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REVIEW ARTICLE

Program implementation gaps and ethical issues in the prevention of HIV infection among infants, children, and adolescents in sub-Saharan Africa

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Strategies for HIV prevention among infants, children, and adolescents have evolved significantly over the past 20 years. These include the global scale-up of simplified multidrug HIV regimens for pregnant women, leading to impressive reductions in new child HIV infections. However, significant gaps remain, especially in high HIV-burden sub-Saharan African countries. For example, many pregnant women living with HIV (WLHIV) are unable to access and sustain HIV testing and treatment partly due to low agency and harmful gender norms. Among pregnant WLHIV, adolescent girls face an additional layer of societal and health-system barriers in accessing care for themselves and their exposed infants. Legal and structural barriers limit access to HIV prevention-related sexual and reproductive health services among high-risk adolescents, including girls and young men who have sex with men. Key ethical issues underlying HIV prevention gaps for infants, children, and adolescents prevail. This narrative review explores these issues and highlights counter-measures for programming and policy, including gender empowerment, improving access to and appropriateness of critical health services, rights-based policy and legislation, closing research gaps, and considering the values and preferences of young people for HIV prevention and treatment services.

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INTRODUCTION

Strategies for HIV prevention among infants, children, and adolescents have evolved significantly within the past 20 years. These include the shift of prevention of mother-to-child transmission of HIV (PMTCT) strategies from the use of a single antiretroviral drug during pregnancy to lifelong antiretroviral therapy (ART) for all pregnant and breastfeeding women living with HIV (WLHIV).[1] In spite of this expansive policy,[2] optimal maternal access to PMTCT services and maximal benefits for both mothers and HIV-exposed infants have not been realized in sub-Saharan Africa (SSA).[3] The ethical tension here is finding ways to increase accessibility and utilization of services without coercion, and without exposing women (and by extension, their HIV-exposed infants) to risks of stigma, discrimination, and violence that could be associated with being known or perceived to be living with HIV.[4,5]

Unlike PMTCT for infants, the prevention and control of HIV infection in adolescents has only recently been given due attention. This is due to evidence demonstrating rising AIDS-related mortality among adolescents despite decreased mortality in all other populations living with HIV.[6] In 2017, nearly 75% of the estimated 256,000 annual new HIV cases among 15–19-year-old adolescents worldwide were in SSA.[7] Additionally, ~20% of all new infections among persons aged 15 years and older in this region occurred among 15–19-year-old adolescents.[7,8]

Adolescent African girls are significantly disproportionately affected by the HIV epidemic; they have persistently higher HIV incidence rates and also acquire HIV infection earlier than their male counterparts.[9,10] For example, in 2017, three-quarters of the estimated new adolescent HIV infections among 15 to 19 year olds in SSA were among girls,[7] who constitute only 50.6% of that age group.[11] Additionally, PMTCT service access, uptake, and outcomes for adolescent girls and their HIV-exposed infants are considerably worse compared to older women.[12,13] The ethical issue here is the need for adolescents to be able to access sexual health services as and when they need them, regardless of how that sits with legal age of consent.

In SSA, there is a concentrated HIV epidemic affecting key populations—men who have sex with men (MSM), female sex workers, and people who inject drugs, concurrent with the epidemic in the general population. These key populations are highly stigmatized in several SSA countries, with the circumstances of MSM being especially worse because of legal statutes that outlaw same-gender sexual contact and threaten prosecution for those engaging in such relationships.[14,15] This creates the ethical dilemma of how to develop and promote services that welcome key populations without "outing" them in the broader community. Furthermore, similar to adolescent girls having lower access to PMTCT services,[12,13] young MSM <26 years of age have poorer access to HIV care, including prevention services, compared to older MSM.[15]

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Finally, children and adolescents in humanitarian emergencies require special attention for HIV prevention. Unfortunately, the SSA region often experiences humanitarian crises, including famine, violent conflict, and infectious disease outbreaks. The risk of HIV transmission often increases in areas experiencing such crises, due to sexual violence and disruption of health systems.[16]

