

**Manchester
Metropolitan
University**

Hillis,, A and Germain, J and Hope, V and McVeigh, James and Van Hout, M (2020)Pre-exposure Prophylaxis (PrEP) for HIV prevention among men who have sex with men (MSM): A scoping review on PrEP service delivery and programming. AIDS and Behavior. ISSN 1090-7165 (In Press)

Downloaded from: <http://e-space.mmu.ac.uk/624905/>

Version: Published Version

Publisher: Springer (part of Springer Nature)

Usage rights: Creative Commons: Attribution 4.0

Please cite the published version

<https://e-space.mmu.ac.uk>

AIDS and Behavior

Pre-exposure prophylaxis (PrEP) for HIV prevention among men who have sex with men (MSM): a scoping review on PrEP service delivery and programming --Manuscript Draft--

Manuscript Number:	AIBE-D-19-00606R2	
Full Title:	Pre-exposure prophylaxis (PrEP) for HIV prevention among men who have sex with men (MSM): a scoping review on PrEP service delivery and programming	
Article Type:	Original Research	
Keywords:	pre-exposure prophylaxis; PrEP; HIV prevention; Men who have sex with men; MSM; Biomedical prevention products	
Corresponding Author:	Marie Claire Van Hout Liverpool John Moores University Liverpool, UNITED KINGDOM	
Corresponding Author Secondary Information:		
Corresponding Author's Institution:	Liverpool John Moores University	
Corresponding Author's Secondary Institution:		
First Author:	Alyson Hillis	
First Author Secondary Information:		
Order of Authors:	Alyson Hillis	
	Jennifer Germain	
	Vivian Hope	
	James McVeigh	
	Marie Claire Van Hout	
Order of Authors Secondary Information:		
Funding Information:	Sexually Transmitted Infection Research Foundation	Prof Marie Claire Van Hout
Abstract:	<p>Background: Pre-exposure prophylaxis (PrEP) is an evidence-based new biomedical HIV prevention intervention, which involves the pre-emptive use of daily (or event-based) antiretroviral drugs, to reduce risk of HIV acquisition if exposed. PrEP has recently been positioned as an integral prevention tool to reduce HIV acquisition risk among men who have sex with men (MSM) at country-level and within global prevention strategies. Given this global scale up of PrEP, we conducted a scoping review of extant international literature documenting service related perspectives, models and lessons learnt in PrEP programming for MSM.</p> <p>Method: A systematic search of literature was conducted, and restricted to English language records in the timeframe 2008 to February 2019. Eligibility criteria centered on whether studies broadly described PrEP programming and service delivery for MSM as well as health communication. Following exclusion of ineligible records and removal of duplicates, 84 records were charted and thematically analysed according to scoping review methods.</p> <p>Results: Four themes emerged from the thematic analysis of data; 'PrEP service aspects, settings and staff'; 'PrEP prescriber experiences, therapeutic alliance and care planning'; 'PrEP adherence within formal service structures'; and 'Multi-disciplinary and innovative PrEP care pathways'.</p> <p>Conclusions: The review highlights the complexities in providing optimal PrEP services for MSM by mapping and illustrating the importance of understanding the informal and formal routes to PrEP use among this HIV risk population; the barriers to uptake; the requirement for the presence of a positive therapeutic alliance between patient and prescriber in supporting patient initiation and adherence to PrEP regimes; and the</p>	

	need for availability in different culturally and ethnically sensitive models of PrEP service delivery according to low to high risk groups within the MSM communities.
Response to Reviewers:	<p>Good afternoon,</p> <p>Thank you for the feedback. The comments have been included in the revised paper. All changes have been included in the spreadsheet uploaded.</p> <p>We look forward to hearing from you shortly.</p> <p>Best wishes, Alyson Hillis</p>

Reviewer number

Editor
Editor

Editor
Editor

Editor

2

2

2
2

2

Comment

The paper will benefit from additional careful edit

Authors must ensure that the paper is formatted correctly for the journal. Authors once more and be sure that your text, references, and tables/figures are properly formatted.

Only include the power point version of the figures - therefore make reference to location in paper

Only include the figures and table at the end of manuscript, after the references. They should not be imbedded with the text - therefore make reference to location in paper

Table II should not be included with manuscript. Please be sure to submit this table as Electronic Supplementary Material in the submission system. You should not include it as a table in submitting the manuscript.

Your description of the profile of studies (p5) is helpful, but could be more succinct; there are some lines, for instance, that don't say anything that adds to the analysis and need to be revised to more clearly describe your observations in relation to the overall cohort of articles

Lines 38-39: the different approaches and subsequent results complemented each other and were underpinned by similar and emergent themes

Lines 48-53: Although it could be argued that utilising the same communication channels....

Theme one presented in the findings (p 6 -7) could be further edited to make it more succinct and unwieldy

The introductory few lines need to be more succinct (p6)

The first sentence of the final paragraph in this section doesn't really say anything (p7)

A better description of the PrEP service delivery model (described on p 12 & presented on p13) is needed. For instance, I'm unclear why risky sexual behaviours and initiation is noted, when you discuss quite a wide range of factors.

