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Integrating pre-exposure prophylaxis of HIV infection into family planning services: a scoping review

Caroline I Gotsche ^{1,2}, Petrus S Steyn ¹, Manjulaa Narasimhan ¹, Michelle Rodolph,³ Rachel Baggaley ³, James N Kiarie ¹

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¹Department of Sexual and Reproductive Health and Research, UNDP/UNFPA/UNICEF/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP), World Health Organization, Geneva, Switzerland

²Faculty of Public Health and Policy, London School of Hygiene & Tropical Medicine, London, UK

³Global HIV, Hepatitis and STIs Programmes, World Health Organization, Geneva, Switzerland

Correspondence to

Caroline I Gotsche; caroline.gotsche@lshtm.ac.uk

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ABSTRACT

Introduction The aim of this review was to map evidence of integrating pre-exposure prophylaxis (PrEP) for HIV prevention into family planning services. A comprehensive package, using a combination of PrEP and contraceptive delivery, could reduce the number of new HIV infections and/or unintended pregnancies for at-risk women and adolescent girls.

Methods A scoping literature search was conducted between August 2020 and October 2020. After developing the review question, electronic databases (MEDLINE, Embase, Cochrane Library, Global Health, Web of Science) were systematically reviewed. All types of articles published from 2012 to August 2020 in English were included. The intended outcome was to identify barriers and enablers of integrating services at the client-level and provider-level.

Results 38 articles met inclusion criteria, with 16 from low-and middle-income countries and 22 from high-income countries. Barriers at the client-level included a lack of risk perception associated with low uptake and continuation of PrEP and pill burden; and at the provider-level, barriers included a lack of studies on cost-effectiveness of integrating services and provider training and knowledge. Facilitators included the initiation of PrEP and contraception at the same time and by the same provider or HIV self-testing.

Conclusion Mapping and synthesising current evidence, this review identified key barriers and facilitators for the integration of PrEP into family planning services for women and adolescent girls. In order to address these factors, more implementation research in a variety of settings is needed to meet women's sexual and reproductive health needs globally.

INTRODUCTION

Integrating pre-exposure prophylaxis (PrEP) for HIV prevention within family planning (FP) services is an area of emerging interest to researchers and

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Pre-exposure prophylaxis (PrEP) in women is an effective HIV prevention option when taken regularly. Providing PrEP in family planning services could contribute to PrEP uptake globally. Understanding how PrEP could be delivered in these services has to be further investigated.

WHAT THIS STUDY ADDS

⇒ Multi-level barriers were identified at client level (eg, low risk perception), and at provider-level (eg, lack of provider training and knowledge). Facilitating factors such as HIV self-testing were identified which should be implemented to improve the integration of both services.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ More implementation of research studies are needed from diverse settings on how best to integrate PrEP into family planning services, with current evidence mainly from pilot studies in Kenya and the USA.

policy-makers. Where women and adolescent girls are at increased risk for HIV infection, offering HIV prevention services during visits to FP services provides an important opportunity to reduce both the risk of HIV infection and unplanned pregnancy during clinic visits.¹ Findings from the Evidence for Contraceptive Options in HIV Outcomes (ECHO) trial showed no significant difference in HIV risk among the contraceptive methods that were evaluated. The aim of this study was to assess

whether the risk of acquiring HIV differs between the three different contraceptive methods offered: intramuscular depot medroxyprogesterone acetate, copper intrauterine device, and levonorgestrel implant.² Oral PrEP is an additional effective HIV prevention option for women and adolescent girls.³ As a user-controlled HIV prevention method, PrEP could reduce infections occurring disproportionately among women and adolescent girls in southern and East Africa by taking one daily tablet.⁴

Integration is defined as combining different types of services to maximise outcomes and can be bi-directional, with sexual and reproductive health (SRH) services integrated into HIV services and HIV services integrated into SRH services.⁵ Integration of HIV prevention interventions within existing SRH services can improve both access and effectiveness of FP care.⁶ Interest in comprehensive approaches to the integration of SRH, HIV and sexually transmitted infections (STIs) services re-emerged when results of the ECHO trial showed a high incidence of HIV infections and other STIs among women seeking FP services.² Although PrEP was not offered until later in the ECHO trial, it was shown that PrEP use decreased HIV incidence among the women who used it.^{7,8} Since PrEP is not commonly available within FP services, UNAIDS, WHO and the Human Reproduction Programme have jointly called for a rapid introduction of PrEP in FP settings, in locations with high HIV incidence as well as in sites that serve women from key populations.⁹ The objective of this scoping review was to map and synthesise the literature on how PrEP can be integrated into FP services, focusing on potential barriers and enablers. Insights from this review may assist international and national stakeholders to improve the future scale-up of integration of both services.

METHODS

This review was informed by Arksey and O'Malley's (2005)¹⁰ methodological framework for scoping reviews. Three authors (CG, PS, JK) developed the research question, search strategy and inclusion criteria. Second checking was performed by two authors (CG, PS), and questionable eligibility of studies was discussed by three authors (CG, PS, JK). The review question was phrased as 'What evidence exists on the integration of HIV pre-exposure prophylaxis (PrEP) into FP services for women and adolescent girls globally?'. According to the question's key concepts and synonyms, search strings (online supplemental table 1) were developed that accounted for differences in databases' search options. Studies included: English language, all article types, all settings, including women and adolescent girls, relating to FP services or care and all populations including key populations (online supplemental table 2).

