

Quarterly Research Digest on Voluntary Medical Male Circumcision for HIV Prevention

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Combination HIV prevention and HIV testing

1. Kuteesa, M. O., et al. **Feasibility of conducting HIV combination prevention interventions in fishing communities in Uganda: A pilot cluster randomised trial.** *PLoS One* 2019;14(3): e0210719.

Online at: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0210719>

OBJECTIVE: We assessed feasibility of an HIV-combination-prevention trial among fishing communities in Uganda.

DESIGN: Cluster randomised trial in four fishing communities on Lake Victoria, Uganda. Two intervention communities received a combination-prevention-package (behaviour change communication, condom promotion, HIV testing, voluntary male medical circumcision and referral for anti-retroviral therapy if HIV-positive). All four communities received routine government HIV care services.

METHODS: Using household census data we randomly selected a cohort of consenting residents aged ≥ 18 years. A baseline sero-survey in July 2014 was followed by two repeat surveys in March and December 2015. We measured uptake of HIV prevention methods, loss-to-follow-up and HIV incidence, accounting for multistage survey design.

RESULTS: A total of 862 participants were enrolled and followed for 15 months. Participation was 62% and 74% in the control and intervention arms respectively; Overall loss to follow up (LTFU) was 21.6% and was similar by arm. Self-reported abstinence/faithfulness increased between baseline and endline in both arms from 53%

to 73% in the control arm, and 55% to 67% in the intervention arm. Reported condom use throughout the study period was 36% in the intervention arm vs 28% in the control arm; number of male participants reporting circumcision in both arms from 58% to 79% in the intervention arm, and 39% to 46% in the control arm. Independent baseline predictors of loss-to-follow-up were: being HIV positive, residence in the community for <1 year, younger age, living in an urban area, and being away from the area for >1 month/year.

CONCLUSIONS: Recruitment and retention of participants in longitudinal trials in highly mobile HIV fishing communities is challenging. Future research should investigate modes for locating and retaining participants, and delivery of HIV-combination prevention.

2. Hosek, S., et al. **HIV prevention interventions for adolescents.** *Curr HIV/AIDS Rep* 2019;6(1): 120-128.

PURPOSE OF THE REVIEW: The goal of this paper is to review recent data on biomedical, behavioral, and structural HIV prevention interventions for adolescents and young adults.

RECENT FINDINGS: While it is accepted that HIV prevention interventions must take an integrated approach to achieve maximum effectiveness, to date, there have been limited, rigorously evaluated combination prevention interventions for adolescents. There are currently a range of effective biomedical, behavioral, and structural approaches that can be integrated into prevention packages to address the prevention needs of adolescents, including oral PrEP, male circumcision, rapid HIV testing, numerous behavioral interventions, and structural interventions such as cash transfers and community mobilization to address gender-based violence.

SUMMARY: There is still a need for rigorously evaluated, innovative combination prevention packages for adolescents. Prevention approaches must take into account the context of young people's lives and address the multiple levels of influence on their lives including parents, partners, and communities.

3. Choko, A. T., et al. **HIV self-testing alone or with additional interventions, including financial incentives, and linkage to care or prevention among male partners of antenatal care clinic attendees in Malawi: An adaptive multi-arm, multi-stage cluster randomised trial.** *PLoS Med* 2019;16(1): e1002719.

Online at:

<https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002719>

BACKGROUND: Conventional HIV testing services have been less comprehensive in reaching men than in reaching women globally, but HIV self-testing (HIVST) appears to be an acceptable alternative. Measurement of linkage to post-test services following HIVST remains the biggest challenge, yet is the biggest driver of cost-effectiveness. We investigated the impact of HIVST alone or with additional interventions on the uptake of testing and linkage to care or prevention among male partners of antenatal care clinic attendees in a novel adaptive trial.

