

Quarterly Research Digest on Voluntary Medical Male Circumcision for HIV Prevention

1. Awori, Q. D., et al. **Use of the ShangRing circumcision device in boys below 18 years old in Kenya: results from a pilot study.** *J Int AIDS Soc* 2017;20(1): 21588.
Online at: <http://onlinelibrary.wiley.com/doi/10.7448/IAS.20.1.21588/abstract;jsessionid=695BAEA03B1E3F2251A8552EB4BC3CA8.f03t01>

INTRODUCTION: Male circumcision is a proven prevention strategy against the spread of HIV. The World Health Organization's new 2016-2021 strategic framework on voluntary medical male circumcision (VMMC) targets 90% of males aged 10-29 years to receive circumcision by 2021 in 14 priority sub-Saharan countries while anticipating an increase in the demand for infant circumcision. It also states that the use of circumcision devices is a safe and efficient innovation to accelerate attainment of these goals. The primary objective of this pilot study was to evaluate the safety and acceptability of the ShangRing, a novel circumcision device, in boys below 18 years of age.

METHODS: A total of 80 boys, 3 months to 17 years old, were circumcised using the no-flip ShangRing technique. All rings were removed 5-7 days later. Participants were evaluated weekly until the wound was completely healed. Data on procedure times, adverse events (AEs), time to clinical wound healing and satisfaction were recorded and analysed.

RESULTS: Nearly all (79/80, 98.8%) circumcisions were successfully completed using the no-flip ShangRing technique without complications. In one (1.2%) case, the outer ring slipped off after the foreskin was removed and the procedure was completed by stitching. The mean circumcision and ring removal times were 7.4 +/- 3.2 and 4.4 +/- 4.2 min, respectively. There were four (5%) moderate AEs, which were managed conservatively. No severe AEs occurred. The mean time to complete clinical healing was 29.8 +/- 7.3 days. Participants or their parents liked ShangRing circumcision because it improved hygiene, was quick and possessed an excellent cosmetic appearance. Most (72/80, 94.7%) were very satisfied with the appearance of the circumcised penis, and all (100%) said they would recommend circumcision to others.

CONCLUSIONS: Our results suggest that no-flip ShangRing VMMC is safe and acceptable in boys below 18 years of age. Our results are to be compared those seen following ShangRing VMMC in African men. Further study with larger sample sizes are needed to explore the scalability of the ShangRing in larger paediatric cohorts in Africa. We believe that the ShangRing has great potential for use in all age groups from neonates to adults, which would simplify device implementation.

2. Bailey, R. C., et al. **Prospective comparison of two models of integrating early infant male circumcision with maternal child health services in Kenya: The Mtoto Msafi Mbili Study.** *PLoS One* 2017;12(9): e0184170.
Online at: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0184170>

As countries scale up adult voluntary medical male circumcision (VMMC) for HIV prevention, they are looking ahead to long term sustainable strategies, including introduction of early infant male circumcision (EIMC). To address the lack of evidence regarding introduction of EIMC services in sub-Saharan African settings, we conducted a simultaneous, prospective comparison of two models of EIMC service delivery in Homa Bay County, Kenya. In one division a standard delivery package (SDP) was introduced and included health facility-based provision of EIMC services with community engagement for client referral versus in a different division a standard package plus (SDPplus) that included community-delivered EIMC services. Babies 1-60 days old were eligible for EIMC. A representative sample of mothers and fathers of baby boys at 16 health facilities was surveyed. We examined differences between mothers and fathers in the SDP and SDPplus divisions and identified factors associated with EIMC uptake. We report adjusted prevalence ratios (aPR). Of 1660 mothers interviewed, 1501 (89%) gave approval to contact the father, and 1259 fathers (84%) were interviewed. The proportion of babies circumcised was slightly greater in the SDPplus division than the SDP division (27.3% vs 23.7%), but the difference was not significant ($p = 0.08$). In adjusted analyses, however, the prevalence of babies being circumcised was greater in the SDPplus division (aPR = 1.23, 95% CI: 1.04-1.45) and the factors associated with a baby being circumcised were the mother having received information about EIMC (during pregnancy, aPR = 4.81, 95% CI: 2.21-3.42), having discussed circumcision with the father if married or cohabiting (aPR = 5.39, 95% CI: 3.31-8.80) or being single (aPR = 5.67, 95% CI: 3.31-9.69), perceiving herself to be living with HIV (aPR = 1.39, 95% CI: 1.15-1.67), or having a post-secondary education (aPR = 1.33, 95% CI: 1.04-1.69), and the father being Muslim (aPR = 1.85, 95% CI: 1.29-2.65) or circumcised (aPR = 1.34, 95% CI: 1.13-1.59). The median age of 2117 babies circumcised was 8 days (IQR: 1-36), and the median weight was 3.6 kg (IQR: 3.2-4.4). There were 6 moderate adverse events (AEs) (0.28%); 5 severe AEs (0.24%), all involving an injury to the glans penis, requiring hospitalization and corrective surgery; and one death probably related to the procedure. There were no AEs among the 365 procedures performed outside health facilities. Information and education campaigns must reach members of the general population, especially men and fathers, who are influential to the EIMC decision. Serious AEs using the Mogen clamp are rare, but do occur and require efficient, reliable emergency back-up. Our results can assist countries considering scale-up of EIMC services for HIV prevention as their adult VMMC programs mature.