The addition of the PrEP service delivery model is helpful to better structure findings, but more could be done to build on this model in the discussion. The paper would be further strengthened if the discussion more directly and succinctly engaged with the model presented.

While the discussion offers insight into the findings, especially paragraphs on p 15-16, the first paragraph on p 14 seems to add new insight/findings to the paper, rather than building on your already presented findings. Can you more clearly say which particular element of the findings this is building on?

Response

Complete
Complete

Complete
Complete

Complete

Edited section, 'Profile of Studies' accordingly. The main change is: 'The majority of research is from the United States (US; n=69), with remaining papers based in Thailand (n=5), South America (n=4), the United Kingdom (UK; n=3), South Africa (n=3), Kenya, Canada, Germany, France (n=2) and Australia, Ukraine and the rest of Europe (n=1). From a global perspective, the US health system largely differs from other countries as it is predominantly funded by private health insurance with elements of public health coverage.'

Replaced with: 'Although different methodological approaches were used, this was not an issue as similar recruitment methods were carried out across the pieces of research. This meant that the results could be appropriately charted and thematically analysed as per scoping review methodologies [49].'

Removed as deemed unnecessary

Revisions made throughout Theme One

Replaced with: 'Theme One outlines current PrEP resource allocation and service delivery models. Three areas were found to be of interest within the papers: the specialty responsible for PrEP provision (also known as the 'Purview Paradox'), the setting in which the services should be held and how these two elements together within a larger framework. Firstly, the 'Purview Paradox' is observed in a number of articles [55-64]. Some authors viewed sexual health workers as 'first adopters' in PrEP delivery due to on-site expertise, [65] whilst others favored that should PrEP be provided by primary care staff as they are the first point of contact for high-risk patients [55, 65, 66].

Doblecki-Lewis and Jones (2016) and Hoffman et al. (2016) offered a unified approach, urging services to consider
Replaced with: 'Finally, taking into consideration both staff and setting, recommendations regarding effective PrEP service delivery models were made in 37 studies.'

Updated to: 'The inner cycle of the model highlights the four main touch points between the service user and the PrEP care pathway. These have been displayed in chronological order and details core elements within these touch points that were deemed successful within the scoping review: access/referral routes (how the patient enters the PrEP pathway); consultation (key topics that should be discussed between the patient and the service provider); adherence (long-term pathway to ensure PrEP maintenance); and follow up/discontinuation (steps in place to enforce effective treatment).'...'Two actions have been included in the model for completeness. Although the PrEP service delivery model is continuous, the cycle is initiated once the patient starts displaying risky sexual behaviours. It is at this point that the patient would enter a health system and therefore the cycle (between touch points 4 and 1). PrEP is initiation in between touch points 2 and 3, during or after the initial consultation, depending on resources.'

Added: 'By standardising key processes within the wider system, this will allow for a more effective service through attainable resource allocation, thus providing a smoother, more robust programme delivery of PrEP, as can be seen in the PrEP service delivery model.'

Added 'This has been highlighted in touch point 4 of the PrEP service delivery model'

Added 'The outer circle and touch point 2 of the PrEP service delivery model addresses these elements'

Added 'Once established, the PrEP care pathway can then be further supported by PrEP navigators to assist potential and current PrEP users through bridging communications, building trust and providing necessary information between users and relevant services [62, 67, 73, 92, 94, 95, 101], as shown in the outer circle of the PrEP service delivery model'

Added: 'Theme One discusses the importance of resource allocations amongst staff and across various settings. Once this is established, patients should ideally have clear access to the PrEP care pathway, as can be seen in the PrEP service delivery model.'

Title: Pre-exposure Prophylaxis (PrEP) for HIV prevention among men who have sex with men (MSM): a scoping review on PrEP service delivery and programming.

Suggested running head: Pre-exposure Prophylaxis for HIV prevention among men who have sex with men: a scoping review

Author Listing

Alyson Hillis¹, Dr Jennifer Germain², Prof Vivian Hope³, Dr James McVeigh⁴ and Prof Marie Claire Van Hout⁵.

Corresponding Author

Marie Claire Van Hout, Public Health Institute, Exchange Station, Liverpool John Moores University, Liverpool L32ET, United Kingdom.

Email: m.c.vanhout@ljmu.ac.uk

Telephone: 0151 231 4542

¹ Faculty of Health, Public Health Institute, Liverpool John Moores University, Liverpool

² Faculty of Health, Public Health Institute, Liverpool John Moores University, Liverpool

³ Faculty of Health, Public Health Institute, Liverpool John Moores University, Liverpool

⁴ Faculty of Health, Public Health Institute, Liverpool John Moores University, Liverpool

⁵ Faculty of Health, Public Health Institute, Liverpool John Moores University, Liverpool

Abstract

Background: Pre-exposure prophylaxis (PrEP) is an evidence-based new biomedical HIV prevention intervention, which involves the pre-emptive use of daily (or event-based) antiretroviral drugs, to reduce risk of HIV acquisition if exposed. PrEP has recently been positioned as an integral prevention tool to reduce HIV acquisition risk among men who have sex with men (MSM) at country-level and within global prevention strategies. Given this global scale up of PrEP, we conducted a scoping review of extant international literature documenting service related perspectives, models and lessons learnt in PrEP programming for MSM.