METHODS AND FINDINGS: An adaptive multi-arm, 2-stage cluster randomised trial was conducted between 8 August 2016 and 30 June 2017, with antenatal care clinic (ANC) days (i.e., clusters of women attending on a single day) as the unit of randomisation. Recruitment was from Ndirande, Bangwe, and Zingwangwa primary health clinics in urban Blantyre, Malawi. Women attending an ANC for the first time for their current pregnancy (regardless of trimester), 18 years and older, with a primary male partner not known to be on ART were enrolled in the trial after giving consent. Randomisation was to either the standard of care (SOC; with a clinic invitation letter to the male partner) or 1 of 5 intervention arms: the first arm provided women with 2 HIVST kits for their partners; the second and third arms provided 2 HIVST kits along with a conditional fixed financial incentive of \$3 or \$10; the fourth arm provided 2 HIVST kits and a 10% chance of receiving \$30 in a lottery; and the fifth arm provided 2 HIVST kits and a phone call reminder for the women's partners. The primary outcome was the proportion of male partners who were reported to have tested for HIV and linked into care or prevention within 28 days, with referral for antiretroviral therapy (ART) or circumcision accordingly. Women were interviewed at 28 days about partner testing and adverse events. Cluster-level summaries compared each intervention versus SOC using eligible women as the denominator (intention-to-treat). Risk ratios were adjusted for male partner testing history and recruitment clinic. A total of 2,349/3,137 (74.9%) women participated (71 ANC days), with a mean age of 24.8 years (SD: 5.4). The majority (2,201/2,233; 98.6%) of women were married, 254/2,107 (12.3%) were unable to read and write, and 1,505/2,247 (67.0%) were not employed. The mean age for male partners was 29.6 years (SD: 7.5), only 88/2,200 (4.0%) were unemployed, and 966/2,210 (43.7%) had never tested for HIV before. Women in the SOC arm reported that 17.4% (71/408) of their partners tested for HIV, whereas a much higher proportion of partners were reported to have tested for HIV in all intervention arms (87.0%-95.4%, $p < 0.001$ in all 5 intervention arms). As compared with those who tested in the SOC arm (geometric mean 13.0%), higher proportions of partners met the primary endpoint in the HIVST + \$3 (geometric mean 40.9%, adjusted risk ratio [aRR] 3.01 [95% CI 1.63-5.57], $p < 0.001$), HIVST + \$10 (51.7%, aRR 3.72 [95% CI 1.85-7.48], $p < 0.001$), and phone reminder (22.3%, aRR 1.58 [95% CI 1.07-2.33], $p = 0.021$) arms. In contrast, there was no significant increase in partners meeting the primary endpoint in the HIVST alone (geometric mean 17.5%, aRR 1.45 [95% CI 0.99-2.13], $p = 0.130$) or lottery (18.6%, aRR

1.43 [95% CI 0.96-2.13], $p = 0.211$) arms. The lottery arm was dropped at interim analysis. Overall, 46 male partners were confirmed to be HIV positive, 42 (91.3%) of whom initiated ART within 28 days; 222 tested HIV negative and were not already circumcised, of whom 135 (60.8%) were circumcised as part of the trial. No serious adverse events were reported. Costs per male partner who attended the clinic with a confirmed HIV test result were \$23.73 and \$28.08 for the HIVST + \$3 and HIVST + \$10 arms, respectively. Notable limitations of the trial included the relatively small number of clusters randomised to each arm, proxy reporting of the male partner testing outcome, and being unable to evaluate retention in care.

CONCLUSIONS: In this study, the odds of men's linkage to care or prevention increased substantially using conditional fixed financial incentives plus partner-delivered HIVST; combinations were potentially affordable.

TRIAL REGISTRATION: ISRCTN 18421340.

4. Hatzold, K., et al. **HIV self-testing: breaking the barriers to uptake of testing among men and adolescents in sub-Saharan Africa, experiences from STAR demonstration projects in Malawi, Zambia and Zimbabwe.** *J Int AIDS Soc* 2019;22 Suppl 1: e25244.

Online at: <https://onlinelibrary.wiley.com/doi/full/10.1002/jia2.25244>

INTRODUCTION: Social, structural and systems barriers inhibit uptake of HIV testing. HIV self-testing (HIVST) has shown promising uptake by otherwise underserved priority groups including men, young people and first-time testers. Here, we use characteristics of HIVST kit recipients to investigate delivery to these priority groups during HIVST scale-up in three African countries.

METHODS: Kit distributors collected individual-level age, sex and testing history from all clients. These data were aggregated and analysed by country (Malawi, Zambia and Zimbabwe) for five distribution models: local community-based distributor (CBD: door-to-door, street and local venues), workplace distribution (WD), integration into HIV testing services (IHTS), or public health facilities (IPHF) and during demand creation for voluntary male medical circumcision (VMMC). Used kits were collected and re-read from CBD and IHTS recipients.

RESULTS: Between May 2015 and July 2017, 628,705 HIVST kits were distributed in Malawi (172,830), Zambia (190,787) and Zimbabwe (265,091). Community-based models, the first to be established, accounted for 519,658 (82.7%) of kits distributed, with 275,419 (53.0%) used kits returned. Subsequent model diversification delivered 54,453 (8.7%) test-kits through IHTS, 23,561 (3.7%) through VMMC, 21,183 (3.4%) through IPHF and 9850 (1.7%) through WD. Men took 294,508 (48.2%) kits, and 263,073 (43.1%) went to young people (16 to 24 years). A higher proportion of male self-testers (65,577; 22.3%) were first-time testers than women (54,096; 17.1%) with this apparent

in Zimbabwe (16.2% vs. 11.4%), Zambia (25.4% vs. 17.7%) and Malawi (27.9% vs. 25.9%). The highest proportions of first-time testers were in young (16 to 24 years) and older (>50 years) men (country-ranges: 18.7% to 35.9% and 13.8% to 26.8% respectively). Most IHTS clients opted for HIVST in preference to standard HTS in each of 12 delivery sites, with those selecting HIVST having lower HIV prevalence, potentially due to self-selection.

