

Assessing Priorities for Combination HIV Prevention Research for Men Who have Sex with Men (MSM) in Africa

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Abstract A consultation was hosted in South Africa (March 2011) to assess the combination HIV prevention research priorities of academics, implementers and MSM community leaders. Sixty-nine participants, representing 17 African countries, participated. Interactive strategies were used to present current data on HIV interventions and discussions on research possibilities were facilitated with research priorities identified using the nominal group technique. Data were analysed using directed content analysis. Health worker training, social mobilisation, and community engagement were prioritised as structural interventions. Comprehensive counselling was identified as the most important behavioural intervention, with

adherence, mental health, and risk reduction counselling identified as key counselling topics. Rectal microbicides, oral pre-exposure prophylaxis and condom and lubricant distribution were the most important biomedical interventions. This consultation resulted in the first combination HIV prevention research agenda for MSM in Africa. Outcomes will inform future research and be used to advocate for combination approaches to HIV prevention for MSM.

Resumen Una consulta se celebró en Sudáfrica en marzo de 2011 para evaluar las prioridades de investigación de prevención de VIH de combinación de académicos, entidades ejecutoras y líderes de la comunidad MSM. Los participantes de sesenta y nueve, que representan a 17 países africanos, participaron. Se utilizaron estrategias interactivas para presentar datos actuales sobre las intervenciones de VIH y discusiones sobre las posibilidades de investigación se vio facilitados con las prioridades de investigación identificadas mediante la técnica de grupo nominal. Los datos se analizaron mediante análisis de contenido dirigido. Formación de los trabajadores sanitarios, movilización social y participación de la Comunidad fueron priorizadas como las intervenciones estructurales. Asesoramiento integral fue identificada como la más importante intervención conductual, con adherencia, salud mental y reducción de riesgo asesoramiento identificado como clave de asesoramiento temas. Microbicidas rectales, profilaxis pre-exposición oral y preservativo y distribución de lubricante compatibles con preservativos fueron las más importantes intervenciones biomédicas. Esta consulta dio lugar a la primera combinación del programa de investigación de prevención de VIH para MSM en África. Resultados informarán a futuras investigaciones y utilizados para promover la enfoques de combinación para la prevención del VIH para MSM.

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Introduction

The spread of HIV across sub-Saharan Africa has been predominately attributed to heterosexual and vertical transmission, and this is where the majority of HIV prevention efforts have been targeted. However, current epidemiological evidence documents high HIV prevalence and incidence among men who have sex with men (MSM) in several sub-Saharan settings, highlighting the role of sexual transmission of HIV between men [1–4]. Many MSM remain purposefully hidden about their behaviours due to reasonable fears of social exclusion, stigma, and persecution [5]. While some of the stigma originates from general population as well as religious and cultural leaders, much is mediated by governments in the form of laws criminalising consensual same sex practices. Engaging in research projects in these settings is intended to identify and address the needs of this population, but can highlight their existence and raise both positive and negative attention and social responses [6]. The unintended consequences of research projects intended to help MSM can include heightened states of stigma and human rights violations, including violence. These realities can shift the ethical balance of benefits versus harms, and makes careful consideration of the potential social harms of scientifically “minimal risk” research of special import in study conception, design, implementation, and results dissemination. To date few MSM focused HIV prevention services have been provided in Africa, many of which have used single intervention (such as peer education or condom distribution) or out-dated approaches, and have shown to increase knowledge levels and access to condoms, but have been inadequate in decreasing HIV incidence [3]. HIV prevention efforts that are informed by scientific advances including antiviral chemoprophylaxis, and which address the biological and structural risk factors that increase vulnerability to HIV acquisition, and to its effects, are likely to have greater impact in reducing the number of new HIV infections among MSM in Africa [7].

Biomedical HIV Prevention Interventions

The RV144 or “Thai” vaccine efficacy trial results (2009) provided the first evidence that a prophylactic HIV vaccine could be developed. This study, conducted among 16,000 Thai individuals, some of whom were MSM, reported 31 % reduction in HIV incidence among participants receiving study vaccine compared to those receiving placebo [8]. However, an improvement on this result, and ultimate licensure and production of a partially effective

prophylactic vaccine is unlikely within the next 10 years. Encouragingly, progress in vaccine development has been complimented by positive results in antiretroviral based prevention approaches. Topical and oral antiretroviral formulations used as pre-exposure prophylaxis (PrEP), and the use of antiretroviral therapy (ART) for the treatment of HIV infected individuals, have shown efficacy in the prevention of HIV transmission [9–11].

The Global iPrEx study, which enrolled 2,499 MSM, including South African participants, reported that daily oral dosing with antiretroviral agents (emtricitabine and tenofovir disoproxil fumarate, FTC-TDF), in combination with complementary HIV prevention activities, could reduce the risk of sexual transmission of HIV by 44 % (95 % CI 15–63 %; $p = 0.005$). In iPrEx, self-reported adherence to pill taking as per protocol was reasonably high, but blood level measures of drug exposure were low or non-existent in a large number of participants. In the subset of men tested for drug levels for whom measurable levels were obtained, a greater than 90 % reduction in HIV risk acquisition (95 % CI 40–99 %; $p < 0.001$) was seen, suggesting that efficacy could be higher with improved adherence [9]. Other studies of oral PrEP have recently reported higher efficacy in discordant couples and heterosexual populations [12, 13], although this optimistic picture must be balanced by recent discontinuations of similar clinical trials by safety monitoring boards for reasons of futility [14] (<http://www.mtnstopshiv.org/news/studies/mtn003>). The potential effectiveness of PrEP and its role within a combination approach will be influenced by adherence. Sub-optimal adherence was seen in the iPrEx trial despite dedicated adherence support [9].

