DREAMS

DETERMINED| RESILIENT| EDUCATED| AIDS-FREE| MENTORED| SAFE

Technical Report

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Applied Policy Project II

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Executive Summary

Human Immunodeficiency Virus (HIV) causes a chronic disease called acquired immunodeficiency syndrome (AIDS) that deteriorates the ability of the human body to fight diseases and can result in death if left untreated (Woodman et al., 2016). Eswatini, a small country in Sub-Saharan Africa, has the highest HIV prevalence of HIV in the world, with an overall HIV prevalence rate of 25.1% in all adults aged 15 to 49 (UNAIDS). In contrast, the prevalence of HIV in women and girls is 66.6% higher than that of men aged 15-49. Each year, 4000 new people are infected with HIV in Eswatini, a small country with a population of just 1.2 million people. HIV disproportionately impacts Adolescent Girls and Young Women (AGYW) compared to their male counterparts. Due to HIV being a sexually transmitted disease, the people living with HIV and Aids (PLWHAs) suffer a lot of stigma and discrimination (Mbonu et al., 2009).

The United States Agency for International Development (USAID) has traditionally been at the forefront of lowering HIV rates worldwide. However, the DREAMS program at the USAID has taken a different approach towards lowering HIV, with Eswatini being one of the pilot countries. DREAMS stands for Determined, Resilient, AIDS-free, Mentored, and Safe. Instead of following the traditional approach of lowering HIV through treatment, DREAMS focuses on reducing HIV through preventive techniques and focuses on the sexual and reproductive health (SRH) of adolescent girls and young women through various capacity-building programs.

This policy paper delves into the ways DREAMS can lower HIV in Eswatini and proposes four alternatives. Each alternative is evaluated based on the criteria of cost (including administrative, monitoring, implementation, and operational costs), effectiveness (measured as the number of HIV cases averted by the alternative), feasibility (both political and social), and sustainability.

The first alternative is Voluntary Medical Male Circumcision (VMMCs). Multiple studies based in Sub-Saharan Africa (SSA) have proven that VMMCs are effective. It is a one-time procedure entailing the removal of male foreskin, which effectively prevents HIV in men by almost 60% (Njeuhmeli et al., 2011; Masango et al., 2021; Mnisi et al., 2019; Carrasco et al., 2020; Mamba et al., 2024). This, in turn, decreases the HIV cases in women, as women are biologically twice as predisposed to HIV infections as their male counterparts in heterosexual encounters.

The second alternative is peer mentoring, about HIV reduction through youth centers. The lower social power and lack of support systems make AGYW more prone to sexual violence. Therefore, providing a network of support and mentoring about SRH can lower the rates of HIV in AGYW

in Eswatini (Saul et al., 2018). A study pointed out that mentoring can reduce HIV incidence by 36% (He et al., 2020).

The third alternative is Comprehensive Sexuality Education. Due to a general lack of awareness about HIV prevention (UNAIDS, 2024), a lot of adolescents engage in risky sexual behaviors. Although CSE is expected to lower HIV rates by up to 34.5% (Gorgens et al., 2022), CSE is vehemently opposed by certain groups who consider the content of education immoral (Kahiu, 2023). However, the existing CSE programs in Eswatini need to continue and adapt to some of the needs of parents to be sustainable and efficient (Mukanga et al., 2024).

The fourth alternative is Community-Based HIV Testing and Counseling services or CBHTCs. These include Home-Based HTCS (HBHTCS) and Mobile HTCs (MHTCs). Due to a lack of adequate transport facilities and options, CBHTCs can be an efficient way to lower HIV through testing and counseling. CBHTC modalities have higher coverage than facility-based HTCs, where HBHTCs have the most significant coverage, especially of the previously never tested populations (Sharma et al., 2015).

Based on the evaluation of the alternatives given criteria, this policy paper recommends the expansion of VMMCs by targeting 10% of the male population, mainly focused on ABYM, based on their likelihood of acquiring HIV. The contributing factors are the robustness of the evidence on its effectiveness, support from the community, and highest sustainability compared to the other three alternatives.

Mandatory Disclaimer

The author conducted this study as part of the program of professional education at the Frank Batten School of Leadership and Public Policy, University of Virginia. This paper is submitted in partial fulfillment of the course requirements for the Master of Public Policy degree. The judgments and conclusions are solely those of the author, and are not necessarily endorsed by the Batten School, by the University of Virginia, or by any other agency.

Introduction

Human Immunodeficiency Virus (HIV) causes a chronic disease called acquired immunodeficiency syndrome (AIDS) that deteriorates the ability of the human body to fight diseases and can result in death if left untreated (Woodman et al., 2016). HIV was officially reported for the first time in the 1981 edition of the Morbidity and Mortality Weekly Report (MMWR) and was initially considered an incurable disease (Mills & Thorne, 2021). To date, HIV has claimed 43 million lives globally (WHO, 2024). Although the rates of HIV infections have reduced around the world, Sub-Saharan Africa (SSA) still has very high rates of HIV infections, especially among Adolescent Girls and Young Women (AGYW). Eswatini has the highest HIV prevalence of HIV in the world, with an overall HIV prevalence rate of 25.1% in all adults aged 15 to 49 (UNAIDS). Each year, 4000 new people are infected with HIV in Eswatini, a small country with a population of just 1.2 million people.