CONCLUSIONS: HIVST delivered at scale using several different models reached a high proportion of men, young people and first-time testers in Malawi, Zambia and Zimbabwe, some of whom may not have tested otherwise. As men and young people have limited uptake under standard facility- and community-based HIV testing, innovative male- and youth-sensitive approaches like HIVST may be essential to reaching UNAIDS fast-track targets for 2020.

5. Cambiano, V., et al. **The impact and cost-effectiveness of community-based HIV self-testing in sub-Saharan Africa: a health economic and modelling analysis.** *J Int AIDS Soc* 2019;22 Suppl 1: e25243.

Online at: <https://onlinelibrary.wiley.com/doi/full/10.1002/jia2.25243>

INTRODUCTION: The prevalence of undiagnosed HIV is declining in Africa, and various HIV testing approaches are finding lower positivity rates. In this context, the epidemiological impact and cost-effectiveness of community-based HIV self-testing (CB-HIVST) is unclear. We aimed to assess this in different sub-populations and across scenarios characterized by different adult HIV prevalence and antiretroviral treatment programmes in sub-Saharan Africa.

METHODS: The synthesis model was used to address this aim. Three sub-populations were considered for CB-HIVST: (i) women having transactional sex (WTS); (ii) young people (15 to 24 years); and (iii) adult men (25 to 49 years). We assumed uptake of CB-HIVST similar to that reported in epidemiological studies (base case), or assumed people use CB-HIVST only if exposed to risk (condomless sex) since last HIV test. We also considered a five-year time-limited CB-HIVST programme. Cost-effectiveness was defined by an incremental cost-effectiveness ratio (ICER; cost-per-disability-adjusted life-year (DALY) averted) below US\$500 over a time horizon of 50 years. The efficiency of targeted CB-HIVST was evaluated using the number of additional tests per infection or death averted.

RESULTS: In the base case, targeting adult men with CB-HIVST offered the greatest impact, averting 1500 HIV infections and 520 deaths per year in the context of a simulated country with nine million adults, and impact could be enhanced by linkage to voluntary medical male circumcision (VMMC). However, the approach was only cost-effective if the programme was limited to five years or the undiagnosed prevalence was above 3%. CB-HIVST to WTS was the most cost-effective. The main drivers of cost-

effectiveness were the cost of CB-HIVST and the prevalence of undiagnosed HIV. All other CB-HIVST scenarios had an ICER above US\$500 per DALY averted.

CONCLUSIONS: CB-HIVST showed an important epidemiological impact. To maximize population health within a fixed budget, CB-HIVST needs to be targeted on the basis of the prevalence of undiagnosed HIV, sub-population and the overall costs of delivering this testing modality. Linkage to VMMC enhances its cost-effectiveness.

Enhancing uptake of VMMC

1. Bass, E., et al. **Demand creation for primary biomedical prevention: identifying lessons across interventions to inform daily oral preexposure prophylaxis programs.** *Curr Opin HIV AIDS* 2019;14(1): 28-40.

PURPOSE OF REVIEW: At a moment when UNAIDS (Joint United Nations Programme on HIV/AIDS) has acknowledged a 'prevention crisis,' and multiple countries and implementers are emphasizing 'user-centered' and/or differentiated models of delivering HIV treatment and prevention, it is essential to understand and act on best practices from all relevant interventions to create effective oral preexposure prophylaxis (PrEP) programs.

RECENT FINDINGS: It is possible to adapt private sector approaches to understanding and segmenting the preferences and mindsets of potential consumers to primary HIV prevention programs, as demonstrated by a voluntary medical male circumcision (VMMC)-focused intervention that successfully trained and supported counselors to identify and deliver tailored messages to men potentially undergoing VMMC. Literature on PrEP and demand creation is less extensive and suggests uneven application of user-centered design and demand-side thinking; a recent analysis of condom programing demonstrates that failure to maintain resources for social marketing can drive a collapse in use and an increase in HIV incidence.

SUMMARY: Approaches to demand creation for primary prevention are dynamic and evolving. However, the lag between implementation and publication means that there is a paucity of PrEP-specific information. Insights from VMMC and other strategies can and must be considered as part of a more holistic approach to increasing demand for primary prevention interventions.

2. Carrasco, M. A., et al. **Systematic review of barriers and facilitators to voluntary medical male circumcision in priority countries and programmatic implications for service uptake.** *Glob Public Health* 2019;14(1): 91-111.