Plasma HIV viral load (VL) is the most important risk factor for HIV transmission, irrespective of transmission mode [15], and can be reduced in plasma and genital secretions to undetectable levels by ART [16]. In 2008, Swiss scientists suggested that people living with HIV, and who were ART compliant, had an undetectable VL, and did not have a sexually transmitted infection, were not infectious [17]. A recent clinical trial, HPTN 052, confirmed that decreasing HIV VL decreases sexual HIV transmission [10]. While the matched pair efficacy in the trials was ~96 %, the actual effectiveness was somewhat lower, since unmatched infections, where sero-negative members of discordant couples were infected outside their primary partnerships, were common. This study enrolled few male couples and did not have sufficient power to inform around ART treatment for prevention between sero-discordant MSM [10, 18]. Nevertheless, the biological plausibility for early treatment as prevention for male same sex discordant couples is high, and there is strong evidence for the clinical benefit of earlier treatment regimens for individual patients, both for HIV treatment, and importantly for

African populations, for reductions in HIV associated TB morbidity and mortality.

Optimistic results on the efficacy of topical PrEP, in the form of microbicides, have also recently been published. The CAPRISA 004 study, which enrolled 889 young women from Kwazulu-Natal (South Africa) showed a 39 % reduction in HIV acquisition among those who used a vaginal microbicide preparation of 1 % tenofovir gel over and above a common standard of prevention that included condoms and counselling [11]. The potential benefit of rectal microbicides (RM) in preventing rectal transmission of HIV has been suggested by animal studies. A tenofovir-based rectal microbicide was shown to be protective against simian immunodeficiency virus (SIV) infection among macaque monkeys rectally exposed to SIV [19]. A phase II study of tenofovir 1 % gel reformulated for rectal use in men and women is currently being conducted by the US National Institutes of Health supported Microbicide Trial Network (MTN) and efficacy evaluations were under development at the time of this writing. Studies have shown RM to be highly acceptable among MSM, and investigations into the development of effective applicator and dosing systems are underway [19, 20].

Behavioural HIV Prevention Interventions

Evidence supporting the need to include behavioural prevention components in a combined HIV prevention approach exists. A systematic review and meta-analysis including 16,224 men in 38 experimental and observational studies demonstrated that compared to controls with no behavioural interventions, groups exposed to behavioural interventions reduced self-reported unprotected anal intercourse (UAI) by 27 % (95 % CI 15–37 %) [21, 22]. To date, evidence on the effect of couples counselling and sero-sorting in the African context does not exist; however, couples counselling is reported to be acceptable to MSM in South Africa [23]. From a North American or European perspective, couples counselling and testing has shown promise in identifying discordant sexual partnerships [24]. Evidence for the prevention impact of sero-sorting is less clear because of dependency on accurate knowledge of HIV sero-status, and sero-sorting is most likely somewhat less risky than consistent lack of condom use, but more risky than consistent condom use [25]. While interventions targeting behaviours have been shown to be effective in improving reported behaviours among MSM, behavioural interventions have not demonstrated efficacy in reducing HIV incidence in any setting [26]. Behavioural interventions will however continue to serve an important role to increase adherence to biomedical technologies included in large-scale intervention studies, and will serve to support safe sex practices among participants.

Structural HIV Prevention Interventions

While there is limited evidence supporting the efficacy or effectiveness of structural interventions for the prevention of HIV among MSM, programmatic experience and plausibility highlight the need to include interventions that target the entire population in a community or country by attempting to modify social, economic, political, and environmental factors, which may increase risk for HIV acquisition [27–29]. Structural interventions for MSM could include health care worker sensitisation and training; efforts to reduce homophobia, as have been implemented in Brazil; and changing the legal and policy environment, as has recently been achieved in India, Nepal, and the US Military [30–33]. The complexity of the study designs required to characterise efficacy and effectiveness of structural interventions, as well as the logistical and cost considerations of such evaluations have prevented appropriate evaluation of the effects of structural-level interventions to date [3]. The manifestations of stigma targeting MSM in Africa are significant and have consistently been demonstrated as a risk factor for HIV infection, and stress the need for structural risk factors to be addressed in order for HIV prevention efforts to be effective [2, 34–36].

Combination HIV Prevention

Combination prevention is an emerging field of investigation. This approach brings together various prevention modalities (biomedical, behavioural and structural), and implements selected interventions across multiple levels (e.g. across the individual, couple, network, community, and population levels) [37–39]. No comprehensive combination approach to HIV prevention among MSM in Africa has been implemented. This paper presents the results of a consultation that brought together a range of African and international stakeholders to develop a combination HIV prevention research agenda for MSM in Africa.