Method: A systematic search of literature was conducted, and restricted to English language records in the timeframe 2008 to February 2019. Eligibility criteria centered on whether studies broadly described PrEP programming and service delivery for MSM as well as health communication. Following exclusion of ineligible records and removal of duplicates, 84 records were charted and thematically analysed according to scoping review methods.

Results: Four themes emerged from the thematic analysis of data; *'PrEP service aspects, settings and staff'*; *'PrEP prescriber experiences, therapeutic alliance and care planning'*; *'PrEP adherence within formal service structures'*; and *'Multi-disciplinary and innovative PrEP care pathways'*.

Conclusions: The review highlights the complexities in providing optimal PrEP services for MSM by mapping and illustrating the importance of understanding the informal and formal routes to PrEP use among this HIV risk population; the barriers to uptake; the requirement for the presence of a positive therapeutic alliance between patient and prescriber in supporting patient initiation and adherence to PrEP regimes; and the need for availability in different culturally and ethnically sensitive models of PrEP service delivery according to low to high risk groups within the MSM communities.

Key Words

Pre-exposure prophylaxis, PrEP; HIV prevention; Biomedical prevention products; Men who have sex with men; MSM

Background

1 In 2016, the United Nations General Assembly agreed that a fast-track response was required to end
2 AIDS by 2030 and reduce new HIV infections to fewer than 500,000 annually by 2020 worldwide. The
3
4 response is primarily through continued progress towards the 90-90-90 target (by 2020, 90% of all
5
6 people living with HIV will know their HIV status, 90% of those diagnosed will receive antiretroviral
7
8 therapy (ART) and 90% will have viral suppression) and through an intensive focus on people-centred
9
10 implementation of the five prevention pillars (1-3). The five prevention pillars are a combination
11
12 prevention approach involving sexual education and economic empowerment to women, human
13
14 rights programmes for key populations, condom programmes, voluntary medical male circumcision,
15
16 and the use of pre-exposure prophylaxis (PrEP) (1).
17
18
19
20

21 The last few years has seen considerable breakthroughs in the prevention of new HIV
22
23 infections (4, 5). Yet transmission of HIV amongst men who have sex with men (MSM) in developed
24
25 and developing countries remains a challenge and the reduction of the HIV disease burden among this
26
27 key population is integral to ending the HIV epidemic (6-10). Globally MSM are estimated to be at
28
29 almost twenty times greater odds of acquiring HIV compared to the general population (11, 12).
30
31 Although undoubtedly important, ART alone will not reduce the epidemic enough to move towards
32
33 elimination (13). PrEP is an evidence-based biomedical HIV prevention intervention which involves the
34
35 pre-emptive use of daily (or event-based) ARTs (tenofovir disoproxil fumarate (TDF) and emtricitabine
36
37 (FTC)) to reduce the risk of HIV acquisition if exposed (14, 15). PrEP has low toxicity and has been
38
39 shown to be effective (particularly when adherence is high) among high risk groups including MSM
40
41 (16-20). Given its successes in efficacy, (21, 22) PrEP is now considered as an integral tool in the
42
43 progressive strengthening of a combined HIV prevention programme among MSM, which includes
44
45 100% condom use, (23) voluntary HIV testing and counselling services, (24, 25) and HIV treatment as
46
47 prevention (TasP) (26). The roll out of PrEP along with continued support in testing and rapid access
48
49 to treatment are the key drivers in the elimination of HIV and it is for this reason that the WHO and
50
51 UNAIDS have prioritised PrEP implementation for populations at the highest risk of HIV (4, 27, 28).
52
53
54
55
56
57
58
59
60
61
62
63
64
65

Regulatory approval of PrEP in recent years has shifted international research activity towards PrEP demonstration projects, (15, 29) which aim to provide evidence around cultural and MSM sub-population variability in the acceptance of PrEP, (8, 30-33) associated stigma and interactions with healthcare providers, (34) understanding of cost and adherence, (35, 36) impact on sexual behaviour and “*risk compensation*”, (12, 37, 38) and development of drug resistance (39, 40).

To date, PrEP literature has focused on knowledge, awareness and willingness to use PrEP, (41-44) but as implementation trials are being carried out and PrEP is being made available, further evidence is required to identify suitable types of service delivery and programming for PrEP. There is now a need to establish how PrEP can optimally be embedded into existing combined HIV prevention programmes for MSM, in order to assert an effective and sustainable stand-alone regimen as well as an efficient combination model of service delivery. An important aspect of PrEP programming incorporates how services have been, and will be, communicated to MSM as well as healthcare providers. This will ensure a streamlined integration of PrEP into healthcare settings and ultimately a global change in attitudes and behaviour (45).

