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PREVENTING HIV AMONG ADOLESCENT BOYS AND YOUNG MEN THROUGH PEPFAR-SUPPORTED VOLUNTARY MEDICAL MALE CIRCUMCISION IN 15 SUB-SAHARAN AFRICAN COUNTRIES, 2018–2021

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Abstract

Voluntary medical male circumcision (VMMC) is an HIV prevention intervention that has predominantly targeted adolescent and young men, aged 10–24 years. In 2020, the age eligibility for VMMC shifted from 10 to 15 years of age. This report describes the VMMC client age distribution from 2018 to 2021, at the site, national, and regional levels, among 15 countries in southern and eastern Africa. Overall, in 2018 and 2019, the highest proportion of VMMCs were performed among 10–14-year-olds (45.6% and 41.2%, respectively). In 2020 and 2021, the 15–19-year age group accounted for the highest proportion (37.2% and 50.4%, respectively) of VMMCs performed across all age groups. Similarly, in 2021 at the site level, 68.1% of

VMMC sites conducted the majority of circumcisions among men aged 15–24 years. This analysis highlights that adolescent boys and young men are the primary recipients of VMMC receiving an important lifetime reduction in HIV risk.

Keywords

HIV prevention; voluntary medical male circumcision; sub-Saharan Africa; adolescent health services; male

INTRODUCTION

Voluntary medical male circumcision (VMMC), first recommended in 2007 by the World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS), remains one of the few HIV prevention strategies to target adolescent and young adult males (Njeuhmeli et al., 2014; UNAIDS, 2020). Shortly after this recommendation, the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), in partnership with ministries of health, established VMMC programs in settings with a high prevalence of HIV and low male circumcision coverage in eastern and southern Africa (WHO/UNAIDS, 2007). Since the establishment of these national programs, adolescent males aged 10–19 years have comprised the greatest proportion of VMMC clients (Davis et al., 2018; World Health Organization Regional Office for Africa, 2012). The high number of adolescent males circumcised through the VMMC program is important, given that this population is more likely to be HIV-negative, maximizing the benefits of VMMC for a lifetime reduction in HIV risk.

Although VMMC programs focus primarily on HIV prevention, they also provide an important opportunity for youth to access broader sexual and reproductive health services (Tobian et al., 2018). VMMC programs offer a WHO-recommended package of HIV-related services that include the complete surgical removal of the foreskin, voluntary HIV testing, linkage to treatment for boys and men who test positive for HIV, condom provision, HIV risk reduction education, and screening for sexually transmitted infections with referrals or treatment offered on site (WHO, 2016). Some programs have also integrated other HIV prevention interventions into VMMC programs (e.g., pre-exposure prophylaxis) through linkages or referrals or direct provision at VMMC sites. More recently, VMMC sites have served as a platform for additional health services offering tetanus vaccinations, female condom provision for sexual partners, and screening for diseases such as tuberculosis and hypertension (Nhlapo et al., 2012; Tibenderana et al., 2019). Services offered by VMMC programs help to fill an important gap by supporting the sexual and reproductive health needs of men throughout sub-Saharan Africa (Kaufman et al., 2016; Lane et al., 2018).

At the start of VMMC programming, WHO prioritized the 15–29-year age group as the key demographic to achieve the greatest population-level reductions in HIV incidence because this population was more likely to be sexually active (WHO, 2010). PEPFAR reiterated these recommendations and encouraged programs to prioritize men aged 15 years and older (PEPFAR, 2017). Modeling estimates have demonstrated that the most immediate reduction in new HIV infections is when men aged 15–29 years are medically circumcised compared

to older age groups (Stegman et al., 2019; UNAIDS, 2011). In 2020, prompted by an increase in adverse events reported among boys under 15 years of age during or following circumcision, PEPFAR changed the minimum age of VMMC eligibility from 10 to 15 years of age (PEPFAR, 2020b).¹ Prior to the release of the updated policy, an analysis from PEPFAR's Notifiable Adverse Events Surveillance System for VMMC found that all glans injuries and the majority (90%) of fistulas occurred almost exclusively in boys under 15 years of age, particularly among those 10 and 11 years old (Lucas et al., 2020, 2021). In 2020, WHO also updated its VMMC guidance, recommending that programs focus on men 15 years and older for various safety, ethical, and public health concerns, including ability to obtain appropriate consent for younger boys (WHO, 2020).

