

Abstract: Ending HIV/AIDS in Africa: reflections from the clinic, field and classroom

The first case of AIDS was first identified in early 1980 in Los Angeles, USA with patients showing evidence of severe immunosuppression. In 1981, the syndrome was described and the virus was subsequently isolated in 1983.

There are two types of HIV. HIV-1 is the predominant type found all over the world. In addition, HIV 2 is found in the West Africa region. HIV 2 is less virulent compared to HIV 1. In Ghana HIV 1 accounts for almost 98% whilst HIV 2 alone or in combination with HIV1 account for approximately 2%.

The origins of HIV range from several conspiracy theories to divine retribution.

Viruses related to HIV-1 have been isolated from the common chimpanzee and several monkey species. There are different clades of HIV -1. Ranging from main group M made up several clades to the outlier O group.

Simian immunodeficiency virus of sooty mangabeys (SIVsmm) is recognized as the progenitor of human immunodeficiency virus type 2 (HIV-2).

SIV infection in humans has been documented. In a paper by Marcia Kallish in *Emerging Infectious Disease* in 2005 among Central African hunters that showed a prevalence of 17.1% in the most exposed that is those who hunted and butchered or kept non-human primates.

There are about 39million people living with HIV. 20.8 million of them are in East and Southern Africa, 4.8million in West and Central Africa. UNAIDS update in 2023 estimates that a life is lost every minute due to HIV. This is equivalent to 650,000 HIV related deaths. In addition, there are 4,000 new infections daily. Every week, 4,000 adolescent girls and young women get infected, 84,000 children died of HIV last year. Sub-Saharan Africa accounts for 51% of all new infections. 76% of people living with HIV are on treatment. Unfortunately for children only 57% are on treatment. Key populations account for less than 5% of the world population but 70% of new infections occur among them and their sexual partners underlying their vulnerability and a call to action.

In 2002, the HIV treatment project called START was birthed through a collaboration of Family Health International and the Ministry of Health. The funding was to start the first 100 patients in St Martin's Hospital in Agomanya and Atua Government Hospital in Atua in the Manya Krobo District on antiretroviral therapy. Following the overwhelming success in the pilot project, the then UK Department for International Development moved to support the program. Subsequently the national treatment program secured funding from USAID, Global Fund and the World Bank. The success was attributable to the commitment of health care workers, facilities, and use of evidence based approach.

The experiences in treating persons living with HIV from the pilot project allowed the development of practice guidelines on the management of side effects like anaemia, peripheral neuropathy, hepatotoxicity among others. Antiretroviral therapy made a huge difference in the life of individuals. There was a reduction in morbidity and mortality. It was clear that patient level strategies at the clinic was effective however many persons living with HIV did not have access to treatment. This required radical change in mindset to transfer the benefits observed at the clinic to the population level particularly in countries with high HIV prevalence or population. This influenced our interventions strategies particularly in

Eastern, Southern Africa and Nigeria and marked an important transition in my career by moving the advantages observed in the clinic to the population level.

In Zambia, we implemented the adherence support worker strategy to address the human resource challenges. Adherence Support (models of Hope in Ghana) are persons living with HIV who trained to offer adherence counseling and follow up. We showed that the adherence counselling provided by these lay providers was comparable to that provided by nurses. We were also able to demonstrate that HIV testing using lay providers was comparable to testing service by nurses. This important evidence provided a strong basis for task shifting efforts to expand access to HIV services across sub-Saharan African countries.

HIV in children is a blot on conscience of humanity. This is because we have the knowledge and the strategies to eliminate pediatric HIV Elimination of Mother to Child Transmission in Africa. Mother to child transmission of HIV can take place during pregnancy, labour and delivery and during the breastfeeding period.

In an observation study of over 28,320 HIV positive mother baby pairs from 317 facilities and 40 districts in Zambia, we observed that HIV transmission was lowest among those where baby and mother received prophylaxis and highest among those who did not attend antenatal clinic. In addition, mothers who received three drugs were less likely to transmit HIV to their babies. Women practicing mixed feeding were likely to transmit HIV to the babies. Other early infant diagnosis studies that we conducted in Kenya and Malawi affirmed this fact.

Majority of pregnant women screened at the antenatal clinic would test negative. Unfortunately, several of them would seroconvert during the pregnancy because of repeated sexual exposure. In our published work in JIAPAC, we were able to show that pregnant women who seroconverted during pregnancy were four times more likely to transmit the infection to the baby. HIV re-testing among seronegative mothers is essential in eliminating HIV.

Key populations are defined groups who, due to specific higher-risk behaviors, are at increased risk of HIV, irrespective of the epidemic type or local context. Also, they often have legal and social issues related to their behaviors that increase their vulnerability to HIV. The key populations are important to the dynamics of HIV transmission. UNAIDS describes five main groups as key population; they include the following; sex workers, men who have sex with men, transgender people, person who inject drugs and prisoners and other incarcerated people. Key populations account for less than 5% of the world's population but about 70% of new infections in 2021. In sub-Saharan Africa, 49% of new infections are among the general population, 41% are among sex workers, clients of sex workers and sexual partners of other key populations and 6% among men who have sex with men. In terms of relative risk, for persons who inject drugs the risk is 7X higher, 4X higher among sex workers, 11X among men who have sex with men and 14X among transgender people.

A strong HIV program can only do well in a strong health system

Globally, official development assistance for HIV from bilateral partners apart from the US Government has declined. The World Bank projects that 52 countries, home to 43% of people living with HIV, will experience a significant drop in their public spending capacity through 2026. The role of domestic financing of HIV program will become very crucial. Ghana must

make urgent steps to increase its domestic contribution to HIV not only to provide services to its people but also demonstrate its commitment to the national response. The approval and operationalization of the National HIV/AIDS fund will be a step in the right direction.

As a teacher, building capacity of next generation implementers and scientists in HIV programming is an area of great importance. Currently our training grants and scholarships, program related research and evaluations seek to give hands on experience in program implementation to our beneficiaries.

The use of long-acting agents in HIV treatment is another interesting area. Evidence from LATTE 1&2, FLAIR and ATLAS studies has shown that long acting carbotegravir and rilpivirine administered monthly or bimonthly is effective compared to the standard of care for treatment. Carbotegravir and rilpivirine also known as Carbenuva. Carbenuva was approved by the US FDA in January 2021 for two monthly dosing. Lenacapavir is an exciting new drug that was approved in the European Union and UK, recently, in August 2022 for drug resistant HIV. It belongs to capsid inhibitors group. It can be given 6 monthly.

Can we end AIDS in Africa? To get into the right trajectory to end AIDS in Africa, we need to attain the state of epidemic control. Epidemic control of HIV is when the number of new HIV infections is less than the number of HIV deaths. This will lead to a gradual decline of persons infected with HIV. In 2022, West and Central Africa had 160,000 new HIV infections with 120,000 HIV deaths. In Eastern and Southern Africa there were 500,000 new infections and 260,000 deaths. Back home in Ghana, there were 17,000 new infections and 9,900 deaths in 2021. Eswatini, Botswana, Rwanda, Tanzania and Zimbabwe have achieved the 95-95-95 whilst eight others are on track to reach the target. Achieving epidemic control requires systematic reduction of new infections in the Africa region.