaths, sourced from routine

Information systems, can provide valuable guidance.

3. *Visibility of precision insights:* Insights are helpful only when accessible to stakeholders who can act on them. This can be achieved by translating data into formats like dashboards, infographics, or simplified narratives hosted in government-owned observatories and integrated with routine health information systems.

4. *Lean ecosystem improvement:* Streamlining systems and operations by eliminating redundancies and promoting efficient, data-driven strategies is crucial in resource-limited settings. For example, reducing childhood pneumonia risk and mortality may require improving access to vaccines through outreach, enabling community health workers to provide pre-referral antibiotics, improving access to medical oxygen through intra-hospital piping, and offering virtual continuing medical education informed by child mortality reviews. Additional lean approaches could include strategic purchasing actions, such as integrating pneumonia treatment into health insurance and leasing cold chains to reduce costs.

5. *Health equity:* Ensuring health equity in initiatives demands prioritizing underserved areas by providing, for example, oxygen plants and mobile clinics for vaccination to tackle childhood pneumonia. Aligning with UHC 2030, interventions must integrate equity by addressing social and ecological determinants of health, including gender, age, economic status, and access to clean water.

Tools of Precision Population Health

Precision population health tools can be classified into six categories: data analytics and governance, ecosystem engagement, lean models, strategic purchasing, public health security, and soft skills and mindsets. This article focuses on the first three. Across all these categories, technology plays a potentially vital role as an enabler (7, 8, 9). The tools highlighted in this article serve as a starter pack, encouraging practitioners to explore new tools, experiment with them, and share their insights.

1. *Data Analytics and Governance*

In this first category of precision population health tools, we examine proximate analytics, predictive modeling, data visibility, interoperability, and security as examples of data analytics and governance tools.

1.1 *Proximate Analytics*

Imagine managing a company for five years without insight into profitability — it would likely collapse. Yet, health systems often rely on data collected every few years, such as demographic surveys, to guide strategies. Precision population health solves this by using routine data sources such as District Health Information Software, Electronic Medical Records, and Health Management Information Systems to generate proximate health impact measures. For example, when skilled delivery attendance exceeds 90%, the facility maternal mortality rate can predict maternal

mortality trends. Analyzing monthly associations between metrics like these and health system action, such as maternal care quality, reveals actionable insights. This methodology, already applied in maternal death reviews, can be extended to other population groups, enabling causal pattern identification. Regular analyses of such data, spanning primary care units to national levels, ensure health system strategies remain relevant to PHC principles. This approach can help avoid the inefficient equilibrium trap described by Prof. Heifetz [10] and contextualized to the health sector by Wanjuki [11], enabling stakeholders to directly assess the effectiveness of their interventions.

When designing programs, consider these precision health questions: What population-level outcome (X) should change over five to 10 years? What routine metric (Y) serves as a good enough monthly proxy for X? How can the team identify impactful interventions (A, B, C, D, E...) to change X using proxy data (Y) and inputs from experts and communities? Which interventions (e.g., B, D, E) should be prioritized to optimize resources for equitable improvement in X, tracked via Y?

1.2 Predictive Modeling

Artificial Intelligence (AI) and Machine Learning (ML) hold unique potential in disease prevention and treatment in resource-limited settings. AI-powered systems can improve responses to climate change-related challenges, exemplified by Kenya's Antimicro.ai, an open-source platform analyzing 850,000 antibacterial samples across 83 countries, 341 bacterial species, and 38 drugs. Antimicro.ai predicts bacterial resistance, enabling precise antibiotic use and improved outcomes while informing public health policies. Despite such success, regions like sub-Saharan Africa lack sufficient health data, limiting AI's potential. Only 2% of Pfizer's antimicrobial resistance data used by Antimicro.ai comes from Africa. To fully leverage AI, robust datasets and a continent-specific language model are vital [12].

1.3 Data Visibility

In healthcare, the value of data emerges when it strengthens health systems to deliver impact. For this, data must be accurate, timely, visible and easily interpretable. Health observatories enable user-friendly visibility by gathering and analyzing health data to track trends and guide policies. Prominent examples include the WHO Global Health Observatory and the African Health Observatory. Typically, observatories present data on inputs (e.g., health budgets), processes (e.g., healthcare workers), and outputs or outcomes (e.g., mortality rates). Observatories can be enhanced by integrating actionable precision insights – in which case we can refer to them as precision population health observatories.

For instance, precision population health observatories in maternal and newborn health could track deaths while suggesting precision or minimalist ecosystem

improvements based on analytics. Governments and development agencies should invest in such precision observatories tailored to country contexts to strengthen policy and programming, allowing health systems to track progress and adapt strategies accordingly. Precision population health observatories can enable countries to achieve what HIV programs have accomplished by deploying care cascades to support nations such as Botswana, Eswatini, Rwanda, Tanzania and Zimbabwe in achieving epidemic control and meeting the '95-95-95' HIV 2030 targets [13].