The rights of children under the age of 18 years are enshrined in the United Nations' Convention of the Rights of the Child, which was ratified in 1989.[17] While many of the Convention's 54 articles are relevant to child health, Article 24 specifically puts forth that signatory countries "recognize the right of the child to the enjoyment of the highest attainable standard of health and to facilities for the treatment of illness and rehabilitation of health. States and Parties shall strive to ensure that no child is deprived of his or her right of access to such healthcare services."[17] Ethical issues include tensions between the need for child protection[18] and the recognition of mature minors, their right to participate and have their needs addressed in health planning and service delivery, and the need to "do no harm."[19]

Recent reviews have discussed multiple strategies and factors to consider when planning and implementing HIV prevention programs for at-risk infants, children, and adolescents in SSA.[9,10,12,20–38] In this article, we discuss gaps and underlying ethical considerations in the development of strategies, delivery of interventions, and/or establishment of policy regarding HIV prevention among different sub-groups of infants, children, and adolescents. Finally, from a rights-based perspective, we review and present measures to close gaps in HIV prevention for these populations.

NARRATIVE REVIEW

Successful PMTCT for infants via optimized healthcare for pregnant women and girls

Successful PMTCT is characterized by HIV-free survival of the HIV-exposed infant and optimal health maintenance for mothers living with HIV.[3] To achieve this, there needs to be consistent maternal and infant access to a package of health interventions identified in the PMTCT cascade.[32] This package includes maternal HIV testing and initiation of ART before or during pregnancy, postpartum infant antiretroviral prophylaxis, appropriate infant feeding counseling, and infant access to early HIV diagnosis.[32] It is evident that an infant's access to and outcomes in the PMTCT cascade will be significantly dependent on maternal access and outcomes.

The Global Plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive (Global Plan) initiative targeted 21 priority SSA countries to reduce new HIV infections among children by 90% and to reduce the MTCT rate to ≤2% and ≤5% among non-breastfeeding and breastfeeding women, respectively.[3] By 2015, Global Plan countries had reduced new child HIV infections by only 60%; MTCT rate among breastfeeding infants fell from 22.4% to 8.9%, but did not reach the ≤5% target.[3] The prevailing gaps were ascribed to poor maternal ART adherence and low retention in care, and notably, the risk of MTCT was particularly high among women who accessed neither HIV testing nor treatment.[3]

Poor access to and uptake of HIV testing and ART among pregnant WLHIV in Africa is influenced by multiple factors, including limited service accessibility, low level of maternal education, poor community/male partner support, stigma, fear of disclosure, and gender-based violence.[39,40] These barriers still persist several years following the introduction of PMTCT programs, making eliminating MTCT in the region an elusive goal, to date.[1,39]

Particularly challenging barriers are gender inequity and low agency,[41,42] often perpetuated by harmful gender norms subscribed to by women, male partners, families, communities, health systems, and/or health policy. These gender-related barriers undermine maternal access to, uptake of, and adherence to PMTCT services.[1,43–47] Such health inequities have been identified as a central problem in public health ethics, and analysis of the relationships between gender, disadvantage, and health shows how lack of agency is correlated with poorer health access.[48] There is data to suggest that improving women's agency significantly improves infants' receipt of HIV testing, maternal ART uptake, and other sexual and reproductive health (SRH) service utilization.[41,49]

Robinson et al.'s systematic review[49] focused on strategies to improve the decision-making capacity of WLHIV for SRH services. These interventions were typically behavioral, and included content delivered individually or to groups by peer WLHIV or trained healthcare personnel.[49] There were encouraging results with regard to significant decreases in the incidence of sexually transmitted infections (STIs).[49] Ford et al.[41] investigated whether a woman's role in household decision-making was associated with uptake of PMTCT services. Women who reported having active domestic decision-making roles were two to almost three times more likely to utilize infant HIV testing services; those who specifically reported making decisions about their own health care were nearly twice more likely to receive and use maternal ART.[41] In spite of this and similar supportive data, gender inequity continues to limit optimization of PMTCT services among eligible women and girls and their infants.[1,50]