3. Blaizot, S., et al. **Combined interventions to reduce HIV incidence in KwaZulu-Natal: a modelling study.** *BMC Infect Dis* 2017;17(1): 522.
Online at: <https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-017-2612-5>

BACKGROUND: Combined prevention interventions, including early antiretroviral therapy initiation, may substantially reduce HIV incidence in hyperendemic settings. Our aim was to assess the potential short-term impact of combined interventions on HIV spreading in the adult population of Mbongolwane and Eshowe (KwaZulu-Natal, South Africa) using sex- and age-specific scenarios, and age-targeted interventions.

METHODS: A mathematical model was used with data on adults (15-59 years) from the Mbongolwane and Eshowe HIV Impact in Population Survey to compare the effects of various interventions on the HIV incidence rate. These interventions included increase in antiretroviral therapy (ART) coverage with extended eligibility criteria, increase in voluntary medical male circumcision (VMMC), and implementation of pre-exposure prophylaxis (PrEP) among women.

RESULTS: With no additional interventions to the ones in place at the time of the survey (ART at CD4 < 350 and VMMC), incidence will decrease by 24% compared to the baseline rate. The implementation of "ART at CD4<500" or "ART for all" would reduce further the incidence rate by additional 8% and 15% respectively by 4 years and 20% and 34% by 10 years. Impacts would be higher with age-targeted scenarios than without.

CONCLUSIONS: In Mbongolwane and Eshowe, implementation of the new South African guidelines, recommending ART initiation regardless of CD4 count, would accelerate incidence reduction. In this setting, combining these guidelines, VMMC, and PrEP among young women could be an effective strategy in reducing the incidence to low levels.

4. Bossio, J. A., et al. **Attitude toward one's circumcision status is more important than actual circumcision status for men's body image and sexual functioning.** *Arch Sex Behav* 2017 Sep 11. [Epub ahead of print]

Research exploring the impact of circumcision on the sexual lives of men has failed to consider men's attitudes toward their circumcision status, which may, in part, help to explain inconsistent findings in the literature. The current study explored the potential relationship between attitudinal factors toward one's circumcision status, timing of one's circumcision, and sexual correlates. A total of 811 men (367 circumcised as neonates, 107 circumcised in childhood, 47 circumcised in adulthood, and 290 intact) aged 19-84 years (M = 33.02, SD = 12.54) completed an online survey. We assessed attitudes toward one's circumcision status, three domains of body image (Male Genital Image Scale, Body Exposure during Sexual Activities Questionnaire, Body Image Satisfaction Scale), and self-reported sexual functioning (International Index of Erectile Function). Men who were circumcised as adults or intact men reported higher satisfaction with their circumcision status than those who were circumcised neonatally or in childhood. Lower satisfaction with one's circumcision status-but not men's actual circumcision status-was associated with worse body image and sexual functioning. These findings identify the need to control for attitudes toward circumcision status in the study of sexual outcomes related to circumcision. Future research is required to estimate the number of men who are dissatisfied with their circumcision status, to explore the antecedents of distress in this subpopulation, and to understand the extent of negative sexual outcomes associated with these attitudes.

5. Fatti, G., et al. **Low HIV incidence in pregnant and postpartum women receiving a community-based combination HIV prevention intervention in a high HIV incidence setting in South Africa.** *PLoS One* 2017;12(7): e0181691.
Online at: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0181691>

BACKGROUND: Young Southern African women have the highest HIV incidence globally. Pregnancy doubles the risk of HIV acquisition further, and maternal HIV acquisition contributes significantly to the paediatric HIV burden. Little data on combination HIV prevention interventions during pregnancy and lactation are available. We measured HIV incidence amongst pregnant and postpartum women receiving a community-based combination HIV prevention intervention in a high HIV incidence setting in South Africa.

