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The Global Burden of HIV and Progress toward the 2030 UNAIDS Targets: A Comprehensive Review

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ABSTRACT

The Human Immunodeficiency Virus (HIV) epidemic, since its emergence in the early 1980s, claimed millions of lives and remained a significant global public health challenge. As of 2023, approximately 38.4 million people were living with HIV, with Sub-Saharan Africa and key populations disproportionately affected. In response, the international community had set ambitious targets to end the AIDS epidemic by 2030, encapsulated in the UNAIDS 95-95-95 goals. This comprehensive review, conducted through a synthesis of current literature and global data, assessed the global burden of HIV, the progress made toward achieving these targets, and the challenges that threatened this progress. The review also explored opportunities and innovations, including advances in HIV prevention, integration of services, community-led approaches, digital health technologies, and innovative financing models. Addressing the identified challenges and leveraging these innovations were crucial to achieving the 2030 targets. The article concluded that while substantial progress has been made, a renewed commitment to equity and human rights is essential for ending the AIDS epidemic as a public health threat by 2030.

Keywords: HIV epidemic, UNAIDS 2030 targets, Global health, Antiretroviral therapy (ART), Prevention and innovation.

INTRODUCTION

The Human Immunodeficiency Virus (HIV) epidemic, since its emergence in the early 1980s, has claimed millions of lives and continues to pose a significant global public health challenge [1,2]. Despite substantial advancements in medical research, treatment, and prevention strategies, HIV remains a pervasive threat, particularly in low- and middle-income countries [3]. As of 2023, approximately 38.4 million people worldwide are living with HIV, with a disproportionate burden borne by Sub-Saharan Africa and key populations across the globe. In response to this ongoing crisis, the international community has set ambitious goals aimed at ending the AIDS epidemic as a public health threat by 2030. Central to this effort are the UNAIDS targets, initially framed as the 90-90-90 goals for 2020, which have now evolved into the 95-95-95 targets for 2030 [4,5]. These targets aim to ensure that 95% of all people living with HIV know their status, 95% of those diagnosed receive sustained antiretroviral therapy (ART), and 95% of those on ART achieve viral suppression [6]. Achieving these targets is crucial for controlling the spread of HIV, reducing AIDS-related mortality, and improving the quality of life for those affected by the virus [7]. This comprehensive review explores the current global burden of HIV, assessing regional disparities and the impact of HIV on key populations. It critically examines the progress made toward the 2030 UNAIDS targets, identifying successes and ongoing challenges. The review also highlights the social, structural, and economic factors that influence the global HIV response and discusses innovative approaches and opportunities to accelerate progress. As the world strives to meet the 2030 targets, understanding the complexities of the HIV epidemic and the multifaceted strategies required to address it is more important than ever.

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THE GLOBAL BURDEN OF HIV

HIV remains a major global health challenge, affecting millions of people worldwide and disproportionately impacting specific regions and populations. As of 2023, approximately 38.4 million people are living with HIV, with Sub-Saharan Africa bearing the heaviest burden—home to nearly 67% of all cases [8]. Within this region, countries like South Africa, Mozambique, and Zimbabwe experience some of the highest HIV prevalence rates globally, driven by factors such as poverty, gender inequality, and limited access to healthcare [9-11]. Outside of Sub-Saharan Africa, the epidemic manifests differently across regions. In Eastern Europe and Central Asia, new infections are rising, fueled by injecting drug use and inadequate harm reduction services. Conversely, Western and Central Europe, along with North America, have seen declines in new infections and mortality due to widespread access to antiretroviral therapy (ART) and robust healthcare systems [12,13]. Key populations, including men who have sex with men (MSM), sex workers, transgender people, and people who inject drugs (PWID), are at significantly higher risk of HIV infection [14]. These groups often face substantial barriers to accessing HIV prevention, testing, and treatment services due to stigma, discrimination, and criminalization, further exacerbating their vulnerability. The global burden of HIV is not only measured in terms of the number of infections and deaths but also by its profound social and economic impact [15]. HIV continues to strain healthcare systems, reduce workforce productivity, and perpetuate cycles of poverty and inequality, particularly in the hardest-hit regions. Addressing this burden requires targeted interventions that consider the unique challenges of each region and population [16,17]. Ensuring equitable access to HIV services, addressing social determinants of health, and leveraging new prevention and treatment technologies are critical to reducing the global burden of HIV and moving toward the UNAIDS 2030 targets.