Online at:

<https://www.tandfonline.com/doi/abs/10.1080/17441692.2018.1465108?journalCode=rgph20>

Voluntary medical male circumcision (VMMC) is an effective biomedical HIV prevention strategy. There is a need to identify key barriers and facilitators to VMMC uptake in priority countries to improve uptake. In this paper, we report findings from a systematic review of the barriers and facilitators of VMMC uptake, comparing them across countries in order to provide programmers critical information to design effective VMMC uptake interventions. Our review followed PRISMA protocol. Twenty three articles from 10 of the 14 priority countries were included. The top three barriers cited were: MC negatively perceived as being practiced by other or foreign cultures and religions, fear of pain caused by the procedure, and perceptions of VMMC as not helpful/needed. The top four facilitators cited in most countries were: Belief that VMMC reduces health risks and improves hygiene, family and peer support of MC, and enhanced sexual performance and satisfaction. The barriers and facilitators highlighted in this paper can help inform programmatic strategies in these countries. More research is needed to ensure that all sub-populations are being adequately reached. By applying this information to new research and programming, these countries can achieve greater VMMC uptake - and thus reductions in HIV transmission and prevalence.

3. Terris-Prestholt, F., et al. **Using discrete choice experiments to inform the design of complex interventions.** *Trials* 2019;20(1): 157.

Online at: <https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-019-3186-x>

BACKGROUND: Complex health interventions must incorporate user preferences to maximize their potential effectiveness. Discrete choice experiments (DCEs) quantify the strength of user preferences and identify preference heterogeneity across users. We present the process of using a DCE to supplement conventional qualitative formative research in the design of a demand creation intervention for voluntary medical male circumcision (VMMC) to prevent HIV in Tanzania.

METHODS: The VMMC intervention was designed within a 3-month formative phase. In-depth interviews ($n = 30$) and participatory group discussions ($n = 20$) sought to identify broad setting-specific barriers to and facilitators of VMMC among adult men. Qualitative results informed the DCE development, identifying the role of female partners, service providers' attitudes and social stigma. A DCE among 325 men in Njombe and Tabora, Tanzania, subsequently measured preferences for modifiable VMMC service characteristics. The final VMMC demand creation intervention design drew jointly on the qualitative and DCE findings.

RESULTS: While the qualitative research informed the community mobilization intervention, the DCE guided the specific VMMC service configuration. The significant positive utilities (u) for availability of partner counselling ($u = 0.43$, $p < 0.01$) and age-separated waiting areas ($u = 0.21$, $p < 0.05$) led to the provision of community information booths for partners and provision of age-separated waiting areas. The

strong disutility of female healthcare providers ($u = -0.24$, $p < 0.01$) led to re-training all providers on client-friendliness.

CONCLUSION: This is, to our knowledge, the first study documenting how user preferences from DCEs can directly inform the design of a complex intervention. The use of DCEs as formative research may help increase user uptake and adherence to complex interventions.

Epidemiological studies

1. Morris, B. J., et al. **Does male circumcision reduce women's risk of sexually transmitted infections, cervical cancer, and associated conditions?** *Front Public Health* 2019;7: 4. Online at: <https://www.frontiersin.org/articles/10.3389/fpubh.2019.00004/full>

BACKGROUND: Male circumcision (MC) is proven to substantially reduce men's risk of a number of sexually transmitted infections (STIs). We conducted a detailed systematic review of the scientific literature to determine the relationship between MC and risk of STIs and associated conditions in women.

METHODS: Database searches by "circumcision women" and "circumcision female" identified 68 relevant articles for inclusion. Examination of bibliographies of these yielded 14 further publications. Each was rated for quality using a conventional rating system.

RESULTS: Evaluation of the data from the studies retrieved showed that MC is associated with a reduced risk in women of being infected by oncogenic human papillomavirus (HPV) genotypes and of contracting cervical cancer. Data from randomized controlled trials and other studies has confirmed that partner MC reduces women's risk not only of oncogenic HPV, but as well *Trichomonas vaginalis*, bacterial vaginosis and possibly genital ulcer disease. For herpes simplex virus type 2, *Chlamydia trachomatis*, *Treponema pallidum*, human immunodeficiency virus and candidiasis, the evidence is mixed. Male partner MC did not reduce risk of gonorrhoea, *Mycoplasma genitalium*, dysuria or vaginal discharge in women.

CONCLUSION: MC reduces risk of oncogenic HPV genotypes, cervical cancer, *T. vaginalis*, bacterial vaginosis and possibly genital ulcer disease in women. The reduction in risk of these STIs and cervical cancer adds to the data supporting global efforts to deploy MC as a health-promoting and life-saving public health measure and supplements other STI prevention strategies.