Building on a previous report, this article describes the overall VMMC age distribution at the site, national, and regional levels, from 2018 to 2021 among the 15 prioritized countries, focusing on changes in age distribution after the VMMC age eligibility policy was updated in 2020 (Davis et al., 2018). Analyzing VMMC age distribution at multiple levels helps identify differential trends to better understand the overall demographics of VMMC clients. A site-level analysis is important, given that VMMC programs are implemented and managed at the site level, with most programs conducting demand creation activities to reach men in the communities surrounding a VMMC site. Describing age distribution at the site level provides more precise information on how the program is being implemented to inform evidence-based priority setting at the subnational level within VMMC priority countries and to identify opportunities to integrate other age-appropriate health services. Findings from this analysis can inform future VMMC program planning, update strategies to enhance quality services offered to adolescents, and minimize new HIV infections.

METHODS

Data from the PEPFAR Monitoring, Evaluation and Reporting (MER) database from U.S. government fiscal years (FYs) 2018–2021 were used for this analysis (PEPFAR, 2020). All 15 countries—Botswana, Eswatini, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, South Sudan, Tanzania, Uganda, Zambia, and Zimbabwe—were included in the analysis. PEPFAR-supported VMMC programs report key indicators quarterly to the MER database in accordance with the U.S. government FY, which starts on October 1 and ends on September 30. Age is reported in aggregate by 5-year age groups starting at age 10 years.

VMMC age distribution was analyzed at the site, national, and regional levels in two ways. First, cumulative and annual trends in the number and proportion of VMMCs performed in all 15 countries are described at the regional level from 2018 to 2021 disaggregated by age group. Second, trends in the annual number and proportion of VMMCs by country are described at the national and VMMC site levels.² For the site-level analysis, the VMMC sites that reported the highest number and proportion of VMMCs per age group were

¹A small number of device-based circumcisions were allowed in boys under 15 if accompanied by enhanced program safety monitoring and reporting.

²South Sudan was excluded from the site-level analysis because its program is managed entirely by the national military forces and all VMMCs are performed at one military site.

categorized. VMMC programs deliver services through a mix of fixed, mobile, and outreach sites. Fixed VMMC sites are typically located within an existing health-care facility such as a hospital or health center, and mobile and outreach sites use temporary locations to provide VMMC services (Centers for Disease Control and Prevention, 2013). All mobile and outreach services are reported through a corresponding static VMMC site. To assess changes in age distribution specifically among younger age groups affected by the 2020 change in VMMC age eligibility, prioritized age groups were collapsed into the following groups: 10–14, 15–19, 20–24, and 25 years and older. All analyses were performed using Stata16 software (StataCorp, 2019). This project was reviewed in accordance with the U.S. Centers for Disease Control and Prevention human research protection procedures and was determined to be nonresearch.

RESULTS

REGIONAL VMMC RESULTS BY AGE GROUP

From 2018 to 2021, 12,567,114 VMMCs were performed among all 15 priority countries (Figure 1). During the combined 4-year period, the greatest proportion (33.2%) and number (4,175,158) of VMMCs were performed among men in the 15–19-year age group followed closely by the 10–14-year age group, representing 31.9% (4,006,778) of all VMMCs. The 20–24-year age group had the lowest proportion and number (16.2%, 2,040,263) of VMMCs performed compared to other youth-specific age groups. VMMC client age distribution varied by year. In 2018 and 2019, the 10–14-year age group had the highest proportion and number (45.6%, 1,652,810; 41.2%, 1,600,976, respectively) of VMMCs performed compared to any other age group. However, in 2020, following the change in age eligibility for VMMC, the age distribution shifted, and there was a 30.6% decrease in the proportion of VMMCs performed in the 10–14-year age group compared to the previous year, and less than a third, 28.6% (752,173), of VMMCs were performed in this age group. In 2021, the 10–14-year age group had a 99.9% decrease in the proportion of VMMCs performed, compared to 2020, and less than 1.0% (0.0%, 819) of all VMMCs were performed in this age group. In 2020, the 15–19-year age group made up the largest proportion of VMMCs, representing 37.2% (979,624) of all VMMCs. This change in age distribution continued into 2021, and half (50.4%, 1,221,966) of all VMMCs were performed in the 15–19-year age group. The proportion of VMMCs conducted in the 20–24-year age group increased annually, and in 2021 the second highest annual proportion (23.6%, 572,771) of all VMMCs were performed in this age group. Combined, the 15–24-year age groups received 74.0% (1,794,737) of all VMMCs in 2021, representing an increase from the previous year, when 53.8% (1,415,681) of all VMMCs were performed in the combined age groups.