By integrating with existing routine information systems through interoperability, precision population health observatories can deliver insights into various population health challenges such as infectious diseases, cardiometabolic disorders, maternal and child health, and neglected tropical diseases.

1.4 Data Interoperability

Clive Humby's 2006 phrase, "Data is the new oil", underscores the transformative potential of refined data. Humby likened data to crude oil, valuable only when processed into actionable products. Tools such as proximate population health data analytics, predictive modeling, and precision data visibility refine raw data into meaningful insights. The full potential of data lies in achieving interoperability by linking diverse systems.

In the health sector, interoperability can enable integration of platforms like the District Health Information Software, Health Management Information System, and community health systems. This integration transitions data analysis from describing 'what' to explaining 'why' and determining 'so what'. In Kenya, for instance, linking electronic community health information systems to medical records through universal patient identifiers can enable client cascades that track screening, referrals, and chronic disease care. These cascades, backed by policy frameworks, can support continuous quality improvement, akin to the previously mentioned HIV program success [13].

Similarly, integrating Kenya Medical Supplies Authority's i-LMIS with county inventory systems has enhanced disease control by enabling real-time data sharing. Its reverse logistics model identifies unused malaria nets in low-demand areas, redistributing them to high-need regions and optimizing malaria prevention efforts [14].

Beyond the traditional health systems, interoperability can facilitate integration of data from social and ecological sectors, including meteorology, education and economics. For example, integrating health and climate data can accelerate malaria control efforts. Achieving meaningful interoperability requires robust policies that foster cross-sectoral data sharing, enabling countries to bridge gaps in connectivity after years of investment in data refinement.

1.5 Data Security

In the health sector, data security, privacy and ethical use are vital for leveraging data to improve health outcomes while safeguarding trust. Health systems must adopt global standards like ISO/IEC 27001 for risk mitigation and ISO/IEC 27799 for healthcare-specific protections [15]. These frameworks provide the foundations for robust policies, regular audits and oversight mechanisms for secure data handling.

Key data security measures include encryption, firewalls, two-factor authentication, and data retention policies. Encryption protects sensitive details like patient records and payment data, ensuring security against breaches. Ethical use involves handling health data responsibly for defined purposes such as treatment or research (with consent). Governance protocols, anonymization and ethical training are applied for accountability.

2. Ecosystem Engagement

This second category of precision population health tools examines examples of ecosystem-wide diagnosis, coaching and mentoring, addressing socio-ecological determinants, and collaborating with communities for co-creation and co-monitoring.

2.1 Ecosystem-wide Diagnosis

Countries facing complex or adaptive health challenges — such as increasing cardiometabolic diseases, stagnant maternal health outcomes, teenage pregnancies, inadequate financial protection, and the impacts of climate change within constrained fiscal spaces — require ecosystem-wide approaches guided by adaptive leadership. This leadership unites diverse stakeholders with varying interests and motivations to enable systemic learning and evolution. The process begins with stakeholder mapping and perspective analysis to identify roles, points of alignment, and conflict related to the adaptive challenge. Key stakeholders may include government bodies, development agencies, healthcare providers, community leaders, patients, civil society, and private-sector partners.

Establishing a 'holding environment' such as a well-facilitated multi-stakeholder working group, as conceptualized by Professor Heifetz, creates a controlled space for productive discomfort. This environment fosters constructive dialogue, conflict resolution, learning, innovation, experimentation, and collaborative problem-solving among stakeholders [10].

Positive deviance analysis is a critical tactic for identifying successful areas within the ecosystem — such as hospitals, regions, or countries excelling in addressing the challenge — providing a solid foundation for replication, scaling, and new innovations. By fostering purposeful multi-sectoral collaboration, ecosystem-wide diagnosis integrates diverse perspectives into coordinated actions, achieving

sustainable improvements in population health and advancing collaboration in PHC.

2.2 Coaching and Mentoring

Building on ecosystem-wide diagnosis, adaptive leaders coach individuals to adapt to changes that disrupt their familiar realities and push them outside their comfort zones to solve complex problems. Coaching involves guiding people to face difficult truths, including losses and power shifts often associated with change. For example, advancing malaria control may require delegating case management to community health workers, potentially reducing client flow and income for laboratory staff. Coaching fosters a culture of observation, experimentation and decentralized problem-solving by strengthening leadership capacity at all levels, aligning with Prof. Heifetz's principle of 'giving the work back to the people', thereby enhancing resilience within the ecosystem [10]. Leaders employ skills like presence, self-awareness, empathy and accountability to create supportive environments where constructive conflict drives innovation.