PROGRESS TOWARD THE 2030 UNAIDS TARGETS

Significant strides have been made in the global fight against HIV, yet the journey toward achieving the 2030 UNAIDS targets where 95% of people living with HIV (PLHIV) know their status, 95% of those diagnosed receive sustained antiretroviral therapy (ART), and 95% of those on ART achieve viral suppression remains fraught with challenges [6]. By 2020, the world witnessed notable progress, with an estimated 84% of PLHIV aware of their status, 73% on ART, and 66% achieving viral suppression [18,19]. These achievements, while impressive, also highlighted critical gaps, particularly in low- and middle-income countries where healthcare infrastructure is often inadequate, and in key populations such as men who have sex with men (MSM), people who inject drugs (PWID), and sex workers, who face significant barriers to accessing care due to stigma and legal challenges. The COVID-19 pandemic has further complicated efforts, disrupting HIV services and diverting resources, which risks reversing gains made over the past decades [20]. Despite these setbacks, innovations in HIV prevention, such as pre-exposure prophylaxis (PrEP) and long-acting injectable treatments, offer promising avenues to curb new infections and improve treatment adherence [21]. However, achieving the 2030 targets will require intensified efforts to address the social determinants of health that fuel the epidemic, such as poverty, gender inequality, and discrimination. Additionally, sustainable financing, both from international donors and domestic sources, is crucial to maintaining and scaling up HIV programs [22].

CHALLENGES IN ACHIEVING THE 2030 TARGETS

Despite the considerable progress made in combating HIV, several challenges threaten the global community's ability to achieve the ambitious 2030 UNAIDS targets. These challenges are multifaceted, spanning structural, social, economic, and health system-related barriers that impede the global response to the epidemic.

Inequities in Access to Healthcare: One of the most significant challenges is the persistent inequities in access to healthcare services, particularly in low- and middle-income countries where the HIV burden is heaviest [23]. In many regions, healthcare infrastructure remains underdeveloped, with limited access to HIV testing, treatment, and care. Rural areas and marginalized communities are often the most affected, facing additional barriers such as long distances to healthcare facilities, inadequate healthcare personnel, and insufficient supplies of antiretroviral therapy (ART). These disparities contribute to gaps in the HIV care continuum, making it difficult to achieve the 95-95-95 targets globally [24].

Stigma and Discrimination: Stigma and discrimination continue to be pervasive obstacles in the fight against HIV. Individuals living with HIV and key populations such as men who have sex with men (MSM), sex workers, people who inject drugs (PWID), and transgender people—often face significant social stigma and legal discrimination, which deter them from seeking testing, treatment, and prevention services [25]. In many countries, laws that criminalize behaviors associated with key populations exacerbate these challenges, leading to further marginalization and limited access to essential services. Overcoming these deep-seated social barriers is crucial to ensuring that all individuals, regardless of their background or circumstances, can access HIV care [26].

Sustainability of Funding: The sustainability of funding for HIV programs poses a significant challenge, particularly as international donors such as the Global Fund and PEPFAR face pressures to reduce or redirect

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funding [27]. Many countries with high HIV burdens are heavily dependent on external financial support for their HIV responses, making them vulnerable to funding shortfalls. The global economic impact of the COVID-19 pandemic has further strained resources, threatening the continuity of HIV services. As international funding becomes more uncertain, there is an urgent need for countries to increase domestic investment in HIV programs to ensure their long-term sustainability [28].

Impact of the COVID-19 Pandemic: The COVID-19 pandemic has had a profound impact on global health systems, including HIV services [30]. Disruptions caused by the pandemic have led to reduced access to HIV testing, delays in ART initiation, and interruptions in ongoing treatment. The reallocation of health resources to combat COVID-19 has also affected the availability of HIV prevention services, such as pre-exposure prophylaxis (PrEP) and harm reduction programs. The long-term effects of these disruptions remain a concern, with the potential to reverse hard-won gains in the fight against HIV [31].