Methods

There have been urgent calls to action from community organisations and charities directed at governments to ensure that once implementation trials end, which in England is relatively soon, there will be a seamless transition for patients to access PrEP (46). The planning of PrEP programming, complemented by effective health communication and education, is therefore key to success. Due to this, a scoping review on PrEP was conducted in order to establish what is known about PrEP, with particular focus on the context of PrEP programming and service delivery for MSM. Scoping review methodologies are a valid approach and increasingly used across a variety of disciplines, particularly when a topic is not extensively reviewed, and where a comprehensive descriptive overview of available information across a wide range of study designs and methodologies is warranted (47-50). It is a form of research synthesis that aims to ‘*map the literature on a particular topic or research area*

1 and provide an opportunity to identify key concepts; gaps in the research; and types and sources of
2 evidence to inform practice, policymaking, and research' (49). The five stage iterative process
3 developed by Arksey and O'Malley (2005) was adhered to throughout this review process and
4 consisted of the following key stages; (1) identifying the research question, (2) identifying relevant
5 studies, (3) study selection, (4) charting the data and (5) collating, summarizing and reporting the
6 results. The underpinning research question was: *'What is known about PrEP service delivery in terms
7 of communication and form of PrEP consumer knowledge, and implementation within stand-alone or
8 combination models of service delivery for MSM?'*
9
10
11
12
13
14
15
16
17

18 Following an initial exploratory search, comprehensive searches were conducted in the
19 Cochrane Database of Systematic Reviews, Medline, Web of Science, Scopus, PsycINFO and CINAHL
20 to locate publications over a ten year timeframe up to 2019. Key words and terms such as *'PrEP'*, *'Pre-
21 exposure prophylaxis'*, *'men who have sex with men'* and *'MSM'* (Table I) were used to locate empirical
22 studies as well as grey literature (for example, international and national policy documents, thesis and
23 online reports, PubMed Clinical Queries and Scopus). Manual searching of reference lists was
24 undertaken. Eligibility criteria centered on whether studies broadly described PrEP programming and
25 service delivery for MSM as well as health communication. Inclusion criteria therefore covered but
26 was not limited to, prescribing, adherence, access, interventions, programming as well as structures
27 and modelling. We restricted the search to records in the English language. Where possible we
28 included PrEP user, MSM community and healthcare provider (nurses, community health workers,
29 doctors, social and outreach worker) perspectives.
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49

50 **Insert Table I 'Search Terms and Strategy' here**

51
52
53

54 Records were managed using EndNote, with duplicates removed manually by two members
55 of the team. The title and abstract of each record were screened independently by two authors, cross
56 checked by a third, and where any doubt remained in terms of inclusion, a fourth author reviewed the
57
58
59
60
61
62
63
64
65

record (50). All records deemed relevant on screening, underwent a second full-text screening to ensure relevance and eligibility for this scoping review. Searches identified 2,013 unique records, and of these, 84 were selected according to inclusion criteria, charted and thematically analysed (Figure 1). The charting exercise was conducted as per Levac et al (2010) by two members of the team in consultation, and generated specific themes pertaining to PrEP communication, delivery and programming of PrEP as either a stand-alone intervention, or as part of a combination HIV prevention intervention for MSM. An Excel spreadsheet charted all relevant data (including year of publication, author, method and aim, results, key findings and conclusion) to enable the identification of commonalities, themes and gaps in the extant literature. A trial charting exercise as recommended by Daudt et al (2013) was conducted in order to ensure consistency of approach and to facilitate the development of prior categories guiding the subsequent extraction and charting of the data from the records. Keywords and emerging themes were documented in parallel to the extraction of data. Once data extraction was completed, two authors discussed the findings and themes. As qualitative, quantitative and mixed methods studies were included in the review, the data extraction table was kept broad to ensure that all data were captured, adequately documented and thoroughly analysed. Where additional data extraction categories emerged, team consultation guided decisions around reporting of results. Four themes emerged from the thematic analysis of the collective records: *'PrEP service aspects, settings and staff'*; *'PrEP prescriber experiences, therapeutic alliance and care planning'*; *'PrEP adherence within formal service structures'*; and *'Multi-disciplinary and innovative PrEP care pathways'* (Table II). These themes additionally reflect the service users' chronological experience of the PrEP cascade (51). Motivations for taking PrEP were not included here as they refer to individual's perceptions and awareness of PrEP, as opposed to their experiences of service delivery.

Insert Figure 1 'Flowchart for Inclusion and Exclusion of Literature' here

Results

Profile of Studies

The final sample consisted of 84 studies, the majority of which were empirical (Table III). While there was a mixture of quantitative (n=49), qualitative (n=29) and mixed methods (n=6) studies, the majority (n=62) had a cross sectional study design. Other methodological approaches were intervention evaluations (n=8), cohort (n=7), randomised control trials (n=6) and ethnographic studies (n=1). Although different methodological approaches were used, this was not an issue as similar recruitment methods were carried out across the pieces of research. This meant that the results could be appropriately charted and thematically analysed as per scoping review methodologies (49). In the studies that targeted MSM (n=70) as opposed to healthcare providers (n=15), the main recruitment channels were through clinics and community health centres (n=26), ongoing trials (n=21), community organisations, groups and outreach (n=11), local neighbourhoods and word of mouth (n=11), social network websites (n=11), social media (n=10) and phone apps (n=9).