Adolescent girls living with HIV have poorer access to and experience worse PMTCT outcomes when compared to older women.[13,51–57] They are significantly less likely to have a planned pregnancy, complete four antenatal care visits, be on ART pre-pregnancy, or have HIV-exposed infants receiving HIV prophylaxis.[58] They are more likely to present with unknown HIV status or to test later during pregnancy, and experience higher MTCT rates, compared to older women.[52,54–56] Many of the unique issues adolescent women face stem from stigma and judgment about their sexuality, independent access to services as legal minors, and economic dependence/instability.[23,59] These issues raise additional concerns about appropriate programming for adolescents and young women who need accessible, age-appropriate, respectful services that cater to their unique social, physiological, and medico-legal vulnerabilities. Integration of rights-based approaches to delivery of adolescent PMTCT care is critically needed, in order to improve outcomes for these young women and their infants.[59,60]

Management of STIs in the context of HIV prevention among adolescents

Nearly 90% of the world's estimated 1.8 million adolescents living with HIV are in SSA,[7] where sub-populations of young persons remain at persistently high risk of incident HIV infection. Multiple studies have associated the high proportion of untreated STIs with increased risk of acquiring and transmitting HIV infection in these sub-populations.[61] Moreover, a significant proportion of STIs are asymptomatic, making diagnosis challenging: in a study among 16–24-year-old South Africans, 80% of young women and 100% of young men diagnosed with at least one laboratory-confirmed STI were asymptomatic.[62] Five percent of this cohort was newly diagnosed with HIV. Similar findings have been reported from other SSA studies among adolescents, young adults, and (young) pregnant women.[63–66] These reports have implications for the management of STIs as an HIV prevention strategy for adolescents and young persons in SSA: widely accessible and affordable, stigma-free STI screening and treatment based on accurate, laboratory-confirmed diagnoses.

In the context of the high HIV burden and incident infection in this population, there is an ethical obligation for African nations to make HIV prevention services and tools accessible to adolescents.[23,34] However, adolescents under 18 years of age are considered minors in several national constitutions.[23,34] These

laws are either silent on, explicitly exclude, or limit independent access to HIV/SRH services by adolescents.[34] Healthcare providers have often translated these legal deficiencies to imply that adolescents need parental consent to access HIV/SRH services, including HIV prevention services.[67] While the World Health Organization has not issued specific recommendations regarding self-consent for SRH services (including HIV testing) by adolescents, it provides a human rights framework for HIV/SRH service delivery to young people and urges policy-makers to review legislation towards facilitating access to services for this population.[1,60,68]

Reducing HIV incidence among high-risk young populations

Men who have sex with men. The criminalization of, and stigma associated with male-to-male sex are major structural barriers to HIV risk reduction. Criminalization limits the exchange of information and skill development for safer sex practices, especially for adolescent and young adult MSM <26 years of age.[15] Blackmail, homophobia, and rape are additional structural drivers of HIV infection for MSM,[69] and inhibit their access to HIV prevention services.[70,71] In a recent prospective study, HIV incidence was found to be four-fold higher in young Nigerian MSM aged 16–19 years and nearly three-fold higher among those aged 20–24 years compared to MSM over 25 years old, demonstrating the increased vulnerability of youth in this population.[71] A critical ethical tension regarding service provision for (young) MSM in the context of criminalization is how to design and deliver appropriate and welcoming services that are discreet and confidential, so as not to increase risks of harm. As has been noted in some country contexts, rights-limiting laws not only constrain access to services but also may increase vulnerability and stigma, and amplify risk in both key and general populations.[70,72,73]

Adolescents and young people engaging in transactional sex. Factors such as poverty, harmful gender and cultural norms and sexual abuse exacerbate HIV risk among young people[74] by creating intersectional vulnerability and perpetuating inequity.[75] For people of all genders, including young women and young MSM, unprotected receptive anal sex carries the highest risk of HIV acquisition.[76] Transactional sex is defined as "non-marital, noncommercial sexual relationships motivated by the implicit assumption that sex will be exchanged for material benefit or status."[77] Transactional sex has been associated with a higher risk for HIV acquisition young African women 15 to 24 years of age, whereas analysis for this association among men (including young men) has been inconclusive.[78] Additionally, socio-cultural factors further increase both adolescent girls' and adolescent MSMs' vulnerability to HIV acquisition and limit their ability to make decisions about their sexual lives and exercise their sexual rights.[79] The biology of an adolescent woman increases her risk for HIV infection: transmission risk during vaginal sex is high, due to the large surface area and permeability of the vaginal tract exposed to HIV-infected seminal fluid.[79] For adolescent girls, transactional sex relationships with more sexually experienced older men increase the risk for HIV transmission.[79] Within their layered vulnerabilities, access to education increases autonomy and decision-making abilities for HIV prevention among adolescent girls.[79,80] However, improving access to, and quality of information would not necessarily appreciably reduce HIV risk in the absence of respect for young women's rights to greater decision making with regard to their sexual health.