Methods

A consultation was hosted in Cape Town, South Africa (22–24 March, 2011) to assess the combination HIV prevention research priorities of academics, HIV implementing partners, government representatives, and MSM community leaders from across the African continent and beyond. Researchers from the Desmond Tutu HIV Foundation (DTHF) at the University of Cape Town; Harvard University; Anova Health Institute's Health4Men (H4M) Clinics, and from the Johns Hopkins Bloomberg School of Public Health served as resource persons for the consultation.

Participants

There were 69 participants in total with 8 participants from high income settings and 61 participants representing 17 geographically and socioeconomically diverse African countries including South Africa, Lesotho, Swaziland, Namibia, Malawi, Zimbabwe, Zambia, Mozambique, Ethiopia, Kenya, Uganda, Ghana, Senegal, Morocco, Cameroon, Cote D'Ivoire and Nigeria. Out of 69 participants, 19 primarily represented academia or research institutes, 14 primarily represented HIV implementing partners or service providers and 36 represented MSM community organisations from across the continent. The academic participants were chosen for inclusion based on experience in HIV prevention research including HIV vaccine, microbicide, and PrEP development, as well as combination prevention interventions. In addition, researchers with specific expertise in behavioural and mental health interventions also participated. Implementing partners and service providers added to the process by contributing knowledge of their experience in the delivery of HIV prevention, treatment and care services in a variety of contexts with representation from Southern, Eastern, and Western Africa. MSM Community representatives including groups that focus on service provision, advocacy, and research (independently or in partnership with academics and implementing partners) provided MSM community perspectives to the discussions. These classifications highlight self-disclosed representation, though many participants could potentially fit more than one category.

Consultation Activities, Data Collection and Data Analysis

The consultation included: (I) presentations on current HIV prevention approaches for MSM; (II) activities to explore biomedical, behavioural, structural and combination HIV prevention research priorities for African MSM, and (III) the development of a prioritised combination prevention concept.

I. Current HIV Prevention Approaches for MSM

Academics, implementing partners, and MSM community leaders provided updates on HIV prevention science, and shared experiences of projects employing behavioural, biomedical, and structural approaches to HIV prevention among MSM.

II. Exploration of HIV Prevention Research Possibilities for MSM in Africa

Small group discussions were used to explore potential research possibilities for MSM in Africa. Groups were comprised of individuals from differing backgrounds and

geographic origin. Discussions were guided by a designated facilitator and supported by dedicated note takers, who observed and recorded discussion points on flip chart paper. Each group was tasked to develop biomedical, behavioural and structural HIV prevention research priorities. Each group then developed a combination HIV prevention research concept. Concepts included a standard package of prevention interventions and an enhanced package of interventions for an experimental arm. Groups presented their list of research priorities and combination prevention research concepts to the larger group for comment and discussion. Issues to be considered when developing future combination prevention research concepts for MSM in Africa were also raised and discussed.

III. Development of a Combination Prevention Concept

The final consultation activity was the prioritisation of HIV prevention research components using the nominal group technique. The data collection and analysis process was guided by a directed content analysis approach. A combination HIV prevention framework was developed with biomedical, behavioural and structural approaches to HIV prevention used as pre-identified themes. Discussion points and group presentation components were treated as meaning units. The meaning units were read several times before being categorised into one of the three over-riding themes by the consultation organisers. The categorised lists of meaning units were then written onto flip chart paper. Each participant was provided with nine stickers (three stickers in three different colours), with each colour assigned to a specific intervention theme. Participants then placed a sticker next to the activity or component (meaning unit) that was of research importance to them. Each participant could select three different meaning units per intervention theme. The number of stickers for each meaning unit was then totalled. The top three meaning units of each theme were identified and combined to reflect the combination HIV prevention package as prioritised by the participants. The results were then presented to the larger group for discussion and comment.

The consultation process and outputs, as well as latent meanings that emerged after reflection on the findings, were generated into a report that was circulated among the consultation organisers. Comments were taken into account, and a revised report was circulated to consultation participants, and formed the basis of this manuscript.

Results

The results presented here reflect the research priorities of the stakeholders participating in the consultation. The

results are presented under headings representing the main approaches for HIV prevention, as were used as themes for the data collection and analysis process. The findings reflect the opinions and discussions emerging from the small and large group discussions, as well from the nominal group technique. The narrative of these results represents a synthesis of the findings and the discussions which complemented the consultation activities.

Behavioural Research Priorities

Interventions focused on increasing condom and condom compatible lubricant use during anal intercourse; on increasing adherence to biomedical HIV prevention strategies, and to the improvement of peer education and HIV counselling and testing practices to suit the needs of African MSM were highlighted as research priorities.

Increasing Condom and Lubricant Use

It was highlighted that the few tools currently used to promote condom and lubricant use in the African context have been derived from interventions focused on heterosexual sex. Unlike other biomedical interventions, condoms and lubricants have not been associated with adverse events, and remain a safe option for HIV prevention. For example, condoms available in many of the African countries represented in the consultation are often unlubricated and thin, and thus not well designed for MSM. The limited availability of lubricants in Africa presents a barrier to current use as a prevention tool [40]. Research into improved methods for condom promotion was deemed important.

