



COMMENTARY

HIV pre-exposure prophylaxis for female sex workers: ensuring women's family planning needs are not left behind

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Abstract

Introduction: Female sex workers (FSWs) experience overlapping burdens of HIV, sexually transmitted infections and unintended pregnancy. Pre-exposure prophylaxis (PrEP) is highly efficacious for HIV prevention. It represents a promising strategy to reduce HIV acquisition risks among FSWs specifically given complex social and structural factors that challenge consistent condom use. However, the potential impact on unintended pregnancy has garnered little attention. We discuss the potential concerns and opportunities for PrEP to positively or negatively impact the sexual and reproductive health and rights (SRHR) of FSWs.

Discussion: FSWs have high unmet need for effective contraception and unintended pregnancy is common in low- and middle-income countries. Unintended pregnancy can have enduring health and social effects for FSWs, including consequences of unsafe abortion and financial impacts affecting subsequent risk-taking. It is possible that PrEP could negatively impact condom and other contraceptive use among FSWs due to condom substitution, normalization, external pressures or PrEP provision by single-focus services. There are limited empirical data available to assess the impact of PrEP on pregnancy rates in real-life settings. However, pregnancy rates are relatively high in PrEP trials and modelling suggests a potential two-fold increase in condomless sex among FSWs on PrEP, which, given low use of non-barrier contraceptive methods, would increase rates of unintended pregnancy. Opportunities for integrating family planning with PrEP and HIV services may circumvent these concerns and support improved SRHR. Synergies between PrEP and family planning could promote uptake and maintenance for both interventions. Integrating family planning into FSW-focused community-based HIV services is likely to be the most effective model for improving access to non-barrier contraception among FSWs. However, barriers to integration, such as provider skills and training and funding mechanisms, need to be addressed.

Conclusions: As PrEP is scaled up among FSWs, there is growing impetus to consider integrating family planning services with PrEP delivery in order to better meet the diverse SRHR needs of FSWs and to prevent unintended consequences. Programme monitoring combined with research can close data gaps and mobilize adequate resources to deliver comprehensive SRHR services respectful of all women's rights.

Keywords: sex workers; Pre-Exposure Prophylaxis (PrEP); contraception; unplanned pregnancy; HIV infections

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1 | INTRODUCTION

Female sex workers (FSWs) in low- and middle-income countries experience overlapping burdens of high HIV prevalence alongside high rates of sexually transmitted infections (STIs) and unintended pregnancy [1,2]. Despite these coexisting reproductive health needs, in many settings family planning is poorly integrated into sexual and reproductive health and rights (SRHR) services for FSWs, which often maintain a narrow focus on HIV and STI prevention and treatment [3–5]. Dual protection, denoting consistent condom use together with another effective contraceptive method, is currently the recommended approach to minimize risk of HIV/STIs and unintended pregnancy. However, the use of effective non-

barrier contraception methods among FSWs is sub-optimal, resulting in high rates of unintended pregnancy [2]. Similarly, FSWs' condom use, even when the primary method of pregnancy prevention, is often inconsistent, particularly with non-paying partners [6–8].

Pre-exposure prophylaxis (PrEP) is a relatively new intervention being offered to FSWs and other populations with high risk of HIV acquisition. Although the potential benefits and acceptability of PrEP among FSWs have been previously established [9–14], specific consideration of the implications of PrEP for family planning in this population is lacking.

Depending on approaches to scale-up, there is the possibility that PrEP programming could increase rates of unintended

pregnancy among FSWs. Risk compensation, normalization of PrEP use and external pressures for condomless sex could impact on condom use, while PrEP provision within single-focus services that insufficiently cater to family planning needs could impact use of other contraceptive methods. Drawing from our experience in working with national PrEP implementation programmes, the purpose of this commentary is to elaborate on the context in which PrEP is being implemented with FSWs and the potential concerns and opportunities for PrEP to impact unintended pregnancy and other aspects of SRHR.

2 | DISCUSSION

2.1 | Context and interactions between PrEP and SRHR

2.1.1 | Benefits of PrEP for FSWs

PrEP offers personal control over HIV, and is therefore a prevention option of particular benefit to FSWs because it can help counter pervasive social and structural factors that limit FSWs' capacity to consistently use condoms to prevent HIV, including gender norms, criminalization, intersecting stigmas and sexual and physical violence [9,15]. In particular, PrEP can mitigate risks of HIV acquisition associated with condom non-use or condom breakage [15,16], including protecting against HIV acquisition with non-paying, emotional partners [17,18]. PrEP also provides an effective way to reduce risk of HIV for FSWs and their partners who wish to conceive [19,20]. There is strong evidence that PrEP is efficacious in preventing HIV infection among women when used consistently and as directed [21].

2.1.2 | Contraceptive use and unintended pregnancy among FSWs

Preventing pregnancy may be the greater motivator for FSWs to use condoms compared to HIV prevention [13,22]. FSWs across low- and middle-income countries experience high rates of unintended pregnancy: in cohort studies without SRHR interventions, the pooled incidence rate for unintended pregnancies among FSWs is 27.1 per 100 person-years (95% CI = 24.4 to 29.8) [2]. Use of effective non-barrier contraceptive methods among FSWs is below 40% in numerous settings across sub-Saharan Africa [7,23–25] with few FSWs in the region using long-acting reversible contraceptives (LARCs) – intrauterine devices and implants – despite their superior effectiveness [2,26]. User-dependent methods such as injections and pills are often used inconsistently or incorrectly [27,28]. Injections are the most commonly used and often the only available non-barrier method in this population [13,24,25,29] but are reported to have acceptability concerns among FSWs due to side effects which interfere with their ability to work [13,30]. Additional barriers to access and uptake of contraception among FSWs include stigma or refusal of service due to sex work, young age or marital status, limited availability or choice of contraceptive methods, lack of health workers trained in LARC provision and limited knowledge of contraceptive methods [5,31–33].

2.1.3 | Risk compensation

The potential for individuals on PrEP to reduce their use of condoms due to negation of HIV risk is a commonly voiced concern [34]. Nonetheless, acceptability studies suggest that FSWs consider PrEP a favourable user-controlled back-up option for when condoms fail or cannot be used, rather than an alternative [12,13,35]. Based on a recent meta-analysis, individuals starting PrEP have a high burden of STIs [36]. Furthermore, there is emerging evidence from open-label and demonstration studies and implementation sites among gay, bisexual and other men who have sex with men (MSM) that condom use decreases among some men on PrEP, particularly among those already engaging in condomless sex or other high-risk behaviours [37–41]. However, modelling among MSM suggest that if PrEP is accompanied by regular STI services, increased detection and treatment may mitigate increases in STI transmission [42,43]. While there is no current evidence among FSWs of decreasing condom use or other behaviours increasing vulnerability to STIs and unintended pregnancy [44–46], implementation data are too limited to discount this possibility. It is possible that risk compensation will increase over time as PrEP becomes more normalized [39]. Importantly, price premiums for condomless sex are already reported by FSWs in many settings [47–49], and as community knowledge of PrEP increases, so too may client demand and pressure for condomless sex [10,50,51]. Of note, modelling in South Africa has suggested that condomless sex may increase two-fold among FSWs on PrEP by lowering negotiating power and increasing coercion by clients [51]. While undocumented, it is also possible that individuals in a position of disparate power or economic control over FSWs may coerce FSWs to use PrEP whether or not they consider it as the most suitable HIV prevention option for their circumstances.