METHODS: A cohort study that included HIV-uninfected pregnant women was performed. Lay community-based workers provided individualized HIV prevention counselling and performed

three-monthly home and clinic-based individual and couples HIV testing. Male partners were referred for circumcision, sexually transmitted infections or HIV treatment as appropriate. Kaplan-Meier analyses and Cox's regression were used to estimate HIV incidence and factors associated with HIV acquisition.

RESULTS: The 1356 women included (median age 22.5 years) received 5289 HIV tests. Eleven new HIV infections were detected over 828.3 person-years (PY) of follow-up, with an HIV incidence rate of 1.33 infections/100 PY (95% CI: 0.74-2.40). Antenatally, the HIV incidence rate was 1.49 infections/100 PY (95% CI: 0.64-2.93) and postnatally the HIV incidence rate was 1.03 infections/100 PY (95% CI: 0.33-3.19). 53% of male partners received HIV testing and 66% of eligible partners received referral for circumcision. Women within known serodiscordant couples, and women with newly diagnosed HIV-infected partners, adjusted hazard ratio (aHR) = 32.7 (95% CI: 3.8-282.2) and aHR = 126.4 (95% CI: 33.8-472.2) had substantially increased HIV acquisition, respectively. Women with circumcised partners had a reduced risk of incident HIV infection, aHR = 0.22 (95% CI: 0.03-1.86).

CONCLUSIONS: Maternal HIV incidence was substantially lower than previous regional studies. Community-based combination HIV prevention interventions may reduce high maternal HIV incidence in resource-poor settings. Expanded roll-out of home-based couples HIV testing and initiating pre-exposure prophylaxis for pregnant women within serodiscordant couples is needed in Southern Africa.

6. Golomski, C., et al. **Christians' cut: popular religion and the global health campaign for medical male circumcision in Swaziland.** *Cult Health Sex* 2017;19(8): 844-858.

Swaziland faces one of the worst HIV epidemics in the world and is a site for the current global health campaign in sub-Saharan Africa to medically circumcise the majority of the male population. Given that Swaziland is also majority Christian, how does the most popular religion influence acceptance, rejection or understandings of medical male circumcision? This article considers interpretive differences by Christians across the Kingdom's three ecumenical organisations, showing how a diverse group people singly glossed as 'Christian' in most public health acceptability studies critically rejected the procedure in unity, but not uniformly. Participants saw medical male circumcision's promotion and messaging as offensive and circumspect, and medical male circumcision as confounding gendered expectations and sexualised ideas of the body in Swazi Culture. Pentecostal-charismatic churches were seen as more likely to accept medical male circumcision, while traditionalist African Independent Churches rejected the operation. The procedure was widely understood to be a personal choice, in line with New Testament-inspired commitments to metaphorical circumcision as a way of receiving God's grace.

7. Govender, K., et al. **Risk compensation following medical male circumcision: results from a 1-year prospective cohort study of young school-going men in KwaZulu-Natal, South Africa.** *Int J Behav Med* 2017 Jul 7. [Epub ahead of print]

PURPOSE: This study sought to assess risk compensation following voluntary medical male circumcision of young school-going men. Risk compensation is defined as an inadvertent increase in sexual risk behaviors and a corresponding decrease in self-perceived risk for contracting HIV following the application of a risk reduction technology.

METHODS: This study documented the sexual practices of circumcised (n = 485) and uncircumcised (n = 496) young men in 42 secondary schools at three time points (baseline and 6 and 12 months) in a sub-district of KwaZulu-Natal, South Africa. Study participants were aged from 16 to 24 years old.

RESULTS: At the end of the study period, there was no significant difference between the two cohorts concerning learners' perceptions of being at risk of contracting HIV (interaction effect: $b = -0.12$, $p = 0.40$). There was also no significant difference in the number of sexual partners in the previous month (interaction effect: $b = -0.23$, $p = 0.15$). The proportion of learners who have never used a condom decreased significantly over time (time effect: $b = -0.27$, $p = 0.01$), and there was no difference between the circumcised and uncircumcised learners (interaction effect: $b = -0.09$, $p = 0.91$).

CONCLUSIONS: Risk compensation, as evidenced in this study over a 1-year period, was not associated with undergoing voluntary medical male circumcision (VMMC) in our sample of young school-going men. However, it is of concern that at the end of this study, less than half of the sexually active sample in a high-HIV-prevalence community used condoms consistently in the previous month (39% for both study cohorts). The latter underscores the need to view VMMC as a potential entry point for planned HIV and sexuality education interventions targeting young men in this community.

8. Gyan, T., et al. **The influence of socioeconomic factors on choice of infant male circumcision provider in rural Ghana; a community level population based study.** *BMC Pediatr* 2017;17(1): 185.