Higher rates of HIV in women are due to many factors, including the twice higher biological predisposition in women to get infected, lack of safe sex, and sexual autonomy in women. Child marriages, polygamy, sex work, transactional sex, inadequate healthcare facilities, and violence against women (especially the controlling intimate partners) are also positively correlated with high rates of HIV in women (Jewkes et al., 2011). Due to patriarchy, women are also often unable to negotiate safe sex practices like condom use, even if they are aware of HIV prevention (Ramjee & Daniels, 2013). Women face more issues due to their social and economic vulnerabilities. For instance, women face higher levels of stigmatization and discrimination than men in general in societies where the idealization of sexual conservatism as a sign of social prestige leads to denial and nondisclosure of HIV status by the patients (Mbonu et al., 2009).

Problem Statement

The DREAMS project is aware of how the Human Immunodeficiency Virus (HIV) disproportionately impacts Adolescent Girls and Young Women in Eswatini, a small country in Sub-Saharan Africa with an HIV prevalence rate of 25.9%. With more than a quarter of its population impacted by the virus, the implementation of effective preventive measures besides treatment is necessary to lower HIV incidence.

Client Overview

DREAMS is a public-private partnership worth $385 million and aims to lower the HIV rates among AGYW (National Academies of Sciences, Engineering, and Medicine, 2017). As a USAID program, it is aware of the higher HIV ratio of AGYW in Sub-Saharan Africa than their male counterparts, making their lives vulnerable in many aspects. USAID implements the DREAMS project through PEPFAR, which is managed and overseen by the U.S. Department of State's Office of the U.S. Global AIDS Coordinator and

Health Diplomacy (FDA, 2024). Due to the deep-set structural issues faced by AGYW, ranging from lack of awareness and financial autonomy to non-monetary resources and support, DREAMS has focused on providing services like HIV screening, testing, and counseling, HIV and violence prevention programs, education subsidies, comprehensive economic strengthening, community mobilization and norms change programs, advocacy for policy change to support HIV prevention in AGYW (USAID, n.d.).

DREAMS' mission is to lower HIV rates by targeting the systemic barriers that asymmetrically impact AGYW. Some of the obstacles include high secondary school drop-out rates, poverty, and lack of access to sexual and reproductive health services, intimate partner violence, discrimination, etc. (Ramjee & Daniels, 2013). Analyzing the impact of various approaches to solving the issue in those countries can also help analyze the effectiveness of multiple programs for the future. DREAMS is aware that despite the significant decline in the rates of HIV overall, the infection rates for adolescents have not declined commensurately. Furthermore, the traditional adult-centric treatment procedures do not cater to the unique needs of adolescents, both in terms of social support and medical aspects of the disease. Currently, DREAMS is implemented in 15 countries. The analysis of disaggregated data on secondary school enrollment, the Human Development Index, the prevalence of stigma, and knowledge about HIV can help identify different regional disparities within various aspects of the issue.

Although HIV is still not curable, Antiretroviral Therapy (ART), which is a combination of medicines, can reduce the viral load of HIV to non-contagious levels, adding to health and longevity (Cleveland Clinic, n.d.). Historically, the focus of the Presidential Emergency Plan for Aids Relief (PEPFAR) has been on viral load suppression rather than prevention (Saul et al., 2018; State Government, 2022). However, despite the treatment of the disease, each year, 4000 new people are infected with HIV in Eswatini. This makes it imperative not just to treat the infected individuals to curtail the spread of the disease but to prevent new infections from occurring yearly. Therefore, the Determined, Resilient, Empowered, AIDS-Free, Mentored, and Safe (DREAMS) program at USAID is focused on the prevention of HIV.

Background of High Rates of HIV in Eswatini

Eswatini has made significant strides against HIV despite having very high rates of infections. The first case of HIV in Eswatini was reported in 1986, and since 2016, Eswatini has been the country with the highest rates of HIV (Burbano, 2022). In 2022, Eswatini became the first country to hit the 95-95-95 target by the UNAIDs so that 95 percent of all people living with HIV to became aware of their HIV status, 95 percent of those aware of their status were on antiretroviral treatment (ART), and 95 percent of those on ART achieved viral load suppression (Frescura et al., 2022). However, the high rates of new infections are a significant challenge in lowering the HIV rates.

The high rates of HIV in Eswatini are also due to demographic, physiological, and social factors, and a lack of awareness as well. As a small country where one-fourth of the population is already infected with HIV, the transmission of HIV is higher, and the rates of transmission of HIV become more significant. Furthermore, physiologically, women are twice as likely to get infected by HIV in heterosexual intercourse as their male counterparts (Higgins et al., 2010). Due to the prevalent patriarchy and relatively low socioeconomic power of AGYW in SSA compared to men, women are unable to negotiate the use of condoms and monogamy in heterosexual relations (Murewanhema et al., 2022). These problems are

exacerbated by the lack of awareness, as only 49.1% of AGYW and 50.1% of ABYM are aware of their HIV prevention methods (UNAIDS).

Certain groups are at a higher risk of HIV in Eswatini. According to the World Health Organization, women in sex work are 30 times more likely to get infected by HIV than women of reproductive age in other professions (WHO, n.d.). HIV prevalence in Eswatini is highest among the sex workers, where 60.8% of them are HIV-positive. It is also really high amongst men who have sex with men (27.1% compared to the average of 19.9% for men), and the people struggling with substance abuse (UNAIDS).

Consequences of the Problem

Besides poor health outcomes, high rates of HIV in AGYW can lead to internalized stigma and are also associated with anxiety, depression, and suicidality in some cases. Research finds that patients fear marital dissolution, verbal and physical abuse, public ridicule, and gossip (Akatukwasa et al., 2021). Treatment fatigue refers to the physical and emotional exhaustion patients may experience due to prolonged medical treatments. It is a significant barrier to the treatment of chronic diseases like HIV (Heckman et al., 2015, 31-36) and can lead to further challenges if the viral load is not suppressed. The continued, lifelong treatment procedures become a substantial barrier to adherence to treatment. For instance, a study conducted in KwaZulu-Natal, South Africa, found that 41% of people taking ART faced fatigue/tiredness as a side effect (Bhengu et al., 2011). Treatment fatigue also disrupts the goals set by international organizations, like the United Nations Programme on HIV/AIDS (UNAIDS), against HIV. These factors necessitate preventive measures against HIV.