HIV prevention for children and adolescents in humanitarian emergencies

Humanitarian crisis results in breakdown of governance, rule of law, and social structures, and is characterized by the destruction of public infrastructure including health systems, massive population displacement, and insecurity.[81] These crises exacerbate existing vulnerabilities and inequalities, with some of the worst-affected persons being children, who are more in need of humanitarian assistance and are at significantly high risk of dying in a disaster.[82–85] Children and adolescents are likely to be most at risk as their needs are often deprioritized when pre-existing forces of marginalization intensify during emergencies.[86]

Adolescent girls and young women especially face sexual- and gender-based violence, gender-based exclusion and exploitation, and are at increased risk for rape and transactional sex for access to daily needs, often resulting in early/unplanned pregnancies.[86–91] During conflict, children and adolescents, especially males, are conscripted into militant groups. They become sexually active at a young age and may commit sexual violence that puts them at increased risk of HIV infection.[86,92,93] Their awareness and use of SRH services during crises is also sub-optimal.[89,90,94] Psychological trauma resulting from events associated with these crises may also drive high sexual-risk behaviors such as drug and alcohol abuse and unsafe sex.[86,93] Adolescent boys also face increased risk of rape, coercion, and transactional sex, and their access to SRH services may be impacted by codes of stigma and silence that accompany these abuses.[95,96]

Although there has been some data to the contrary,[92,97,98] the aforementioned risks can potentially contribute to increased HIV incidence during humanitarian emergencies.[86] Unfortunately, access to critical HIV prevention services and commodities such as pre-exposure prophylaxis (PrEP), post-exposure prophylaxis (PEP), STI treatment, condoms, and HIV testing kits is often compromised at these times.[86,99] Access to HIV treatment services is also compromised as disruption of health-system and supply chain structures affect availability of medicines, including antiretroviral drugs for persons already HIV infected.[86] For nursing mothers living with HIV, this also means that safe infant feeding may be compromised due to the lack of ART or appropriate breastmilk substitutes.[100] Overall, disruptions in HIV treatment infrastructure increase the risk for virological non-suppression among persons living with HIV, thereby increasing risk for onward HIV transmission.

It is therefore ethically imperative for SSA countries to have robust emergency plans for humanitarian emergencies, especially given the propensity and chronicity of these events on the continent.[83,86,99,101] Such plans should prioritize vulnerable populations such as pregnant and postpartum women, children, and adolescents for HIV prevention, as well as treatment-as-prevention services.[99,101,102] This includes supporting healthcare systems to be more resilient to crisis, particularly in maintaining consistent access to quality pregnancy, STI, and HIV prevention services and commodities.[81]

Cross-cutting issues for adolescents: independent access to HIV/SRH services among minors

Requirements for parental consent are often justified on the grounds that young people lack the experience and judgment to make fully informed decisions.[67,103] However, emancipated minors—individuals who have not attained the age of majority, but due to marital status, pregnancy, or otherwise are deemed no longer dependent on parental control—are empowered to make autonomous decisions in several contexts.[104] These emancipated minors can make decisions about their own health care.[104–106] With emancipation, minors are also assumed to have the competency to be able to make rational decisions about risks and benefits in health research. Empowerment for decision making among emancipated minors considers their evolving capacity and autonomy,[104] while not necessarily dismissing the roles that supportive adults, including parents, can still provide in the decision-making process.[107,108] We argue that this consideration of evolving capacity and autonomy be applied to minor adolescents seeking HIV/SRH services, in order to increase their

Table 1. Recommended solutions for ethical issues and programming gaps in HIV prevention among infants, children, and adolescents in sub-Saharan Africa