Online at: <https://bmcpediatr.biomedcentral.com/articles/10.1186/s12887-017-0937-2>

BACKGROUND: The influence of socio-economic determinants on choice of infant male circumcision provider is not known in areas with high population coverage such as rural Africa. The overall aim of this study was to determine the key socio-economic factors which influence the choice of infant male circumcision provider in rural Ghana.

METHODS: The study investigated the effect of family income, distance to health facility, and cost of the circumcision on choice of infant male circumcision provider in rural Ghana. Data from 2847 circumcised infant males aged under 12 weeks and their families were analysed in a population-based cross-sectional study conducted from May to December 2012 in rural Ghana. Multivariable logistic regression models were adjusted for income status, distance to health facility, cost of circumcision, religion, maternal education, and maternal age.

RESULTS: Infants from the lowest income households (325, 84.0%) were more likely to receive circumcision from an informal provider compared to infants from the highest income households (260, 42.4%) even after adjusting for religious affiliation (adjusted odds ratio [aOR] 4.42, 95% CI 3.12-6.27 $p < 0.001$). There appeared to be a dose response with increasing risk of receiving a circumcision from an informal provider as distance to a health facility increased (aOR 1.25, 95 CI 1.30-1.38 $P < 0.001$). Only 9.0% (34) of families in the lowest socio-economic quintile received free circumcision services compared to 27.9% (171) of the highest income families.

CONCLUSIONS: The Government of Ghana and Non-Government Organisations should consider additional support to poor families so they can access high quality free infant male circumcision in rural Ghana.

9. Han, H., et al. **Novel penile circumcision suturing devices versus the shang ring for adult male circumcision: a prospective study.** *Int Braz J Urol* 2017 43(4): 736-745.
Online at: http://www.intbrazjurol.com.br/pdf/vol43n04/Han_736_745.pdf

INTRODUCTION: To evaluate the safety and efficacy of a novel penile circumcision suturing devices PCSD and Shang ring (SR) for circumcision in an adult population.

MATERIALS AND METHODS: A total of 124 outpatients were randomly assigned to receive PCSD (n=62) or SR (n=62). Patient characteristics, operative time, blood loss, return to normal activities time (RNAT), visual analogue scale (VAS), scar width, wound healing time, cosmetic result, and complications were recorded.

RESULTS: There were no significant differences in blood loss, RNAT, or complications between the two groups. There were no significant differences in the VAS scores at the operation, and 6 or 24 hours after surgery ($P>0.05$). The wound scar width was wider in the SR group than in the PCSD group ($P<0.01$). Patients in the SR group had significantly longer wound healing time compared with those in the PCSD group ($P<0.01$). Patients who underwent PCSD were significantly more satisfied with the cosmetic results ($P<0.01$).

CONCLUSIONS: SR and PCSD are safe and effective minimally invasive techniques for adult male circumcision. Compared with SRs, PCSDs have the advantages of faster postoperative incision healing and a good effect on wound cosmetics.

10. Kaufman, M. R., et al. **Voluntary medical male circumcision among adolescents: a missed opportunity for HIV behavioral interventions.** *AIDS* 2017;31(Suppl 3): S233-S241.
Online at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5497778/>

OBJECTIVE: Voluntary medical male circumcision (VMMC) is one of the first opportunities for adolescent males in African countries to interact with the healthcare system. This study explored the approaches used during adolescent VMMC counseling and whether these strategies maximize broader HIV prevention opportunities.

METHODS: Qualitative interviews were conducted with 92 VMMC clients ages 10-19 years in South Africa (n = 36), Tanzania (n = 36), and Zimbabwe (n = 20) and 33 VMMC providers across the three countries. Discussions explored HIV prevention counseling, testing, and disclosure of results. Audio recordings were transcribed, translated into English, and coded thematically by two individuals.

RESULTS: Male adolescents in all three countries reported that limited information was provided about HIV prevention and care, and adolescents were rarely provided condoms. Although VMMC protocols require opt-out HIV testing, adolescents recounted having blood taken without knowing the purpose, not receiving results, nor completely understanding the link between VMMC and HIV. Most males interviewed assumed they had tested negative because they were subsequently circumcised without knowing test results. Providers reported spending

little time talking about HIV prevention, including condom use. They admitted that younger adolescent clients often receive little information if assumed they are not sexually active or too young to understand and instead discussed nonsexually transmitted routes of HIV.

CONCLUSION: In the sites of the three countries studied, HIV prevention and care messages were inconsistent and sometimes totally absent from VMMC counseling sessions. VMMC appears to be a missed opportunity to engage in further HIV prevention and care with adolescents.

11. Lilleston, P. S., et al. **Multilevel influences on acceptance of medical male circumcision in Rakai District, Uganda.** *AIDS Care* 2017 29(8): 1049-1055.