2.1.4 | Impacts of unintended pregnancy

Most concerns raised around the potential implications of condomless sex focus on STIs – perhaps given the predominance of PrEP studies involving MSM in the literature. Although less frequently considered, mistimed or unwanted pregnancies are a potential adverse outcome of PrEP use that may have enduring social and health consequences. Among FSWs, unintended pregnancy is commonplace and is often followed by unsafe abortion [33]. Restrictive abortion policies throughout most of Africa result in three-quarters of abortions in the region being unsafe, contributing to 10% of maternal deaths [52–54]. Furthermore, restrictive donor policies prevent programmatic support for identifying safer termination options for women, as referrals or counselling around pregnancy options are prohibited under the renewed United States' global gag rule [55].

In addition to the immediate health risks of unintended pregnancy due to unsafe abortion and high maternal mortality in areas most affected by HIV [56], pregnancy and caring for children has major economic implications for FSWs that can lead to subsequent risk. While motivations for selling sex are complex and multifactorial [57], one reason often reported is the need for financial independence among women with children who are not financially supported by a partner [57–59].

Unintended motherhood may increase economic dependency on sex work and pressure women to take more clients, accept condomless sex for more money, or serve as a barrier to leaving sex work, thus increasing or prolonging risk for HIV and other STIs [59–62]. A study in India found that FSWs with more children were more likely to report inconsistent condom use and accept more money for condomless sex [60]. In Tanzania, sex workers reported increasing sexual risk behaviours to help fund their children's school fees [63]. Pregnancy and childcare may also lead to women taking unplanned or unwanted breaks from sex work, thus adding to household insecurity [64]. Conversely, for some FSWs, responsibility to care for children may be a motivator to use PrEP in order to stay healthy and maintain their earning potential [12,35,63].

2.1.5 | Evidence from PrEP studies

Evidence of the impact of PrEP on pregnancy rates among all women is scant. The FEM-PrEP randomized controlled trial (RCT) did not show a significant impact of PrEP compared to placebo on unintended pregnancy among women [65,66]. As use of contraception was a condition of enrolment and supplied to participants, this result suggests that PrEP does not reduce the efficacy of hormonal contraception [67], but it cannot be used to predict the influence of PrEP on behaviour in real-life settings. Pregnancy incidence has not been reported in contexts that would give a better indication of the real-world effect of PrEP, specifically among FSWs, such as demonstration studies, open-label comparisons of women using versus not using PrEP, or monitoring of larger scale PrEP programmes [44,45]. Nonetheless, pregnancies in PrEP trials were relatively common among both PrEP and control groups with rates comparable to general rates in developing countries [68], even when baseline criteria had stipulated contraceptive use and no current pregnancy intentions and provided access to at least shorter acting contraceptive methods: the overall pregnancy incidence was 10 per 100 person-years in both the Partners PrEP and FEM-PrEP studies [65,69], and approximately 8 per 100 person-years in the FACTS 001 tenofovir gel and VOICE trials [70,71]. High rates of unintended pregnancies have also been reported in older PrEP trials [22] and trials of other HIV prevention technologies [72,73], often in the context of free provision of contraceptives [69,73].

2.1.6 | Contraceptive method mix for PrEP users

Choice of contraceptive is important, and in FEM-PrEP, the pregnancy rate was much higher among those using oral contraceptive pills (incidence rate 31.7 per 100 person years overall) compared to injectables (incidence rate 1.6 per 100 person years) or long-acting or permanent methods (none reported) [65]; similar findings were reported from VOICE [74]. This highlights the need to promote and supply longer acting methods and deliver high-quality contraceptive counselling [72] in the context of PrEP provision. Importantly, many PrEP trials provided oral and injectable contraceptives onsite but referral for LARCs [65,74], which may have been a deterrent to accessing more effective contraception. Trials have also indicated higher pregnancy incidence among new versus established contraceptive users, especially among oral contraceptive users, emphasizing the need for counselling support

for new users [65,74]. Recent findings from the ECHO contraceptive trial showed no difference in HIV risk between three commonly available contraceptive methods in Sub-Saharan Africa [75]. However, just as high rates of pregnancy have been observed in PrEP trials, high rates of HIV acquisition were observed in the ECHO trial across all contraceptive arms, despite the integration of HIV risk reduction counselling, condom provision, HIV and STI testing and eventually PrEP, when it became locally available. Considering there are unmet HIV and family planning needs in the context of well-resourced and closely monitored HIV and contraceptive trials, the scale-up of these services requires effective service integration to meet the breadth of SRHR needs in targeted populations.

2.2 | Opportunities and considerations for family planning and PrEP integration

There are opportunities to meet the HIV prevention needs of many FSWs while minimizing additional unintended pregnancy risk through the integration of PrEP and family planning services. Such service integration would also enhance opportunities for STI prevention and treatment and could promote more efficacious approaches such as LARCs and multipurpose prevention technologies for combined HIV prevention and contraception.

2.2.1 | Synergies between PrEP and family planning services

PrEP and family planning services for FSWs are likely to be complementary. PrEP adherence and maintenance among FSWs with sustained high-risk behaviours remains a major challenge, with studies consistently demonstrating low PrEP continuation among FSWs even at one month [44,45,76,77]. Provision of complementary services such as STI testing has been associated with longer maintenance of PrEP [77,78]. Integration of family planning may also facilitate PrEP uptake and continuation, as women seeking contraception or wanting to conceive may be ideal PrEP candidates. Regular monitoring of individuals on PrEP also provides opportunities for contraception renewal and vice versa. Building on these synergies between family planning and PrEP may reduce the administrative burden to both service providers and clients and promotes more cost-effective service provision [79,80]. Shared social, economic and structural factors underlying vulnerability to both unintended pregnancy and HIV acquisition, such as violence, substance use and financial insecurity, may also affect uptake of PrEP and family planning [81,82]. Programmes which address these factors may support uptake and adherence to PrEP, contraception and condoms alike [83].