Increasing Adherence to Biomedical Interventions

The potential adverse effects of biomedical interventions was raised as a concern, and as a potential barrier to their use among men who are generally healthy. Participants felt that investigating methods to improve adherence was an important area of future research. Some discussion focused on how improved methods of biomedical product delivery could assist adherence. There was limited consensus on appropriate content of adherence interventions and much of the research recommended was on understanding adherence, or the lack thereof, rather than on specific interventions to increase adherence. It was suggested that a better understanding of the discrepancies between self-reported and measured biomedical product use, and of the facilitators to product adherence, is needed.

Improved HIV Counselling and Testing

It was highlighted that many HIV counsellor training programmes fail to incorporate aspects of MSM sexual

health and safer sex practices between men in their curricula. This was stated as another example where heterosexual based service provision and standards had been directly and inappropriately used in the context of MSM. To illustrate the point, it was mentioned that many health workers are unable to provide appropriate education or counselling for MSM around risk reduction, anal sex and sexual health. The participants acknowledged that in the majority of sub-Saharan African countries, there will not be dedicated HIV testing and counselling centres for MSM in the foreseeable future. As such, in order to deliver effective counselling from existing centres, research should focus on ways to increase the knowledge levels and cultural competence of HIV pre- and post-test counsellors. The effectiveness of Couples HIV Counselling and Testing (CVCT) for male couples in Africa was also mentioned as a behavioural intervention requiring investigation. CVCT could provide critical support to treatment as prevention efforts for discordant MSM couples.

Improved Peer Education

It was suggested that peer educators would have greater impact if they were MSM identified, were well educated about HIV prevention and equipped with appropriate condoms and condom-compatible lubricants. Research into effective methods of training and equipping peer educators was suggested as means to improve the benefit of peer education. Assessing the use of electronic media or other mobile health (mHealth) technologies to deliver counselling, including risk reduction and adherence counselling, were seen as areas requiring additional research.

Biomedical Research Priorities

Pre-Exposure Prophylaxis (PrEP)

PrEP was seen as an important strategy for HIV prevention among MSM and it was stated that the research agenda should focus on implementation aspects to assess what is needed for the realisation of PrEP provision among African MSM. Moreover, there was interest in exploring new models of PrEP dosage regimens—including coitally-dependent or otherwise intermittent PrEP.

Rectal Microbicides (RM)

For RM, the research priorities suggested focused on product-related and HIV efficacy-related issues. Participants reported that there was a common assumption that RM would also serve as lubricant, and suggested that research should aim to develop a RM with the

characteristics of a condom-compatible lubricant, and that RM applicators should be designed for ease of use.

Post-Exposure Prophylaxis (PEP)

While PEP was considered an important intervention, there was limited clarity about what a trial design would look like to assess the specific efficacy of PEP for HIV prevention.

Structural Research Priorities

There was a consensus in the group that while research evaluating the efficacy or effectiveness of structural interventions is complex, the intense levels of stigma and discrimination affecting MSM in Africa indicate that this is an important component of HIV prevention. Structural interventions were broadly divided into those that would facilitate improved access to biomedical services and those that could decrease risk independently. A list of potential structural research questions was developed and a summary of priority structural topics are presented in Fig. 1.

Structural Interventions to Improve Access

The need to improve the clinical and cultural competence of workers in the health care system as well as to improve health system structures to better enable MSM to access services was stated. The comparison of the relative effectiveness between a vertical service provision model (such as stand-alone MSM clinics); a horizontal service provision model (such as integrated MSM clinics), and a combination of vertical and horizontal service provision models (where MSM dedicated services would be provided at certain times within an otherwise non-MSM dedicated clinic) were suggested as possible research questions.

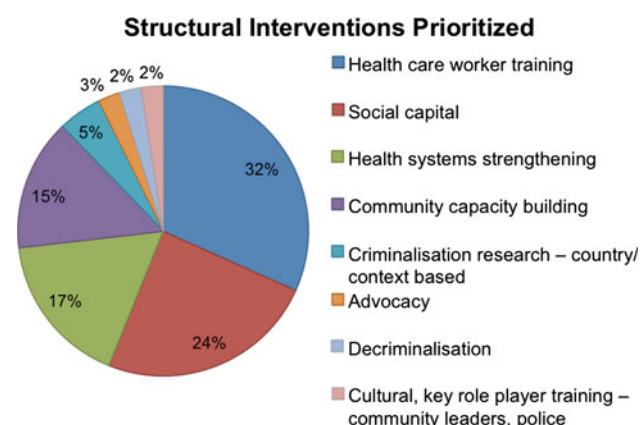


Fig. 1 Research priorities for structural components of HIV prevention efforts focused on African MSM

Structural Interventions to Decrease Risk

Research assessing the relative importance of cognitive and structural social capital interventions at the micro, meso, and macro level were also considered important to inform structural change. Assessment of the utility of destigmatising interventions such as social marketing or local champions to advocate for the rights of MSM were also considered an important component of the research agenda.

Combination Prevention Priorities

A common theme emerged that from a programmatic and research perspective, evaluating a menu-driven approach for biomedical interventions would likely have the highest uptake given the individual differences between African MSM and the vastly different socio-cultural and economic contexts that these men live in across the continent. The menu-driven approach is currently being investigated for MSM by the Prevention Umbrella for MSM in Americas (PUMA) team (http://www.fenwayhealth.org/site/DocServer/Buchbinder_Fenway_April_2010_final.pdf?docID=7606). Research using mathematical modelling to explore the potential efficacy of individual components and effectiveness of potential packages is currently underway. In this consultation, the top three prioritised components of a combination HIV prevention research proposal for MSM in Africa are summarized in Table 1.