2.3 Tackling Social and Ecological Determinants

Social and ecological determinants are pivotal across precision population health pillars, including demographics, analytics and health equity. Analyzing data that integrates these determinants enables actionable insights and fosters cross-sector collaboration with ministries such as education, water, and gender, as well as civil society. For instance, causal analyses of maternal health facility mortality data can identify factors influencing complications, such as education, economic stability and gender dynamics. Multi-sectoral partnerships can address these barriers through targeted solutions, like school retention programs for girls and pro-poor social health insurance schemes. Additionally, integrating epidemiologic and meteorological data can enhance control of climate-sensitive diseases like malaria. As climate change emerges as a significant social determinant of health, data-driven, coordinated multi-sectoral action becomes essential.

2.4 Co-Creation and Co-Monitoring with Communities

Precision population health emphasizes targeted interventions tailored to specific demographics, improving implementational efficiency and equity in outcomes. Co-designing and co-monitoring interventions with individuals with lived experience ensures programs address real needs, leaving out any superfluous elements. During implementation, co-monitoring through qualitative methods — such as focus groups — captures insights on key service attributes from both users and non-users of services. These attributes include access, equity, safety, quality, efficiency and responsiveness, all assessed from the user's perspective, facilitating meaningful refinement of interventions. This approach enhances health equity by reducing exclusion risks, a precision population health pillar, and fostering solutions that meet the needs of those most at risk.

3. Lean Models

Effective health systems must deliver scalable, context-specific services that extend to the last mile, encompassing preventive care, diagnosis and treatment. In line with the spirit of precision population health, for these services to be accessible and affordable at scale in low-resource settings, they must follow a lean, minimalist design, precisely tailored to meet communities' distinct needs and well-supported by sound strategic purchasing decisions.

This section examines examples of lean models, namely, tackling health inequalities, poverty elimination via the Graduation approach, last-mile services, self-care interventions, access to medicines, virtual learning for health workers, health facility autonomy, genomic sequencing, disease elimination, safe drinking water access, and micronutrient supplementation.

3.1 Tackling Health Inequalities

Addressing health inequalities is crucial for effective health systems in sub-Saharan Africa, where disparities are significant. Equity measurement using disaggregated data — by geography, gender, disability and income — can guide the design of interventions for underserved populations.

HIV programs have employed equity-focused strategies, prioritizing vulnerable groups such as residents of urban informal settlements and youth and sex workers. For example, South Africa's She Conquers initiative was successful through data-driven actions, community engagement, and strong leadership [16]. Similarly, MTV's Shuga empowers adolescent girls and young women to prevent HIV [17]. These initiatives, combined with pre-exposure prophylaxis and harm reduction programs, have established HIV prevention and care as effective large-scale efforts. Beyond HIV, Rwanda's inclusive health insurance system improves maternal health and provides financial protection for disadvantaged groups.

Equity-focused interventions can be categorized into four approaches: individual-level graduation strategies, equitable resource allocation at the meso level, last-mile service delivery, and local manufacturing. Kenya's Equalisation Fund exemplifies equitable resource allocation to marginalized counties. Last-mile service delivery, described elsewhere in this article, ensures services reach remote areas. Local manufacturing — such as Kenya's Universal Corporation Limited [18] and micro-manufacturing of pressure swing adsorption (PSA) plants for oxygen in remote areas [19] — enhances access to essential medical supplies and strengthens health system resilience.

These types of interventions, when supported by robust policies and regulations, can enable countries to achieve meaningful progress toward health equity.

3.2 Graduation Approach to Eliminate Poverty

Extreme poverty obstructs health equity. BRAC's Graduation model, a top-rated development strategy, disrupts poverty cycles through four key interventions: immediate support — cash or food aid and health services to address urgent needs; - income generation—training or assets for microbusinesses; - financial inclusion—financial literacy, savings, and responsible borrowing for resilience; d) Social empowerment — confidence building, community integration and life skills for independence.

In Bangladesh, 95% of participants achieved sustainable livelihoods, with earnings rising 37%, savings increasing nine-fold, and food security improving. These outcomes persisted beyond seven years [20]. Applied in nearly 50 countries, the graduation approach links poverty reduction to better health outcomes, including nutrition and psychosocial well-being. As a scalable, evidence-based tool, it addresses poverty — one of the most critical health determinants — and holds immense potential for resource-constrained settings.

3.3 Last-mile Services

Precision preventive and therapeutic interventions focus on delivering tailored services to underserved communities. For example, Amref Health Africa's collaboration with civil society organizations, the Global Fund and Kenya's Ministry of Health empowers community health workers to provide home-based malaria diagnosis and treatment. This model, extendable to maternal health, demonstrates adaptability for various health needs [21, 22]. Similarly, Amref and the Turkana County Government, with USAID funding, deploy One Health outreach clinics for nomadic pastoralists. These clinics integrate human and animal health services, including vaccinations, tailored to the unique needs of these populations [23].