Alternatives and Criteria

VMMCS: Voluntary Medical Male Circumcision or VMMCs entail removing the foreskin which is the loose fold covering the head of the penis (Njeuhmeli et al., 2011). It is a widely practiced act in many countries due to health, religious, and traditional factors. However, in many other countries, VMMCs are uncommon. Several studies point toward the benefits of voluntary medical male circumcision against HIV. Studies based in Eswatini also emphasize the positive benefits of early VMMCs (conducted at the age of 15 or younger) and relate them to lower odds of getting infected by HIV (Masango et al., 2021; Mnisi et al., 2019; Carrasco et al., 2020). The evidence of VMMCs lowering HIV is robust, as several studies found VMMCs to reduce the risk of HIV from heterosexual acquisition of HIV by as much as 60% in men (Mamba et al., 2024). Since men are active carriers of HIV with twice the biological predisposition, it can significantly lower HIV in women as they engage in heterosexual encounters.

However, Eswatini has historically had lower VMMC coverage than other countries. According to a school survey, 48.98 percent of the boys are circumcised. This delineates

the need to expand the male circumcision programs by equipping healthcare facilities with the apparatus, staff training, and raising awareness about the benefits of VMMCs. The Swazi government has already taken steps to expand VMMCs in Eswatini. For instance, in 2009, Eswatini aimed to expand VMMCs to cover 80% of its boys and men in response to a WHO mission, but as of 2021, it estimated only 40% of the boys and men in Eswatini were circumcised (Adams et al., 2022). Besides improving access, efforts are required to get boys and men to overcome the fear of pain at the community level to encourage VMMCs.

1. **Youth Centers and Peer Mentoring:** Lack of support systems puts women at an extra risk of engaging in risky sexual behaviors such as transactional sex and puts them in a more vulnerable position in the face of sexual violence. A PEPFAR-supported Violence Against Children survey in Eswatini, Kenya, Tanzania, and Zimbabwe, one-third of the females reported sexual violence of some kind during childhood (Saul et al., 2018; Durevall & Lindskog, 2015), putting them at higher risk of HIV and IPV. To make socializing easier and strengthen the network of AGYW who are at high risk of HIV, peer-mentoring through youth centers can be established. Youth centers can be challenging to establish and have historically faced issues reaching the targeted populations. Therefore, places can be rented at walkable distances from the targeted communities in both urban and rural areas.

   DREAMS can conduct biweekly peer-mentoring sessions in the youth centers with targeted efforts for AGYW. These sessions can involve activities for networking, trust-building, and mentoring. Although the main focus would be on HIV prevention, youth centers can provide a promising avenue for the AGYW to benefit from other services that DREAMS offers, such as capacity-building, economic strengthening, and community mobilization for the well-being of women; all of these can indirectly help lower the rates of HIV.
2. **Comprehensive Sexuality Education (CSE):** The World Health Organization defines CSE as education that gives "young people accurate, age-appropriate information about sexuality and their sexual and reproductive health, which is critical for their health and survival.". In Eswatini, half of the AGYW and ABYM population is unaware of the HIV prevention methods. This group is at the highest risk of getting infected with HIV and engages in risky sexual behavior due to a lack of power, peer pressure, and a lack of awareness. This necessitates comprehensive sexuality education at all levels to ensure

that both ABYM and AGYW are aware of their and each other's sexual and reproductive rights and know about the risks associated with risky sexual behavior.

Although research proves the positive benefits of CSE in lowering HIV prevalence, in Eswatini, the CSE programs are currently facing many structural barriers. The most significant barrier to CSE is the opposition by parents to including the CSE content in the school curricula. Therefore, DREAMS should focus on not only implementing CSE but sustaining it as well. It can be done by making parents more aware of the benefits of CSE. DREAMS can also focus on gauging the levels of sexuality education that do not face overwhelming opposition from the public. It can be done by improving parent-to-teacher relations, engaging community leaders and activists, and running information campaigns.

3. **Community-based HTCs:** Community-based HIV Testing and Counseling (HTC) can reduce HIV prevalence in AGYW by improving access, especially spatial accessibility for women, as they are economically less empowered to own the means of transportation (Foley et al., 2022; Porter et al., 2021). These are offered through mobile clinics and home HTCs (door-to-door services), community mobilization, and targeting high-risk individuals (like sex workers, etc). A meta-analysis of community-based HTCs focused on South Africa, Kenya, Uganda, and Malawi found that community HTC modalities had higher coverage than facility-based HTCs, where home-based HTCs and campaigns had the most significant coverage (Sharma et al., 2015).

   To expand the coverage, the healthcare providers must be trained so that the testing services receive less opposition from the communities. Similarly, regular visits to the communities for testing and counseling services must be made. It will require a mechanism for transportation in both urban and rural areas for the healthcare service providers to visit and facilities to store the equipment and manage information in a centralized manner.

The alternatives will be evaluated according to these four criteria

1. Cost: Due to limited funding, DREAMS cannot undertake experimental ventures requiring high costs. The costs will be divided into different categories: administrative costs, training and capacity building costs, infrastructure, equipment costs, and community engagement costs.