NATIONAL VMMC RESULTS BY AGE GROUP

During the combined period of 2018–2021, 9 of the 15 countries (60.0%)—Botswana, Eswatini, Kenya, Lesotho, Mozambique, Namibia, South Africa, Tanzania, and Zimbabwe—reported that the highest proportion of VMMCs were conducted among 10–14-year-olds (Table 1). Among these 9 countries, the proportion and number of VMMCs conducted in the 10–14-year age group ranged from 31.9% (39,249) in Namibia to 63.6% (485,432) in Kenya. Five countries had the highest proportion and number of VMMCs performed among

young men aged 15–19 years during the combined 4-year period, ranging from 30.8% (40,997) in Ethiopia to 55.8% (447,964) in Rwanda. South Sudan was the only country to perform the highest proportion (37.9%, 2,976) of VMMCs among men aged 20–24 years during the combined 4-year period.

Annual performance by age group and country were reviewed. In 2018 and 2019, 11 of the 15 countries (73.3%)—Botswana, Eswatini, Ethiopia, Kenya, Lesotho, Mozambique, Namibia, South Africa, Tanzania, Uganda and Zimbabwe—performed the highest proportion and number of VMMCs among the 10–14-year age compared to other age groups. In 2019, 11 of the 15 countries (73.3%) had decreases in the proportion of VMMCs performed with boys aged 10–14 years compared to the previous year. In 2020, 13 countries increased the proportion of VMMCs performed among 15–19-year-olds compared to 2019, and 7 of the 15 countries (46.7%) reported that the highest proportion of VMMCs were conducted in this age group. Among age groups under 25 years of age, in 2021, 14 of the 15 countries (93.3%) reported that the highest proportion and number of VMMCs were performed in the 15–19-year age group; Malawi had the highest proportion and number (37.0%, 53,221) of VMMCs conducted among 20–24-year-olds. Among countries that conducted the most VMMCs among 15–19-year-olds in 2021, Kenya had the highest proportion, with 75.9% (42,244) of all VMMCs conducted in this age group, followed by Rwanda with 64.9% (174,304).

Prior to the release of the updated change in age eligibility in 2020, VMMC age distribution varied by country. In 2018 and 2019, three countries—Malawi, South Sudan, and Zambia—performed a smaller proportion (31.4% or less) of VMMCs in the 10–14-year age group compared to other countries. In 2018, South Sudan conducted a smaller proportion and number (10.4%, 85) of VMMCs among boys aged 10–14 years compared to the 15–19-year age group (28.1%, 229). Four countries—Eswatini, Kenya, Lesotho, and Botswana—conducted over half of all VMMCs among boys aged 10–14 years in 2018 and 2019. Kenya conducted the overwhelming majority (69.2% [211,344] and 74.9% [210,483] in 2018 and 2019, respectively) of VMMCs among 10–14-year-olds. In 2020 and 2021, Kenya had a decrease in the proportion of VMMCs performed among 10–14-year-olds, from 52.3% (63,601) in 2020 to <1% (4) in 2021.

VMMC RESULTS AT THE SITE LEVEL

The distribution of VMMC clients by age group and site is presented in Table 2. Overall, the number of VMMC sites ranged from 3,250 in 2020 to 3,663 in 2018. The number of VMMC sites varied by country and year, with some countries, including Lesotho, utilizing fewer than 21 sites per year and other countries, including South Africa, Zambia, and Zimbabwe, having more than 500 sites per year. Overall, in 2018 and 2019, the majority (65.3% and 60.1%, respectively) of sites conducted the highest proportion of VMMCs in boys aged 10–14 years. There were variations, including Rwanda, where most VMMC sites conducted the majority of VMMCs among men aged 15–19 years in 2018 and 2019. In 2020, there was a 35.8% increase in the number of sites, from 871 in 2019 to 1,183 in 2020, that reported conducting the majority of VMMCs in men aged 15–19 years. However, in 2020, in seven

countries, most VMMC sites continued to conduct the majority of VMMCs among boys aged 10–14 years.

In 2021, the age distribution continued to change at the site level, and less than 1.0% (0.3%, 9 sites) of VMMC sites reported conducting the majority of VMMCs in boys aged 10–14 years. In eight countries, the majority of sites reported conducting the highest proportion of VMMCs among men aged 15–19 years, and in six countries the majority of sites reported conducting the highest proportion of VMMCs among men 25 years and older in 2021. During the 4-year period, most countries reported fewer than 10.0% of VMMC sites conducting the majority of VMMCs among men aged 20–24 years.