Search strategy

Between August 2020 and September 2020, five peer reviewed electronic databases were systematically reviewed comprising MEDLINE, Embase, Cochrane Library, Global Health, and Web of Science. To include grey literature the search was also run in Google Scholar. Potential ongoing studies were searched for in PROSPERO (International prospective register of systematic reviews) as well as the Australian New Zealand Clinical Trial Registry (ANZCTR) (online supplemental table 3). The timeframe included all studies from 2012 to August 2020. The rationale for setting the start date in 2012 was the publication date of the Partners PrEP study, which for the first time, showed efficacy of PrEP in women.³ Endnote, version X9 (Clarivate, Philadelphia, PA) was used as reference manager. To include articles published after the initial search, email updates were set and reviewed. Further studies were identified through snowballing of experts, references and organisational or institutional websites. In total, 4326 articles were retrieved from databases, and 2651 articles remained after removing duplicates. The following inclusion criteria were applied when screening the material: English language, all article types, all countries, including women and adolescent girls (10–19 years of age, rational: according to WHO definition of adolescence), relating to FP services or care, key populations (eg, sex worker, injecting drug users, trans women). This study focused only on the integration of PrEP into FP services and not into HIV services. By scanning titles and abstracts to identify relevant articles, 2605 articles were removed. Forty-seven full-text articles were assessed for eligibility and nine of those were removed (online supplemental figure 1¹¹). All types of articles (eg, peer reviewed articles, abstracts and conference posters) were included into the review. Included studies were screened in order to identify patterns and themes arising from the dataset.^{12,13}

RESULTS

Description of included studies

The search and selection found that 38 articles met the inclusion criteria and were included in the review; 33 of the articles provided primary data (the others were commentaries or opinion pieces without original data). Sixteen articles referred to low- and middle-income countries (LMICs) (13/16 in Kenya) and 22 in high-income countries (HICs) (22/22 in the USA). Studies from LMICs on the integration of PrEP into FP services were primarily published since 2018, studies from the USA primarily since 2016. Online supplemental table 4 provides an overview of all included studies. All included articles referred to oral PrEP only. Of the 16 articles that provided data from LMIC, 11 were from the three implementation studies listed in box 1. In the USA, studies were conducted in various settings. Mainly the first two steps in the PrEP and

Box 1

- ⇒ *PrEP Implementation in Young Women and Adolescents* (PrYA) programme (n=6) is an implementation programme in Kisumu, Kenya which delivered PrEP to young women at substantial risk of HIV.
- ⇒ *Zimbabwe National Family Planning Council* (ZNFPC) (n=2) coordinates, takes leadership and supports implementation of integrated FP and related SRH services in Zimbabwe.
- ⇒ *Prevention Options for Women Evaluation Research* (POWER) study (n=3) intends to understand PrEP use and uptake among women attending FP clinics in Kenya and youth friendly clinics in South Africa.

SRH cascade (figure 1) were investigated in the USA, whereas in LMICs the focus primarily was on steps 3–5 of the cascade.

This review identified multiple inhibiting and facilitating factors when PrEP services were accessed through FP services. Table 1 provides an overview of these barriers and facilitators categorised by PrEP indicators such as interest, uptake and (dis)continuation. Table 2 lists barriers and enablers of integrating PrEP into FP services affecting providers, such as a lack of costing studies and a lack of provider training.

Furthermore, when available, characteristics of implementation strategies were specified in the results section.

Themes that arose from the dataset included client-level and provider-level barriers and facilitators of delivering PrEP in settings where FP services were provided.

Client-level barriers and facilitators affecting PrEP services when integrated into FP services

Awareness and knowledge of PrEP

A survey conducted by Sila *et al* found that awareness of PrEP (89%) was high among high-risk adolescent girls and young women (AGYW) (n=470) attending four FP services in Kisumu, Kenya.¹⁴ Although overall awareness of PrEP among clients was high, it was lower among AGYW ≤18 years of age compared with those >18 years, which can be perceived as a barrier to awareness. Enablers of awareness included regular employment, engagement in transactional sex in the last 6 months, and engagement in condomless sex in the last 6 months.¹⁴ In the USA, figures on awareness among women (general population and at high risk) attending FP services varied considerably across studies.^{15–17} O'Connell and Critini explored the feasibility of integrating routine PrEP counselling in a high-volume FP clinic with no previous PrEP experience using a Women's PrEP Counselling Checklist (WPCC) tool developed to structure and standardise each counselling session. Clients who received WPCC-guided counselling had significantly higher knowledge scores and more enhanced PrEP acceptability than their peers receiving unguided counselling.¹⁸

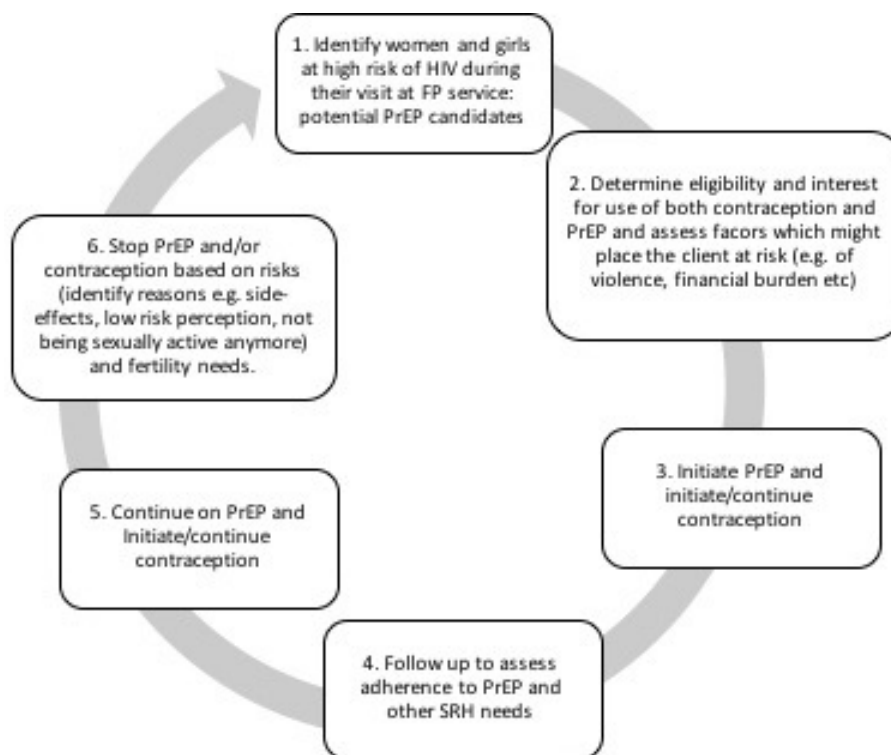


Figure 1 A proposed PrEP and SRH cascade, based on the PrEP cascade supported by WHO. FP, family planning; PrEP, pre-exposure prophylaxis; SRH, sexual and reproductive health.