Kenya's investment in bulk oxygen storage and PSA plants, supported by the Global Fund, strengthens its oxygen supply chain. Hospitals distribute oxygen directly to patient bedsides via intra-hospital piping, significantly improving access, particularly for children with pneumonia [19].

Digital health innovations offer transformative last-mile solutions, with telemedicine, AI-powered tools, mobile health apps, and virtual communities addressing care gaps effectively. For instance, in Kenya, Jacaranda Health employs AI and ML in local languages to guide pregnant women to timely care [24]. Similarly, portable AI-enabled digital x-rays expedite tuberculosis diagnosis [7]. Integrated into solar-powered mobile clinics, as seen during the COVID-19 pandemic, such technologies enhance access to preventive and diagnostic care in remote areas [25].

3.4 Self-Care Interventions

Self-care, as defined by WHO, is the ability of individuals, families and communities

to manage health, prevent disease, and cope with illness and disability, independently of or with minimal support from health workers. It includes evidence-based medicines, devices, diagnostics and digital tools that can be accessed without formal health services. The COVID-19 pandemic underscored its importance through practices like masking, distancing, and handwashing. With half the global population lacking access to essential health services, WHO advocates self-care interventions to strengthen PHC and achieve UHC [26].

Self-care provides a precise model for improving health outcomes and reducing costs in resource-limited settings. It empowers individuals to make informed health decisions, adopt healthier lifestyles, use preventive measures, adhere to medications, recognize illness symptoms, and seek timely care. Self-monitoring tools, such as home-use glucose and blood pressure devices, further enhance disease management.

Governments and development agencies can advance self-care through supportive policies and programs offering accessible, accurate information. Mobile platforms, social media, community health promoters and local radio are effective in educating individuals on self-care practices. Scaling up these initiatives provides a sustainable pathway for addressing complex issues like non-communicable diseases and improving population health in resource-limited settings [27].

3.5 Medicine Access Initiatives

In low-resource settings, poor health outcomes often stem from limited access to essential medicines. For instance, heat-stable carbetocin, a synthetic oxytocin analog that retains efficacy without refrigeration, shows promise in reducing maternal mortality from postpartum hemorrhage. A WHO-led study across ten countries demonstrated its potential [28]. However, as a patented drug, its high cost limits adoption in countries with constrained fiscal spaces.

To address this, Ferring Pharmaceuticals partnered with UNITAID's Medicines Patent Pool in April 2024 under a conditional licensing agreement [29]. This arrangement enables affordable carbetocin production through sublicensing in select nations. The initiative's impact is already notable. In Kenya, prices dropped from Ksh1,444 (\$11.18) to Ksh92 (\$0.71) per dose, contributing to declining maternal mortality rates, as reflected in monthly facility data.

Countries with constrained fiscal spaces should collaborate with stakeholders to replicate such initiatives for other costly but life-saving medicines. Development agencies should facilitate negotiations between pharmaceutical companies, WHO, UNITAID and governments to design and implement similar strategies to enhance access to essential medicines.

3.6 Virtual Learning Platforms for Health Workers

Virtual learning is an educational approach that replaces or complements traditional classrooms with digital tools like live video, pre-recorded lectures and mobile content, offering flexibility for broad access and engagement across diverse settings. During the COVID-19 pandemic, governments leveraged virtual learning to equip frontline health workers with life-saving skills [<https://amrefuk.org/our-work/health-worker-training/leap>]. Amref Health Africa, supported by the Global Fund, used platforms such as Leap [<https://leaphealthmobile.com/>] and Jibu [<https://icd.amref.org/jibu/>] to train health workers across Africa. In Kenya, a two-month Leap campaign educated 70,000 community health workers on COVID-19 prevention, while Ethiopia's Ministry of Health also used Leap to train 40,000 Health Extension Workers in a month [30].

Virtual learning enables swift, cost-effective delivery of Continuing Medical Education, building technical and behavioral skills tailored to health challenges. At less than 1% of the cost of traditional training, this approach exemplifies precision population health. Development practitioners should partner with governments, professional associations, and regulatory agencies to deliver accredited virtual learning sessions that address adaptive challenges in the health sector.

3.7 Primary Care Unit Autonomy

Decentralizing decision-making in resource-limited settings strengthens PHC financing by enabling primary care units to address local needs autonomously. By generating and managing funds independently, these units ensure predictable financing aligned with healthcare priorities, promoting sustainable PHC models.

In Kenya, Facility Improvement Fund (FIF) laws allow public health facilities to retain revenues from user fees, insurance and donor contributions. This autonomy facilitates local quality improvements while avoiding delays associated with central treasury processes. The funds are used to procure essential supplies, pay casual staff and implement facility-specific upgrades, effectively mitigating bureaucratic inefficiencies typical of centralized systems.