Despite access to safe medical male circumcision (MMC) and proven effectiveness of the procedure in reducing acquisition of HIV and other sexually transmitted infections, uptake remains suboptimal in many settings in sub-Saharan Africa, including Rakai District, Uganda. This study explored multilevel barriers and facilitators to MMC in focus group discussions (FGDs) (n = 35 groups) in Rakai. Focus groups were conducted from May through July 2012 with adolescent and adult males, with a range of HIV risk and reproductive health service use profiles, and with adolescent and adult females. Data were analyzed using Atlas.ti and an inductive approach. Participants' discussions produced several key themes representing multilevel influences that may facilitate or create barriers to uptake of MMC. These include availability of MMC services, economic costs, masculine ideals, religion, and social influence. Understanding how males and females view MMC is a crucial step towards increasing uptake of the procedure and reducing disease transmission.

12. Liu, C. M., et al. **Penile anaerobic dysbiosis as a risk factor for HIV infection.** *MBio* 2017;8(4): 1049-1055.

Sexual transmission of HIV requires exposure to the virus and infection of activated mucosal immune cells, specifically CD4+ T cells or dendritic cells. The foreskin is a major site of viral entry in heterosexual transmission of HIV. Although the probability of acquiring HIV from a sexual encounter is low, the risk varies even after adjusting for known HIV risk factors. The genital microbiome may account for some of the variability in risk by interacting with the host immune system to trigger inflammatory responses that mediate the infection of mucosal immune cells. We conducted a case-control study of uncircumcised participants nested within a randomized-controlled trial of male circumcision in Rakai, Uganda. Using penile (coronal sulcus) swabs collected by study personnel at trial enrollment, we characterized the penile microbiome by sequencing and real-time PCR and cytokine levels by electrochemiluminescence assays. The absolute abundances of penile anaerobes at enrollment were associated with later risk of HIV seroconversion, with a 10-fold increase in *Prevotella*, *Dialister*, *Finnegoldia*, and *Peptoniphilus* increasing the odds of HIV acquisition by 54 to 63%, after controlling for other known HIV risk factors. Increased abundances of anaerobic bacteria were also correlated with increased cytokines, including interleukin-8, which can trigger an inflammatory response that recruits susceptible immune cells, suggesting a mechanism underlying the increased risk. These same anaerobic genera can be shared between heterosexual partners and are associated with increased HIV acquisition in women, pointing to anaerobic dysbiosis in the genital microbiome and an accompanying inflammatory response as a novel, independent, and transmissible risk factor for HIV infection.

IMPORTANCE: We found that uncircumcised men who became infected by HIV during a 2-year clinical trial had higher levels of penile anaerobes than uncircumcised men who remained HIV negative. We also found that having higher levels of penile anaerobes was also associated with higher production of immune factors that recruit HIV target cells to the foreskin, suggesting that anaerobes may modify HIV risk by triggering inflammation. These anaerobes are known to be shared by heterosexual partners and are associated with HIV risk in women. Therefore, penile anaerobes may be a sexually transmissible risk factor for HIV, and modifying the penile microbiome could potentially reduce HIV acquisition in both men and women.

13. Matthews, L. T., et al. **Beyond HIV-serodiscordance: Partnership communication dynamics that affect engagement in safer conception care.** *PLoS One* 2017;12(9): e0183131.
Online at: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0183131>

INTRODUCTION: We explored acceptability and feasibility of safer conception methods among HIV-affected couples in Uganda.

METHODS: We recruited HIV-positive men and women on antiretroviral therapy (ART) ('index') from the Uganda Antiretroviral Rural Treatment Outcomes cohort who reported an HIV-negative or unknown-serostatus partner ('partner'), HIV-serostatus disclosure to partner, and personal or partner desire for a child within two years. We conducted in-depth interviews with 40 individuals from 20 couples, using a narrative approach with tailored images to assess acceptability of five safer conception strategies: ART for the infected partner, pre-exposure prophylaxis (PrEP) for the uninfected partner, condomless sex timed to peak fertility, manual insemination, and male circumcision. Translated and transcribed data were analyzed using thematic analysis.