Impact and coverage

1. Dent, J., et al. **Age targeting and scale-up of voluntary medical male circumcision in Mozambique.** *PLoS One* 2019;14(2): e0211958.

Online at: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0211958>

BACKGROUND: The voluntary medical male circumcision (VMMC) program in Mozambique aimed to increase male circumcision (MC) coverage to 80 percent among males ages 10 to 49 by 2018. Given the difficulty in attracting adult men over age 20 for circumcision, Mozambique became interested in assessing its age-targeting strategy and progress at the provincial level to inform program planning.

METHODS: We examined the impact and cost-effectiveness of circumcising different age groups of men using the Decision Makers' Program Planning Toolkit, Version 2.1 (DMPPT 2). We also applied the model to assess the scale-up efforts through the end of September 2017 and project their impact on HIV incidence through 2030. The DMPPT 2 is a compartmental Excel-based model that analyzes the effects of age at circumcision on program impact and cost-effectiveness. The model tracks changes in age-specific MC coverage due to VMMC program circumcisions. Baseline MC prevalence was based on data from the 2011 Demographic and Health Survey. The DMPPT 2 was populated with HIV incidence projections from Spectrum/Goals under an assumption that Mozambique would reach its national targets for HIV treatment and prevention by 2022.

RESULTS: We estimate the VMMC program increased MC coverage among males ages 10 to 49 from 27 percent in 2009 to 48 percent by end of September 2017. Coverage increased primarily in males ages 10 to 29. VMMCs conducted in the national program through the end of September 2017 are projected to avert 67,076 HIV infections from 2010 to 2030. Scaling up circumcisions in males ages 20 to 29 will have the most immediate impact on HIV incidence, while the greatest impact over a 15-year period is obtained by circumcising males ages 15 to 24 in the majority of priority provinces. Circumcising 80 percent of males ages 10 to 29 can achieve 77 percent of the impact through 2030 compared with circumcising 80 percent of males ages 10 to 49.

CONCLUSION: The VMMC program in Mozambique has made great strides in increasing MC coverage, particularly for males ages 10 to 29. Scaling up and maintaining MC coverage in this age group offers an attainable and cost-effective target for VMMC in Mozambique.

2. Hensen, B., et al. **Application of an HIV prevention cascade to identify gaps in increasing coverage of voluntary medical male circumcision services in 42 rural Zambian communities.** *AIDS Behav* 2019 Feb 8. [epub ahead of print]

Increased coverage of voluntary medical male circumcision (VMMC) is needed in countries with high HIV prevalence. We applied an HIV-prevention cascade to identify

gaps in male circumcision coverage in Zambia. We used survey data collected in 2013 and 2014/15 to describe circumcision coverage at each time-point, and prevalence of variables related to demand for and supply of VMMC. We explored whether circumcision coverage in 2014/15 was associated with demand and supply among uncircumcised men in 2013. Results show that circumcision coverage was 11.5% in 2013 and 18.0% in 2014/15. Levels of having heard of circumcision and agreeing with prevention benefits was similar at both time-points (79.8% vs 83.2%, and 49.7% vs 50.7%, respectively). In 2013, 39.3% of men perceived services to be available compared to 54.7% in 2014/15. Levels of having heard of circumcision in 2013 was correlated with and higher perceived service availability associated with coverage in 2014/15. VMMC coverage was low in these study sites. Knowledge of prevention tools and of service availability are necessary to increase coverage but alone are insufficient.

3. Zhang, C., et al. **Modeling economic and epidemiological impact of voluntary medical male circumcision among men who have sex with men in Beijing, China.** *Int J STD AIDS* 2019 Mar 19: 956462419831859. [epub ahead of print]

Voluntary medical male circumcision (VMMC) among men who have sex with men (MSM) may protect against HIV acquisition. We conducted a series of analyses to assess if expanded VMMC might reduce HIV incidence among MSM effectively and economically. We used a deterministic compartmental model to project new HIV cases (2016-2026) under annual VMMC coverage rates (λ) ranging from 0.0001 to 0.15. The 'number needed to avert' (NNA) is defined as the cumulative number of VMMCs conducted up to that year divided by the cumulative number of HIV cases averted in that specific year. Compared with the baseline circumcision coverage rate, we projected that new HIV cases would be reduced with increasing coverage. By 2026 (last year simulated), the model generated the lowest ratio (11.10) when the annual circumcision rate was the most optimistic ($\lambda = 0.15$). The breakeven point was observed at the year of 2019 with the annual VMMC coverage rate of 0.001. The total cost saved by averting HIV cases would range from 2.5 to 811 million US dollars by the end of 2026 with different hypothetical coverage rates. Our model suggests that acceleration in VMMC implementation among MSM could help stem the HIV/AIDS epidemic.