Early FIF achievements highlight key strategies for success, such as effective engagement of county assemblies, robust legal and governance frameworks, digital revenue tracking systems, stakeholder collaboration, capacity building and inter-county learning [31, 32, 33].

3.8 Genomic Sequencing

Genomic sequencing enables precise diagnosis and treatment of hereditary and complex diseases by tailoring care to genetic profiles, whether individual (precision medicine) or population-based (precision population health).

This approach holds promise for diseases such as breast cancer in Black women,

who face elevated risks for aggressive subtypes like triple-negative breast cancer yet remain underrepresented in genetic research. A study of 40,000 women of African descent identified 12 loci linked to breast cancer, including three specific to triple-negative cases. Eight per cent of participants carried high-risk variants, increasing their risk by 4.2 times. These findings inform predictive tools, such as polygenic risk scores, enabling earlier detection and targeted therapies [34, 35].

Addressing funding gaps, building local genetics and bioinformatics expertise, and ensuring ethical genomic data use are essential to leveraging Africa's genetic diversity for improved population health outcomes [36]. Collaborative initiatives, such as H3Africa, are advancing genomic research to illuminate genetic and environmental factors to enhance population health.

3.9 Elimination of Selected Diseases

Eliminating specific diseases represents a pinnacle in preventive health. The eradication of smallpox, declared by WHO in 1980, saved millions of lives, alleviated suffering, and delivered economic returns 130 times its \$300 million cost. Dr. William Foege, a key strategist in this effort, highlighted essential lessons, including truth-seeking, coalition-building, political will, cultural respect and health equity [37].

Polio eradication demonstrates the power of precision tools such as surveillance and genomic sequencing, supported by robust global coalitions. Similarly, combating diseases intensified by climate change requires focused collaboration. Malaria, a climate-sensitive disease causing over 600,000 annual deaths — 94% in sub-Saharan Africa — represents a key elimination target [38]. By 2050, an additional 608 million Africans could face malaria risk due to climate change [39]. Yet, eradication is achievable.

Forty-four countries, including five in Africa – Algeria, Cape Verde, Mauritius, Seychelles, and Egypt- have successfully eliminated malaria through leadership, innovation and coalitions. Effective interventions include indoor residual spraying, insecticidal nets, chemoprophylaxis, intermittent preventive treatment during pregnancy, rapid diagnostics, and Artemisinin-based therapies. Emerging technologies offer additional promise, such as malaria vaccines, gene drives, Wolbachia-based vector modifications, AI tools, resilient supply chains, and optimized human resources.

Achieving polio and malaria elimination and subsequent eradication, alongside addressing various climate-sensitive diseases, requires sustained funding and coordinated global action. Initiatives like Roll Back Malaria must integrate elimination goals with climate adaptation strategies to maintain political commitment. Unified efforts can deliver profound health and economic benefits, safeguarding future generations.

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3.10 Access to Safe Drinking Water

In 2020, one in four people globally — approximately two billion individuals — lacked access to safely managed drinking water, with rural and fragile populations most affected. Sub-Saharan Africa alone accounts for half of the global population without basic drinking water services [40]. At current rates, global coverage will reach only 81% by 2030, leaving 1.6 billion people without safe water.

Ensuring access to safe drinking water is critical for preventing waterborne diseases, improving nutrition and school attendance, and enhancing health outcomes [41]. The economic benefits are equally compelling, with every dollar invested in safe water access generating up to \$4 in returns by lowering healthcare costs and increasing productivity [42].

Health systems must — through government-led frameworks and multi-sectoral collaborations — prioritize investments in water systems as a fundamental equity issue. These efforts are even more urgent in the face of climate change, which threatens to reverse progress. As Dr. Maria Neira, Director of the Department of Environment, Climate Change and Health, observed: “Climate change is eating into those achievements. We have to accelerate our efforts to ensure every person has reliable access to safe drinking water—something that is a human right, not a luxury.” [43]

3.11 Micronutrient Supplementation

Micronutrient deficiencies, particularly iron deficiency anemia, profoundly affect health in resource-limited settings, especially among children, pregnant, and postpartum women. Globally, anemia impacts 40% of children aged 6–59 months, 37% of pregnant women, and 30% of women aged 15–49 years (273 million), predominantly in low- and lower-middle-income countries [44, 45]. In 2019, anemia caused 50 million years of healthy life lost, mainly due to dietary iron deficiency and diseases such as malaria [46].

Precision Population Health offers tailored solutions, such as biofortified crops like iron-enriched beans and vitamin A-rich sweet potatoes in Uganda led by HarvestPlus working with local governments and farmer cooperatives. A randomized trial found biofortified beans reduced anemia among women by 19% within a year [47]. Another effective intervention is micronutrient supplementation using Multiple Micronutrient Powders (MMPs), which enhance children's diets in areas with limited nutritious food.