The majority of research is from the United States (US; n=69), with remaining papers based in Thailand (n=5), South America (n=4), the United Kingdom (UK; n=3), South Africa (n=3), Kenya, Canada, Germany, France (n=2) and Australia, Ukraine and the rest of Europe (n=1). From a global perspective, the US health system largely differs from other countries as it is predominantly funded by private health insurance with elements of public health coverage. Due to this disparity in the geographic reach of research, this review of extant PrEP service-related literature must be understood through the lens of limited access to free healthcare and the need to pay for potential PrEP prescriptions. Interestingly, the studies that focused on PrEP in Thailand, highlighted the more innovative approaches of service provision that focused on widespread distribution, scale up and novel interventions (52-54).

In terms of age and demographic, the included records focused on two key MSM subgroups, namely youth and Black/African American populations (Table III). Eleven studies focused on 'young' MSM aged between 16 and 25 years old; 47 studies addressed 26 to 40 year olds; four studies explored 41 year olds and above and seven targeted all age groups. Of the articles that targeted PrEP service users, 36% of records had a sample that was predominantly Black/African American/non-Hispanic,

whilst 49% were White and only 15% had a Latino/Hispanic majority. Only 11% (n=9) of the final articles directly focused on Black MSM and their specific needs.

Theme One: PrEP service aspects, settings and staff

Theme One outlines current PrEP resource allocation and service delivery models that were reported in the studies. Three areas were found to be of interest within the papers: the specialty responsible for PrEP provision (also known as the 'Purview Paradox'), the setting in which the services should be held and how these two elements operate together within a larger framework. Firstly, the 'Purview Paradox' was reported in a number of articles (55-64). Some authors viewed sexual health workers as '*first adopters*' in PrEP service delivery due to on-site expertise, (65) whilst others favored primary care staff as they are the first point of contact for high-risk patients (55, 65, 66). Doblecki-Lewis and Jones (2016) and Hoffman et al (2016) offered a unified approach, urging services to consider '*task-shifting*' between primary care staff and HIV specialists. Alternatively, seven studies identified the potential role for 'PrEP navigators' – individuals performing activities to assist potential and current PrEP users through bridging communications with relevant services through information provision and support (62, 68-73). Additional training for service providers was noted as a necessity by 18 studies to ensure effective and sustainable PrEP delivery and programming, which could also provide a solution to bridging the gap between service provider knowledge and the prescribing of PrEP (55, 57, 59, 60, 63, 65, 67-69, 72-81).

Secondly, the scoping review highlighted the geographical constraints experienced by many of the study samples. Whilst 53 studies were based in cities, only two studies explored the impact of rural locations on accessing PrEP (53, 82). The distance between the service user and provider dictated patients' ability to access PrEP (82, 83). For example, Hubach et al (2017) stated that more rural primary care providers did not prescribe PrEP as they believed it was out of their medical purview. Geographical barriers can have a significant impact on health outcomes, mostly effecting disadvantaged individuals (71). To overcome these obstacles, Aloysius et al (2017) and Sun et al (2019)

observed that pharmacies were geographically convenient for patients. However, some pharmacies experienced disruptions in the delivery of medication, with participants having to receive refills by post. Two studies discussed the possibility of home-based (HB) PrEP provision (56, 60). John et al (2017) reported that nearly three-quarters (n=655) of their sample, '*preferred to receive PrEP...care via HB-PrEP services*', and it should therefore be considered as a potential avenue to increase PrEP uptake. Alongside other authors, (53, 55, 62, 65, 69, 70, 85, 86) Anand et al (2017) observed that PrEP uptake was greatest in community-based clinics (CBCs), such as Adam's Love Clinic (70.4%) in Thailand and 56 Dean Street in London (84). Although Arnold et al (2012) reported irregular access to doctors, poor laboratory monitoring and lack of follow-up at CBCs, in general they were seen to provide a broader, holistic approach to PrEP service provision by performing counselling, HIV and STI screening, tailored patient care and adherence support (52). Furthermore, as CBCs are specialised, staff receive regular training opportunities and quality assessments to ensure that patients continue to receive high standards of care (52).

Finally, taking into consideration both staff and settings, recommendations regarding effective PrEP service delivery models were made in 37 studies. Of paramount importance was the design and implementation of a PrEP service, tailored to the patient's needs (53, 87). Uptake and adherence would then be reinforced by regular contact between the PrEP user and healthcare providers with regular screening and patient counselling (55, 88-92). PrEP service implementation is underpinned by the necessity to reiterate the importance of taking PrEP as a commitment for protecting both the PrEP user and other people, (54, 92, 93) allowing for non-judgmental consultations, reporting missed dosages and providing ongoing education (67, 92).

Theme Two: PrEP prescriber experiences, therapeutic alliance and care planning

MSM experiences of sexual health consultations were heavily reported in the included studies. The main areas covered were the relationship between the service user and service provider, topics discussed during consultation and service delivery recommendations. It is worth noting that only 18%

(n=15) of the studies interviewed service providers. Of these, the majority of service providers described positive attitudes towards PrEP prescribing with only two studies reporting that providers did not feel comfortable with current procedures (61, 76).