2. Effectiveness: The best alternative will be the most/one of the most effective against HIV in terms of prevention by lowering the projected number of HIV infections. The best alternative should have a significant marginal impact on reducing HIV in AGYW. The effectiveness will be measured by how many cases of HIV can be prevented annually

3. Feasibility: Due to HIV being a mainly sexually transmitted disease, often associated with sexual promiscuity, the political feasibility of the alternative is fundamental. Although all the other alternatives are expected to face some level of political opposition, the best alternative will not receive overwhelming opposition from the community.

4. Sustainability: The best alternative should sustainably lower HIV. It is evident that Eswatini initially achieved the UN's 95-95-95 target and then went back to 92-93-98. The best alternative should ensure Eswatini's lack of dependence on USAID or other international organizations to control the virus so that Eswatini achieves self-sufficiency in keeping the viral loads under control and lowering HIV prevalence.

Analysis

Based on the aforementioned description of what each alternative will entail, his section identifies four alternatives for lowering HIV in Eswatini through preventive techniques, including: Voluntary Medical Male Circumcisions (VMMCs), Comprehensive Sexuality Education (CSE), Youth Centers and Peer Mentoring, and Community-based HIV Testing and Counseling Services (HTCs). Each alternative is evaluated based on cost, effectiveness, sustainability, and feasibility.

1. Voluntary Medical Male Circumcisions (VMMCs)

Several studies point toward the benefits of voluntary medical male circumcision against HIV and the positive benefits of early VMMCs (conducted at the age of 15 or older) (Masango et al., 2021; Mnisi et al., 2019; Carrasco et al., 2020).

Criteria and Evaluation

Cost: The overall cost of more than halving (60% reduction) the possibility of HIV

transmission through heterosex is $39,713,7.2578 among the sexually active men. The cost calculations are provided in Appendix 4.

Effectiveness: It can prevent 4856 new HIV cases in AGYW as shown in Appendix 5. Several randomized controlled trials found that VMMCs reduce the risk of HIV from heterosexual acquisition of HIV by as much as 60% (Mamba et al., 2024; Bailey et al., 2007; Auvert et al., 2005). VMMCs remove both inner and outer parts of the foreskin tissue as they contain CD4+ T cell and dendritic cell subsets that are susceptible to HIV (Prodger, 2022). Since HIV is a surgical procedure and most of the studies are conducted within SSA, the results can be expected to be the same for Eswatini. The World Health Organization and the UNAIDS have even recommended making VMMCs a part of the comprehensive HIV prevention program. In general, most studies found a negative correlation between HIV and VMMCs (WHO., n.d).

Sustainability: Circumcision lowers the likelihood of getting HIV for a lifetime and is, therefore, sustainable. However, it does not entirely rule out the threat of HIV, and it is associated with risky sexual behavior in some studies based in Zambia and Kenya (Agot et al.; Garenne & Matthews, n.d).

Feasibility: VMMCs are also related to individual freedoms, and convincing young boys to go through them is complex and can violate freedom of choice if done by force. Men in Eswatini are found to have a negative attitude toward VMMCs in general (Shezi et al., 2023). For instance, a study found that fear of pain was the key barrier and seemed to outweigh the benefits of VMMCs (Mamba et al., 2024). The Swazi Government has already taken steps to increase the VMMCs in Eswatini. In 2009, Eswatini aimed to expand VMMCs to cover 80% of its boys and men in response to a WHO mission. Still, as of 2021 estimates, only 40% of the targeted population in Eswatini were circumcised (Adams et al., 2022), demonstrating the difficulty in achieving the set targets.

Although UNAIDS, the Eswatini government, and health professionals mainly advocate for higher levels of VMMCS, several groups are concerned about the potential implications of young male adults' lack of agency, who are sometimes opposed to circumcision. In Eswatini, respect for elders might curtail the decision-making powers

of young adults who might or might not want to undergo VMMCs. Many young men get circumcised even if they are opposed to it (Moyer et al., 2022). Due to the comparative lack of agency of young adults, it is easier to have more VMMCs in the age group dependent on their parents. However, VMMCs are more difficult in the older age groups as men's decision-making depends less on their elders' approval.

2. Youth Centers and Peer Mentoring

The peer pressure for an early sexual debut, especially for boys, can lead to risky sexual behaviors, negatively impacting the Sexual and Reproductive Health (SRH) of AGYW as well (UNICEF, 2020). Youth clubs can provide AGYW with community support so that they are less likely to face intimate partner violence (IPV), as IPV by controlling partners puts women at a higher risk of HIV (Jewkes et al., 2011).

Criteria and Evaluation

Cost: Since the construction costs of new buildings are high, renting the places for youth centers is a more feasible option. Rented apartments/houses often serve as community buildings and offices. Most of Eswatini's population lives in rural areas, where rent prices are lower than in the urban centers. Assuming that each 3-room space can accommodate around 50 people, the cost of establishing and running youth centers to provide peer-mentoring would be at least $34,942,28.05 per year as provided in Appendix 2.

Effectiveness: It can prevent 121.75 new HIV cases in AGYW as shown in Appendix 5 Peer-mentoring through youth centers can be helpful to provide a support network for AGYW to negotiate safe sex practices like condom use, decreasing their predisposition to HIV (Ramjee & Daniels, 2013). There is mixed evidence about the effectiveness of youth centers and peer mentoring. **O**pponents argue that peer mentoring is more helpful to older adolescent girls than younger ones, raising equity concerns, and youth centers are criticized for being expensive (Mouli et al., 2015). Although there is not enough Eswatini-specific literature showing the positive impact of peer-mentoring on HIV incidence, a study on high-HIV risk individuals indicates that peer mentoring can reduce HIV incidence by 36% (He et al., 2020). Another qualitative study conducted in-depth interviews of the adolescents living with HIV, identified a social support system as one of the leading facilitators of Antiretroviral Therapy (ART) adherence, which leads to lower HIV (Hlophe et al., 2024). Overall, having peers and community for support is especially

helpful given the high rates of sexual violence against young girls (Saul et al., 2018). However, due to mixed evidence about both peer-mentoring and youth centers, and a lack of robust evidence in favor of either of them, the generalizability of the results of different studies is challenging.