Each group stressed that evaluating the effectiveness of strategies to improve peer education and voluntary counselling and testing activities should form part of a combination prevention research approach. There was consensus in the group that at least one biomedical intervention was a necessary component of a research project evaluating combination HIV prevention for MSM in Africa. Participants differed in their views as to which biomedical prevention intervention should be offered to all participants as part of standard HIV prevention and what would be included in the experimental arm. Thus, there was a distinction in terms of which components of the proposed package were more in need of prevention research and which ones would form the basis of a control package of prevention services. There was agreement on the need to consider this decision carefully, and on the need to take existing efficacy evidence as well as socioeconomic contexts into account when developing prevention package research initiatives. Given the limited access to condom-compatible lubricant for African MSM, despite high demand, there would likely be high acceptability of RM as a component of the combination HIV prevention research agenda. The provision of PEP was considered an essential component of a prevention service that should be made available to all research participants in prevention studies.

Table 1 Prioritised components for combination HIV prevention research for MSM in Africa

Interventions	Prioritised components of combination prevention	Other identified research priorities
Structural	(1) Healthcare worker training (2) Improved social capital (3) Community capacity building	Improved linkages to care and HIV counselling and testing; bridging between heterosexual and MSM services and individuals; criminalization research—country/context based; advocacy; cultural key role player training—community leaders and police, awareness and education around post and pre-exposure prophylaxis (PEP/PrEP); policy/access to PEP; mass media; building competency in all services; safe access; safe spaces; skilled health care professionals; electronic media; tools for guidelines, screening, and adherence; economic education and income generation
Behavioural	(1) Adherence counselling (2) Risk reduction counselling (3) Mental health counselling	Education; choices—condoms/interventions; HIV prevention counselling for positive individuals; male couples counselling; alcohol and drug awareness and preparation; psychosocial support counselling
Biomedical	(1) Rectal microbicide (2) Pre-exposure prophylaxis (3) Condoms/condom-compatible lubricants	Vaccines (Hep A/B, HPV); anal health (Pap smear, exam); TB screening; ART above CD4 count of 350 for HIV infected people and for sero-discordant male couples

Discussion

This is the first assessment to date, known to the authors, which as one of its objectives, aimed to develop research priorities for combination HIV prevention for MSM in Africa based on stakeholder consultation.

The results of the consultation reflect the appreciation of community leaders, researchers and service providers that combination approaches are likely to play a fundamental role in the ultimate prevention of HIV. Importantly, biomedical approaches were believed to be an essential part of all combination prevention research activities, based on demonstrated efficacy. However, biomedical interventions necessitate identification, risk assessment, and follow up of participants. Participants must be willing to self-disclose as MSM, engage in discussions around MSM sexual practices and comply with study procedures. To ensure the safety of participants, studies would need to be conducted in safe environments, and staff would need to harbour client trust and confidence. In light of these issues, the need to include structural interventions to facilitate access to services was expressed in several different contexts by the participants of the consultation.

The interest in oral PrEP effectiveness data for MSM in Africa may provide an indication of a wide-ranging view that oral PrEP is acceptable, and that the next steps should be taken in order for policy change and programmatic interventions to occur. The concerns raised relating to the implementation of PrEP were mostly related to the need for repeated HIV testing and safety monitoring. Several studies have demonstrated high levels of fear of accessing health services among African MSM due to perceived and experienced stigma and discrimination [5, 34, 36]. It is clear that structural interventions are required to address stigma within the health services in order for oral PrEP to be provided.

Health sector interventions emerged as a crucial component of combination HIV prevention approaches. The goal of these interventions is to improve the health sector's ability to respond to the specific needs of MSM. Health sector interventions are focused on increasing clinical capacity of providers (including doctors, nurses and HIV counsellors), as well as increasing their cultural competence to engage with MSM [41]. Changing physician and ancillary health provider's behaviour is complicated and active strategies such as knowledge translation tend to be more effective than passive methods [42]. Within the consultation, the lack of appropriate health worker training, specifically around risk reduction and HIV counselling for MSM was highlighted. The failure of current health worker training curricula needs to be addressed in order for maximum impact of counselling to be achieved. Program models to address these issues among providers in the African context have been proposed by DTHF, Anova Health Institute's Health4Men project, and the Kenyan Medical Research Institute. Preliminary evaluation of the DTHF's training project showed positive results [43].

Interest in evaluating the efficacy of antiviral-loaded RMs by participants is testament to the acceptability of microbicides as a component of HIV prevention strategies. The interest was attributed to the reality that RM could be used in a coitally-dependent manner, like a lubricant, which many MSM are accustomed to using. The prioritisation of RM research among participants is in line with reports from African MSM participating in the International Rectal Microbicide Advocacy's Project Africa for Rectal Microbicides (ARM) (<http://www.rectalmicrobicides.org/docs/Project%20ARM%20fact%20sheet%20FINAL.pdf>). However, many issues remain to be determined including whether these interventions will be efficacious in the prevention of HIV, as well as product-related issues such as methods of

application and dosing requirements. The MTNs' planned Phase II trial (MTN 017) will likely include South African MSM.