The reported descriptions of the service provider-user relationship ranged from an *'impersonal, heteronormative nature of [healthcare provider] interactions'* (78) to the empathetic and professional efforts made by staff *'to develop rapport across cultures'* (94). Of the more negative experiences, stigma (related to homophobia, racism, lack of sensitivity, discrimination and inappropriate or offensive language) played a key role in the discussions between the patient and the service provider (62, 68, 78-80, 82, 83, 94-98). Furthermore, Calabrese et al (2016) described the service provider's disapproval of the users' motivations for seeking PrEP and the perception of it as *"a gay man's prevention tool"*.

A surprising finding was the lack of open discussion that was experienced during consultations. From the perspective of the service user, conversations around sexual behaviour were missed as they were seen to be difficult, (62, 67, 80) uncomfortable, (61, 97) or as a consequence of the service providers' failure to take complete histories (56, 60, 68, 78, 79, 86, 96). Some studies reported the lack of disclosure of sexual activity (80, 82, 99) and PrEP use (80, 82, 99), due to concerns for privacy and confidentiality, perceived stigma, fear of negative repercussions and embarrassment. When service users were able to disclose their previous and current sexual behaviours this was due to a *'positive rapport with staff'* (55, 77, 82, 92, 100, 101). Other conversation topics noted informal PrEP use, (102) missed pills, (92) risk reduction and counselling, (55, 62) testing, (86) HIV prevention, wider sexual health and sexual orientation, (62, 80, 81, 97) systemic barriers such as lack of primary care practices, adherence and medication refills, (62, 97) drug use (101) and lack of healthcare support (94, 103). As has been shown, research evidences service provision and initiation of PrEP, however the discontinuation of PrEP was only reported in three studies (57, 63, 104). Ending treatment, as within any therapy area, requires clear protocol, guidelines and communication.

A range of solutions for improving the relationship between the service users and providers were offered in the studies. These included having gay-friendly service providers and affirmative training, (77, 79, 80, 94, 100) improving long-term communication to build trust, (62, 67, 92, 94, 95, 101) developing patient-centred care, (92) increasing service provider knowledge and awareness of PrEP, (62, 96, 101) and encouraging wider health discussions (62, 78). Key solutions included the routinisation of PrEP prescribing with electronic health record systems that could be used *‘to identify potential PrEP candidates...and follow up-care’*, (62) and the delivery of PrEP using a shared decision-making approach between the patient and service provider, as proposed by Calabrese et al (2016) and Krakower et al (2017).

Theme Three: PrEP adherence within formal service structures

Promoting and supporting the adherence to PrEP regimens was an occurring theme across all studies. Adherence is crucial to efficacy of PrEP, and if poorly managed, it can result in a risk of HIV acquisition due to suboptimal levels of drug concentration (85). While Daughtridge et al (2015) witnessed an increase in adherence from 79% at 16 weeks post initiation to 88% at 28 weeks, some studies noted that adherence reduced over time (53, 106).

Tellalian et al (2013) and Stekler et al (2018) identified that service level support was needed in order to improve correct use of PrEP, adherence and retention. Other barriers to PrEP adherence at service user level included medication concerns, for example the pill being too big or tasting unpleasant, (108) missing clinics, (109) forgetting to take medication (54, 75, 103, 110) and cost (111, 112). Disruption in routine was also reported (54, 93, 103, 108) but Vaccher et al (2018) stated that this could be reduced by carrying spare medication for emergencies. Certain service user groups were identified as being at risk of low PrEP adherence, including those from ethnic minorities, (73, 91, 111) young MSM, (91) smokers, (111) and those with problematic alcohol or substance use, (91) all of which are exacerbated by systemic disadvantages within society or from an individual’s predisposition to risky behaviour.

Dosing aids such as building on existing pill taking routines, (92) mobile phone technologies, pill boxes, calendars, alarms (73, 89, 91-93, 108, 111-113) and matching PrEP dosages to daily routines, (93) such as taking PrEP with food or when brushing teeth, (88, 103) were reported to be effective in helping service users adhere to their regimen. Jaiswal et al (2018) stated that those who had been taking PrEP for a prolonged period of time no longer required the support of reminders to ensure adherence to PrEP. However, certain dosing aids were met with some resistance. Vaccher et al (2018) found that some service users perceived pill boxes as being for the elderly. This was supported by Elst et al (2013), who suggested that adherence support strategies may not work outside of a trial setting.

Theme Four: Multi-disciplinary and innovative PrEP care pathways

Successful PrEP care pathways are underpinned by multi-disciplinary and innovative approaches. Within the chronology of an optimal PrEP service delivery model, these presented as health messaging and communication, referral into the pathway, support services and technology interventions once individuals had initiated PrEP. The multi-level implementation framework and system characteristics described by Beach et al (2018) and Galindo et al (2012), provided a combination model of PrEP service delivery. Beach et al (2018) looked at provision across *microsystem*, *mesosystem* and *macrosystem* levels, identifying the constituents of each level.