2.2.2 | Models of PrEP and family planning service integration

Current programmes providing PrEP to FSWs are predominantly implemented through FSW-focused services, which include drop-in centres and clinics led by community-based organizations [84]. Acceptability studies indicate that these focused services are often the preferred way for FSWs to access healthcare due to staff friendliness, lower cost, shorter

waiting times, privacy, proximity to places of work and greater quality of care [8,81,85,86]. There are several advantages of building upon this model for integrated PrEP and family planning delivery. FSW-focused services commonly utilize peer-based prevention and community mobilization programmes and may provide opportunities to address syndemic vulnerabilities as well as informational, structural and social barriers to the use of PrEP and contraception, including condoms [4,81,86]. Community mobilization approaches promoting social cohesion, leadership and empowerment have been empirically associated with reductions in HIV and STI acquisition and increased treatment adherence [83,87]. With appropriate training, leadership and buy-in, community health workers and peer educators can play an important role in supporting PrEP and reproductive health provision. Community-supported models of care are already important for delivery of antiretroviral therapy in numerous settings [88]. Providing options for PrEP and family planning through mobile service delivery may extend service access and acceptability among FSW [13,89]. The potential of FSW-focused services to provide comprehensive SRHR care can be further realized by the addition of pregnancy testing, STI management, gender-based violence services and cervical cancer screening [3].

Alternative models for the integration of family planning and HIV services have focused on antenatal or family planning services [90,91]. There are emerging data supporting the feasibility of integrating PrEP into family planning clinics targeting adolescent girls and young women [92,93], although these may have limited utility and acceptability for FSWs due to potential stigmatization. FSWs and women who are pregnant outside of marriage are often stigmatized, shamed, denied care in public clinics, or are provided limited contraceptive choice based on assumptions about their needs and behaviours [5,94–97]. However, this model of integration may still be valuable in contexts where FSWs are already accessing services in public or private antenatal or family planning facilities [85]. Lessons learned from these studies highlight that PrEP and family planning integration does not only confer synchronized commodity delivery in a common space; there is also a need to integrate tools for screening, monitoring and evaluation, coordinate demand generation activities and integrate training [92].

Family planning entails not only provision of contraception, but also non-judgemental and non-coercive discussions around method options, fertility desires and safer conception counselling. Based on learnings from SRHR, regardless of integration model, providing multiple contraceptive options [98] and counselling and provision of LARCs over other non-barrier methods where possible [31,32] may optimize contraceptive uptake and acceptability among FSW. Counselling on contraceptive options should consider individuals' existing contraceptive use as well as current needs, as oral contraceptives may be less effective among new users in particular [65].

2.2.3 | *Barriers to integration*

There are several barriers to realizing integrated PrEP and family planning services. Common reliance on donor-driven funding schemes favour vertical, disease-specific programming, thus limiting the availability of sufficient funding for adequate family planning and STI services within HIV programmes [99,100]. This is exacerbated by inadequate mobilization of

domestic funding for HIV prevention programmes, particularly among key populations [101]. The management and procurement of PrEP and family planning commodities through different funding and sources may pose additional challenges to integrated delivery. Furthermore, the community-based nature of many services reaching FSWs and other key populations [102] can limit the availability of staff with suitable qualifications and training to deliver LARCs [26,79,103]. Finally, there is currently a lack of policy guidance to support implementers to integrate family planning into their programmes, with most national PrEP policies and guidelines making fleeting references to including contraceptive counselling within a combination package of prevention services [104–106]. Means to overcome these barriers without relying on referrals to other services include task-shifting contraceptive administration to lower-cadre healthcare workers [107,108] and collaborations between family planning and HIV services to hold recurrent “family planning days” at FSW-friendly community services which are attended by trained personnel for LARC administration. Enabling policies, clear implementation guidelines and adequate systems for commodity supply and distribution may support task-shifting and service integration [109]. “Diagonal” models of care which leverage the international vertical funding for PrEP and other HIV prevention programmes [110], and incorporate it into existing SRHR services focused on FSWs, may also facilitate more effective integration. Intersectional stigmas remain major barriers to PrEP uptake among key populations in many settings [111,112]. Interventions aimed at mitigating PrEP-related stigmas in the community, as well as during PrEP provision and family planning services, through careful marketing and peer-led, confidential and non-judgemental services may potentiate PrEP uptake and retention and integration with reproductive health services [13,81,89].

STI management is already commonly integrated in HIV programmes for FSW [3]. However, many programmes among FSWs in resource-limited settings currently rely on syndromic management of STIs, and given that the majority of STIs are asymptomatic, this approach is likely to result in untreated STIs and ongoing transmission [113,114]. To uphold improvements in SRHR through integrated PrEP delivery, there is demonstrated need to invest in improvements for STI services, including low-cost point-of-care STI tests where possible [115], vaccination for human papilloma virus and viral hepatitis, and other modalities for STI management [116].

2.2.4 | *Multipurpose devices for prevention of HIV and pregnancy*

Combined delivery of PrEP and hormonal contraception could be a convenient and efficient means of simultaneously preventing HIV and unintended pregnancy. Multipurpose prevention technologies for modern contraception and HIV are in early development stages, including intravaginal ring and gel preparations. A dual-purpose intravaginal ring delivering dapivirine and levonorgestrel has undergone Phase I trials through the MTN-030/IPM-041 study in the US and demonstrated high tolerance and safety [117]. However, similar technologies for PrEP delivery demonstrated only moderate effectiveness, reducing HIV incidence by 27% [118] and 31% [119] in Phase III trials. Long-acting multipurpose technologies have the potential to ease barriers to adherence, and intravaginal rings have the advantage of

providing direct delivery to the predominant site of viral transmission among most women. However, one study among FSWs in Tanzania found lower acceptability of the intravaginal ring compared to other PrEP modalities [120]. Furthermore, while long-acting injectable multipurpose technologies may have greater acceptability [120], single-purpose injectable PrEP is still under Phase III trial for PrEP efficacy and thus more immediate interventions are needed [121]. In the near-term, this might include options for co-packaging PrEP with oral contraceptives. However, this should still be considered in light of the limitations of oral contraceptives, in particular lower effectiveness compared to LARCs and pill burden [65]. Finally, despite synergies between HIV and unintended pregnancy risks, HIV risks and pregnancy intentions are each dynamic and temporal needs may not always synchronize. The ease of transitioning to single-purpose prevention modalities due to change in needs or fertility desires must also be considered.