Male circumcision methods, including devices

1. Mavhu, W., et al. **Is the PrePex device an alternative for surgical male circumcision in adolescents ages 13-17 years? Findings from routine service delivery during active surveillance in Zimbabwe.** *PLoS One* 2019;4(3): e0213399.

Online at: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0213399>

BACKGROUND: Male circumcision devices have the potential to accelerate adolescent voluntary medical male circumcision roll-out. Here, we present findings on safety, acceptability and satisfaction from active surveillance of PrePex implementation among 618 adolescent males (13-17 years) circumcised in Zimbabwe.

METHODS: The first 618 adolescents consecutively circumcised from October 2015 to October 2016 using PrePex during routine service delivery were actively followed up. Outcome measures included PrePex uptake, attendance for post-circumcision visits and adverse events (AEs). A survey was conducted amongst 500 consecutive active surveillance clients to assess acceptability and satisfaction with PrePex.

RESULTS: A total of 1,811 adolescent males were circumcised across the three PrePex active surveillance sites. Of these, 870 (48%) opted for PrePex but only 618/870 (71%) were eligible. Among the 618, two (0.3%) self-removals requiring surgery (severe AEs), were observed. Four (0.6%) removals by providers (moderate AEs) did not require surgery. Another 6 (1%) mild AEs were due to: bleeding (n = 2), swelling (n = 2), and infection (n = 2). All AEs resolved without sequelae. Adherence to follow-up appointments was high (97.7% attended 7 day visit). A high proportion (71.6%) of survey respondents said they heard about PrePex from a mobilizer; 49.8% said they chose PrePex because they wanted to avoid the pain associated with the surgical procedure/surgery on their penis. Acceptability and satisfaction with PrePex was high; 95.4% indicated willingness to recommend PrePex to peers. A majority (92%) reported experiencing pain when PrePex was being removed.

CONCLUSIONS: Active surveillance of the first 618 adolescent males circumcised using PrePex suggests that the device is both safe and acceptable when used in routine service delivery among 13-17 year-olds. There is need to intensify specific demand generation activities for PrePex male circumcision among this group of males.

Public health policy

1. Bulled, N. **Public health's social contract: An obstacle in the advancement of effective HIV technologies.** *Glob Public Health* 2019 Feb 27: 1-11. [Epub ahead of print]
Online at:
<https://www.tandfonline.com/doi/abs/10.1080/17441692.2019.1585468?journalCode=rgph20>

Evidence from the past 40 years of HIV technology development and implementation indicates that the public health social contract - with its expectations of patient/citizen compliance - has hampered global disease control efforts. Despite the availability of a wide array of effective technologies, including antiretroviral drugs as treatment and prevention, voluntary medical male circumcision procedures, and newly developed

intravaginal ring products, new infections among adults globally have not decreased significantly. In this paper, I describe a historical trend of limiting access to effective biomedical technologies to those deemed most deserving and compliant given concerns of misuse (non-adherence), product repurposing (not using the product for purposes originally intended), and the incitement of autonomy (increasing the risk of public exposure to diseases given personal protection from a specific disease). Examining the expectations of good citizenship (compliance, adherence, appropriate product use, and continued risk reduction) as it relates to human-technology interactions, reveals a continuing narrative of initially restricting access to newer technologies perceived fragile or costly based on an assessment of patient/citizen worth. In this, the conventional public health social contract continues to be an obstacle in the advancements of technologies to effectively reduce the global burden of HIV.

2. Njeuhmeli, E., et al. **Using mathematical modeling to inform health policy: A case study from voluntary medical male circumcision scale-up in eastern and southern Africa and proposed framework for success.** *PLoS One* 2019;14(3): e0213605.

Online at: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0213605>

BACKGROUND: Modeling contributes to health program planning by allowing users to estimate future outcomes that are otherwise difficult to evaluate. However, modeling results are often not easily translated into practical policies. This paper examines the barriers and enabling factors that can allow models to better inform health decision-making.

DESCRIPTION: The Decision Makers' Program Planning Tool (DMPPT) and its successor, DMPPT 2, are illustrative examples of modeling tools that have been used to inform health policy. Their use underpinned Voluntary Medical Male Circumcision (VMMC) scale-up for HIV prevention in southern and eastern Africa. Both examine the impact and cost-effectiveness of VMMC scale-up, with DMPPT used initially in global advocacy and DMPPT 2 then providing VMMC coverage estimates by client age and subnational region for use in country-specific program planning. Their application involved three essential steps: identifying and engaging a wide array of stakeholders from the outset, reaching consensus on key assumptions and analysis plans, and convening data validation meetings with critical stakeholders. The subsequent DMPPT 2 Online is a user-friendly tool for in-country modeling analyses and continuous program planning and monitoring.