Sustainability: The Youth Centers and Peer Mentoring need regular supervision and staffing to be sustainable. However, this can be difficult to achieve with the changing political landscape as the directed funding fluctuates. In this case, balancing the economies of scale and greater reachability is also challenging. Fewer but larger youth centers would be cheaper and more efficient for biweekly gatherings. However, reaching the maximum number of AGYW will be difficult due to a lack of walkability. It was observed in some studies where youth centers were found to get older than targeted men living near them, instead of adolescents (especially girls) (Mouli et al., 2015).

Feasibility: The Youth Centers align well with the Eswatini government's vision of empowering youth and lowering HIV. The discussion of SRH among young girls and boys in terms of abstaining from sex is more likely to receive support from the community members than just informal sex education. The impact of peer mentoring and youth centers is hard to evaluate because they are challenging to track in terms of engagement and may face administrative challenges like staffing, administrative concerns, and infrastructural challenges. The prominent stakeholders of this alternative are AGYW, the healthcare workers, activists for raising awareness, and the community members. Community members and parents can oppose this alternative as sex is considered a taboo subject in many communities in Eswatini. It can also receive pushback from the funders due to high operational costs.

3. Comprehensive Sexuality Education (CSE)

Although Eswatini has implemented comprehensive sexuality education in the primary and secondary curricula (Wekesah et al., 2019), the sociocultural and structural hurdles persist, making it hard to balance allocated time, educational level, and cultural and age appropriateness. **E**ndeavors, such as the 2009 national youth policy and its revision in 2020 in Eswatini, entail integrating life skills (including sexuality education) in curricula, targeted efforts to include sexuality education remain missing due to reasons including high drop-out rates from **secondary schools** (UNESCO, 2024). **However, the strong and organized parental opposition to HIV poses risks to both learning and sustainability of the CSE programs.**

Criteria and Evaluation

Cost: A study based on six countries, including Kenya and Nigeria, found the cost of CSE to **be $**7 in Nigeria and $50 in Kenya. After extrapolating the results and adjusting inflation rates and currency exchange rates, the cost of CSE in Eswatini is from $131,252.88 to $776,396.95 for **13200 children** aged 13 to 17. The calculations are provided in Appendix 3.

Effectiveness: It can prevent 6853.77 new HIV cases in AGYW as shown in Appendix 5. Some researchers suggest that CSE is effective in reducing HIV prevalence (Mouli et al., 2015); they argue that early sexual debut and lack of knowledge about safe sex can significantly increase the risk of acquiring HIV, and CSE can prevent it (Nxumalo et al., 2023). **A cluster** randomized control trial conducted in Eswatini found that the incentives conditional on school attendance or on remaining free of sexually transmitted infections reduced HIV prevalence by 34.5% on average (Gorgens et al., 2022). This demonstrates that students being in school is essential in raising their awareness about the prevention of sexually transmitted diseases like HIV. CSE positively impacts girls' empowerment, mainly if it entails polic**ies and rationales focusing on gender, power, and rights (Nicole Haberland & Rogow, 2015). A qualitative exploratory-descriptive study conducted in the Manzini region in Eswatini showed that 40% of the participants engaged in sexual activity before turning** 18 (Nxumalo et al., 2023).

Feasibility: Balancing the CSE with community-specific needs is difficult, especially in countries like Eswatini, where sex is a taboo subject (Motsa, 2021), and the Swaziland National Association of Teachers (SNAT) receives a lot of pushback for allegedly spreading immorality in the form of CSE (Kahiu, 2023). It is **challenging to** manage monitoring, gender sensitivity, community engagement, socio-cultural identities, and the time allotted to CSE by the teachers, as learned from the Zambian example, which faced the same challenges (Mukanga et al., 2024). Uganda also committed to comprehensive sex education in 2013, but its parliament banned sex education beyond abstinence in 2016 due to strong public opposition (Achen et al., 2023). These examples demonstrate how, despite implementing CSE, it is difficult to get the desired outcomes. The generalizability of CSE programs is challenging due to cultural differences and tolerance levels for different content. **The organized opposition of specific stakeholders, such as parents and religious groups, challenges the political feasibility of CSE**.

Sustainability: Even if comprehensive sexuality education is implemented, policy practitioners must be aware of the sustainability challenges it might face, which can even result in its reversal. For instance, Uganda, one of the pilot countries of the DREAMS program, committed to CSE in 2013, but its parliament banned sex education beyond abstinence in 2016 (Achen et al., 2023). Due to or**ganized opposition to CSE, Eswatini can face similar challenges in the future.**

4. Community-based Testing and Counseling Services

Community-based HIV Testing and Counseling (HTC) can reduce HIV prevalence in AGYW by **i**mproving access, especially spatial accessibility, for women, as they are economically less **e**mpowered to own the means of transportation that could take them to healthcare facilities (Foley **e**t al., 2022; Porter et al., 2021).

Criteria and Evaluation

Cost: Assuming that we want community-based HIV services to be available to all adolescent girls and young women in the country, the total cost would be approximately $4,469,49.642 in 2025 dollars.