3 | CONCLUSIONS

Given the significant social and health impacts of unintended pregnancy for FSWs, there is impetus to consider family planning as an integral component of PrEP programming. Surprisingly, the potential for unintended pregnancy in the provision of PrEP use has garnered limited attention to date despite well-documented concerns around condom migration and STI risk. Bi-directional integration of PrEP and family planning could have a broad positive impact on FSWs across low- and middle-income countries. In view of the complex social and structural influences on condom use, settings with low use of non-barrier methods pose a major concern in terms of unintended pregnancy risk and should be prioritized for integrated delivery of PrEP and family planning. As PrEP is scaled up among FSWs, it remains important to measure the unintended consequences of PrEP as well as its benefits. Systematic collection and reporting of implementation data pertaining to PrEP, family planning and related outcomes will support the optimization of integration strategies to meet the multifaceted needs of FSWs. Furthermore, dedicated research is needed to test the hypotheses that integrating contraception with PrEP delivery improves PrEP continuation and decreases unintended pregnancy and to compare models of PrEP and family planning integration. These data can be used by researchers and programmatic implementers alike to mobilize adequate resources to deliver comprehensive SRH services respectful of all women's SRH needs and reproductive rights.

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COMPETING INTEREST

The authors have no competing interest to declare.

AUTHORS' CONTRIBUTIONS

MH proposed the initial concept. ALB took the lead role in writing the manuscript, reviewing the literature and developing the initial framework. FHA, SS, SL, MS, SB and MH provided valuable feedback into the content and structure of the manuscript. All authors provided intellectual input on the contents and perspective of the commentary.

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REFERENCES

1. Baral S, Beyrer C, Muessig K, Poteat T, Wirtz AL, Decker MR, et al. Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *Lancet Infect Dis*. 2012;12(7):538–49.
2. Ampt FH, Willenberg L, Agius PA, Chersich M, Luchters S, Lim MSC. Incidence of unintended pregnancy among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *BMJ Open*. 2018;8:e021779.
3. Dhana A, Luchters S, Moore L, Lafort Y, Roy A, Scorgie F, et al. Systematic review of facility-based sexual and reproductive health services for female sex workers in Africa. *Glob Health*. 2014;10(1):1–28.
4. Moore L, Chersich MF, Steen R, Reza-Paul S, Dhana A, Vuylsteke B, et al. Community empowerment and involvement of female sex workers in targeted sexual and reproductive health interventions in Africa: a systematic review. *Glob Health*. 2014;10(1):47.
5. Petruney T, Minichiello SN, McDowell M, Wilcher R. Meeting the contraceptive needs of key populations affected by HIV in Asia: an unfinished agenda. *AIDS Res Treat*. 2012;2012:1–6.
6. Schwartz SR, Papworth E, Ky-Zerbo O, Sithole B, Anato S, Grosso A, et al. Reproductive health needs of female sex workers and opportunities for enhanced prevention of mother-to-child transmission efforts in sub-Saharan Africa. *J Fam Plann Reprod Health Care*. 2017;43(1):50–9.
7. Lafort Y, Greener R, Roy A, Greener L, Ombidi W, Lessitala F, et al. Sexual and reproductive health services utilization by female sex workers is context-specific: results from a cross-sectional survey in India, Kenya, Mozambique and South Africa. *Reprod Health*. 2017;14(1):13.
8. Katz KR, McDowell M, Green M, Jahan S, Johnson L, Chen M. Understanding the broader sexual and reproductive health needs of female sex workers in Dhaka, Bangladesh. *Int Perspect Sex Reprod Health*. 2015;41(4):182–90.
9. Cowan FM, Delany-Moretlwe S. Promise and pitfalls of pre-exposure prophylaxis for female sex workers. *Curr Opin HIV AIDS*. 2016;11(1):27–34.
10. Bekker L-G, Johnson L, Cowan F, Overs C, Besada D, Hillier S, et al. Combination HIV prevention for female sex workers: what is the evidence? *Lancet*. 2015;385(9962):72–87.
11. Van der Elst EM, Mbogua J, Operario D, Mutua G, Kuo C, Mugo P, et al. High acceptability of HIV pre-exposure prophylaxis but challenges in adherence and use: qualitative insights from a phase I trial of intermittent and daily PrEP in at-risk populations in Kenya. *AIDS Behav*. 2013;17(6):2162–72.
12. Eakle R, Bothma R, Bourne A, Gumede S, Motsosi K, Rees H, et al. The PrEP life: Female sex workers' perspectives on uptake and use of daily pre-exposure prophylaxis for HIV prevention in South Africa. *The 22nd International AIDS Conference (AIDS 2018)* Jul 23–27; Amsterdam; 2018.
13. Eakle R, Bourne A, Mbogua J, Mutanha N, Rees H. Exploring acceptability of oral PrEP prior to implementation among female sex workers in South Africa. *J Int AIDS Soc*. 2018;21:e25081.
14. Karagu M, Mukoma W, Nduta S, Kilonzo N, Eakle R, Kiragu M, et al. Willingness to take daily oral HIV pre-exposure prophylaxis (PrEP) among young women and female sex workers in Kenya. *The 22nd International AIDS Conference (AIDS 2018)* Jul 23–27; Amsterdam; 2018.
15. Shannon K, Strathdee SA, Goldenberg SM, Duff P, Mwangi P, Rusakova M, et al. Global epidemiology of HIV among female sex workers: influence of structural determinants. *Lancet*. 2015;385(9962):55–71.
16. Masvawure TB, Mantell JE, Tocco JU, Gichangi P, Restar A, Chabeda SV, et al. Intentional and unintentional condom breakage and slippage in the sexual