DISCUSSION

The findings from this analysis demonstrate that youth aged 15–24 years continue to make up the greatest proportion and number of clients circumcised at PEPFAR-supported VMMC sites. Countries adapted strategies to attract men 15 years and older, and in 2021, 74.0% of VMMCs were performed among 15–24-year-olds. It is important that the VMMC program continues to increase circumcision coverage in this age group because it is thought to achieve the most immediate reduction in HIV incidence, as well as the greatest HIV incidence reduction over a 15-year period (Kripke, Opuni, et al., 2016).

Overall, the number of VMMCs performed at the site level was similar to those performed at the regional and national levels, with most sites reporting that the majority of VMMCs were conducted among boys aged 10–14 years in 2018 and 2019. Starting in 2020, countries adjusted their approach, and in 2021 sites predominantly supported men aged 15–19 years. In addition, in 2020 and 2021, there was a notable increase in the number of sites reporting an increase in men over the age of 25 years accessing VMMC services. Some countries, including Eswatini, Mozambique, Kenya, and South Africa, had a reduction in the total number of sites conducting VMMCs during the 4-year period. The reductions in the number of VMMC sites were primarily due to reductions in funding and changes in service delivery. Despite the reduction in the number of VMMC sites, Mozambique and Kenya followed a similar trend to other countries, with the majority of their PEPFAR-supported sites reporting the highest number of VMMCs in the 15–19-year age group. Eswatini and South Africa varied slightly, with most sites reporting the highest number and proportion of VMMCs among clients 25 years and older. Reviewing site-level trends is important to the overall success of the VMMC programs because it provides a more in-depth understanding of the age of clients seeking services at specific sites.

Findings from this analysis have important implications for the future sustainability and planning of VMMC programs. This report indicates that there is currently a high uptake for VMMC among adolescents and young men compared to older age groups. This finding supports previous literature that adolescents have the highest acceptability and readiness for VMMC compared to other age groups (Sgaier et al., 2014). Previous research indicates that VMMC is perceived as a normative behavior for adolescent males, and older age groups may view male circumcision as something that occurs during adolescence and would be unusual for older men, particularly older married men (Patel et al., 2018). Older men, 25–

49-year-olds, have reported barriers to VMMC uptake, including a lack of partner support for seeking services compared to younger age groups (Hatzold et al., 2014). Research indicates that adolescent females support their male counterparts seeking VMMC services, believing it is beneficial to the sexual health of both partners (Kaufman, Dam, et al., 2018). Additional studies have found strong parental engagement in VMMC uptake for adolescent and young males (Dam et al., 2018). Having various sources of external support, including peer and familial support for adolescent VMMC clients, is important and can increase health service uptake among youth (Doyle et al., 2010; Erulkar et al., 2006; Mmari & Magnani, 2003). In addition, research has found that cultural influences and practices greatly impact adolescent males' decision to receive VMMC (Mavundla et al., 2020).

Maintaining demand for VMMC among adolescent and young males will be important for the long-term sustainability of VMMC programs, with extraordinary growth anticipated in populations under 30 years of age in countries prioritized for VMMC (Feldacker et al., 2018; Hankins et al., 2016; Kripke, Njeuhmeli, et al., 2016; United Nations, 2018). WHO (2020) recommends that VMMC programs include adolescents as they transition from donor support to country-supported programs. It is also more cost-effective for VMMC programs to target men aged 15 years and older; modeling estimates demonstrate that the cost per HIV infection averted by VMMC is substantially higher when males aged 10–14 years are included, primarily because it takes longer for the benefits of circumcision to accrue due to delays in sexual activity (Ross et al., 2006). Ensuring that VMMC services continue to prioritize and meaningfully engage with adolescents will remain critical to sustaining the current demand for VMMC among younger age groups.