The *microsystem level* represents where individuals participate directly with their surroundings and should therefore include the following three key elements. Firstly, information should be provided on how to access PrEP to address current structural barriers and challenges, (52, 57, 68, 70, 73, 85, 94, 97, 101, 108, 114-117) such as cost, (113, 118, 119) geography, (83) and stigma (78, 82, 120). Secondly, general education about PrEP should be made accessible across a range of media, to a broad geographic and culturally diverse audience. The literature shows that aside from the regular methods of communication, PrEP messaging was effectively delivered through specialised PrEP educators and navigators, (65, 72, 93, 114, 120-123) the LGBT community (68, 73, 80, 83) and PrEP hotlines (73). These communication methods were delivered through various interventions such

as outreach work, (73, 78, 122) behaviour changing strategies (82) and stigma-specific campaigns (61, 73, 77). Community mobilisation interventions were particularly effective as they created, '*social change by building awareness of critical health issues...empower[ing] community members to take charge of their healthcare needs through a collective, engaging and iterative process...[therefore it] has been effective in other population-level HIV prevention efforts*' (114). Although much of the literature discussed the positive impact that tailored and reframed messaging has had on the uptake of PrEP, (56, 78, 96, 98, 114) 22 studies identified the need for greater levels of communication and education (59, 61, 65, 67, 72, 73, 77-80, 82, 88, 92, 93, 101, 102, 117, 120, 122, 124-126). For example, Calabrese et al (2016) stated that there was a gap for '*the development of curricula and evaluation standards for PrEP-related medical education*', whilst Newman et al (2018) highlighted the importance of online experiences in bringing together the gay and bisexual male (GBM) PrEP community. The third element is the identification of potential PrEP users (52, 61, 73, 96, 108, 127). This could be through existing relationships between the individuals and healthcare providers or counsellors but also through established referral systems. A clear referral route into the PrEP care pathway was highlighted in 14 studies (53, 55, 57, 61, 62, 66, 68, 69, 73, 79, 83, 101, 115, 117, 123). Pathways may need to accommodate a number of referral routes, including online platforms, testing services, LGBT services, self-referrals (such as word of mouth, dating apps and online search engines), peer and community-based organisations, primary care practices or general practices, other departments (such as health, infectious disease, sexual health, urgent care or emergency), social organisations, medical agencies as well as by transitioning patients who were previously prescribed post-exposure prophylaxis (PEP) and through partners seen at HIV or sexual health clinics. Anand et al (2017) described an online-to-offline (O2O) model that connects high risk MSM to PrEP and HIV testing services, counselling, information and administrative services. Other elements of the delivery model within the PrEP care pathway would benefit from improving these aspects of PrEP programming. This framework could subsequently help to reduce stigma, encourage uptake and adherence, give confidence, reaffirm decisions, rectify

misinformation, better patient-provider relationships and ultimately provide open communication and optimum care for the patient.

The *mesosystem level* is the cross-disciplinary collaboration and interaction of service providers to MSM. Seven studies found that patients sought an environment in which providers were comfortable discussing sexual history and orientation, a place that was free from stigma and discrimination (52, 55, 56, 65, 82, 105, 120). There is a need for the service provider to ensure the maintenance of confidentiality and therefore instil trust in the relationship, which will in turn encourage uptake and adherence to PrEP (57, 58, 61, 68, 72, 73, 78, 83, 94, 103, 108, 114, 120). Support services that constitute current PrEP pathways were identified in 21 studies. Outside of routine PrEP care, services included LGBT-friendly support, (67) social support including mental health, homelessness and substance use, (65, 128) prevention and treatment of unrelated diseases, (128) sexual health education, (52, 55, 78, 118) vaccine administration, (69, 105) pharmaceutical patient assistance programs and outreach programs (67, 78, 88). 15 studies focused on the positive impact of counselling or discussion-based services (52, 54, 62, 65, 66, 72, 73, 79, 87, 88, 91, 92, 96, 108, 129). Providing these services, particularly with certain demographics such as adolescents and ethnic minorities, proved to increase adherence and uptake (65, 66, 88, 91, 92, 108). Technology-based interventions were reported in five studies and they can be viewed as uniting the *micro-* and *mesosystem levels*. These technologies were considered to be useful for service users and providers for setting reminders, (92, 103, 106, 112, 130) monitoring and surveillance (particularly those with a high risk of contracting HIV), (52, 91, 112) education and information, (82, 102, 106, 130) tailoring care, (102) providing counselling, (52, 66, 77, 107, 131) adherence, (53, 67, 73, 79, 89, 91-93, 103, 106, 111, 112, 131, 132) recording dosing regimen (event-based, intermittent or daily), (93, 106, 112, 132) allowing individuals to feel connected and even providing maps that show where PrEP is offered in the local area (106, 133). In their studies, Refugio et al (2018), Stekler et al (2018) and Fuchs et al (2018) implemented a text-based support strategy, which allowed participants to send messages, set reminders, download and receive information, abate stigma and enable staff to provide additional

support throughout the PrEP user's journey. Fuchs et al (2018) found that messages sent by service providers earlier in the week received better response rates from both PrEP users and other staff members. Liu et al (2018)'s PrEPmate included weekly 'check-in' messages, reminders and fun facts or trivia for users, with 92% of participants recommending the intervention to others. Mitchell et al (2018)'s mSMART intervention app for adherence enabled users to log their dosing, take part in daily surveys (with a 70% completion rate) and take pictures to consolidate memories of taking the medication. In general, bi-directional and two-way messaging services were positively received by participants (89, 91, 93, 103, 106).