Interestingly, biomedical interventions focused on treating MSM living with HIV, such as seek, test, and treat programs and early initiation of ART were not prioritised. This may imply that participants believed that interventions targeting HIV uninfected MSM may be more feasible in the African context. There are reported high levels of stigma in health care settings targeting MSM in the Africa context; especially among MSM living with HIV [34]. Participants may feel that earlier treatment of MSM living with HIV, in the absence of meaningful change in health care settings, would be challenging because of this stigma. In addition, participants noted that in the context of limited existing ART availability for those meeting CD4 < 350 criteria, earlier treatment was simply not feasible at this time. Research into seek, test, and treat strategies may become more important once access to culturally competent HIV testing and treatment services become available.

Similarly, this group did not prioritise circumcision, which is consistent with systematic reviews highlighting that circumcision is of limited benefit for MSM [44]. Circumcision has been shown to be important in decreasing HIV acquisition among heterosexual MSM and may be of benefit to primarily insertive MSM that have multiple female partners [45]. With high rates of bisexual concurrency among MSM in Africa, there may be a role in preventing HIV acquisition with circumcision [46]. Since circumcision is offered as a free service in many African settings, it was suggested that MSM research participants should be informed and referred for this service if desired.

There are several limitations to the approach used here to develop a combination prevention research agenda. Primarily, the people that were part of this workshop are not representative of all stakeholders in the HIV prevention field. In addition, this work does not represent a formal qualitative study and is instead a synthesis of meeting proceedings documented during 3 days of group discussion, and of the use of the nominal group technique to prioritise the components of a research agenda. However, the work draws strength from providing a forum for balanced conversations on these issues between scientists, funders, government, service-providers, and MSM community leaders from seventeen African countries. Stakeholders provided important contributions, with academics providing updates on HIV prevention science; service providers furthering understanding of barriers and facilitators of effective service provision; government representatives enhanced counterpart understanding of the rules and regulations used to govern, and African MSM community leaders provided insights into the values and

preferences of their peers as well as the structural barriers limiting the uptake of services.

Conclusions

There are huge challenges ahead, but this workshop identified the unmet needs faced by MSM in Africa and underscored the need for additional HIV prevention research. The multi-disciplinary approach used in this consultation is an example of how mutual and sustained engagement between community representatives and research partners can lead to HIV prevention solutions. Old paradigms of single interventions, or of interventions from single disciplines such as behaviour change, were understood to be inadequate. For example, Project EXPLORE as well as smaller earlier trials among MSM informed a systematic review and meta-analysis including 16,224 MSM in 38 experimental and observational studies demonstrating that compared to controls with no interventions, study groups reduced UAI by 27 % (95 % CI 15–37 %). However, the benefit of these interventions were subject to decay over time, additionally the reported behaviour change did not translate to decreased HIV incidence where evaluated [21, 26, 47]. With landmark studies such as the Global iPrEx study, CAPRISA 004, HPTN-052, and partners-prep, the era of combination HIV prevention and of public and community partnership is here [9–11, 13]. The findings of implementation science may improve uptake and retention in HIV prevention activities, and was identified by workshop participants to be an underlying principal for the suggested research agenda [48]. Thus, questions such as real world effectiveness of topical versus oral PrEP or the role of treatment as prevention for sero-discordant male couples are likely to be important components of the future HIV prevention research agenda among MSM in Africa.

The scientific advances under way in HIV/AIDS prevention, treatment, and care are truly unprecedented. Making them real for MSM in Africa is the task at hand. Reflection on the outcomes of the nominal voting technique process helped workshop participants to assess what needs to be done, and inspired all to aggressively move forward. Led by groups such as the DTHF and the Health4Men clinics in South Africa; the Kenyan Medical Research Institute in Kenya, and Enda-Santé in west Africa, this ambitious research agenda is underway. There are many questions left to answer including who will fund this agenda due to lack of attention given to MSM in Africa and whether ethical review boards in contexts with high levels of stigma will allow the prevention needs of these men to be explored. While different groups and individuals will work on different parts of the research agenda

articulated, the emergence of an engaging, supportive community, committed to collaboration was arguably the most important outcome of the workshop.