Attracting adolescents and young men for VMMC requires approaches that consider youth-specific needs, preferences, and social norms (UNICEF, 2011). Studies have demonstrated that young men prefer to attend clinics only when accompanied by a peer educator or to interact with and ask health-related questions to people of similar ages (Mmari & Magnani, 2003; WHO, 2014). A study in Tanzania found that consultation with peers on sexual health education was associated with an increase in safer sexual health decision-making, but in other settings this approach led to the spread of misinformation (Babalola, 2006; Mashamba & Robson, 2002; Ndubani et al., 2003). Research also indicates that younger adolescents have specific concerns and fear of pain that deter them from seeking services (Patel et al., 2018). A literature review highlighted the structural barriers to adolescents seeking sexual and reproductive health services and found that common barriers included operating hours coinciding with school, sports events, and work hours and client's perception of an unwelcoming atmosphere (Kaufman et al., 2016). Addressing context-specific barriers to VMMC service delivery requires innovative approaches to ensure that programs are on track to meet HIV reduction targets.

Some countries continued to conduct circumcisions in boys under 15 years of age in 2021, with a few VMMC programs offering circumcision to boys aged 13–14 years using ShangRing®, a WHO-prequalified circumcision device approved for boys aged 10 years and older. PEPFAR has approved the use of ShangRing® for boys aged 13–14 years if a VMMC program meets specific safety stipulations, including enhanced safety monitoring, and voluntary informed assent is obtained from the client and consent from their parent or

guardian (PEPFAR, 2021). In some priority countries, ministries of health have not adopted a national change in age eligibility for non-PEPFAR-supported VMMC and continue to circumcise boys under the age of 15.

For boys under 15 years of age who present for VMMC at a PEPFAR-supported site, it is recommended that age-appropriate services be provided, that the client and parents are advised of the risks for medical circumcision in males aged 10–14 years, and that they are encouraged to return when they are eligible (PEPFAR, 2021). To effectively engage with adolescents under the age of 15 years who present at VMMC sites, adolescent-specific guidelines and trainings may be needed to ensure that potential future clients receive appropriate information and have access to other services offered at VMMC sites. Previous research has identified that a lack of age-specific guidance and provider's personal beliefs may hinder the quality and type of HIV prevention counseling, reproductive health education, and other services received by adolescent boys at VMMC sites (Kaufman, Patel, et al., 2018; Tobian et al., 2018).

LIMITATIONS

The findings in this report are subject to several limitations. First, this analysis includes only PEPFAR-supported sites in 15 countries in eastern and southern Africa, and findings may not be generalizable to other settings and may not be representative of national VMMC performance. Second, MER data are subject to reporting and data entry errors, which could affect the interpretation of this analysis. Finally, in 2020 the majority of VMMC programs were impacted by mitigation measures to reduce the spread of COVID-19, with a 32.5% reduction in the annual number of VMMCs performed in 2020 compared to 2019 (Peck et al., 2022). The effects of COVID-19 mitigation measures on VMMC performance were not uniformly captured across programs, and thus the impact of the COVID-19 pandemic on VMMC performance cannot be distinguished from the change in PEPFAR VMMC age eligibility on the age distribution of clients. Most programs fully resumed VMMC services by September 2020; however, some programs continued to experience disruptions to services for the remainder of the year.

CONCLUSIONS

The successful inclusion of youth in VMMC programs is an important accomplishment, given that this population is more likely to be HIV negative, helping to maximize the benefits of VMMC for a lifetime reduction in HIV risk (Reed et al., 2012). In 2020, 15 countries in southern and eastern Africa prioritized for VMMC successfully implemented the change in VMMC age eligibility, with decreases noted across all countries in the number and proportion of VMMCs performed among boys 10–14 years of age. To effectively reduce HIV incidence in priority settings, VMMC programs can continue to target the specific needs of adolescents and ensure that comprehensive sexual and reproductive services are offered at VMMC sites (Stegman et al., 2019).