Evidence confirms MMPs reduce anemia by 18%, iron deficiency by 53%, and improve hemoglobin levels, with a favorable safety profile [48]. The WHO recommends MMPs for food fortification for infants and children aged 6–23 months

in populations with high rates of anemia and nutrient deficiencies.

Common Traps in the Practice of Precision Population Health

Precision population health holds considerable promise, yet practitioners face several pitfalls that can derail even well-intentioned initiatives.

One key pitfall is metric chasing. For example, prioritizing high rates of facility-based deliveries may overshadow the broader goal of improving maternal health outcomes, diverting attention from the quality of care. Metric chasing stems from phenomena such as surrogation (metrics replacing strategic objectives), metric fixation (confusing metrics with actual performance), and Goodhart's Law (metrics losing validity when used as sole indicators). To avoid this, practitioners should adopt metrics aligned with desired outcomes and involve communities in monitoring efforts. Tools like the HIV care '95-95-95' cascade provide stakeholders with clear insights into service fidelity.

Another common pitfall is addressing adaptive challenges as technical problems. This often occurs when health professionals assume leadership roles without the skills to distinguish between these fundamentally different challenges. Misclassifying adaptive challenges leads to leadership failures, as it ignores the complexities of broader systems. In under-resourced regions like sub-Saharan Africa, investments in adaptive leadership training, mentorship and coaching can significantly enhance leadership capacity.

A third trap is problem paralysis, where overanalysis stifles decision-making and action, leading to wasted resources, missed opportunities and demoralized teams. In the climate-health nexus, extensive modeling and data generation often fail to produce actionable priorities, such as eliminating malaria or scaling climate-resilient health infrastructure. Leaders can mitigate this by clarifying objectives, setting decision timeframes, engaging stakeholders, and adopting a learning approach that prioritizes progress over perfection.

The evidence-to-policy gap also poses challenges. Producing evidence of effective solutions does not guarantee adoption by governments or stakeholders. Successful uptake requires engaging governments early in the evidence-generation process, fostering co-ownership, and mobilizing implementation resources. Ecosystem engagement tools, as discussed earlier, are vital for bridging this gap, as linking evidence to policy is an adaptive — not technical — challenge.

Precision approaches further risk exacerbating health inequities. Marginalized groups often lack access to advanced tools like AI or ML. For instance, while these technologies can guide pregnant women to care, those in remote areas

without connectivity are often excluded. In such contexts, community health workers conducting household visits offer more equitable solutions, underscoring the importance of people-centered design.

Lastly, the data-driven nature of precision approaches introduces risks of surveillance and data misuse, raising ethical concerns about privacy and trust [49]. Robust data governance policies are essential to safeguard patient data, ensure transparency and accountability, and maintain public trust.

By recognizing and addressing these challenges with context-appropriate tools, practitioners can more effectively navigate the complexities of health systems and avoid inefficient equilibria.

Concluding Reflections

This article examined three categories of precision population health tools: Data Analytics and Governance, Ecosystem-wide Engagement, and Lean Models. A forthcoming article will explore three additional categories: Strategic Purchasing, Public Health Security, and Soft Skills and Mindsets.

The series of articles aims to inspire reimagination of health systems for the 21st century, as argued by Wanjuki (50). Health systems in low-resource settings, constrained by fiscal challenges, demographic and epidemiologic shifts, and the growing impacts of climate change, must prioritize contextual relevance and efficiency. Achieving UHC requires scalable and cost-effective precision population health tools to address inefficiencies in health systems.

This article outlined tools to mitigate systemic inefficiencies. Readers are encouraged to adopt these tools where applicable, pursue context-specific solutions to advance the UHC agenda, and contribute to this evolving field by sharing practical insights and additional precision population health strategies.

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An open notebook with a pen resting on it, set against a blurred background of a desk and a laptop. The notebook is open to a blank, lined page. A silver pen lies diagonally across the page. The background shows a desk with a laptop and some papers, all out of focus.

Health Articles



GRAPHIC HEALTH WARNINGS ARE VITAL TO EFFECTIVE TOBACCO CONTROL AND PUBLIC HEALTH

By Dr Leon Ogoti

In March 2024, the Ministry of Health Kenya organized a series of public participation activities nationwide. Among the participants of these often-heated sessions were government officials, representatives of the tobacco industry, youth from public institutions, and a small seemingly random but passionate group comprising the same faces, who appeared at all the Public participation venues, carrying a message that appeared to strongly contradict the proposals by the Ministry of Health.

What was the Ministry of Health proposing?

Before discussing what Kenya's Ministry of Health was proposing, it is important to first understand tobacco control, the evolution of tobacco products, and the motives of the tobacco industry.