Effectiveness: It can prevent 273.79 new HIV cases in AGYW as shown in Appendix 5. The World Bank attributes Eswatini's 44 percent decrease in new HIV infections from 2014 to 2019 to the scale-up of testing and treatment, which became easier through community-based HIV testing and counseling (Minnery et al., 2020). An RCT based in Eswatini found that HBHTCs

covered 63% of the adolescents (aged 10-19) that had not been covered before, and overall MHTCs and HBHTCs covered 34% and 22% of the population that had not been tested before (Parker et al., 2015). This shows that community-based HTCs can potentially target communities not tested by facility-based clinics and should therefore be expanded. Studies also indicate that community-based HTCs can improve HIV testing from 5.8% to 37%, improve the positive attitudes towards HIV patients from 34.3% to 73.0%, and increase the use of condoms from 12.3% to 28.0% (Sulat et al., 2018). As a country with an HIV rate of more than 30% in women, continued accessibility of HTC services is imperative to prevent the epidemic from spreading further by increasing awareness in people about their HIV status (Frescura et al., 2022).

Sustainability: Mobile clinics and community-based facilities have been in place for a long time and can be a sustainable option if healthcare workers are willing to go to the communities and work. However, delivering services to doorsteps requires a larger human workforce, which can be challenging to maintain.

Feasibility: Community-based HIV Testing and Counseling can face opposition from stakeholders, for instance, those who have HIV and want to keep their status hidden due to the fear of stigma and discrimination. Groups with rigid views against PLWHAs can also oppose it. Besides, aggressive HIV testing strategies can face community opposition, as people might not support the HBHTC providers. Some studies suggest that community-based HTCs are more costly than health Facility-Based Clinics (FBC), which can cause administrative opposition (Mdege & Chindove, 2013). However, this alternative is most likely supported by AGYW and women who cannot travel long distances to get HTC services.

The Outcomes Matrix

The outcomes matrix is based on the four alternatives and their criteria.

Outcomes Matrix				
	Cost	**Effectiveness**	**Feasibility**	**Sustainability**

Voluntary Medical Male Circumcision	$39,713,7.2578	4856.697 cases averted in women	Medium	High
Youth Centers and Peer Counseling	$34,942,28.05	121.75 cases averted	Medium	Low
Comprehensive Sexuality Education	$131,252.88-$776,396.95	6853.77 cases averted	Low	Medium
Community-based Testing and Counseling Services	$4,469,49.642	273.79 cases averted	High	High

Recommendation

Based on the **outcome's** matrix and ease of implementation, VMMCs is the best option because it is highly effective, highly sustainable, **is** less likely to face overwhelming opposition from the community**,** and **is** not highly **costly** given the lifelong benefits and less likelihood of getting HIV. Although VMMCs lower HIV in men by **up to** 60%, given the fact that women are twice **as likely to be** biologically predisposed to get HIV**, this** increases the positive externalities for women**,** where HIV rates from heterosex**ual encounters** decline amongst women too.

Implementation

The implementation of VMMCs would not include the surgical procedure for removing the foreskin but guidance and training of the staff operating the procedures as well. It will require greater community-wide participation. Even through VMMCs are considered voluntary, the social pressure to undergo VMMCs can

challenge the agency if ABYM. Therefore, it is essential that the staff and community are equipped to allow men to exercise their will while informing and educating them.

Sequence of Events

The implementation process of VMMCs will depend upon the following sequence of events:

1. **Community Awareness about benefits of VMMCs:**
   The communities should be made aware about the benefits of VMMCs to combat disinformation and provide a system of support. Having peers and family members circumcised increases the rate of male circumcision.
2. **Acceptance of VMMCs by the Communities:**
   Once the communities are made aware of the positive benefits of VMMCs, they are more likely to support it.
3. **Safety of the procedures**:
   Even if the communities have a positive attitude towards VMMCs, the safety of procedures must be highly emphasized to avoid the fear of pain in ABYM.
4. **Implementation of VMMCs**
   Once the community support and safety of procedures are considered, VMMCs can be administered.

Dependencies Necessary to Achieve the Sequence of Activities and Successful Implementation:

Successful VMMCs depend on the following factors:

1. Stable funding for surgical and counseling procedures and awareness
2. Overcoming the fear of pain from VMMCs.
3. Safe and successful precedents of VMMCs to encourage more men

Risks to successful Implementation of VMMCs

These include fear of pain and socioreligious factors as VMMCs have historically been very low in Eswatini. However, risks can be mitigated by the following ways:

1. Peer support and open discussions in schools about VMMCs.
2. Advertising the benefits of VMMCs in terms of hygiene and benefits other than HIV.
3. Incentivizing the mentioning of VMMCs by contraceptives providers.

Appendix 1: Voluntary Medical Male Circumcision

Population of Eswatini =1.20 million (2020 estimates), probably sexually active population 15-64 = 765,180 (World Bank Group, 2023)

The percentage of the male population in Eswatini = 49.1%, population of sexually active male population = 765180 (.491)= 375703.38

Population of already circumcised males = 27.1% (Mnisi, 2019)

Population of uncircumcised males = 72.9%

Assuming that the circumcised male population is equally distributed among all age groups, the number of uncircumcised men between 15 and 64 = 375703.38 * 0.729 = 273,887.764

Since we cannot circumcise all the men in the given range, targeting one-tenth of the population per year would be more feasible. Thus, 10% of the men aged 15 and 64 would be: 27388.7764

The cost of implementing the policy per person in 2016 = $109 (Kripke et al., 2016)

The cost of implementing the policy per person in 2025 = 145 dollars (inflation-adjusted)

Cost of implementing the policy to rule out HIV transmission = $39,713,7.2578

Appendix 2: Youth Centers and Peer Mentoring

Estimated rent in urban centers for a three bedroom apartment: monthly $411 (NUMBEO, 2024) Estimated monthly rent in rural centers for a three bedroom apartment: $309 (NUMBEO, 2024) Rural population of Eswatini (%age): 75.83% (World Bank Group, 2023) Urban population of Eswatini (%age): 24.17%

The female population that DREAMS is focused on comprises 18.74% of the total population is comprised of alolescents; since we are just focusing on girls, the population would be 9.37% of the total population.