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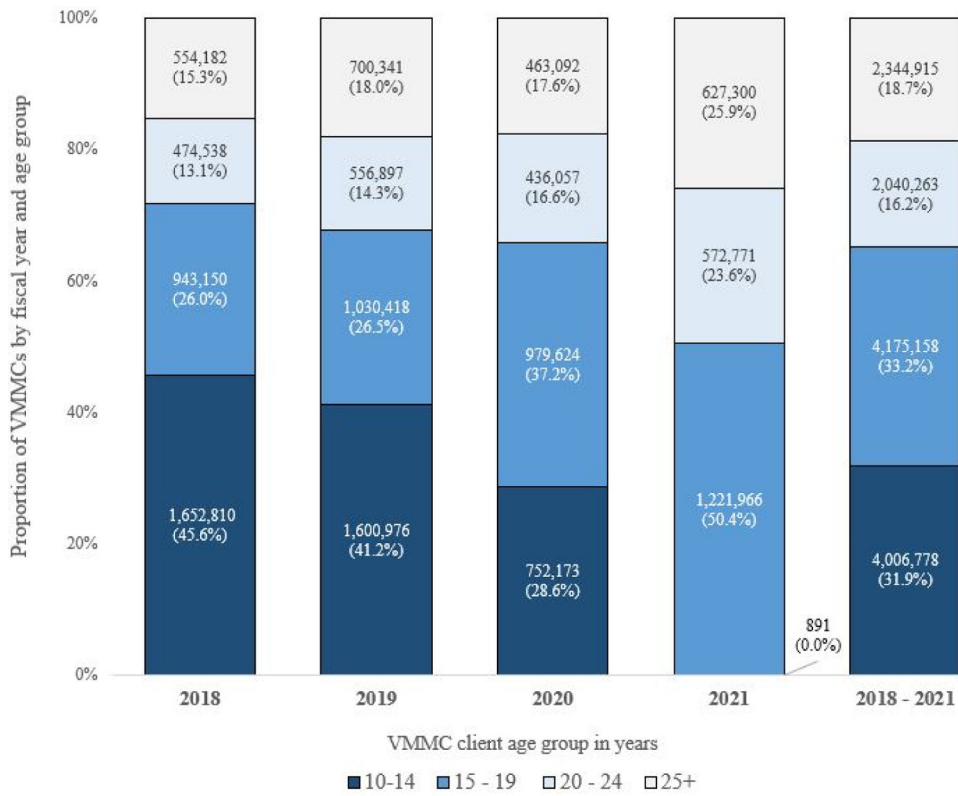


FIGURE 1. Number and proportion of U.S. PEPFAR-supported voluntary medical male circumcisions (VMMC) performed among adolescent boys and men by age group and year, in 15 southern and eastern African countries between 2018 and 2021.

TABLE 1.

Age Distribution of U.S. PEPFAR-Supported Voluntary Medical Male Circumcision (VMMC) Among 15 Eastern and Southern African Countries, 2018–2021

Country	2018					2019					2020*					2021					Total				
	10–14 (%)	15–19 (%)	20–24 (%)	25+ (%)	10–14 (%)	15–19 (%)	20–24 (%)	25+ (%)	10–14 (%)	15–19 (%)	20–24 (%)	25+ (%)	10–14 (%)	15–19 (%)	20–24 (%)	25+ (%)	10–14 (%)	15–19 (%)	20–24 (%)	25+ (%)	10–14 (%)	15–19 (%)	20–24 (%)	25+ (%)	
Botswana	60.3	8.6	8.7	15.6	57.5	8.2	9.7	23.4	3.6	15.1	21.2	59.6	1.1	25.2	16.9	56.3	50.0	10.4	10.7	25.2	10.4	10.4	10.7	25.2	
Eswatini	67.5	18.0	7.3	7.2	58.4	22.3	10.1	9.2	44.7	21.9	14.4	19.0	0.1	35.5	24.2	40.2	50.9	22.6	11.9	14.6	22.6	22.6	11.9	14.6	
Ethiopia	44.2	24.7	13.5	18.0	42.2	24.7	15.0	18.0	9.6	33.6	26.5	30.3	0.0	35.7	31.1	33.2	19.0	30.8	24.7	25.5	30.8	30.8	24.7	25.5	
Kenya	69.2	18.6	6.5	5.7	74.9	15.1	5.4	4.6	52.3	37.1	6.2	4.4	0.0	75.9	12.7	11.3	63.6	24.4	6.5	5.5	24.4	24.4	6.5	5.5	
Lesotho	61.0	14.8	7.0	17.2	58.6	13.1	7.9	20.4	30.1	20.3	14.0	35.6	0.0	31.9	21.2	46.9	47.1	17.4	10.4	25.2	17.4	17.4	10.4	25.2	
Malawi	30.5	30.7	21.2	17.6	31.2	29.2	21.1	18.5	17.6	37.2	25.1	20.1	0.0	35.1	37.0	27.9	20.0	32.5	26.3	21.2	32.5	32.5	26.3	21.2	
Mozambique	49.3	31.0	10.4	9.4	50.7	30.5	9.9	8.9	47.0	33.4	10.3	9.3	0.0	56.6	21.4	22.0	43.4	34.3	11.5	10.7	34.3	34.3	11.5	10.7	
Namibia	37.4	22.6	13.3	26.8	43.9	24.5	11.2	20.3	27.4	29.7	15.8	27.1	0.0	53.9	17.2	28.8	31.9	29.3	13.7	25.1	29.3	29.3	13.7	25.1	
Rwanda	43.0	39.6	9.6	7.8	29.3	47.4	11.9	11.4	18.1	60.7	12.1	9.1	0.0	64.9	17.4	17.7	18.8	55.8	13.4	12.1	55.8	55.8	13.4	12.1	
South Africa	47.7	18.2	11.3	22.7	43.4	22.8	14.0	19.8	26.6	29.1	19.9	24.3	0.0	32.8	22.6	44.7	37.8	23.0	14.7	24.5	23.0	23.0	14.7	24.5	
South Sudan	10.4	28.1	37.5	24.0	1.8	26.0	48.0	24.1	2.0	25.7	43.6	28.7	0.0	39.0	31.5	29.4	1.9	32.5	37.9	27.7	32.5	32.5	37.9	27.7	
Tanzania	45.7	25.9	14.2	14.1	39.4	21.7	15.0	24.0	42.9	27.8	13.3	16.0	0.0	54.4	20.7	25.0	33.8	31.1	15.6	19.5	31.1	31.1	15.6	19.5	
Uganda	43.6	28.5	13.0	14.9	35.8	30.1	15.3	18.8	24.4	39.6	16.8	19.1	0.2	54.6	21.9	23.3	28.9	36.2	16.2	18.7	36.2	36.2	16.2	18.7	
Zambia	30.4	30.0	18.9	20.6	26.4	32.8	19.5	21.2	10.3	42.4	24.2	23.1	0.0	47.0	28.3	24.7	15.5	38.8	23.1	22.6	38.8	38.8	23.1	22.6	
Zimbabwe	40.5	26.0	15.0	18.5	40.7	24.7	15.7	18.9	38.5	23.9	17.0	20.6	0.0	36.6	26.7	36.7	34.2	26.8	17.3	21.7	26.8	26.8	17.3	21.7	