Table 1 Barriers and facilitators of PrEP services when PrEP was accessed through FP services

Client-level		
PrEP indicator	Barriers	Facilitators
Awareness	▶ Kenya: AGYW ≤18 years of age were less aware of PrEP	▶ Kenya: AGYW with regular employment; AGYW engaged in transactional sex or condomless sex in the last 6 months were more likely to take up PrEP
Uptake	▶ Kenya: Low perceived risk for HIV reduced PrEP uptake ▶ Zimbabwe: Fear of pill burden, wanting partner's consent or fearing partner's reaction to PrEP, satisfied with current method of HIV prevention ▶ USA: PrEP stigma reduced uptake ▶ USA: Perception of PrEP being too new and mistrust in the medical community reduced uptake	▶ Kenya: Unmarried women, women with an HIV positive partner, women >24 years of age were more likely to take up PrEP ▶ Zimbabwe: High HIV risk perception, preference for PrEP over other HIV prevention methods, perceived severity of living with HIV, confidence in PrEP ▶ USA: Clinical tools for provider and education material for clients increased PrEP uptake
Continuation	▶ Zimbabwe: Unaccustomed to taking pills, religious issues, travel out of town, clinic schedule/hours, lack of transport funds, misunderstanding dosing guidance, side effects ▶ Kenya: Low perceived risk of acquiring HIV, finding out partner was HIV negative, side effects, pill burden, fear of intimate partner violence reduced continuation of PrEP	▶ Zimbabwe: Focus on original motivation, establishing daily pill routine, accessible PrEP pill storage, planning ahead before travel out of town, partner or facility support impacted positively on PrEP continuation

AGYW, adolescent girls and young women; FP, family planning; PrEP, pre-exposure prophylaxis.

Uptake of PrEP

In a qualitative study, Gombe *et al*¹⁹ studied key barriers (fear of pill burden such as size of pill or difficulties with adherence, wanting partner's consent or fearing of partner reaction, or feeling satisfied with current method of HIV prevention) and enablers (high HIV risk perception, preference for PrEP over other HIV prevention measures, perceived severity of living with HIV, and confidence in PrEP) associated with uptake of PrEP in two semi-public Zimbabwe National Family Planning Council (ZNFPC) clinics.¹⁹ In the USA, Sales *et al* found that delivering PrEP through FP services, which are already trusted by black adolescent and young adult women, can have a positive impact on drug adherence and uptake and therefore act as an enabler of uptake.²⁰ In their survey, Calabrese *et al*¹⁵ identified stigma as an important structural barrier reducing PrEP uptake.¹⁵ Using the RE-AIM (Reach, Efficacy, Adoption, Implementation, Maintenance) evaluation framework, Brant *et al*²¹ showed a low PrEP uptake (6%) when integrated into FP care. Enablers, such as clinical tools for providers and client education materials, were provided and increased uptake. The RE-AIM framework is a widely used tool to assess the quality, feasibility, and public health impact of a health intervention.²¹ Overall, figures of PrEP uptake

varied across studies. In their qualitative study, Gombe *et al* piloted PrEP integration in an urban FP clinic in Zimbabwe in 2018, and found an uptake of 4.1% that was influenced by partners' or families' support, by healthcare workers' knowledge and attitudes, as well as participants' awareness of PrEP.²² This aligns with the figures of Sila *et al*¹⁴ who also found a low uptake of 4% despite the high awareness of PrEP (89%). In their study, 24% of AGYW who declined PrEP had a high HIV risk score¹⁴ ≥ 5 (VOICE score, Vaginal and Oral Interventions to Control the Epidemic (VOICE) study).²³ Thus, low risk perception is considered to be an important barrier to PrEP uptake. In Kenya, Mugwanya *et al* integrated routine HIV testing and counselling for PrEP into FP clinics which was delivered by a PrEP dedicated-nurse. Results showed that PrEP uptake was 22% among HIV-negative women, overall, and 16% among AGYW (n=1271). Facilitators for an uptake of PrEP among study participants included unmarried women, women who had an HIV positive partner, and women >24 years old.²⁴ As indicated in Sila *et al*'s study, a woman's low perceived risk for HIV was an important reason for low PrEP uptake.¹⁴ Deviating from other study's figures, early results from the Prevention Options for Women

Table 2 Barriers and facilitators affecting providers when PrEP was accessed through FP services

Provider-level		
	Barriers	Facilitators
Costs	▶ Lack of costing studies	▶ Kenya: Reducing costs through (1) postponing creatinine testing and (2) prioritising PrEP delivery to clients at high HIV risk
Workforce	▶ Kenya: Increased workload of healthcare worker, physical space constraints, drug stockouts, inaccurate PrEP knowledge	▶ Kenya: Task sharing, facility-specific client flow modifications (eg, fast tracking), myths busting groups
Provider training	▶ Kenya: Lack of provider training ▶ USA: Lack of provider training	▶ USA: 1.5 hour PrEP information training improved providers' PrEP knowledge

FP, family planning; PrEP, pre-exposure prophylaxis.