- interactions of female and male sex workers and clients in Mombasa, Kenya. *AIDS Behav.* **2018**;22(2):637–48.
17. Murray L, Moreno L, Rosario S, Ellen J, Sweat M, Kerrigan D. The role of relationship intimacy in consistent condom use among female sex workers and their regular paying partners in the Dominican Republic. *AIDS Behav.* **2007**;11(3):463–70.
 18. Peitzmeier S, Mason K, Ceasay N, Diouf D, Drame F, Loum J, et al. A cross-sectional evaluation of the prevalence and associations of HIV among female sex workers in the Gambia. *Int J STD AIDS.* **2013**;25(4):244–52.
 19. Schwartz SR, Baral S. Fertility-related research needs among women at the margins. *Reprod Health Matters.* **2015**;23(45):30–46.
 20. Duff P, Shoveller J, Feng C, Ogilvie G, Montaner J, Shannon K. Pregnancy intentions among female sex workers: recognising their rights and wants as mothers. *J Fam Plann Reprod Health Care.* **2015**;41(2):102–8.
 21. Fonner VA, Dalglish SL, Kennedy CE, Baggaley R, O'Reilly KR, Koehlin FM, et al. Effectiveness and safety of oral HIV preexposure prophylaxis for all populations. *AIDS.* **2016**;30(12):1973–83.
 22. MacQueen KMPMPH, Johnson LMA, Alleman PMA, Akumatey BM, Lawoyin TMMPHF, Nyiama TMA. Pregnancy prevention practices among women with multiple partners in an HIV prevention trial. *J Acquir Immune Defic Syndr.* **2007**;46(1):32–8.
 23. Schwartz S, Papworth E, Thiam-Niangoin M, Abo K, Drame F, Diouf D, et al. An urgent need for integration of family planning services into HIV care: the high burden of unplanned pregnancy, termination of pregnancy, and limited contraception use among female sex workers in Côte d'Ivoire. *J Acquir Immune Defic Syndr.* **2015**;68:S91–8.
 24. Braunstein SL, Ingabire CM, Kestelyn E, Uwizera AU, Mwarangwe L, Ntirushwa J, et al. High human immunodeficiency virus incidence in a cohort of Rwandan female sex workers. *Sex Transm Dis.* **2011**;38(5):385–94.
 25. Surie D, Yuhas K, Wilson K, Masese LN, Shafi J, Kinuthia J, et al. Association between non-barrier modern contraceptive use and condomless sex among HIV-positive female sex workers in Mombasa, Kenya: a prospective cohort analysis. *PLoS ONE.* **2017**;12:e0187444.
 26. Morse J, Chipato T, Blanchard K, Nhemachena T, Ramjee G, McCulloch C, et al. Provision of long-acting reversible contraception in HIV-prevalent countries: results from nationally representative surveys in southern Africa. *BJOG.* **2013**;120(11):1386–94.
 27. Luchters S, Bosire W, Feng A, Richter ML, King'ola N, Ampt F, et al. "A Baby Was an Added Burden": predictors and consequences of unintended pregnancies for female sex workers in Mombasa, Kenya: a mixed-methods study. *PLoS ONE.* **2016**;11(9):1–20.
 28. Sutherland EG, Alaii J, Tsui S, Luchters S, Okal J, King'ola N, et al. Contraceptive needs of female sex workers in Kenya – a cross-sectional study. *Eur J Contracept Reprod Health Care.* **2011**;16(3):173–82.
 29. Chanda MM, Ortblad KF, Mwale M, Chongo S, Kanchele C, Kamungoma N, et al. Contraceptive use and unplanned pregnancy among female sex workers in Zambia. *Contraception.* **2017**;96(3):196–202.
 30. Ochako R, Okal J, Kimetu S, Askew I, Temmerman M. Female sex workers experiences of using contraceptive methods: a qualitative study in Kenya. *BMC Womens Health.* **2018**;18:105.
 31. Rees H, Pillay D, Mullick S, Chersich M. Strengthening implant provision and acceptance in South Africa with the 'Any woman, any place, any time' approach: an essential step towards reducing unintended pregnancies. *S Afr Med J.* **2017**;107(11):939–44.
 32. Benova L, Cleland J, Daniele MAS, Ali M. Expanding method choice in Africa with long-acting methods: IUDs, implants or both? *Int Perspect Sex Reprod Health.* **2017**;43(4):183–91.
 33. Ippoliti NB, Nanda G, Wilcher R. Meeting the reproductive health needs of female key populations affected by HIV in low- and middle-income countries: a review of the evidence. *Stud Fam Plann.* **2017**;48(2):121–51.
 34. Alaei K, Paynter CA, Juan SC, Alaei A. Using preexposure prophylaxis, losing condoms? Preexposure prophylaxis promotion may undermine safe sex. *AIDS.* **2016**;30(18):2753–6.
 35. Reza-Paul S, Lazarus L, Doshi M, Hafeez Ur Rahman S, Ramaiah M, Maiya R, et al. Prioritizing risk in preparation for a demonstration project: a mixed methods feasibility study of oral pre-exposure prophylaxis (PrEP) among female sex workers in South India. *PLoS ONE.* **2016**;11:e0166889.
 36. Ong J. STIs incidence and prevalence in PrEP programmes – highlights from a systematic review. 10th IAS Conference on HIV Science; Jul 21–24; Mexico City; **2019**.
 37. Oldenburg CE, Nunn AS, Montgomery M, Almonte A, Mena L, Patel RR, et al. Behavioral changes following uptake of HIV pre-exposure prophylaxis among men who have sex with men in a clinical setting. *AIDS Behav.* **2018**;22(4):1075–9.
 38. Traeger MW, Cornelisse VJ, Asselin J, Price B, Roth NJ, Willcox J, et al. Association of HIV preexposure prophylaxis with incidence of sexually transmitted infections among individuals at high risk of HIV infection. *JAMA.* **2019**;321(14):1380–90.
 39. Traeger MW, Schroeder SE, Wright EJ, Hellard ME, Cornelisse VJ, Doyle JS, et al. Effects of pre-exposure prophylaxis for the prevention of HIV infection on sexual risk behavior in men who have sex with men: a systematic review and meta-analysis. *Clin Infect Dis.* **2018**;67:676–86.
 40. Liu AY, Cohen SE, Vittinghoff E, Anderson PL, Doblecki-Lewis S, Bacon O, et al. Preexposure prophylaxis for HIV infection integrated with municipal- and community-based sexual health services. *JAMA Intern Med.* **2016**;176(1):75–84.
 41. Montano MA, Dombrowski JC, Dasgupta S, Golden MR, Duerr A, Manhart LE, et al. Changes in sexual behavior and STI diagnoses among MSM initiating PrEP in a clinic setting. *AIDS Behav.* **2019**;23(2):548–55.
 42. Jenness SM, Weiss KM, Goodreau SM, Gift T, Chesson H, Hoover KW, et al. Incidence of gonorrhea and chlamydia following human immunodeficiency virus preexposure prophylaxis among men who have sex with men: a modeling study. *Clin Infect Dis.* **2017**;65(5):712–8.
 43. Wilkinson AL, Scott N, Tidhar T, Luong P, El-Hayek C, Wilson DP, et al. Estimating the syphilis epidemic among gay, bisexual and other men who have sex with men in Australia following changes in HIV care and prevention. *Sex Health.* **2019**;16(3):254–62.
 44. Eakle R, Gomez GB, Naicker N, Bothma R, Mbogua J, Cabrera Escobar MA, et al. HIV pre-exposure prophylaxis and early antiretroviral treatment among female sex workers in South Africa: results from a prospective observational demonstration project. *PLoS Med.* **2017**;14:e1002444.
 45. Mboup A, Béhanzin L, Guédou FA, Geraldo N, Goma-Matsétsé E, Giguère K, et al. Early antiretroviral therapy and daily pre-exposure prophylaxis for HIV prevention among female sex workers in Cotonou, Benin: a prospective observational demonstration study. *J Int AIDS Soc.* **2018**;21:e25208.
 46. Giguère K, Béhanzin L, Guédou FA, Talbot D, Leblond FA, Goma-Matsétsé E, et al. PrEP use among female sex workers: no evidence for risk compensation. *J Acquir Immune Defic Syndr.* **2019**;83(3):257–64.
 47. Alam N, Chowdhury ME, Mridha MK, Ahmed A, Reichenbach LJ, Streatfield PK, et al. Factors associated with condom use negotiation by female sex workers in Bangladesh. *Int J STD AIDS.* **2013**;24(10):813–21.
 48. Grosso AL, Lei EL, Ketende SC, Peitzmeier S, Mason K, Ceasay N, et al. Correlates of condom use among female sex workers in The Gambia: results of a cross-sectional survey. *PeerJ.* **2015**;3:e1076.
 49. Ntumbanzondo M, Dubrow R, Nicolai LM, Mwandagalirwa K, Merson MH. Unprotected intercourse for extra money among commercial sex workers in Kinshasa, Democratic Republic of Congo. *AIDS Care.* **2006**;18(7):777–85.
 50. UNAIDS. Sex workers' hopes and fears for HIV pre-exposure prophylaxis: recommendations from a UNAIDS consultation meeting. November 11–12, 2013; Johannesburg, South Africa: Wits Reproductive Health and HIV Institute; **2014**.
 51. Quaipe M, Vickerman P, Manian S, Eakle R, Cabrera-Escobar MA, Delany-Moretlwe S, et al. The effect of HIV prevention products on incentives to supply condomless commercial sex among female sex workers in South Africa. *Health Econ.* **2018**;27(10):1550–66.
 52. Gebremedhin M, Semahegn A, Usmael T, Tesfaye G. Unsafe abortion and associated factors among reproductive aged women in Sub-Saharan Africa: a protocol for a systematic review and meta-analysis. *Syst Rev.* **2018**;7(1):130.
 53. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller A-B, Daniels J, et al. Global causes of maternal death: a WHO systematic analysis. *Lancet Glob Health.* **2014**;2(6):e323–33.
 54. Ganatra B, Gerds C, Rossier C, Johnson BR Jr, Tunçalp Ö, Assifi A, et al. Global, regional, and subregional classification of abortions by safety, 2010–14: estimates from a Bayesian hierarchical model. *Lancet.* **2017**;390(10110):2372–81.
 55. Bingenheimer JB, Skuster P. The foreseeable harms of trump's global gag rule. *Stud Fam Plann.* **2017**;48(3):279–90.
 56. Alkema L, Chou D, Hogan D, Zhang S, Moller A-B, Gemmill A, et al. Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. *Lancet.* **2016**;387(10017):462–74.
 57. Stoebenau K, Heise L, Wamoyi J, Bobrova N. Revisiting the understanding of "transactional sex" in sub-Saharan Africa: a review and synthesis of the literature. *Soc Sci Med.* **2016**;168:186–97.
 58. Cange CW, LeBreton M, Saylor K, Billong S, Tamoufe U, Fokam P, et al. Female sex workers' empowerment strategies amid HIV-related socioeconomic vulnerabilities in Cameroon. *Cult Health Sex.* **2017**;19(10):1053–65.