RESULTS: 11/20 index participants were women, median age of 32.5 years, median of 2 living children, and 80% had HIV-RNA <400 copies/mL. Awareness of HIV prevention strategies beyond condoms and abstinence was limited and precluded opportunity to explore or validly assess acceptability or feasibility of safer conception methods. Four key partnership communication challenges emerged as primary barriers to engagement in safer conception care, including: (1) HIV-serostatus disclosure: Although disclosure was an inclusion criterion, partners commonly reported not knowing the index partner's HIV status. Similarly, the partner's HIV-serostatus, as reported by the index, was frequently inaccurate. (2) Childbearing intention: Many couples had divergent childbearing intentions and made incorrect assumptions about their partner's desires. (3) HIV risk perception: Participants had disparate understandings of HIV transmission and disagreed on the acceptable level of HIV risk to meet reproductive goals. (4) Partnership commitment: Participants revealed significant discord in perceptions of partnership commitment. All four types of partnership miscommunication introduced constraints to autonomous reproductive decision-making, particularly for women. Such miscommunication was common, as only 2 of 20 partnerships in our sample were mutually-disclosed with agreement across all four communication themes.

CONCLUSIONS: Enthusiasm for safer conception programming is growing. Our findings highlight the importance of addressing gendered partnership communication regarding HIV disclosure, reproductive goals, acceptable HIV risk, and commitment, alongside technical safer conception advice. Failing to consider partnership dynamics across these domains risks limiting reach, uptake, adherence to, and retention in safer conception programming.

14. Maughan-Brown, B., et al. **Accuracy and determinants of perceived HIV risk among young women in South Africa.** *BMC Public Health* 2017;18(1): 42.
Online at: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-017-4593-0>

BACKGROUND: HIV risk perceptions are a key determinant of HIV testing. The success of efforts to achieve an AIDS-free generation - including reaching the UNAIDS 90-90-90 target - thus depends critically on the content of these perceptions. We examined the accuracy of HIV-risk perceptions and their correlates among young black women in South Africa, a group with one of the highest HIV incidence rates worldwide.

METHODS: We used individual-level longitudinal data from the Cape Area Panel Study (CAPS) from 2005 to 2009 on black African women (20-30 years old in 2009) to assess the association between perceived HIV-risk in 2005 and the probability of testing HIV-positive four years later. We then estimated multivariable logistic regressions using cross-sectional data from the 2009 CAPS wave to assess the relationship between risk perceptions and a wide range of demographic, sexual behaviour and psychosocial covariates of perceived HIV-risk.

RESULTS: We found that the proportion testing HIV-positive in 2009 was almost identical across perceived risk categories in 2005 (no, small, moderate, great) ($\chi^2 = 1.43$, $p = 0.85$). Consistent with epidemiologic risk factors, the likelihood of reporting moderate or great HIV-risk perceptions was associated with condom-use (aOR: 0.57; 95% CI: 0.36, 0.89; $p < 0.01$); having ≥ 3 lifetime partners (aOR: 2.38, 95% CI: 1.53, 3.73; $p < 0.01$); knowledge of one's partner's HIV status (aOR: 0.67; 95% CI: 0.43, 1.07; $p = 0.09$); and being in an age-disparate partnership (aOR: 1.73; 95% CI: 1.09, 2.76; $p = 0.02$). However, the likelihood of reporting moderate or great self-perceived risk did not vary with sexually transmitted disease history and respondent age, both strong predictors of HIV risk in the study setting. Risk perceptions were associated with stigmatising attitudes (aOR: 0.53; 95% CI: 0.26, 1.09; $p = 0.09$); prior HIV testing (aOR: 0.21; 95% CI: 0.13, 0.35; $p < 0.01$); and having heard that male circumcision is protective (aOR: 0.38; 95% CI: 0.22, 0.64; $p < 0.01$).

CONCLUSIONS: Results indicate that HIV-risk perceptions are inaccurate. Our findings suggest that this inaccuracy stems from HIV-risk perceptions being driven by an incomplete understanding of epidemiological risk and being influenced by a range of psycho-social factors not directly related to sexual behaviour. Consequently, new interventions are needed to align perceived and actual HIV risk.

15. Oddo, A. R., et al. **Prevalence of preoperative penile abnormalities among voluntary male medical circumcision patients in Swaziland.** *J Pediatr Surg* 2017;52(8): 1332-1334.
Online at: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-017-4593-0>

BACKGROUND: Circumcision has been found to be an effective strategy for lowering the transmission of HIV in Africa. The Luke Commission, a mobile hospital outreach program, has used this information to decrease the rate of HIV in Swaziland by performing voluntary male medical circumcisions throughout the country. During many of these circumcisions, genital medical conditions and penile abnormalities are simultaneously discovered and corrected.

PURPOSE: The goal of our study was to evaluate the prevalence of penile abnormalities discovered and treated during voluntary male medical circumcisions performed by The Luke Commission (TLC) throughout rural Swaziland.

BASIC PROCEDURES: We completed a retrospective analysis of all male patients who underwent voluntary male medical circumcision performed by TLC during a period from June-August, 2014. The penile abnormalities included: phimosis, paraphimosis, epispadias, hypospadias, ulcers, balanitis, torsion, and foreskin adherent to the glans.