Thus, the rent to accommodate all women of that age, assuming that rural and urban populations have similar age distribution, in a regionally disaggregated manner, would be the following:

Total target population: 0.0937*1.2M = 112440, as targeted girls comprise only 9.37% of the total population

The target population in rural areas = 112440 * 0.07583 (as 75.83% of the total population lives in rural areas) = 8526.3252

The target population in urban centers = 112440* 0.02417 (as 24.17% of the total population lives in urban areas) = 2717.6748

Number of facilities required by rural areas, if each can accommodate 50 girls for the sessions = 8526.3252/50 = 170.52

Number of facilities required by urban areas, if each can accommodate 50 girls = 2717.6748/50 = 54.35

Estimated total rent per month by rural areas per month = 170.52* $411 = $70,083.72 Estimated total rent per month by urban areas per month = 54.35* $309 = $16794.15. Estimated total rent for the alternative for the year = 12*($70,083.72+$16794.15) = **$1042534.44** The average monthly income of a healthcare worker in Eswatini is estimated to be $1287 (WHO, n.d.). Given that the youth centers require healthcare workers to guide the peer-mentoring process, we assume that each facility needs, on average, 2 to 3 healthcare workers. Thus the total cost = Number of facilities* no of healthcare workers* their monthly salaries = (170.52+54.35)/10* 3*$1287 = 86822.307 per month/ **$10,418,67.684 per year**

Given that we want to make visiting the youth centers lucrative to young girls, at least once a week, free meals will be provided to incentivize them. The average meal price ranges from $2.2 to $5 per person. If we assume that each week, one meal at $4 per person is provided to every AGYW, Cost of food per year = target population * price * no. of weeks

= 11244 * 4 * 52 = **23,387,52**

For the facilities, the cost of electricity = USD 0.127/kW

Per capita consumption of electricity = 1,092 kWh per year

Since the AGYW visit the youth centers for a short while per week, but if we assume that three people (the healthcare providers) use electricity from the youth centers full time, then the total cost would be at least: users * consumption* cost* number of facilities = 3*1092*0.1276*224.85 = **$9354.922**

The given statistics are for the entire population in both urban and rural areas is covered. However, it is not viable given the resource constraints. Therefore, as in the first alternative, DREAMS can start by targeting one-tenth of the total target population. It can even lead to positive spillovers requiring lesser facilities with time.

There are also expected to be miscellaneous costs, including repairs, inventory, etc. Total minimum costs = (**$1,042,534.44+ $10,418,676.84 + $23,387,520 + $93,549.22)/10 = 34,942,28.05 per year**

Appendix 3: Comprehensive Sexuality Education

Eswatini already has CSE in place, this alternativeThere is not enough literature on finding the cost of CSE in Eswatini, however, the research from Nigeria and Kenya can be used to provide an estimate of the cost of CSE per child for the continuation of the CSE program. Although Nigeria has very low costs for CSE while Kenya has higher. For calculating the costs, both countries are considered.

No of students enrolled in secondary education in Nigeria in 2008 = 3.125M (Nigeria Secondary Education Enrollment (I: NSEEUY), 2021)

Comprehensive sexuality education is the most appropriate for the age groups 13 to 17 as the early sexual debut is at 13.20 years and the typical sexual debut is 16.28 years (Chemhaka et al.,

2024). However, the overall sexual debut age is 17.73 years. 11% of Eswatini's population falls between 13 and 17, constituting 1.20M*0.11 people=132000 people.

The intracurricular comprehensive sexuality education in Nigeria cost $7

per student in 2009. 1 USD = 1497.87 Nigerian Nira (fxexchangerate, 2025)

Average inflation rate from 2009 to 2023 = 13.69% (Macrotrendsmacrotrends, 2025)

A Nira in 2009, if compounded into 2023 Nira is = 1(1+ 0.1369) ^14

= 6.027

Thus, today's Nira per student cost would be = 1497.87* 6 = 9027.88 Nira = 5.99 USD Per capita GDP of Eswatini = $4,069

Per capita GDP of Nigeria = $2449.59

If we assume that the educational spending for CSE is proportional to per capita GDP, Eswatini will spend $4,069/ $2449.59 = 1.66 times more per student.

So the expenditure per student = 5.99*1.66 = 9.9434

Given the target population of 13200 people, the total cost = 131,252.88 dollars. However,, these are very optimistic estimates as the cost of CSE was lowest in Nigeria. CSE cost $50 in Kenya in 2009, which is 7.14 times greater than Nigeria. Given that Nigeria and Kenya do not have a lot of difference in their GDP expenditure per person, as Kenya's per capita GDP is $2070

We can calculate the dollar value for Eswatini, which is 131,252.88* 7*($2070/$2449.59) = 776,396.95. Therefore, the price of this alternative can $131,252.88 to $776396.95.

Appendix 4: Community-Based HTC

In Eswatini , facility-based HIV testing and counseling health facilities cost US$7.96-US$9.65 per person and community-based healthcare facilities cost US$19.68 per person (McGee et al., 2022). The main costs include transportation, supplies, medical service providers, monitoring and infrastructure etc.