LESSONS LEARNED: Through three iterations of the DMPPT applied to VMMC, a comprehensive framework with six steps was identified: (1) identify a champion, (2) engage stakeholders early and often, (3) encourage consensus, (4) customize analyses, (5), build capacity, and (6) establish a plan for sustainability. This framework could be

successfully adapted to other HIV prevention programs to translate modeling results to policy and programming.

CONCLUSIONS: Models can be used to mobilize support, strategically plan, and monitor key programmatic elements, but they can also help inform policy environments in which programs are conceptualized and implemented to achieve results. The ways in which modeling has informed VMMC programs and policy may be applicable to an array of other health interventions.

Social and behavioural research

1. Kapumba, B. M., et al. **Perceived HIV-protective benefits of male circumcision: risk compensatory behaviour among women in Malawi.** *PLoS One* 2019;14(2): e0211015.

Online at: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0211015>

BACKGROUND: Male circumcision (MC) reduces men's risk of contracting HIV by approximately 60% and has the potential to significantly alter HIV epidemics. However, MC does not significantly reduce the risk of HIV transmission to women from a circumcised man. In Malawi, several researchers have examined the acceptability, accessibility and sexual behaviour change after circumcision in men but behaviour change in women following their partner's circumcision remains uncertain. In order to fully realise the protective benefits of MC against HIV, factors related to risky sexual behaviour is imperative as some studies have shown potentials of increased risky behaviour in men following voluntary medical male circumcision (VMMC). This study aimed to explore the perceptions and opinions of female school teachers and health workers on HIV-protective benefits of MC and its impact on risk compensatory behaviour among women in Malawi.

METHODS: We conducted a cross-sectional survey of women (N = 68) between May and June 2016 in three districts of southern Malawi. Risk compensatory behaviour was measured by number of sexual partners and use of protection during sex among female teachers and health care workers who are involved with educating people on benefits of VMMC. The bivariable analysis was conducted to test for association between HIV-protective benefits and risk compensatory behaviour. Purposive sampling was used to conduct eight qualitative in-depth interviews with women from the selected districts and the qualitative data was analysed thematically.

RESULTS: The mean age of women who participated in the survey was 30 years. Most women (94.1%) correctly indicated that HIV-positive circumcised men can still infect their partner and approximately, 90% of were knowledgeable of risky sexual behaviour for HIV. However, 55.9% perceived MC can lead women to adopt risky sexual behaviour. On the contrary to this finding, qualitative data indicate women's misconceptions

regarding their partners' circumcision and HIV-protective benefits. Most women expressed that risky sexual behaviour such as having multiple sexual partners and inconsistent or non-use of condoms can easily be observed among women if they learn of their partners' partial HIV-protective benefits circumcision.

CONCLUSION: Exploring women's sexual behaviour change in the right of HIV-protective benefits of MC fills in a research knowledge important to public health. In-depth studies are therefore required to give more evidence that will guide the development of HIV risk-reduction interventions.

2. Chetty-Makkan, C. M., et al. **To speak or not to speak": A qualitative analysis on the attitude and willingness of women to start conversations about voluntary medical male circumcision with their partners in a peri-urban area, South Africa.** *PLoS One* 2019;14(1): e0210480.

Online at: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0210480>

INTRODUCTION: Voluntary medical male circumcision (VMMC) reduces the risk of HIV infection in heterosexual men and has long-term indirect protection for women, yet VMMC uptake in South Africa remains low (49.8%) in men (25-49 years). We explored the attitude and willingness of women to start conversations on VMMC with their sexual partners in a South African peri-urban setting to increase VMMC uptake.

METHODS: Thirty women with median age of 30 years (inter-quartile range 26-33 years) were interviewed in a language of their choice. Key questions included: types of approach to use, gender roles, benefits and barriers to introducing the topic of VMMC, and perceptions of VMMC. Interviews were digitally-recorded, transcribed, and translated. Through a standard iterative process, a codebook was developed (QSR NVIVO 10 software) and inductive thematic analysis applied.

RESULTS: Most women were willing talk to their sexual partners about circumcision, but indicated that the decision to circumcise remained that of their sexual partner. Women felt that they should encourage their partners, show more interest in circumcision, be patient, speak in a caring and respectful tone, choose a correct time when their partner was relaxed and talk in a private space about VMMC. Using magazine/newspaper articles, pamphlets or advertisements were identified as tools that could aid their discussion. Substantial barriers to initiating conversations on VMMC included accusations by partner on infidelity, fear of gender-based violence, cultural restrictions and hesitation to speak to a mature partner about circumcision.

CONCLUSIONS: Women need to ensure that before talking to their partner about circumcision, the environment and approach that they use are conducive. Female social network forums could be used to educate women on conversation techniques, skills to use when talking to their partners and how to address communication challenges about

circumcision. Involvement of women in VMMC awareness campaigns could encourage circumcision uptake among men.