Evaluation Research (POWER) cohort study indicated a rather high uptake, with 90% of enrolled AGYW (n=540) agreeing to initiate PrEP. In this abstract, however, no further information on potential reasons for a higher uptake was provided.²⁵

Continuation of PrEP

In Zimbabwe, Gombe *et al*¹⁹ investigated factors affecting continuation of PrEP for women accessing PrEP through FP clinics. Common barriers included being unaccustomed to taking pills, religious issues, travel out of town, clinic schedule/hours, lack of transport funds, misunderstanding dosing guidance or side-effects. Facilitators included focusing on original motivation, establishing a daily pill routine, accessible PrEP storage, planning ahead before travel out of town, and the promotion of partner or facility support.¹⁹ In Jilinde, a 4-year PrEP scale-up project in Kenya, FP and PrEP services and counselling were offered during the same session by the same provider, and follow-up appointments were synchronised. AGYW initiating PrEP and FP at the same time (39.4%) had higher month continuation rates after 1 month, compared with AGYW who only initiated PrEP (36.2%).²⁶ Data on continuation and discontinuation remained scarce with more evidence coming from LMIC than from HIC. Early results from the POWER study showed that 50% of those starting PrEP discontinued within 1 month and another 25% by 3 months.²⁵ Mugwanya *et al*'s findings revealed that PrEP discontinuation was high in women who accessed PrEP in FP clinics. After 1, 3, and 6 months post-initiation, only 41%, 24%, and 15% of all women, respectively, continued using PrEP. Most frequent reasons for discontinuation were a low perceived risk of acquiring HIV (25%), finding out that their male partner was HIV negative (24%), side effects (20%), and pill burden (17%); additionally, 7% of women reported discontinuing PrEP due to fear of intimate partner violence (IPV).²⁷

Provider-level barriers and facilitators affecting PrEP services

Costs

Roberts *et al*²⁸ measured incremental costs of integrating PrEP into FP services and explored cost implications of service delivery modifications in the context of the PrEP Implementation in Young Women and Adolescents (PrIYA) programme.²⁸ Before PrEP is recommended, testing for HIV and other STIs as well as a renal function test is required.²⁹ Several measures were identified to reduce costs and burden on providers and may therefore act as facilitators of integrating services: (1) postponing the renal function or creatinine testing to the first follow-up visit; and (2) targeting people at higher risk. These measures reduced costs by 8% and 14%, respectively (US\$26.52 cost/client/month). Additionally, costs decreased to

US\$16.54/client/month when implementation was delivered by the ministry of health personnel.²⁸

Workforce

Beima-Sofie *et al*³⁰ found that healthcare workers (HCW) in Kenya felt overburdened by the increased workload when PrEP was integrated into FP services. Barriers reported by HCW included physical space constraints, drug stockouts, inaccurate PrEP knowledge, and lack of PrEP delivery training. HCW strategies to optimise delivery included task sharing (nurses to HIV testing service providers), facility-specific client flow modifications such as fast-tracking PrEP clients to reduce waiting times, and myth-busting during group health talks to reduce individual time spent counselling clients.³⁰ In the USA, Seidman *et al* conducted a national survey which identified a lack of provider training as one of the main structural barriers to implementing PrEP, with <50% of FP providers answering questions on PrEP correctly.³¹ Sales *et al* showed significant improvement of providers' PrEP knowledge and confidence to identify eligible women after providing a 1.5 hour PrEP information training in public FP clinics in a high HIV prevalence area in the USA.³²

DISCUSSION

This scoping review aimed to map and synthesise the existing literature on the integration of PrEP into FP services for women and adolescent girls; special emphasis was dedicated to barriers and facilitators when PrEP was accessed through FP services. Findings revealed multi-level barriers affecting the PrEP and SRH cascade (Figure 1) and its indicators at the client- as well as the provider-level. Identified barriers and enablers may affect the integration of PrEP into FP services and therefore have to be addressed by future implementation research studies and policies.

Client-level barriers and facilitators

Awareness and knowledge of PrEP

In a Kenyan setting, awareness was significantly lower in younger women (<18 years), highlighting the need to find ways of specifically supporting this age group.³³ The ECHO trial showed that HIV incidence was higher in women <25 years old, which highlights the urgency of HIV prevention efforts in that age group and the impact PrEP use could have in AGYW.²

Uptake and continuation of PrEP

Results identified a reduced risk perception to be a major barrier of PrEP interest,³⁴ as well as uptake and continuation.^{14 27 35} This corresponds with Ngure *et al*'s findings revealing that a high risk perception was found to be a motivator for PrEP initiation and continuation.³⁶ Garfinkel *et al*³⁷ found that women's HIV risk perception was shaped by both behavioural and structural risk factors, including IPV, sexual coercion, having multiple sexual partners, and trading sex.³⁷

Therefore, targeting women who face IPV or who trade sex may be important to address the lack of risk perception among particularly vulnerable populations. Women's perception of their own risk is a critical component of PrEP uptake³⁸ and this review's findings showed that women's perceived and actual risk were often misaligned,^{14 39 40} requiring refined approaches to ensure a woman's perceived risk of HIV acquisition meets her actual risk. In a matched-cluster randomised controlled trial, Thomas *et al* are currently investigating whether an interactive tablet-based education intervention can correct risk perception.⁴¹ Approaches as to how to achieve an alignment of women's risk perception and their actual risk are not yet well understood and more research is needed.

As a key barrier, this review revealed that particularly younger women were less likely to initiate or continue using PrEP. Mugwanya *et al* showed that being younger than 24 years of age decreased the likelihood of PrEP uptake and continuation.¹⁹

Across settings, results identified pill burden and not being accustomed to taking pills as one of the major barriers for uptake or continuation of PrEP at the client-level.^{14 19 24 34 42} This aligned with recent findings from Kenya revealing that AGYW found it challenging to keep up with daily PrEP pill-taking.⁴³ Challenges to adhere to daily medication are not unique to PrEP.⁴⁴ However, PrEP can only prevent HIV in women when taken consistently as prescribed.⁴⁵ Therefore, overcoming this barrier is essential to increase uptake and continuation of oral PrEP. According to Gombe *et al*, establishing a daily pill routine, as well as accessible PrEP pill storage, were facilitating factors.¹⁹

Follow-up visits, to test for HIV regularly and to provide support to continue PrEP, were also considered a barrier to PrEP uptake, which may also have an impact on the integration of PrEP in FP services.^{34 42} Tools such as HIV self-testing (HIVST) may facilitate the integration of PrEP into FP services on a client-level by reducing the number of clinic visits, but also on a provider-level by saving health workers time.^{46 47} A study in Kenya found that using HIVST in PrEP delivery among FP clients was feasible and had the potential to simplify its delivery at the client-level.⁴⁷ This aligns with current recommendations by WHO to integrate HIVST into contraceptive clinics as it is highly acceptable, feasible and empowering for women.⁹