Assuming that we want community-based HIV services to be available to all adolescent girls and young women in the country, the total cost would be: $19.68* (108,654) = $2,138,310.72 in 2022 dollar/ **$4,469,496.42** in 2025

dollars after adjusting for inflation. However, targeting the 10% of the population as consistent with the other 3 alternatives, the total cost would be $4,469,49.642

Appendix 5: Effectiveness Calculations

VMMCs

VMMCs reduce the HIV in males by approximately 60%. It is common for ABYM to engage in risky sexual behavior. If we assume even monogamy by the circumcised ABYM, targeting the top 10% of the most vulnerable ABYM by the following calculations:

Target population = 27388.7764

Likelihood of the target population of being infected by HIV= 19.9%

So the number of people who are circumcised who would otherwise get HIV = 5396.33

The decrease in HIV prevalence of HIV due to VMMCs = 60%/0.6

Thus, VMMCs will reduce HIV prevalence in circumcised men by 60% = 5396.33*0.6 = 3237.798 men will be 60% less likely to get HIV

Since 30.3 percent of women have HIV, which is 1.5 times the number of men, in case of monogaous relations, the likelihood of women infected by HIV would be prevented by = 0.6*1.5* 5396.33= 4856.697

Peer Mentoring and Youth Centers

According to some estimates, this alternative can reduce HIV prevalence by 36% in women. Considering that we are targeting AGYW at high risk of HIV, the number of cases averted per year woud be = target population* their likelihood of getting HIV* expected reductitons in HIV prevalence

= 1124.39* 0.36*0.301

= 121.79

Comprehensive Sexuality Education

The number of HIV cases prevented through CSE is around 34.5%

The cases averted = 0.345* target population/2* their predisposition to HIV

= 0.345*132000/2*0.301

= 6853.77 cases averted

Community Based HTCs

Target population = 108,65.4

Some studies indicate that diagnosis of HIV reduces HIV prevalence by 4%. 63% of the adolescents are diagnosed by the first time through community-based HTCs.

Thus, it lowers HIV by : 10865.4* 0.63*0.04

= 273.79

Appendix 6

Implementation

Alternative	**Sequence of Events upon which successful Implementation Depends on**	**Dependencies Necessary to Achieve the Sequence of Activities and Successful Implementation**	**Risks to Successful implementation**	**Ways to Mitig Risks Implementation**

VMMCs	**1.** Community awareness about benefits of VMMCs **2.** Acceptance of VMMCs by the communities. **3.** Safety of the procedures. **4.** Implementation of VMMCs	**1.** Stable funding for procedures and awareness **2.** Overcoming the fear of pain from VMMCs. **3.** Safe and successful precedents of VMMCs to encourage more men.	**1.** Fear of pain. **2.**Socioreligious factors that might not support it.	**1.** Peer support a open discussions schools ab VMMCs. **2.** Advertising the benefits of VMMC terms of hygiene benefits other than H **3.** Incentivizing the mentioning VMMCs b contraceptives providers.
CSE	**1.** Acceptance of the benefits of CSE by parents. **2.** Making the CSE curriculum age-appropriate and culturally sensitive. **3**. Teacher training for intracurricular CSE. **4.** Having clarity about the extent of CSE content beyond abstinence.	**1.** Parental satisfaction with the benefits of CSE of the content that is taught. **2.** Tolerance of parents for CSE, even for topics that are beyond abstinence. **3.** Alignment between cultural values and the content covered. **4. Parents'** trust in the education system and in the teachers.	**1.** Opposition by parents. **2.** Socio-cultural and religious hurdles, that Belief CSE can lead to sexually promiscuous behavior. **3.** Parents' lack of trust in the education system and in teachers.	**1.** Advertising the Importance of CSE through social me and other me targeted towa parents. **2.** Conducting surv before inculcating in the curriculum check the level tolerance by parents different topics. **3.** Adequate teacher training and regular Parent-teacher meetings to build tru

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Community-Based HTCs	**1.** Public trust in the efficiency of community-based HTCs. **2.** Availability of vehicles, medicines, and healthcare providers regularly. **3.** Provision of the HTC services in high HIV risk areas. **4.** Preserving confidentality.	**1**. Vehicles to carry the healthcare materials to the communities. **2.** Some existing infrastructure for transportation. **3.** Communities being comfortable with the door-to-door provision of HIV medicines. **4.** Presence of healthcare providers.	**1.** Community's discomfort with door-to-door transfer of treatment as it can cause privacy concerns for some. **2.** Risk of lower effectiveness given the predominance of facility-based HTCs. **3.** More management challenges compared to facilities where everything is Designed for HTC.	**1.** The mobile cli should not be obviou avoid stigma. For For instance, by n writing AIDS or HI on the vehicles for mobile clinics. **2.** Ensuring that all Mobile clinics/ supp have adequate mate through reg supervision of suppl **3.** Having a ro system of veh monitoring and qu inspection.

Youth Centers and Peer Counseling	**1.** Training provided to people for peer counseling. **2.** Establishment of Youth Centers in the areas where HIV is rising in AGYW. **3.** Hiring full-time staff members. **4.** Incentivizing AGYW to attend peer-mentoring every week at youth centers.	**1.** The Youth Centers reaching the target population. **2.** AGYW's adherence to the routine of going to Youth Centers for support. **3.** AGYW having the freedom to attend events at the Youth Centers despite being in a patriarchal society.	**1.** Community's opposition to the Youth Centers due to their focus on sex-related issues. **2.** Youth Centers reaching older than the targeted age and mainly men living nearby as experienced before. **3.** The Youth Centers reaching already empowered AGYW only.	**1.** Advertising it a place for socializa rather than just in te of SRH. **2.** Scaling according to the in responses so that it not lead to signifi failures in terms of c **3.** Sharing leadership responsibilities with attendees to reach o to the isolated girls communities that ar not directl accessible b DREAMS.

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