3. Mukudu, H., et al. **Voluntary medical male circumcision (VMMC) for prevention of heterosexual transmission of HIV and risk compensation in adult males in Soweto: Findings from a programmatic setting.** *PLoS One* 2019;14(3): e0213571.

Online at: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0213571>

BACKGROUND: Clinical trials have clearly shown a reduction in HIV acquisition through voluntary medical male circumcision (VMMC). However, data assessing risk compensation under programmatic conditions is limited.

METHODS: This was a prospective cohort of HIV seronegative males aged 18-40 years receiving VMMC between November 2012 and July 2014. HIV serostatus was determined pre and post VMMC. Risk compensation was defined as a decrease in condom use at last sex act and/or an increase in concurrent sexual relationships, both measured twelve months post-circumcision.

RESULTS: A total of 233 males were enrolled and underwent voluntary medical male circumcision (VMMC) for prevention against HIV. There was no evidence of risk compensation post-circumcision as defined in this study. Significant increases in proportion of participants in the 18-24 years age group who knew the HIV status of their sexual partner (39% to 56%, $p = 0.0019$), self-reported condom use at last sex act (21% to 34%, $p = 0.0106$) and those reporting vaginal sexual intercourse in the past 12 months (67% to 79%, $p\text{-value} = <0.0001$) were found. In both 18-24 and 25-40 years age groups, there was a significant increase in perception of being at risk of contracting HIV (70% to 84%, $p\text{-value} = <0.0001$).

CONCLUSION: No significant risk compensation was observed in this study on comparing pre-and post-circumcision behaviour. An increase in proportion of participants in the 18-24 years age group who had vaginal intercourse in the first 12 months post-circumcision as a possibility of risk compensation was minimal and negated by an increase in proportion of those reporting using a condom at the last sex act, increase in knowledge of partner's HIV status and lack of increase in alcohol post-circumcision.

Traditional circumcision

1. Hove, J., et al. **Incorporating voluntary medical male circumcision into traditional circumcision contexts: experiences of a local consortium in Zimbabwe collaborating with an ethnic group.** *Glob Health Sci Pract* 2019;7(1): 138-146.

Online at: <http://www.ghspjournal.org/content/7/1/138.long>

Employing voluntary medical male circumcision (VMMC) within traditional settings may increase patient safety and help scale up male circumcision efforts in sub-Saharan Africa. In Zimbabwe, the VaRemba are among the few ethnic groups that practice traditional male circumcision, often in suboptimal hygienic environments. ZAZIC, a local consortium, and the Zimbabwe Ministry of Health and Child Care (MoHCC) established a successful, culturally sensitive partnership with the VaRemba to provide safe, standardized male circumcision procedures and reduce adverse events (AEs) during traditional male circumcision initiation camps. The foundation for the VaRemba Camp Collaborative (VCC) was established over a 4-year period, between 2013 and 2017, with support from a wide group of stakeholders. Initially, ZAZIC supported VaRemba traditional male circumcisions by providing key commodities and transport to help ensure patient safety. Subsequently, 2 male VaRemba nurses were trained in VMMC according to national MoHCC guidelines to enable medical male circumcision within the camp. To increase awareness and uptake of VMMC at the upcoming August-September 2017 camp, ZAZIC then worked closely with a trained team of circumcised VaRemba men to create demand for VMMC. Non-VaRemba ZAZIC doctors were granted permission by VaRemba leaders to provide oversight of VMMC procedures and postoperative treatment for all moderate and severe AEs within the camp setting. Of 672 male camp residents ages 10 and older, 657 (98%) chose VMMC. Only 3 (0.5%) moderate infections occurred among VMMC clients; all were promptly treated and healed well. Although the successful collaboration required many years of investment to build trust with community leaders and members, it ultimately resulted in a successful model that paired traditional circumcision practices with modern VMMC, suggesting potential for replicability in other similar sub-Saharan African communities.

VMMC – general

3. Gray, R. H. **Male circumcision for HIV and STI prevention: a reflection.** *Clin Chem* 2019;65(1): 15-18.

Since the 1990s, the Rakai Health Sciences Program has worked on male circumcision for prevention of HIV and other sexually transmitted infections (STIs) through a series of studies conducted in rural Rakai district of south-central Uganda. This reflection summarizes our work, progressing from observational studies, clinical trials, assessment of effectiveness in programmatic settings, and implementation science to improve efficiency and cost-effectiveness. To better understand the biologic effects of circumcision, we also assessed penile histopathology, immunology, and the microbiome. These and other studies have established circumcision as a major component of HIV prevention strategies in sub-Saharan Africa (1) and have affected policies in the US.