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References

- Smith AD, Tapsoba P, Peshu N, Sanders EJ, Jaffe HW. Men who have sex with men and HIV/AIDS in sub-Saharan Africa. *Lancet*. 2009;374(9687):416–22.
- Baral S, Trapence G, Motimedi F, Umar E, Iipinge S, Dausab F, et al. HIV prevalence, risks for HIV infection, and human rights among men who have sex with men (MSM) in Malawi, Namibia, and Botswana. *PLoS ONE*. 2009;4(3):e4997.
- Beyrer C, Wirtz AL, Walker D, Johns B, Sifakis F, Baral SD. The Global HIV epidemics among men who have sex with men. Washington, DC: The World Bank; 2011.
- Beyrer C, Baral SD, Walker D, Wirtz AL, Johns B, Sifakis F. The expanding epidemics of HIV type 1 among men who have sex with men in low- and middle-income countries: diversity and consistency. *Epidemiol Rev*. 2010;32(1):137–51.
- Poteat T, Diouf D, Drame FM, Ndaw M, Traore C, Dhaliwal M, et al. HIV risk among MSM in Senegal: a qualitative rapid assessment of the impact of enforcing laws that criminalize same sex practices. *PLoS ONE*. 2011;6(12):e28760.
- amfAR, International AIDS Vaccine Initiative, Johns Hopkins University—Center for Public Health and Human Rights, United Nations Development Programme. Respect protect fulfil. New York: amfAR; 2012.
- Merson MH, O'Malley J, Serwadda D, Apisuk C. The history and challenge of HIV prevention. *Lancet*. 2008;372(9637):475–88.
- Rerks-Ngarm S, Pitisuttithum P, Nitayaphan S, Kaewkungwal J, Chiu J, Paris R, et al. Vaccination with ALVAC and AIDSVAX to prevent HIV-1 infection in Thailand. *N Engl J Med*. 2009;361(23):2209–20.
- Grant RM, Lama JR, Anderson PL, McMahan V, Liu AY, Vargas L, et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *N Engl J Med*. 2010;363(27):2587–99.
- Cohen M, Chen Y, McCauley M, Gambel T, Hosseinipour MC, Kumarasamy N, et al. Prevention of HIV-1 infection with early antiretroviral therapy. *N Engl J Med*. 2011;365(6):493–505.
- Abdool Karim Q, Abdool Karim SS, Frohlich JA, Grobler AC, Baxter C, Mansoor LE, et al. Effectiveness and safety of tenofovir gel, an antiretroviral microbicide, for the prevention of HIV infection in women. *New York: Science*; 2010;329(5996):1168–74.
- Thigpen M, Kebaabetswe P, Smith D, Segolodi T, Soud F, Chillag K, et al. Daily oral antiretroviral use for the prevention of HIV infection in heterosexually active young adults in Botswana: results from the TDF2 study. In: 6th IAS Conference on HIV Pathogenesis, treatment and prevention, Rome; 2011.
- Baeten J, Celum C. Antiretroviral pre-exposure prophylaxis for HIV-1 prevention among heterosexual african men and women: the partners PrEP study. In: 6th IAS conference on HIV pathogenesis, treatment and prevention, Rome; 2011.
- Liebert MA. Early end for FEM-PrEP HIV prevention trial. *AIDS patient care STDs*. 2011;25(6):383.
- Quinn TC, Wawer MJ, Sewankambo N, Serwadda D, Li C, Wabwire-Mangen F, et al. Viral load and heterosexual transmission of human immunodeficiency virus type 1. Rakai Project Study Group. *N Engl J Med*. 2000;342(13):921–9.
- Granich R, Crowley S, Vitoria M, Smyth C, Kahn JG, Bennett R, et al. Highly active antiretroviral treatment as prevention of HIV transmission: review of scientific evidence and update. *Curr Opin HIV AIDS*. 2010;5(4):298–304.
- Dalton P, McCord A. HIV sexual transmission under HAART: project inform comments on 2008 Swiss statement. *Proj Inf Perspect [Newspaper Article]*. 2008;Sept(46):26–8.
- Eshleman SH, Hudelson SE, Redd AD, Wang L, Debes R, Chen YQ, et al. Analysis of genetic linkage of HIV from couples enrolled in the HIV Prevention Trials Network 052 trial. *J Infect Dis*. 2011;204(12):1918–26.
- Crane M, Sharpe S, Herrera C, Cope A, Dennis M, Berry N, et al. Prevention of SIV rectal transmission and priming of T cell responses in macaques after local pre-exposure application of tenofovir gel. *PLoS Med*. 2008;5(8):e157.
- McGowan I. Rectal microbicides: can we make them and will people use them? *AIDS behav*. 2011;15(Suppl 1):S66–71.
- Herbst JH, Sherba RT, Crepaz N, Deluca JB, Zohrabayan L, Stall RD, et al. Meta-analytic review of HIV behavioral interventions for reducing sexual risk behavior of men who have sex with men. *J Acquir Immune Defic Syndr*. 2005;39(2):228–41.
- Johnson WD, Diaz RM, Flanders WD, Goodman M, Hill AN, Holtgrave D, et al. Behavioral interventions to reduce risk for sexual transmission of HIV among men who have sex with men. *Cochrane database of systematic reviews (Online)*. 2008;(3):CD001230.
- Stephenson R, Rentsch C, Sullivan P. High levels of acceptability of couples-based HIV testing among MSM in South Africa. *AIDS care*. 2012;24(4):529–35.
- Sullivan PS, Stephenson R, Salazar L, Mann M, Scales L, Allen S. Prevalence of serodiscordance, seropositivity, and exclusionary factors in US male couples presenting for couples voluntary counseling and testing (CVCT): preliminary results. In: 6th IAS conference on HIV pathogenesis, treatment and prevention, Rome; 2011.
- Golden MR, Stekler J, Hughes JP, Wood RW. HIV serosorting in men who have sex with men: is it safe? *J Acquir Immune Defic Syndr*. 2008;49(2):212–8.
- Koblin B, Chesney M, Coates T. Effects of a behavioural intervention to reduce acquisition of HIV infection among men who have sex with men: the EXPLORE randomised controlled study. *Lancet*. 2004;364(9428):41–50.
- Degenhardt L, Mathers B, Vickerman P, Rhodes T, Latkin C, Hickman M. Prevention of HIV infection for people who inject drugs: why individual, structural, and combination approaches are needed. *Lancet*. 2010;376(9737):285–301.
- Gupta GR, Parkhurst JO, Ogden JA, Aggleton P, Mahal A. Structural approaches to HIV prevention. *Lancet*. 2008;372(9640):764–75.
- Adimora AA, Auerbach JD. Structural interventions for HIV prevention in the United States. *J Acquir Immune Defic Syndr*. 2010;55(Suppl 2):S132–5.
- Burks DJ. Lesbian, gay, and bisexual victimization in the military: an unintended consequence of “Don’t Ask, Don’t Tell”? *Am Psychol*. 2011;66(7):604–13.
- Bhardwaj K, Divan V. Sexual health and human rights. A legal and jurisprudential review of select countries in the SEARO region: Bangladesh, India, Indonesia, Nepal, Sri Lanka and Thailand. Report. Geneva: WHO; 2011.
- Wilson E, Pant SB, Comfort M, Ekstrand M. Stigma and HIV risk among Metis in Nepal. *Cult Health Sex*. 2011;13(3):253–66.