The use of tobacco, extracted mostly from the tobacco leaf has existed for many years – thousands even. Before Christopher Colombus made his maiden Journey to the Americas, where the plant *Nicotiana Tabacum* was indigenous, the natives were smoking, chewing, and using it for rituals. This excited Colombus and his crew, resulting in them carrying it back to Europe and beyond, and thus began the recreational use of tobacco we know today.

Back in the 1930s, the increasing lung cancer rates in the United Kingdom and the United States of America were noted but with no direct attributable cause. In the 1940s, Nazi Germany led the war on smoking tobacco by funding research, banning public smoking, and introducing a sin tax on these products. Concurrently, the tobacco industry was on a marketing offensive in the West.

In 1950, a British scientist was the first to publish a paper in the British Medical Journal and The Lancet showing a close link between smoking and lung cancer, and in 1964, the Surgeon General's report showed that smoking was associated not only with cancer but also with other respiratory and cardiovascular conditions. Consequently, the 1970s became a time of intense anti-tobacco activism and public health campaigns gained momentum.

The tobacco industry and its allies simultaneously engaged in disinformation and faux research demonstrating how smoking was harmless or less harmful than

claimed. The economic significance of tobacco products gave the industry significant leverage, resulting in political and legal threats that derailed the anti-tobacco activism/anti-smoking efforts for nearly 30 years. With the dawn of the new millennium came a deeper understanding of new policies regarding tobacco regulation.

In 2003, the World Health Organization introduced the first public health treaty the Framework Convention for Tobacco Control (FCTC), which was signed by 168 countries, including Kenya. The FCTC consisted of numerous articles addressing both demand and supply reduction measures but underpinned by the idea that the interests of the tobacco industry and those of public health could never be married. As part of the implementation of this treaty, countries were to develop local legislation and implementation strategies to progressively reduce smoking prevalence and mitigate the impact of tobacco on the health of its citizens. To aid this a simpler tool kit - MPOWER - was also developed.

What does MPOWER stand for?

It is an acronym, M -monitor tobacco use, P- protect people from the harmful effects of tobacco smoke, O – offer persons using tobacco help to quit the use, W- warning labels on tobacco product packages, E – enforce the ban on tobacco product advertising, promotion or sponsorships and R – raise taxes on tobacco products. Back to the question, what was the Ministry of Health proposing?

They proposed a newly developed set of graphic health warnings, (GHWs) that were evidence-based, clearer, and more realistic than those currently in circulation which many find unconvincing. Additionally, the images were to be put on the front and back packaging of not only the traditional tobacco products but also on the newer nicotine delivery products like e-cigarettes and nicotine pouches, which are often designed to appeal to children and young people.

Graphic health warnings are an effective public health intervention that informs both users and non-users about the dangers of tobacco use, whether through smoking or other means. These warnings also increase smokers' willingness to quit and seek help, especially when combined with psychological or pharmacological support. An International Tobacco control report evaluated policies in over 20 countries at different levels of implementation of text and graphic health warnings and revealed that the use of pictures, covering a larger percentage of the packaging, particularly at the front, was more effective.

And what were the passionate advocates opposing?

The opposition to placing these images on the front and back packaging of both

traditional tobacco products, and especially on newer products e.g. electronic cigarettes, nicotine pouches, etc. was based on the claims that there was little evidence of harm to health, that it would negatively affect businesses and reduce the tax benefit for the country, and some products help people quit smoking among other reasons.

However, economic research has shown that the costs associated with healthcare, lost productivity, and environmental damage, far outweigh the benefits from taxes and job creation. In low and middle-income countries, the loss was equivalent to three shillings for every shilling gained. This has been demonstrated by the Centre for Disease Control, the Royal College of Physicians, and locally by KEMRI.

There is no benefit to the country from the manufacture or use of tobacco; instead, it harms public health and incurs significant costs. In 2018, the prevalence of tobacco use in Africa was only 4% but is predicted to reach as much as 26% by the end of the century. This increase is predicted because the industry has identified Africa as its' new frontier, with 40% of the population under the age of 15, and one out of every three Africans aged between 15 and 34.

Some of the strategies by the tobacco industry to achieve this increased uptake of the products in Africa are; limiting information on the public health risks of these products, aggressively marketing novel products with youth-appealing designs and flavors, increasing access to these products through innovative and often illegal marketing, online advertising, and door-to-door delivery options, and lastly, erroneously claiming these products are safer or can be used to help people quit smoking, thus appealing to uninformed persons. They also actively work with/hire lobby groups such as those seen at the public participation forum passionately, and at times violently opposing the graphic warnings to wear the public face for their opposition.