MAIN FINDINGS: Of 929 total circumcisions, 771 (83%) patients had at least one pre-existing penile abnormality identified during their examinations and procedures, totaling 1110 abnormalities. Three specific abnormalities were detected - phimosis, adherent foreskin, and hypospadias. The 6-12 and 13-19 age groups had adequate sample sizes to yield precise estimates of prevalence (age group 6-12: 87% (95% confidence interval [CI]=84-90%; age group 13-19: 79% (95% CI=74-84%).

PRINCIPLE CONCLUSIONS: The Luke Commission is improving the lives of children and adults with limited access to healthcare through regular preoperative evaluations during male circumcision, and the organization is setting an example for other international healthcare groups.

LEVEL OF EVIDENCE: Type of Study: Prognostic Study, Level II.

16. Redman-MacLaren, M., et al. **Implications of male circumcision for women in Papua New Guinea: a transformational grounded theory study.** *BMC Womens Health* 2017;17(1): 53. Online at: <https://bmcwomenshealth.biomedcentral.com/articles/10.1186/s12905-017-0406-y>

BACKGROUND: Male circumcision reduces the risk of female-to-male transmission of human immunodeficiency virus (HIV) and is being explored for HIV prevention in Papua New Guinea (PNG). PNG has a concentrated HIV epidemic which is largely heterosexually transmitted. There are a diverse range of male circumcision and penile modification practices across PNG. Exploring the implications of male circumcision for women in PNG is important to inform evidence-based health policy that will result in positive, intended consequences.

METHODS: The transformational grounded theory study incorporated participatory action research and decolonizing methodologies. In Phase One, an existing data set from a male circumcision study of 861 male and 519 female participants was theoretically sampled and analyzed for women's understanding and experience of male circumcision. In Phase Two of the study, primary data were co-generated with 64 women in seven interpretive focus group discussions and 11 semi-structured interviews to develop a theoretical model of the processes used by women to manage the outcomes of male circumcision. In Phase Three participants assisted to refine the developing transformational grounded theory and identify actions required to improve health.

RESULTS: Many women know a lot about male circumcision and penile modification and the consequences for themselves, their families and communities. Their ability to act on this knowledge is determined by numerous social, cultural and economic factors. A transformational grounded theory was developed with connecting categories of: Women Know a Lot, Increasing

Knowledge; Increasing Options; and Acting on Choices. Properties and dimensions of each category are represented in the model, along with the intervening condition of Safety. The condition of Safety contextualises the overarching lived reality for women in PNG, enables the inclusion of men in the transformational grounded theory model, and helps to explain relationships between men and women. The theory presents the core category as Power of Choice.

CONCLUSIONS: This transformational grounded theory provides a means to explore how women experience male circumcision and penile modification in PNG, including for HIV prevention. Women who have had opportunities for education have a greater range of choices and an increased opportunity to act upon these choices. However, women can only exercise their power of choice in the context of safety. The concept of Peace drawn from the Social Determinants of Health is applied in order to extend the explanatory power of the transformational grounded theory. This study shows that women's ambivalence about male circumcision is often related to lack of safety, a consequence of gender inequality in PNG.

17. Sgaier, S. K., et al. **A case study for a psychographic-behavioral segmentation approach for targeted demand generation in voluntary medical male circumcision.** *Elife* 2017;6: e25923. Online at: <https://elifesciences.org/articles/25923>

Public health programs are starting to recognize the need to move beyond a one-size-fits-all approach in demand generation, and instead tailor interventions to the heterogeneity underlying human decision making. Currently, however, there is a lack of methods to enable such targeting. We describe a novel hybrid behavioral-psychographic segmentation approach to segment stakeholders on potential barriers to a target behavior. We then apply the method in a case study of demand generation for voluntary medical male circumcision (VMMC) among 15-29-year-old males in Zambia and Zimbabwe. Canonical correlations and hierarchical clustering techniques were applied on representative samples of men in each country who were differentiated by their underlying reasons for their propensity to get circumcised. We characterized six distinct segments of men in Zimbabwe, and seven segments in Zambia, according to their needs, perceptions, attitudes and behaviors towards VMMC, thus highlighting distinct reasons for a failure to engage in the desired behavior.