33. Pulerwitz J, Barker G. Measuring attitudes toward gender norms among young men in Brazil development and psychometric evaluation of the GEM scale. *Men Masculinities*. 2008;10(3): 322–38.
34. Fay H, Baral SD, Trapence G, Motimedi F, Umar E, Iipinge S, et al. Stigma, health care access, and HIV knowledge among men who have sex with men in Malawi, Namibia, and Botswana. *AIDS Behav*. 2011;15(6):1088–97.
35. Baral S, Burrell E, Scheibe A, Brown B, Beyrer C, Bekker L-G. HIV risk and associations of HIV Infection among men who have sex with men in Peri-Urban Cape Town, South Africa. *BMC Public Health*. 2011;11(1):766.
36. Baral S, Adams D, Lebona J, Kaibe B, Letsie P, Tshehlo R, et al. A cross-sectional assessment of population demographics, HIV risks and human rights contexts among men who have sex with men in Lesotho. *J Int AIDS Soc*. 2011;14(1):36.
37. Kurth AE, Celum C, Baeten JM, Vermund SH, Wasserheit JN. Combination HIV prevention: significance, challenges, and opportunities. *Curr HIV/AIDS Rep*. 2011;8(1):62–72.
38. Padian NS, McCoy SI, Manian S, Wilson D, Schwartländer B, Bertozzi SM. Evaluation of large-scale combination HIV prevention programs: essential issues. *J Acquir Immune Defic Syndr*. 2011;58(2):e23–8.
39. Merson M, Padian N, Coates TJ, Gupta GR, Bertozzi SM, Piot P, et al. Combination HIV prevention. *Lancet*. 2008;372(9652): 1805–6.
40. Rispel LC. a. Breaking the silence: South African HIV policies and the needs of men who have sex with men. *Reprod Health Matters*. 2009;17(33):133–42.
41. Beyrer C, Baral S, Kerrigan D, El-Bassel N, Bekker L-G, Celentano DD. Expanding the space: inclusion of most-at-risk populations in HIV prevention, treatment, and care services. *J Acquir Immune Defic Syndr*. 2011;57(Suppl 2):S96–9.
42. Grimshaw JM, Shirran L, Thomas R, Mowatt G, Fraser C, Bero L, et al. Changing provider behavior: an overview of systematic reviews of interventions. *Med Care*. 2001;39(8 Suppl 2):II2–45.
43. Scheibe A, Duby Z, Brown B, Sanders EJ, Bekker L-G. Evaluation of a health care worker training program around sensitization around men who have sex with men (MSM) in Cape Town, South Africa. 6th IAS Conference on HIV Pathogenesis, Treatment and Prevention, 2011;CDD132.
44. Wiysonge CS, Kongnyuy EJ, Shey M, Muula AS, Navti OB, Akl EA, et al. Male circumcision for prevention of homosexual acquisition of HIV in men. *Cochrane Database Systematic Reviews* (Online). 2011;(6):CD007496.
45. Sánchez J, Sal Y, Rosas VG, Hughes JP, Baeten JM, Fuchs J, Buchbinder SP, et al. Male circumcision and risk of HIV acquisition among men who have sex with men from the United States and Peru. *AIDS*. 2011;25(4):519–23.
46. Beyrer C, Trapence G, Motimedi F, Umar E, Iipinge S, Dausab F, et al. Bisexual concurrency, bisexual partnerships, and HIV among Southern African men who have sex with men. *Sex Transm Infect*. 2010;86(4):323–7.
47. Johnson WD, Holtgrave DR, McClellan WM, Flanders WD, Hill AN, Goodman M. HIV intervention research for men who have sex with men: a 7-year update. *AIDS Educ Prev*. 2005;17(6): 568–89.
48. Padian NS, Holmes CB, McCoy SI, Lye R, Bouey PD, Goosby EP. Implementation science for the US President's emergency plan for AIDS relief (PEPFAR). *J Acquir Immune Defic Syndr*. 2011;56(3):199–203.