HIV prevention context	High-risk/relevant population	Major issues and gaps	Recommended solutions for policy and programs
PMTCT	Pregnant and postpartum women living with HIV	• Gender inequality, limited decision-making power • Limited access to SRH/PMTCT services • Stigma and discrimination	• Comprehensive, multicomponent gender empowerment programs • Robust research on impact of empowerment on PMTCT outcomes
	Pregnant adolescent girls living with HIV	• Gender inequality, limited decision-making power • Limited knowledge, access to SRH/PMTCT services • Age/sexual stigma and discrimination • Economic vulnerability	• Comprehensive, multicomponent gender empowerment programs • Comprehensive sexual education • Independent access to HIV testing and care • Social protection and support programs • Qualitative evidence to inform strategies and policy
	HIV-exposed infants	• Highly vulnerable to adverse maternal outcomes	• Improving maternal outcomes
Adolescents (10–19 years)	Girls	• Gender inequality • Limited knowledge, access to appropriate prevention services • Age/sexual stigma and discrimination	• Age-appropriate gender empowerment programs • Comprehensive sexual education • Expanded access to dual-protection contraception • Expanded access to PreP and PEP • Social protection and support programs • Healthcare worker training and sensitization
	Young men who have sex with men	• Age/sexual stigma and discrimination • Punitive laws against same-sex sexuality • Limited access to appropriate prevention services	• Expanded access to PrEP • Social protection and support programs • Healthcare worker training and sensitization
	All (all genders)	• Age of consent ≥18 years for access to services • Inadequate STI screening and treatment services • Healthcare worker biases/negative attitudes • Stigma and discrimination	• Legislation to reduce age of consent • Expanded access to STI diagnosis and treatment • Healthcare worker training and sensitization • Research on values in service uptake and adherence
Humanitarian emergencies	Children	• Marginalization and exploitation	• Social protections in emergency plans
	Adolescents	• Marginalization and exploitation • Lack of age-appropriate, quality services • Lack of/poor implementation of emergency plans • Stigma and discrimination	• Social protections in emergency plans • Planning and strengthening emergency plans to address adolescent needs
	Girls	• Disenfranchisement/poor access to services • Lack of HIV knowledge • Lack of services for sexual/gender-based violence • Lack of family planning/contraception services • Lack of STI/HIV prevention and treatment services	• Comprehensive sexual education • Social protections • Strengthening emergency plans to address needs • Rights-based delivery of STI/SRH/HIV services
	Boys	• Limited HIV knowledge • Trauma and health-system stigma from experiencing and/or perpetuating violence (including sexual) • Limited recognition of boys as victims • Lack of STI/HIV prevention and treatment services	• Comprehensive sexual education • Social protections • Interventions to increase health-seeking behavior • Sensitizing and strengthening emergency plans to recognize and address needs

PMTCT prevention of mother-to-child transmission of HIV, *SRH* sexual and reproductive health, *PrEP* pre-exposure prophylaxis, *PEP* post-exposure prophylaxis, *STI* sexually transmitted infections

access and uptake of available services. There is consensus in the literature that adolescents aged 12 to 14 years old have the cognitive ability to comprehend language and information necessary for informed consent.[109–112]

Despite efforts to improve diagnosis, treatment, and healthcare system capacity to deliver services, STI rates, especially among young people, remain high.[113] This is concurrent with high HIV incidence and mortality, particularly in SSA.[6] Clearly, practical, rights-based strategies are need to improve access and uptake. There is currently no specific guidance on an appropriate minimum age for independent access to HIV/SRH services.[60,68] There is however qualitative data and expert consensus supporting reduced age of consent to encourage adolescent access and uptake of HIV/SRH services.[34,114–117] SSA countries that have reduced age of consent for HIV testing to under 18 years include South Africa, Lesotho, and Uganda (12 years), Malawi (13 years), Ethiopia, Kenya, and Rwanda (15 years), Mozambique, Namibia, Zambia, and Zimbabwe (16 years).[23,34,112]

A recent empiric study may provide some concrete guidance. McKinnon and Vandermorris[112] analyzed 2011–2016 Demographic and Health and AIDS Indicator Survey data from 15 SSA countries. They compared countries with less restrictive (≤15 years) vs. more restrictive (≥16 years) age-of-consent laws. Findings showed that HIV testing rates for adolescents in countries with less restrictive age-of-consent laws were significantly higher, at +11% overall, posting 14% points higher among females and 6.9% points higher among males. To further guide policy, more empirical evidence is needed on the impact of lowering age of consent, not only for HIV/STI testing but also for HIV/SRH service access and uptake, and all related research.