Provider-level barriers and facilitators

This review identified a lack of costing studies on the integration of PrEP into FP services. Roberts *et al*'s costing study was the only study that addressed this. It found that integrating PrEP into other medical or non-medical services may be an efficient strategy to reach priority populations and may have low incremental costs. However, the authors' highlighted results were context-specific and not easily transferable to other settings.²⁸

The facilitating role that trained providers play in improving the integration of PrEP into FP settings was emphasised by different studies across settings^{30-32 37} and is aligned with WHO recommendations on how to prevent HIV in women using FP services.⁹ Existing literature highlights that provider training is essential in order to integrate services and is often challenging to achieve.^{48 49} This review identified provider training and knowledge of PrEP to be an important barrier^{30 31} and at the same time facilitator^{18 32} when PrEP services are integrated into FP services. Facilitators

included task sharing or facility-specific client flow modifications (eg, fast tracking). This is supported by Bhavaraju *et al* claiming that changes in policies on task sharing may be needed to enable the integration of PrEP into FP services.⁵⁰

Inhibiting and enabling factors identified by this review impact on the integration of services and ultimately limit the impact oral PrEP may have when provided within FP settings. Exploiting potential synergies of both services may help to overcome barriers and enablers presented above.

Synergy of services

Synergy is defined as 'the combined power of a group of things when they are working together that is greater than the total power achieved by each working separately'.⁵¹ Synergies may arise when PrEP and contraceptive methods are offered simultaneously. To appreciate the role synergies may play in the integration of PrEP into FP services we adapted the PrEP cascade supported by WHO, and integrated the SRH aspects.³⁸ In the context of integrating PrEP into FP services, there are benefits of these synergies.^{21 26} For example, both contraceptive methods and PrEP have to consider eligibility, client choice, contraindications and time period needed to use PrEP.⁵² This review included a study from Were *et al*²⁶ that suggested delivering PrEP combined with FP services to AGYW might work synergistically to improve continuation for both interventions.²⁶ They found that when PrEP and FP were initiated concurrently at the same visit and by the same provider, discontinuation after months 1 and 3 was less likely. However, results of this review indicated that characteristics of these synergies and how they may impact positively on PrEP and FP outcome measures has not yet been researched in depth.

Recommendations for future research

This review found that research was primarily limited to Kenya and the USA, requiring more implementation of research from a variety of settings to ensure generalisability.

Indicators alongside the PrEP and SRH cascade help to assess and monitor a programme's effectiveness and to identify bottlenecks and opportunities for improvement.^{38 52} Future implementation of research studies that cover all steps of the cascade are needed

in order to inform the intervention's scale-up at large. For example, among included studies, data on continuation of PrEP when it was provided in the context of FP services was limited in both LMIC and HIC. When investigated, it was low, further declining from 1 to 3 months post-initiation.²⁴ Future studies on this should seek to understand why women discontinue PrEP, and to support and advise woman who may want to stop and re-start PrEP. It is also important to understand reasons for stopping PrEP—for example, side-effects such as the 'start-up syndrome' sometimes experienced during the first month of PrEP use, no longer feeling at risk for HIV acquisition, or other reasons. Tailoring an adequate response that addresses these reasons will help ensure a PrEP programme's effectiveness.³⁸

In the context of successful integration of services, the improvement of a programme's cost-effectiveness through integration is often assumed.⁵³ However, whether this applies to the integration of PrEP into FP services is not yet well understood—calling for future research with this particular focus.

More information is needed to which extent potential facilitators may impact positively on the integration of PrEP into FP services. For example, HIVST is recommended in FP settings. In the context of PrEP delivery within these contexts, however, data especially on cost-effectiveness and client acceptability and feasibility are needed.

Limitations

The amount of novel data included into this review is limited since all types of articles (eg, commentaries) were included. Conference poster and abstracts were also included in this review, which made a systematic quality assessment of all studies unfeasible. Only material in English was reviewed. In LMIC, primary data mainly stemmed from three studies (PrIYA, ZNFPC and POWER) which may have reduced the significance for this review's results. Most studies were based in two countries, Kenya and the USA, which reduced generalisability of results and points to the need for research in other countries.

Most of the included studies examined PrEP programmes delivered in the context of FP services by measuring PrEP indicators. This review found that figures on PrEP indicators (eg, uptake or continuation) varied considerably across settings, and reasons for the variation remained unclear. For example, in LMIC, figures on uptake varied widely, ranging from 4%¹⁴ to 90%²⁵ of study participants who initiated PrEP at their current FP visit. As Dunbar *et al*⁵² discussed in their review, interpretation of PrEP indicator measures (eg, uptake) may be impeded due to an interchangeable use of various indicators with different meanings and a lack of a common definition. Although possible, the variation of indicators across studies may be, at least in part, due to inconsistency in terminology, but it could not be ultimately answered by the given data.

Promoting guidance on standardised measures and definitions across the PrEP and SRH cascade will be important to allow the comparison of indicators across settings.⁵²

CONCLUSION

As a mapping and synthesis of currently available evidence in this field, this review identified barriers and facilitators for the integration of PrEP into FP services for women and adolescent girls. Multiple barriers along the PrEP and SRH cascade have an impact on clients (low-risk perception, young age) and providers (lack of training and knowledge) and indicate other areas needing further research. There is a need to enhance the integration of PrEP into FP services, including self-care interventions such as HIV self-testing or enhancing training of providers. Data on the integration of PrEP into FP services was limited, with most studies from Kenya and the USA. To prepare global scale-up of PrEP in FP services successfully, future studies have to be conducted in a variety of settings. As part of a comprehensive package, using a combination of PrEP and contraceptive delivery could reduce the number of new HIV infections and/or unintended pregnancies for at-risk women and girls.