The Ministry of Health must counter these efforts by ensuring routine and accurate publication of GHWs, rotating them as prescribed, and ensuring that products in the market adhere to the guidelines published. Additionally, there should be continued widespread dissemination of public messaging on the negative effects of newer and older tobacco products, and ensure that learners in primary, post-primary, and tertiary institutions are reached and informed adequately.

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“In 2018, the prevalence of tobacco use in Africa was only 4% but is predicted to reach as much as 26% by the end of the century.”

-Dr. Leon Ogoti



GREEN HEALTH CARE: PIONEERING SUSTAINABLE HEALTH SUPPLY CHAIN IN EMERGING ECONOMIES

By Brian Kipkoech

Healthcare is a critical part of the national infrastructure and has long been focused on delivering health services to the population. The United Nations, Sustainable Development Goals (SDGs) recognize the need for expanded access to care for all, with an extensive call for general substantial consideration of the environment, SDG 6 on access to clean water and sanitization, SDG 11 on sustainable cities and human settlements, SDG 12 on responsible, sustainable consumption and production, SDG 13 calls for climate action, SDG 14 and SDG 15 on life below water and on land respectively (1). The assent of the 2030 agenda on sustainable development in 2015 ingrained a blueprint towards prosperity for the planet and its population, now and in years to come.

There are growing concerns about environmental sustainability, especially in developing countries and emerging economies all across the globe, with a consistent call for green processing, especially in manufacturing industries. Healthcare, holistically, is a service industry that is dependent on other parties for in-ward supplies. Healthcare industry has relatively been late to environmental thinking but the paradigm call for 'green healthcare' engenders sustainable procurement

measures that reduce waste and minimize the industry's overall environmental footprint (2). Like other emerging economies, Kenya should urgently adopt this transformative direction as these nations grapple with ballooning population masses necessitating expanded healthcare provision and a consequent expanded medical waste generation.

Growing need for green healthcare in emerging economies

Emerging economies are modern-day subject to rapidly growing populations, urbanization, and extensive industrialization that have heightened the demand for healthcare services. The Kenyan population is projected to grow from approximately 54 million in 2020 to about 80 million in 2040 (3). This projected growth in population necessitates the urgent expansion of healthcare services all across the country, indicating a projected escalation in medical waste generation. According to the World Health Organization (WHO), healthcare facilities globally own up to 5.2 million tons of waste generated annually, which increasingly swells with increased healthcare service access and provision expansion.

Africa generated approximately 282,447 tons of medical waste annually in 2021

Kenyan regulatory architecture affirming green healthcare

Over time, Kenya has adopted various robust legal and regulatory architectures to promote sustainable service provision within the healthcare space. However, despite establishing suitable mechanisms to guide green procurement, prudent waste management, and overall environmental protection, there has been minimal implementation effort. Some are not directly attached to the healthcare industry, and most are general provisions within which all industries, both service and manufacturing, should act.

The Public Procurement and Disposal Act, 2005, and Public Procurement and Asset Disposal Act, 2015, underpins the need for environmentally friendly procurement and proper disposal within public entities, including healthcare facilities. The International Organization for Standardization (ISO) 14001:2015 has been used by most healthcare facilities to manage their waste in a systematically environmentally conscious manner in line with environmental regulations and enhancing sustainability. Moreover, the Environmental Management and Coordination Act (EMCA), 1999; Health Act, 2017; Public Health Act, Cap 242; the Kenya National Health Policy 2014-2030; Energy Act, 2019; the National Climate Change Action Plan (NCCAP) 2018-2022, the Public-Private Partnership (PPP) Act, 2013, the Climate Change Act, 2016 and the National Environmental Policy, 2013, to mention a few acts and policy

guidelines in Kenya, coupled with other international legal and regulatory provisions, demand for adoption of collaborative green actions to reduce greenhouse gas emission and reduce environmental degradation, use of energy-efficient technology, use of renewable energy, affirming the necessity of green procurement and eco-innovation, now and going into the future.

Conclusion: The Present and Future of Green Healthcare

Kenya has made significant progress towards adopting green healthcare practices, informed by existing regulatory frameworks. Some facilities have adopted environmentally suitable practices such as solar-panel energy generation and proper waste segregation measures. However, the cost of adopting green technologies is prohibitive on cost and extensive regulatory non-compliance to regulatory frameworks, with policy paralysis due to a lack of goodwill to implement. As demand for healthcare is expected to expand, Kenya and other economies should integrate eco-innovation and sustainable procurement practices that align with established local and international regulatory frameworks. Kenya holds the potential to lead in pioneering green healthcare in emerging economies through government support, expanded campaigns, government incentives on green policies, and green supply chain awareness.

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“According to the World Health Organization (WHO), healthcare facilities globally own up to 5.2 million tons of waste generated annually, which increasingly swells with increased healthcare service access and provision expansion.”

-Brian Kipkoech



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