Note. PEPFAR = President’s Emergency Plan for AIDS Relief.

* In 2020, PEPFAR implemented a change in age eligibility for VMMC clients from 10 to 15 years of age due to an increase in adverse events occurring among 10–14-year-old adolescent boys.

TABLE 2.

Age Distribution of U.S. PEPFAR-Supported Voluntary Medical Male Circumcision (VMMC) at the Site Level in 14 Eastern and Southern African Countries, 2018–2021

Country	Year	# of VMMC sites	VMMC sites that performed the highest number and proportion of VMMCs by age group			
			10–14 <i>n</i> (%)	15–19 <i>n</i> (%)	20–24 <i>n</i> (%)	25+ <i>n</i> (%)
Botswana	2018	27	26 (60.3)	26 (8.6)	26 (8.7)	26 (15.6)
	2019	27	19 (85.7)	19 (0.0)	0 (0.0)	1 (14.3)
	2020	27	19 (57.5)	19 (8.2)	19 (9.7)	19 (23.4)
	2021	27	20 (1.1)	20 (25.2)	20 (16.9)	20 (56.3)
Eswatini	2018	66	62 (93.9)	0 (0.0)	0 (0.0)	4 (6.1)
	2019	61	59 (96.7)	2 (3.3)	0 (0.0)	0 (0.0)
	2020	40	33 (82.5)	2 (5.0)	0 (0.0)	5 (12.5)
	2021	12	0 (0.0)	5 (41.7)	0 (0.0)	7 (58.3)
Ethiopia	2018	22	18 (81.8)	4 (18.2)	0 (0.0)	0 (0.0)
	2019	26	21 (80.8)	5 (19.2)	0 (0.0)	0 (0.0)
	2020	29	0 (0.0)	12 (41.0)	4 (13.8)	13 (44.8)
	2021	34	0 (0.0)	14 (41.2)	3 (8.8)	17 (50.0)
Kenya	2018	339	281 (82.9)	32 (9.4)	6 (1.8)	20 (5.9)
	2019	336	275 (81.8)	38 (11.3)	13 (3.9)	10 (3.0)
	2020	233	160 (68.7)	67 (28.8)	1 (0.4)	5 (2.1)
	2021	193	0 (0.0)	177 (91.7)	7 (3.6)	9 (4.7)
Lesotho	2018	6	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
	2019	7	7 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
	2020	7	2 (28.6)	0 (0.0)	0 (0.0)	5 (71.4)
	2021	6	0 (0.0)	1 (16.7)	0 (0.0)	5 (83.3)
Malawi	2018	92	35 (38.0)	36 (39.1)	14 (15.2)	7 (7.6)
	2019	89	47 (52.8)	19 (21.3)	20 (22.5)	3 (3.4)
	2020	102	15 (14.7)	67 (65.7)	13 (12.7)	7 (6.9)
	2021	66	0 (0.0)	33 (50.0)	31 (47.0)	2 (3.0)
Mozambique	2018	126	101 (80.2)	24 (19.0)	0 (0.0)	1 (0.8)
	2019	142	112 (78.9)	30 (21.1)	0 (0.0)	0 (0.0)
	2020	76	56 (73.7)	20 (26.3)	0 (0.0)	0 (0.0)
	2021	66	0 (0.0)	47 (71.2)	1 (1.5)	18 (27.3)
Namibia	2018	33	23 (69.7)	2 (6.1)	0 (0.0)	8 (24.2)
	2019	51	38 (74.5)	2 (3.9)	1 (2.0)	10 (19.6)
	2020	68	17 (25.0)	14 (20.6)	1 (1.5)	36 (52.9)
	2021	69	0 (0.0)	28 (40.6)	0 (0.0)	41 (59.4)
Rwanda	2018	75	33 (44.0)	41 (54.7)	0 (0.0)	1 (1.3)
	2019	76	34 (44.7)	41 (53.9)	0 (0.0)	1 (1.3)
	2020	125	49 (39.2)	66 (52.8)	3 (2.4)	7 (5.6)
	2021	189	0 (0.0)	161 (85.2)	6 (3.2)	22 (11.6)
South Africa	2018	927	670 (72.3)	41 (4.4)	9 (1.0)	207 (22.3)