18. Sgaier, S. K., et al. **Attitudes and decision-making about early-infant versus early-adolescent male circumcision: Demand-side insights for sustainable HIV prevention strategies in Zambia and Zimbabwe.** *PLoS One* 2017;12(7): e0181411. Online at: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0181411>

As countries approach their scale-up targets for the voluntary medical male circumcision program for HIV prevention, they are strategizing and planning for the sustainability phase to follow. Global guidance recommends circumcising adolescent (below 14 years) and/or early infant boys (aged 0-60 days), and countries need to consider several factors before prioritizing a cohort for their sustainability phase. We provide community and healthcare provider-side insights on attitudes and decision-making process as a key input for this strategic decision in Zambia and Zimbabwe. We studied expectant parents, parents of infant boys (aged 0-60 days), family members and neo-natal and ante-natal healthcare providers in Zambia and Zimbabwe. Our integrated methodology consisted of in-depth qualitative and quantitative one-on-one interviews, and a simulated-decision-making game, to uncover attitudes towards, and the

decision-making process for, early adolescent or early infant medical circumcision (EAMC or EIMC). In both countries, parents viewed early infancy and early adolescence as equally ideal ages for circumcision (38% EIMC vs. 37% EAMC in Zambia; 24% vs. 27% in Zimbabwe). If offered for free, about half of Zambian parents and almost 2 in 5 Zimbabwean parents indicated they would likely circumcise their infant boy; however, half of parents in each country perceived that the community would not accept EIMC. Nurses believed their facilities currently could not absorb EIMC services and that they would have limited ability to influence fathers, who were seen as having the primary decision-making authority. Our analysis suggests that EAMC is more accepted by the community than EIMC and is the path of least resistance for the sustainability phase of VMMC. However, parents or community members do not reject EIMC. Should countries choose to prioritize this cohort for their sustainability phase, a number of barriers around information, decision-making by parents, and supply side will need to be addressed.

19. Shumba, K., et al. **Cultural competence: a framework for promoting voluntary medical male circumcision among VaRemba communities in Zimbabwe.** *Afr J AIDS Res* 2017;16(2): 165-173.

Almost a decade after the formal introduction of voluntary medical male circumcision (VMMC) as an important technology for HIV prevention, its implementation is still fraught with acceptability challenges. This is especially true among ethnic groups where male circumcision is conducted as a rite of passage into adulthood. In this article we question why VMMC is being met with resistance despite widespread awareness of its promise to reduce HIV incidence in a culturally circumcising community in Zimbabwe. In-depth and key informant interviews were conducted with selected VaRemba initiation graduates and surgeons respectively in Mposi area in Mberengwa to explore why VMMC has not been readily accepted in their community. Findings suggest that male circumcision among VaRemba is not only the removal of prepuce but comprises a secretive and rich curriculum rooted in their culture and identity. Such a conceptualisation renders some social and programmatic impediments for VMMC uptake. To scale up VMMC uptake among VaRemba, we argue for a reorganisation and adaptation of VMMC services in a culturally competent way that accounts for local conceptions of circumcision and respect for the cultural beliefs and practices of VaRemba communities.

20. Wall, K. M., et al. **Optimizing prevention of HIV and unplanned pregnancy in discordant African couples.** *J Womens Health (Larchmt)* 2017;26(8): 900-910.

BACKGROUND: Dual method use, which combines condoms with a more effective modern contraceptive to optimize prevention of HIV and unplanned pregnancy, is underutilized in high-risk heterosexual couples.

MATERIALS AND METHODS: Heterosexual HIV-discordant Zambian couples were enrolled from couples' voluntary HIV counseling and testing services into an open cohort with 3-monthly follow-up (1994-2012). Relative to dual method use, defined as consistent condom use plus modern contraception, we examine predictors of (1) condom-only use (suboptimal pregnancy prevention) or (2) modern contraceptive use with inconsistent condom use (effective pregnancy prevention and suboptimal HIV prevention).

RESULTS: Among 3,049 couples, dual method use occurred in 28% of intervals in M+F- and 23% in M-F+, $p < 0.01$; condom-only use in 56% in M+F- and 61% in M-F+, $p < 0.01$; and modern contraceptive use with inconsistent condom use in 16% regardless of serostatus. Predictors ($p <$

0.05) of condom-only use included the man being HIV+ (adjusted hazard ratio, aHR = 1.15); baseline oral contraceptive pill (aHR = 0.76), injectable (aHR = 0.48), or implant (aHR = 0.60) use; woman's age (aHR = 1.04 per 5 years) and lifetime number of sex partners (aHR = 1.01); postpartum periods (aHR = 1.25); and HIV stage of the index partner III/IV versus I (aHR = 1.10). Predictors ($p < 0.05$) of modern contraceptive use with inconsistent condom use included woman's age (aHR = 0.94 per 5 years) and HIV+ male circumcision (aHR = 1.51), while time-varying implant use was associated with more consistent condom use (aHR = 0.80).

CONCLUSIONS: Three-quarters of follow-up intervals did not include dual method use. This highlights the need for counseling to reduce unintended pregnancy and HIV transmission and enable safer conception.