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ORCID iDs

Caroline I Gotsche <http://orcid.org/0000-0003-4986-8575>
 Petrus S Steyn <http://orcid.org/0000-0001-8300-7985>
 Manjulaa Narasimhan <http://orcid.org/0000-0003-0598-6887>
 Rachel Baggaley <http://orcid.org/0000-0001-6320-3444>
 James N Kiarie <http://orcid.org/0000-0003-4180-7858>

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SUPPLEMENT - Integrating PrEP into Family Planning Services - A scoping review

Supplementary table 1: Details Search Strategy

Name of data base	Search strategy	Number of records retrieved
MEDLINE	1 (PrEP or preexposure prophylaxi* or pre-exposure prophylaxi*).mp. (4311) 2 Pre-Exposure Prophylaxis/ (1961) 3 1 or 2 (4311) 4 (family planning or contracept* or birth spac*).mp. (15827) 5 Family Planning Services/ (1741) 6 contraception/ or hormonal contraception/ or long-acting reversible contraception/ (2489) 7 ((sexual and reproductive) adj3 (health or healthcare)).mp. (2889) 8 Reproductive Health Services/ (602) 9 reproductive health/ or sexual health/ (2498) 10 exp HIV/ (16290) 11 exp HIV Infections/ (42748) 12 (hiv or hiv-1 or hiv-2 or human immunodeficiency virus*).mp. (91639) 13 or/4-12 (110132) 14 (wom?n or girl* or AGYW or adolescent* or youth).mp. (689470) 15 exp Women/ (4984) 16 Adolescent/ (307962) 17 14 or 15 or 16 (689470) 18 3 and 13 and 17 (1094) 19 limit 18 to (English language and yr="2012 -Current") (1081)	1081
EMBASE	1 (PrEP or preexposure prophylaxi* or pre-exposure prophylaxi*).mp. (12854) 2 Pre-Exposure Prophylaxis/ (4392) 3 1 or 2 (12854) 4 (family planning or contracept* or birth spac*).mp. (165672) 5 family planning/ (40027) 6 contraception/ or hormonal contraception/ or long-acting reversible contraception/ (55412) 7 ((sexual and reproductive) adj3 (health or healthcare)).mp. (10082) 8 exp reproductive health/ (17489) 9 exp Human immunodeficiency virus/ (196001) 10 exp Human immunodeficiency virus infection/ (377192) 11 (hiv or hiv-1 or hiv-2 or human immunodeficiency virus*).mp. (502456) 12 or/4-11 (721124)	556

	13 (wom#n or girl* or AGYW or adolescent* or youth).mp. (3453070)	
	14 female/ (9737405)	
	15 adolescent/ (1663970)	
	16 13 or 14 or 15 (10506992)	
	17 3 and 12 and 15 (570)	
	18 limit 17 to (English language and yr="2012 -Current") (556)	
Web of Science	# 1 (TS=(PrEP OR "preexposure prophylaxi*" OR "pre-exposure prophylaxi*")) AND LANGUAGE: (English) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=2012-2020 (6944)	1696
	# 2 (TS=(family planning OR contracept* OR birth spac*) AND LANGUAGE: (English) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=2012-2020 (42381)	
	# 3 (TS=Family Planning Services) AND LANGUAGE: (English) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=2012-2020 (5752)	
	# 4 (TS=reproductive healthcare) AND LANGUAGE: (English) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=2012-2020 (2813)	
	# 5 (TS=(HIV OR HIV infect*) AND LANGUAGE: (English) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=2012-2020 (148668)	
	# 6 (TS=(wom?n or girl* or AGYW or adolescent* or youth)) AND LANGUAGE: (English) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=2012-2020 (914740)	
	# 7 (#5 OR #4 OR #3 OR #2) AND LANGUAGE: (English) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=2012-2020 (190857)	
	# 8 (#7 AND #6 AND #1) AND LANGUAGE: (English) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=2012-2020 (1696)	
Global Health	1 (PrEP or preexposure prophylaxi* or pre-exposure prophylaxi*).mp. (2503)	612
	2 (family planning or contracept* or birth space*).mp. (19486)	
	3 exp family planning/ (10370)	
	4 contraceptives/ or contraception/ or injectable contraceptives/ or oral contraceptives/ (10561)	
	5 ((sexual and reproductive) adj3 (health or healthcare)).mp. (3950)	
	6 exp reproductive health/ (8451)	
	7 exp sexual health/ (2938)	
	8 exp human immunodeficiency viruses/ (179862)	
	9 exp HIV infections/ (147094)	
	10 (hiv or hiv-1 or hiv-2 or human immunodeficiency virus*).mp. (186902)	
	11 or/2-10 (216594)	
	12 (wom#n or girl* or AGYW or adolescent* or youth).mp. (454945)	
	13 exp women/ (255165)	
	14 exp adolescents/ (64805)	
	15 12 or 13 or 14 (455041)	
	16 1 and 11 and 15 (652)	

	17 limit 16 to (English language and yr="2012 -Current") (612)	
Cochrane Library	#1 (PrEP or "preexposure prophylaxi*" or "pre-exposure prophylaxi*"):ti,ab,kw (Word variations have been searched) (1752)	1
	#2 MeSH descriptor: [Pre-Exposure Prophylaxis] explode all trees (163)	
	#3 #1 or #2 (1752)	
	#4 ("family planning" or contracept* or birth spac*):ti,ab,kw (13440)	
	#5 MeSH descriptor: [Family Planning Services] explode all trees (215)	
	#6 MeSH descriptor: [Contraception] explode all trees (448)	
	#7 MeSH descriptor: [Reproductive Health Services] explode all trees (449)	
	#8 MeSH descriptor: [Sexual Health] explode all trees (38)	
	#9 MeSH descriptor: [HIV] explode all trees (3017)	
	#10 MeSH descriptor: [HIV Infections] explode all trees (12355)	
	#11 (hiv or hiv-1 or hiv-2 or human immunodeficiency virus*):ti,ab,kw (26578)	
	#12 #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 (39893)	
	#13 (wom?n or girl* or AGYW or adolescent* or youth):ti,ab,kw (273179)	
	#14 MeSH descriptor: [Women] explode all trees (604)	
	#15 MeSH descriptor: [Adolescent] explode all trees (102500)	
	#16 #13 or #14 or #15 (273179)	
	#17 #3 and #12 and #16 with Cochrane Library publication date from Aug 2012 to Aug 2020 (350)	
Google scholar	(Preexposure prophylaxis OR Pre-exposure prophylaxis OR PrEP) AND (women OR woman OR "adolescent girls and young women" OR AGYW OR girls OR youth)) AND ("family planning" OR contracept* OR birth spac* OR "sexual health" OR "reproductive health" OR HIV OR "human immunodeficiency virus" OR HIV-1 OR HIV-2) Limited to 2012-2020	380
	TOTAL amount of articles retrieved from databases	4326
	TOTAL amount of articles after removing duplicates	2651