Country	Year	# of VMMC sites	VMMC sites that performed the highest number and proportion of VMMCs by age group			
			10–14 <i>n</i> (%)	15–19 <i>n</i> (%)	20–24 <i>n</i> (%)	25+ <i>n</i> (%)
Tanzania	2019	845	630 (74.6)	80 (9.5)	16 (1.9)	119 (14.1)
	2020	520	319 (61.3)	63 (12.1)	18 (3.5)	120 (23.1)
	2021	487	0 (0.0)	124 (25.5)	38 (7.8)	325 (66.7)
	2018	256	229 (89.5)	10 (3.9)	3 (1.2)	14 (5.5)
	2019	220	191 (86.8)	7 (3.2)	2 (0.9)	20 (9.1)
Uganda	2020	230	149 (64.8)	60 (26.1)	4 (1.7)	17 (7.4)
	2021	296	9 (3.0)	264 (89.2)	3 (1.0)	20 (6.8)
	2018	305	183 (60.0)	73 (23.9)	9 (3.0)	40 (13.1)
	2019	314	160 (51.0)	94 (29.9)	1 (0.3)	59 (18.8)
	2020	317	106 (33.4)	165 (52.1)	1 (0.3)	45 (14.2)
Zambia	2021	281	0 (0.0)	227 (80.8)	8 (2.8)	46 (16.4)
	2018	798	321 (40.2)	290 (36.3)	59 (7.4)	128 (16.0)
	2019	957	258 (27.0)	419 (43.8)	80 (8.4)	200 (20.9)
	2020	1,017	0 (0.0)	550 (54.1)	117 (11.5)	350 (34.4)
	2021	1,197	0 (0.0)	597 (49.9)	180 (15.0)	420 (35.1)
Zimbabwe	2018	591	416 (70.4)	124 (21.0)	17 (2.9)	34 (5.8)
	2019	546	374 (68.5)	132 (24.2)	13 (2.4)	27 (4.9)
	2020	459	313 (68.2)	96 (20.9)	19 (4.1)	31 (6.8)
	2021	522	0 (0.0)	286 (54.8)	64 (12.3)	172 (33.0)
	Global	2018	3,663	2,404 (65.6)	703 (19.2)	143 (3.9)
2019		3,697	2,225 (60.2)	888 (24.0)	146 (3.9)	450 (12.2)
2020		3,250	1,238 (38.1)	1,201 (37.0)	200 (6.2)	660 (20.3)
2021		3,445	29 (0.8)	1,984 (57.6)	361 (10.5)	1,124 (32.6)

Note. PEPFAR = President's Emergency Plan for AIDS Relief.