Ethical considerations for addressing gaps in HIV prevention for infants, children, and youth in SSA

Table 1 summarizes major ethical issues faced in HIV prevention for the populations and the contexts discussed in this article. It also highlights key strategies and recommendations for addressing these issues, some of which are already being implemented in some SSA countries.

Successful HIV prevention for exposed infants is significantly influenced by maternal factors, including social support, and PMTCT knowledge, access, uptake, and retention in care.[35,37,50,118–121] Considerations for adult women and adolescent girls in the elimination of MTCT must include comprehensive gender empowerment approaches addressing context-specific gender inequalities in access to HIV and SRH care[49,122] as highlighted in Table 1. The UNAIDS HIV Prevention 2020 roadmap supports a multicomponent biomedical, behavioral, and structural approach, where healthcare workers, male partners, peers, and other community stakeholders are engaged in transforming harmful gender norms, improving decision-making opportunities and capacity for WLHIV, and revising policy to better integrate SRH and rights into PMTCT care for women and infants.[16]

Adolescents can benefit from increased access to HIV prevention services through legislative reform, policy formulation and revision, and program design and implementation that is non-punitive with respect to sexual activity or orientation, and facilitates access to stigma-free HIV testing, STI screening and treatment, and PEP and PrEP services[15,23,34] (Table 1). One of such approaches is the design of rights-based prevention programs that increase access of young persons often at high risk for stigma and exclusion.[12,23,34,117,123,124]

However, there is currently mixed evidence on what works to increase access to HIV/SRH prevention services and reduce HIV incidence among adolescents. Strategies incorporating gender-based violence prevention, support, and care have had encouraging impact.[60] However, service integration and compliant implementation of these strategies, and of related laws and policies, need to be strengthened.

Another strategy to increase adolescents' access to HIV/SRH services is to reduce the age of consent, which is often inferred from age of majority laws.[34] A few African countries have empowered medical personnel to determine appropriateness of service provision by the capacity and maturity of the adolescent, while others have lowered the age of consent to as low as 12 years.[23,34] However, the age of consent for HIV/SRH services is often inconsistent with the legal age to engage in sexual activity or marriage, creating challenges for healthcare workers to interpret and apply these laws.[23,34] Unfortunately, the use of media and information and communications technology to change norms, attitudes, and behaviors of communities and families towards adolescents' access to HIV/SRH services have not been effective so far.[125]

Adolescent-friendly services, while desirable, have not worked effectively, as they are only able to reach a relatively small proportion of young persons, are more often used by older adolescents, and service uptake at these sites is low in spite of the high setup costs.[126] There is need for robust evidence on adolescents' values and preferences with regards to engagement in HIV programs and service uptake and utilization, and on strategies to improve benefit perceptions in the use of these services.[12,123,124,127]

For children and adolescents of all genders in humanitarian emergencies, a major prevailing issue is inadequate preparedness of response systems to address their unique vulnerabilities in the context of HIV prevention. Strategies for these populations include addressing access to services, supply chain challenges, and healthcare worker HIV prevention and treatment competencies in the context of humanitarian crises.[101,102] Anticipatory social protections, and promptly accessible post-violence social, counseling, HIV, STI, and SRH services also need to be put into emergency programs, given the extreme vulnerability of children and adolescents to gender-based and sexual violence in these situations.[86,89,101,102]

CONCLUSION

Given its high HIV incidence and burden within a large and expanding child and youth population, SSA is of prime importance in the global HIV elimination agenda. However, ethics and rights-based approaches have not been optimally applied to the development and implementation of HIV prevention services that are relevant for this population. This is contributing to continued challenges with accessing and optimizing benefits from testing, prophylaxis, and other available, evidence-based HIV prevention tools and services. Prevailing ethical considerations include adolescent protections vs. independent access to care, maternal empowerment for health decision making vs. further exposure to stigma/discrimination and gender-based violence, and for young MSM, discreet and confidential care while expanding access. Policy- and law-makers, healthcare workers, community members (including youth and adults living with HIV), researchers, and other stakeholders must collectively advocate for, and contribute to rights-based care and relevant revisions to policy and programming.

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ADDITIONAL INFORMATION

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