Supplementary table 2 Inclusion Criteria

Inclusion criteria:	English language, all article types, all settings, including women and adolescent girls (10-19 years of age, rational: according to WHO definition of adolescence), relating to family planning services or care, key populations (e.g. sex worker, injecting drug users, trans women).
Exclusion criteria:	pregnant and postpartum women (rational: pregnant and postpartum women rarely attend family planning services), basic science (e.g. clinical or pharmacological research/ trials on PrEP efficacy, not containing PrEP as main intervention, studies that omit important details (e.g. title or author) or focus on other diseases than HIV.

Supplementary table 3 Ongoing Studies

Ongoing studies					
#	Investigator	Title	Country	Study type	Protocol
A	Sales et al.	Pre-Exposure Prophylaxis Integration into Family Planning Services at Title X Clinics in the Southeastern United States: A Geographically-Targeted Mixed Methods Study (Phase 1 ATN 155)	US	A Geographically-Targeted Mixed Methods Study	Jmir Research Protocols 8(6): 10.
B	Celum et al.	A Cohort for Evaluation of Open-label PrEP Delivery Among Kenyan and South African Women: The POWER Cohort, study ID STUDY00000950	Kenya, South Africa	Cohort study	NCT03490058
C	Kohler et al.	Standardized Patient Encounters to Improve PrEP Counselling for Adolescent Girls and Young Women in Kenya (PrYA-SP)	Kenya	Behavioural: Clinician training intervention	NCT03875950

Supplementary table 4 Included Studies

#	Author & Year	Title	Journal	Country	Article type/ Study type
Low-and middle-income countries					
1	Gombe et al. (2020)	Key barriers and enablers associated with uptake and continuation of oral pre-exposure prophylaxis (PrEP) in the public sector in Zimbabwe: Qualitative perspectives of general population clients at high risk for HIV	PLoS One	Zimbabwe	Full article/ Qualitative study
2	Sila et al. (2020)	High Awareness, Yet Low Uptake, of Pre-Exposure Prophylaxis Among Adolescent	AIDS Patient Care STDS	Kenya	Full article/ Cross-sectional study conducted as follow-on study

		Girls and Young Women Within Family Planning Clinics in Kenya			
3	Wanga et al. (2020)	Uptake and impact of facility-based HIV self-testing on PrEP delivery: a pilot study among young women in Kisumu, Kenya	J Int AIDS Soc	Kenya	Full article/ Implementation research study Cohort study
4	Were et al. (2020)	Oral pre-exposure prophylaxis (PrEP) and family planning (FP) integration to improve PrEP continuation among adolescent girls and young women (AGYW) in Kenya	J Int AIDS Soc	Kenya	Conference abstract/ no specifics provided
5	Beima-Sofie et al. (2019)	Implementation challenges and strategies in integration of PrEP into maternal and child health and family planning services: Experiences of frontline healthcare workers in Kenya	J Int AIDS Soc	Kenya	Conference presentation/ Qualitative study
6	Celum et al. (2019)	HIV pre-exposure prophylaxis for adolescent girls and young women in Africa: from efficacy trials to delivery	J Int AIDS Soc	Kenya, South Africa, Tanzania, Zimbabwe	Commentary Review/ Na
7	Hodges-Mameletzi et al. (2019)	Pre-Exposure Prophylaxis for HIV Prevention in Women: Current Status and Future Directions	Drugs	n/a	Narrative review/ Na
8	Mugwanya et al. (2019)	Integrating preexposure prophylaxis delivery in routine family planning clinics: A feasibility programmatic evaluation in Kenya	PLoS Medicine	Kenya	Full article/ Pilot open-label, "real-world" implementation study
9	Pintye et al. (2019)	Frequent detection of tenofovir-diphosphate among young Kenyan women in a real-world PrEP implementation program	J Int AIDS Soc	Kenya	Brief report/ Pilot open-label, "real-world" implementation study
10	Roberts et al. (2019)	The role of costing in the introduction and scale-up of HIV pre-exposure prophylaxis: evidence from integrating PrEP into routine maternal and child health and family planning clinics in western Kenya	J Int AIDS Soc	Kenya	Full article/ Costing study
11	Dunbar et al. (2018)	Understanding and measuring uptake and coverage of oral pre-exposure prophylaxis delivery among adolescent girls and young women in sub-Saharan Africa	Sex Health	DREAMS countries (Kenya, Lesotho, Malawi,	Full article/ Literature review