59. Beckham SW, Shembilu CR, Winch PJ, Beyrer C, Kerrigan DL. 'If you have children, you have responsibilities': motherhood, sex work and HIV in southern Tanzania. *Cult Health Sex.* **2015**;17(2):165–79.
60. Reed E, Silverman JG, Stein B, Erasquin JT, Biradavolu M, Rosenberg A, et al. Motherhood and HIV risk among female sex workers in Andhra Pradesh, India: the need to consider women's life contexts. *AIDS Behav.* **2013**;17(2):543–50.
61. Papworth E, Schwartz S, Ky-Zerbo O, Leistman B, Ouedraogo G, Samadoulougou C, et al. Mothers who sell sex: a potential paradigm for integrated HIV, sexual, and reproductive health interventions among women at high risk of HIV in Burkina Faso. *J Acquir Immune Defic Syndr.* **2015**;68 Suppl 2:S154–61.
62. Fielding-Miller R, Mnisi Z, Adams D, Baral S, Kennedy C. "There is hunger in my community": a qualitative study of food security as a cyclical force in sex work in Swaziland. *BMC Public Health.* **2014**;14(1):1–20.
63. Beckham SW, Shembilu CR, Winch PJ, Beyrer C, Kerrigan DL. 'If you have children, you have responsibilities': motherhood, sex work and HIV in southern Tanzania. *Cult Health Sex.* **2015**;17(2):165–79.
64. Mbonye M, Nalukenge W, Nakamanya S, Nalusiba B, King R, Vandepitte J, et al. Gender inequality in the lives of women involved in sex work in Kampala, Uganda. *J Int AIDS Soc.* **2012**;15 Suppl 1:17365.
65. Callahan R, Nanda K, Kapiga S, Malahleha M, Mandala J, Ogada T, et al. Pregnancy and contraceptive use among women participating in the FEM-PrEP trial. *J Acquir Immune Defic Syndr.* **2015**;68(2):196–203.
66. Van Damme L, Corneli A, Ahmed K, Agot K, Lombaard J, Kapiga S, et al. Preexposure prophylaxis for HIV infection among african women. *N Engl J Med.* **2012**;367(5):411–22.
67. Thomson KA, Baeten JM, Mugo NR, Bekker LG, Celum CL, Heffron R. Tenofovir-based oral preexposure prophylaxis prevents HIV infection among women. *Curr Opin HIV AIDS.* **2016**;11(1):18–26.
68. Bearak J, Popinchalk A, Alkema L, Sedgh G. Global, regional, and subregional trends in unintended pregnancy and its outcomes from 1990 to 2014: estimates from a Bayesian hierarchical model. *Lancet Glob Health.* **2018**;6(4):e380–9.
69. Mugo NR, Hong T, Celum C, Donnell D, Bukusi EA, John-Stewart G, et al. Pregnancy incidence and outcomes among women receiving preexposure prophylaxis for HIV prevention: a randomized clinical trial. *JAMA.* **2014**;312(4):362–71.
70. Marrazzo JM, Ramjee G, Richardson BA, Gomez K, Mgodini N, Nair G, et al. Tenofovir-based preexposure prophylaxis for HIV infection among African women. *N Engl J Med.* **2015**;372(6):509–18.
71. Delany-Moretlwe S, Lombard C, Baron D, Bekker L-G, Nkala B, Ahmed K, et al. Tenofovir 1% vaginal gel for prevention of HIV-1 infection in women in South Africa (FACTS-001): a phase 3, randomised, double-blind, placebo-controlled trial. *Lancet Infect Dis.* **2018**;18(11):1241–50.
72. Halpern V, Lie C-C, Feldblum P, Van Damme L. Predictors of pregnancy in microbicide trials. *Contraception.* **2011**;83(5):436–40.
73. Odotola A, Baisley K, Hayes RJ, Rusizoka M, Tanton C, Weiss HA, et al. Pregnancy and contraceptive use among women participating in an HIV prevention trial in Tanzania. *Sex Transm Infect.* **2012**;88(6):436–43.
74. Akello CA, Bunge KE, Nakabiito C, Mirembe BG, Fowler MG, Mishra A, et al. Contraceptive use and pregnancy incidence among women participating in an HIV prevention trial. *J Womens Health.* **2017**;26(6):670–6.
75. Ahmed K, Baeten JM, Beksinska M, Bekker L-G, Bukusi EA, Donnell D, et al. HIV incidence among women using intramuscular depot medroxyprogesterone acetate, a copper intrauterine device, or a levonorgestrel implant for contraception: a randomised, multicentre, open-label trial. *Lancet.* **2019**;394(10195):303–13.
76. Cowan FM, Davey C, Fearon E, Mushati P, Dirawo J, Chabata S, et al. Targeted combination prevention to support female sex workers in Zimbabwe accessing and adhering to antiretrovirals for treatment and prevention of HIV (SAPPH-IRE): a cluster-randomised trial. *Lancet HIV.* **2018**;5(8):e417–26.
77. Kyongo JK, Kiragu M, Karagu R, Ochieng C, Ngunjiri A, Wachih C, et al. How long will they take it? Oral pre-exposure prophylaxis (PrEP) retention for female sex workers, men who have sex with men and young women in a demonstration project in Kenya. The 22nd International AIDS Conference (AIDS 2018); Jul 23–27; Amsterdam; **2018**.
78. Diouf O, Sarr M, Gueye D, Mboup A, Toure Kane C, et al. Retention in care for HIV pre-exposure prophylaxis (PrEP) among sex workers of four public health centers in Senegal. The 22nd International AIDS Conference (AIDS 2018) Jul 23–27; Amsterdam; **2018**.
79. Haberlen SA, Narasimhan M, Beres LK, Kennedy CE. Integration of family planning services into HIV care and treatment services: a systematic review. *Stud Fam Plann.* **2017**;48(2):153–77.