Emerging Threats and Co-Infections: Emerging health threats and co-infections, such as tuberculosis (TB), hepatitis, and sexually transmitted infections (STIs), continue to complicate the global HIV response [32]. TB remains the leading cause of death among people living with HIV, particularly in low-resource settings. The intersection of HIV with other epidemics creates additional challenges in managing the disease, as co-infections require integrated care approaches and place further strain on already burdened health systems [33].

Structural and Social Determinants of Health: The structural and social determinants of health—such as poverty, gender inequality, education, and access to basic services—play a significant role in shaping the HIV epidemic [34]. Poverty and lack of education limit individuals' ability to access and afford healthcare, while gender inequality and violence against women increase the vulnerability of women and girls to HIV infection [35]. Addressing these underlying determinants is critical to achieving the 2030 targets, as they influence both the spread of HIV and the effectiveness of the global response.

OPPORTUNITIES AND INNOVATIONS IN ACHIEVING THE 2030 UNAIDS TARGETS

As the global community strives to meet the 2030 UNAIDS targets, several opportunities and innovations offer promising pathways to accelerate progress against HIV.

Advances in HIV Prevention: Recent innovations in HIV prevention, such as pre-exposure prophylaxis (PrEP) and long-acting injectable antiretrovirals, have transformed the landscape of HIV prevention [36]. These methods provide effective protection against HIV, especially for key populations at higher risk of infection. Expanding access to these prevention tools, particularly in regions with high HIV prevalence, offers a critical opportunity to reduce new infections and move closer to achieving the 2030 targets [37,38].

Integration of HIV Services: Integrating HIV services with broader health systems can improve service delivery and enhance the efficiency of healthcare infrastructure [39]. By combining HIV care with other health services, such as maternal and child health, sexual and reproductive health, and non-communicable disease management, healthcare providers can offer more comprehensive care, improve patient outcomes, and reach a larger portion of the population [25].

Community-Led Approaches: Empowering communities to take a leading role in the HIV response has proven effective in reaching marginalized populations [40]. Community-led initiatives, particularly those that involve people living with HIV and key populations, can overcome barriers related to stigma and discrimination, ensuring that services are tailored to the specific needs of those most affected by the epidemic. Supporting and scaling up these community-driven efforts is essential for achieving equitable access to HIV services [41].

Digital Health Technologies: The use of digital health technologies presents new opportunities for enhancing HIV care and prevention [42]. Mobile health (mHealth) platforms, telemedicine, and digital tools for self-testing and monitoring can increase access to services, particularly in remote and underserved areas. These technologies also enable real-time data collection and monitoring, improving the responsiveness and targeting of HIV interventions.

Innovative Financing Models: To ensure the sustainability of HIV programs, innovative financing models are being explored. Blended finance, public-private partnerships, and social impact bonds are examples of approaches that can mobilize additional resources for HIV responses. Encouraging countries to increase domestic funding and invest in their HIV programs is also critical for long-term sustainability [20,43].

CONCLUSION

The global response to HIV has undoubtedly achieved significant milestones, yet the journey toward ending the AIDS epidemic as a public health threat by 2030 remains complex and challenging. The persistent disparities in healthcare access, the enduring stigma and discrimination faced by key populations, and the uncertain sustainability of funding underscore the multifaceted obstacles that must be addressed. The COVID-19 pandemic has further highlighted the fragility of progress, emphasizing the need for resilient and adaptable health systems. However, there is cause for optimism. Advances in HIV prevention technologies, the integration of HIV services

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with broader health initiatives, and the empowerment of communities to lead the response offer promising pathways to accelerate progress. Additionally, innovative financing models and digital health technologies provide new avenues for enhancing the effectiveness and reach of HIV programs. Achieving the 2030 UNAIDS targets will require a concerted and sustained effort from the global community. It is imperative to maintain a strong commitment to equity, human rights, and the social determinants of health that drive the epidemic. By leveraging the opportunities at hand and addressing the remaining challenges with a strategic and holistic approach, the world can move closer to realizing the goal of an AIDS-free future.

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