				Mozambique, South Africa, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe)	
12	Gombe et al. (2018)	Integrating oral HIV pre-exposure prophylaxis (PrEP) in a public family planning facility and youth centre to inform national roll out in Zimbabwe	J Int AIDS Soc	Zimbabwe	Conference abstract/ Qualitative study
13	Mugwanya et al. (2018)	Uptake of PrEP within clinics providing integrated family planning and PrEP services: Results from a large implementation program in Kenya	J Int AIDS Soc	Kenya	Conference abstract/ Pilot open-label, “real-world” implementation study
14	Mugwanya et al. (2018)	One-month PrEP Continuation Among Adolescent Girls and Young Women in Routine Maternal Child Health and Family Planning Clinics	AIDS Res Hum Retroviruses	Kenya	Conference abstract/ Pilot open-label, “real-world” implementation study
15	Omollo et al. (2018)	PrEP delivery platforms: Are family planning clinics an option?	AIDS Res Hum Retroviruses	Kenya	Conference abstract/ Open-label prospective study
16	Rousseau-Jemwa et al. (2018)	A comparative study of risk among adolescent girls and young women who accept or decline PrEP uptake from a community-based mobile clinic	22nd international AIDS conference	Kenya/ South Africa	Conference abstract/ Open label PrEP implementation study
High-income countries					
17	Brant et al. (2020)	Integrating HIV Pre-Exposure Prophylaxis into Family Planning Care: A RE-AIM Framework Evaluation	AIDS Patient Care STDS	USA, Washington DC	Full article/ Prospective cohort study
18	Calabrese et al. (2020)	Contraception as a Potential Gateway to Pre-Exposure Prophylaxis: US Women's Pre-Exposure Prophylaxis Modality Preferences Align with Their Birth Control Practices	AIDS Patient Care STDS	USA, Connecticut	Full article/ Cross-sectional study

19	Fields et al. (2020)	Understanding Opportunities to Discuss HIV Prep in Contraceptive Counselling Services Provided to Adolescent Women	J Adolesc Health	USA	Conference poster/ Secondary analysis study
20	Johnson et al. (2020)	Awareness and Intent to Use Pre-exposure Prophylaxis (PrEP) Among African American Women in a Family Planning Clinic	J Racial Ethn Health Disparities	USA	Full article, Cross-sectional study
21	O'Connell et al. (2020)	The Impact of HIV Pre-Exposure Prophylaxis (PrEP) Counselling on PrEP Knowledge and Attitudes among Women Seeking Family Planning Care	J Womens Health	USA, Philadelphia	Full article, Cross-sectional study Survey
22	O'Malley et al. (2020)	Intimate Partner Violence, HIV Pre-Exposure Prophylaxis (PrEP) Acceptability, and Attitudes About Use: Perspectives of Women Seeking Care at a Family Planning Clinic	AIDS Behav	USA, Pittsburgh	Full article, Mixed-methods study
23	Sales et al. (2020)	Where can Southern girls go for prep? Examining the PrEP-providing practices of Title-X funded family planning clinics across the Southern US	J Adolesc Health	USA	Abstract/ Explanatory, sequential mixed-methods study
24	Unger et al. (2020)	Providing Pre-exposure Prophylaxis in Family Planning Centers: A Survey of Provider Knowledge and Attitudes	J Assoc Nurses AIDS Care	USA	Full article/ Cross-sectional study
25	Carley et al. (2019)	Interest in Pre-exposure Prophylaxis (PrEP) for HIV is Limited Among Women in a General Obstetrics & Gynaecology Setting	AIDS Behav	USA, Louisiana	Full article/ Cross-sectional study
26	Sales et al. (2019)	Impact of PrEP Training for Family Planning Providers on HIV Prevention Counselling and Patient Interest in PrEP in Atlanta, Georgia	J Acquir Immune Defic Syndr	USA, Atlanta	Full article/ Implementation study
27	Sales et al. (2019)	Patient recommendations for PrEP information dissemination at family planning clinics in Atlanta, Georgia	Contraception	USA, Atlanta	Full article/ Cross-sectional study
28	Calabrese et al. (2018)	HIV Pre-Exposure Prophylaxis Stigma as a Multidimensional Barrier to Uptake Among Women Who Attend Planned Parenthood	J Acquir Immune Defic Syndr	USA, Connecticut	Full article/ Cross-sectional study
29	Haider et al. (2018)	Examining knowledge of and attitudes toward preexposure prophylaxis (PrEP) among HIV-vulnerable women in a Chicago-based family planning clinic	Contraception	USA, Chicago	Abstract/ Mixed-methods study

30	Koren et al. (2018)	HIV Pre-Exposure Prophylaxis and Women: Survey of the Knowledge, Attitudes, and Beliefs in an Urban Obstetrics/Gynaecology Clinic	AIDS Patient Care STDS	USA, Philadelphia	Full article/ Cross-sectional study Survey
31	Pollock et al. (2018)	Role of Preexposure Prophylaxis in the Reproductive Health of Women at Risk for Human Immunodeficiency Virus Infection	Obstet Gynecol	USA	Current commentary/ Na
32	Scott et al. (2018)	Knowledge and acceptability of HIV preexposure prophylaxis (PrEP) among women presenting for family planning services in a high-prevalence community	Contraception	USA, Washington DC	Abstract/ Cross-sectional study
33	Seidman et al. (2018)	Family planning providers' role in offering PrEP to women	Contraception	USA	Review article/ Na
34	Garfinkel et al. (2017)	Predictors of HIV-related risk perception and PrEP acceptability among young adult female family planning patients	AIDS Care	USA, Baltimore City	Full article/ Cross-sectional study
35	Sanders et al. (2017)	Integration of prep in an academic adolescent clinic & impact of prep use on sexually transmitted infection (STI) rates	Sex Transm Infect	USA, Baltimore City	Abstract/ No specifics provided
36	Seidman et al. (2016)	United States family planning providers' knowledge of and attitudes towards preexposure prophylaxis for HIV prevention: a national survey	Contraception	USA	Full article/ Cross-sectional study
37	Seidman et al. (2016)	Women's Knowledge of, Interest in, and Eligibility for HIV Pre-exposure Prophylaxis at Family Planning Clinics in Northern California	AIDS Res Hum Retroviruses	USA, Northern California	Meeting abstract/ Cross-sectional study
38	Seidman et al. (2016)	Integrating Preexposure Prophylaxis for Human Immunodeficiency Virus Prevention Into Women's Health Care in the United States	Obstet Gynecol	USA,	Commentary/ Na

Na/ not applicable

Figure a: PRISMA flowchart