80. Shade SB, Kevany S, Onono M, Ochieng G, Steinfeld RL, Grossman D, et al. Cost, cost-efficiency and cost-effectiveness of integrated family planning and HIV services. *AIDS.* **2013**;27 Suppl 1:S87–92.
81. Bazzi AR, Yotebieng K, Otticha S, Rota G, Agot K, Ohaga S, et al. PrEP and the syndemic of substance use, violence, and HIV among female and male sex workers: a qualitative study in Kisumu, Kenya. *J Int AIDS Soc.* **2019**;22:e25266.
82. Leddy AM, Weiss E, Yam E, Pulerwitz J. Gender-based violence and engagement in biomedical HIV prevention, care and treatment: a scoping review. *BMC Public Health.* **2019**;19(1):897.
83. Kerrigan D, Mbwambo J, Likindikoki S, Davis W, Mantsios A, Beckham SW, et al. Project shikamana: community empowerment-based combination HIV prevention significantly impacts HIV incidence and care continuum outcomes among female sex workers in Iringa, Tanzania. *J Acquir Immune Defic Syndr.* **2019**;82(2):141–8.
84. Reza-Paul S, Lazarus L, Jana S, Ray P, Mugo N, Ngure K, et al. Community inclusion in PrEP demonstration projects: lessons for scaling up [version 1; peer review: 2 approved with reservations, 1 not approved]. *Gates Open Res.* **2019**;3:1504.
85. Lafort Y, Greener R, Roy A, Greener L, Ombidi W, Lessitala F, et al. Where do female sex workers seek HIV and reproductive health care and what motivates these choices? A survey in 4 cities in India, Kenya, Mozambique and South Africa. *PLoS ONE.* **2016**;11:e0160730.
86. Eakle R, Bourne A, NBothma R, Gomez G, Venter F, Rees H. "They must understand us as sex workers": health service perspectives among female sex workers in the context of PrEP and early ART introduction in the TAPS Demonstration Project, South Africa. The 22nd International AIDS Conference (AIDS 2018); Jul 23–27; Amsterdam; **2018**.
87. Kerrigan D, Kennedy CE, Morgan-Thomas R, Reza-Paul S, Mwangi P, Win KT, et al. A community empowerment approach to the HIV response among sex workers: effectiveness, challenges, and considerations for implementation and scale-up. *Lancet.* **2015**;385(9963):172–85.
88. Bemelmans M, Baert S, Goemaere E, Wilkinson L, Vandendyck M, van Cutsem G, et al. Community-supported models of care for people on HIV treatment in sub-Saharan Africa. *Trop Med Int Health.* **2014**;19(8):968–77.
89. Penfold E, O'Connor C, Hill N, Bothma R, Khoza T. Enabling factors for rapid scale-up of services for sex workers in large urban African sites, 2014–2018 (WEPEd811). 10th IAS Conference on HIV Science; Jul 21–24; Mexico City; **2019**.
90. Kennedy CE, Spaulding AB, Brickley DB, Almers L, Mirjahangir J, Packer L, et al. Linking sexual and reproductive health and HIV interventions: a systematic review. *J Int AIDS Soc.* **2010**;13(1):26.
91. Narasimhan M, Yeh PT, Haberlen S, Warren CE, Kennedy CE. Integration of HIV testing services into family planning services: a systematic review. *Reprod Health.* **2019**;16(1):61.
92. Gombe MM, Mangwendeza Y, Ncube G, Zwangobani N, Prust M, Cakouros B, et al. Integrating oral HIV pre-exposure prophylaxis (PrEP) in a public family planning facility and youth center to inform national roll out in Zimbabwe. The 22nd International AIDS Conference; Jul 23–27; Amsterdam; **2018**.
93. Mugwanya KK, Pintye J, Kinuthia J, Abuna F, Lagat H, Begnel ER, et al. Integrating preexposure prophylaxis delivery in routine family planning clinics: a feasibility programmatic evaluation in Kenya. *PLoS Med.* **2019**;16:e1002885.
94. Nyblade L, Reddy A, Mbote D, Kraemer J, Stockton M, Kemunto C, et al. The relationship between health worker stigma and uptake of HIV counseling and testing and utilization of non-HIV health services: the experience of male and female sex workers in Kenya. *AIDS Care.* **2017**;29(11):1364–72.
95. Scorgie F, Nakato D, Harper E, Richter M, Maseko S, Nare P, et al. 'We are despised in the hospitals': sex workers' experiences of accessing health care in four African countries. *Cult Health Sex.* **2013**;15(4):450–65.
96. Hargreaves JR, Busza J, Mushati P, Fearon E, Cowan FM. Overlapping HIV and sex-work stigma among female sex workers recruited to 14 respondent-driven sampling surveys across Zimbabwe, 2013. *AIDS Care.* **2017**;29(6):675–85.
97. Beckham SW, Shembilu CR, Brahmbhatt H, Winch PJ, Beyrer C, Kerrigan DL. Female sex workers' experiences with intended pregnancy and antenatal care services in southern Tanzania. *Stud Fam Plann.* **2015**;46(1):55–71.
98. Ross J, Stover J. Use of modern contraception increases when more methods become available: analysis of evidence from 1982–2009. *Glob Health Sci Pract.* **2013**;1(2):203–12.
99. Mwisongo A, Nabyonga-Orem J. Global health initiatives in Africa – governance, priorities, harmonisation and alignment. *BMC Health Serv Res.* **2016**;16(4):212.
100. Walsh A, Biesma RG, Brugha R, Harmer A, Walt G, Spicer N. The effects of global health initiatives on country health systems: a review of the evidence from HIV/AIDS control. *Health Policy Plan.* **2009**;24(4):239–52.

101. The Joint United Nations Programme on HIV/AIDS. Miles to go—closing gaps, breaking barriers, righting injustices. Geneva: UNAIDS; 2018 [cited 2019 Oct 29]. Available from: https://www.unaids.org/sites/default/files/media_asset/miles-to-go_en.pdf
102. Awungafac G, Delvaux T, Vuylsteke B. Systematic review of sex work interventions in sub-Saharan Africa: examining combination prevention approaches. *Trop Med Int Health*. 2017;22(8):971–93.
103. Adeagbo O, Mullick S, Pillay D, Chersich M, Morroni C, Naidoo N, et al. Uptake and early removals of Implanon NXT in South Africa: Perceptions and attitudes of healthcare workers. *S Afr Med J*. 2017;107(10):822–6.
104. Ministry of Health, National AIDS & STI Control Program. Guidelines on use of antiretroviral drugs for treating and preventing HIV in Kenya. Nairobi: NASCOP; 2018 [cited 2019 Nov 13]. Available from: http://cquin.icap.columbia.edu/wp-content/uploads/2017/04/ICAP_CQUIN_Kenya-ARV-Guidelines-2018-Final_20thAug2018.pdf
105. South Africa National Department of Health. Guidelines for expanding combination prevention and treatment options: oral Pre-Exposure Prophylaxis (PrEP) and Test and Treat (T&T). Pretoria: South Africa National Department of Health; 2016 [cited 2018 May 30]. Available from: <http://www.nicd.ac.za/assets/files/PrEP%20and%20TT%20Guidelines%20-%20Final%20Draft%20-%2011%20May%202016.pdf>
106. World Health Organization. WHO Implementation tool for pre-exposure prophylaxis (PrEP) of HIV infection. Module 1: Clinical. Geneva: WHO; 2017.
107. Charyeva Z, Oguntunde O, Orobato N, Otolorin E, Inuwa F, Alalade O, et al. Task shifting provision of contraceptive implants to community health extension workers: results of operations research in Northern Nigeria. *Glob Health Sci Pract*. 2015;3(3):382–94.
108. Hoke TH, Wheeler SB, Lynd K, Green MS, Razafindravony BH, Rasamihamanana E, et al. Community-based provision of injectable contraceptives in Madagascar: 'task shifting' to expand access to injectable contraceptives. *Health Policy Plan*. 2012;27(1):52–9.
109. Stout A, Wood S, Barigye G, Kabore A, Siddo D, Ndione I. Expanding access to injectable contraception: results from pilot introduction of subcutaneous depot medroxyprogesterone acetate (DMPA-SC) in 4 African Countries. *Glob Health Sci Pract*. 2018;6(1):55–72.
110. Orenstein WA, Seib K. Beyond vertical and horizontal programs: a diagonal approach to building national immunization programs through measles elimination. *Expert Rev Vaccines*. 2016;15(7):791–3.
111. Golub SA. PrEP stigma: implicit and explicit drivers of disparity. *Curr HIV/AIDS Rep*. 2018;15(2):190–7.
112. Were D, Atkins K, Musau A, Plotkin M, Curran K. Manifestations of stigma in the context of a national oral pre-exposure prophylaxis (PrEP) scale-up program in Kenya. 10th IAS Conference on HIV Science; Jul 21–24; Mexico City; 2019.
113. Kaida A, Dietrich JJ, Laher F, Bekinska M, Jaggernath M, Bardsley M, et al. A high burden of asymptomatic genital tract infections undermines the syndromic management approach among adolescents and young adults in South Africa: implications for HIV prevention efforts. *BMC Infect Dis*. 2018;18(1):499.
114. Shah NS, Kim E, de Maria Hernández Ayala F, Guardado Escobar ME, Nieto AI, Kim AA, et al. Performance and comparison of self-reported STI symptoms among high-risk populations - MSM, sex workers, persons living with HIV/AIDS - in El Salvador. *Int J STD AIDS*. 2014;25(14):984–91.
115. Garrett NJ, Osman F, Maharaj B, Naicker N, Gibbs A, Norman E, et al. Beyond syndromic management: opportunities for diagnosis-based treatment of sexually transmitted infections in low- and middle-income countries. *PLoS ONE*. 2018;13:e0196209.
116. Prevention and control of sexually transmitted infections (STIs) in the era of oral pre-exposure prophylaxis (PrEP) for HIV. Geneva: World Health Organization; 2019 [cited 2019 Nov 13]. Available from: <https://apps.who.int/iris/bitstream/handle/10665/325908/WHO-CDS-HIV-19.9-eng.pdf?ua=1>
117. Achilles S, Hendrix C, Poloyac S, Hoesley C, Peda M, Gundacker H, et al. Safety and pharmacokinetics of dapivirine and levonorgestrel vaginal rings for multipurpose prevention of HIV and pregnancy (Abstract OA12.02LB). *HIV Research for Prevention (HIVR4P)*; Oct 21–25; Madrid, Spain; 2018.
118. Baeten JM, Palanee-Phillips T, Brown ER, Schwartz K, Soto-Torres LE, Govender V, et al. Use of a vaginal ring containing dapivirine for HIV-1 prevention in women. *N Engl J Med*. 2016;375(22):2121–32.
119. Nel A, van Niekerk N, Kapiga S, Bekker L-G, Gama C, Gill K, et al. Safety and efficacy of a dapivirine vaginal ring for HIV prevention in women. *N Engl J Med*. 2016;375(22):2133–43.
120. Beckham S, Shembilu C, Galai N, Mwampashi A, Likindikoki S, Mbwambo J, et al. Comparative acceptability and preferences for oral, injectable, and ring-based PrEP: A project Shikamana mixed-methods study among Tanzanian female sex workers. The 22nd International AIDS Conference (AIDS 2018); Jul 23–27; Amsterdam; 2018.
121. Evaluating the safety and efficacy of long-acting injectable cabotegravir compared to daily oral TDF/FTC for pre-exposure prophylaxis in HIV-uninfected women [cited 2019 March 18]. November 6, 2018. Available from: <https://clinicaltrials.gov/ct2/show/NCT03164564>