Lastly, the *macrosystem level* identifies the broad socio-cultural dynamics of PrEP users in society and ensures '*comprehensive services are available to all individuals*' (83). The comprehensive service utilises six main factors. These include the initial assessment of the potential PrEP user (52, 73, 96, 113); tailoring of services to the individual receiving them (52, 54, 56, 57, 60, 65, 68, 79, 82, 83, 87, 88, 93, 94, 113-115, 117, 120); triaging of services to ensure efficiency, for example point of care access, '*on demand*' or same day PrEP initiation (57, 94, 113, 115, 117); ongoing relationship between the PrEP provider and the individual, which also includes shared-decision making processes (57, 61, 78, 93); availability of resources such as onsite support staff, PrEP navigators or '*take-away*', home-based PrEP services (56, 60, 68, 73, 88, 101, 103); and ongoing support throughout the duration of the service (53, 58, 72, 73, 78, 82, 85, 87, 88, 90, 93, 94, 96, 101, 103, 108, 114-116, 120, 124, 127, 132). If these elements are successfully integrated at a *macrosystem level*, then not only will the PrEP care pathway provide a holistic service but it will effectively cut across and encompass all patient groups regardless of different demographics or backgrounds.

PrEP Service Delivery Model

Based on the findings of the review, with particular consideration to Newman et al (2018) augmented PrEP cascade diagram, as well as in alignment to the multi-level framework and system characteristics presented by Beach et al (2018) and Galindo et al (2012) respectively, the authors have developed a

PrEP service delivery model (Figure 2). The model combines key service delivery aspects that were identified, evaluated and proven to be effective or positively received in the studies.

The inner cycle of the model highlights the four main touch points between the service user and the PrEP care pathway. The touch points are in the recommended order that will establish an effective patient pathway, according to the findings of the scoping review: access/referral routes (how the patient enters the PrEP pathway); consultation (key topics that should be discussed between the patient and the service provider); adherence (long-term pathway to ensure PrEP maintenance); and follow up/discontinuation (steps in place to enforce effective treatment).

The outer circle represents the context in which the four touch points function. These contextual factors operate throughout the PrEP care pathway in order for the overall model to perform effectively. These factors include education and messaging (through a tailored delivery using skilled PrEP navigators); task-shifting between primary care providers and HIV specialists; geographically convenient distribution and access to PrEP (also in the form of home-based delivery); and ongoing support services, complemented through innovative technological interventions.

Two actions have been included in the model for completeness. Although the PrEP service delivery model is continuous, the cycle is initiated once the patient starts displaying risky sexual behaviours. It is at this point that the patient would enter a health system and therefore the cycle (between touch points 4 and 1). PrEP should be initiated between touch points 2 and 3, during or after the initial consultation, depending on local resource allocation.

Insert Figure 2 ‘PrEP Service Delivery Model’ here

Discussion

The scoping review presents a unique mapping of extant literature on the PrEP service care pathway, which can be used collectively to inform technical guidance in optimising PrEP provision within STI prevention programming for MSM. It highlights the complexities involved in optimising PrEP service

uptake and service delivery, including the role of staffing, PrEP provider experience, setting, communications and service configuration for MSM. We recognise the limitations of such a review at a time when PrEP is being rolled out, with data restricted to the US, Thailand, UK, Canada, Kenya, Ukraine, Australia, France, Peru and Europe and Central Asia. Strengths centre on the thoroughness of the review approach through extensive searches to locate all forms of information with regard to PrEP service aspects and programming.

Theme One discusses the importance of resource allocations amongst staff and across various settings. Once these elements are established, patients should ideally have clear access to the PrEP care pathway, as can be seen in the PrEP service delivery model (Figure 2). However, the review occurs at a time where online sourcing of drugs and pharmaceutical medicines is increasingly common. As many countries do not currently offer PrEP or restrict access, PrEP users can source the PrEP drugs informally via diverted medication and online (70, 72, 99, 102, 103, 126, 129). Studies have also described the accessing of PrEP through deceit, either by pretending they have been exposed to HIV and are planning to use PEP as PrEP, (100) or pretending to be living with HIV (129). In some instances this is a cost related decision where use of prescribed PrEP occurs either '*on-demand or event-driven*' in order to save money, (103, 113) where MSM are initiated to use PrEP by a sexual partner for '*extra security*', (129) or where MSM simply felt confident using informal PrEP as pharmaceutical product if accessed through friends (102). This has implications for technical service aspects of PrEP programming as users of informal PrEP report feeling guilty in deceiving their healthcare providers and fear judgement (129). In addition, service configurations are hindered by the disconnect between healthcare providers who recommend PrEP but are unable to prescribe it, (72) the complexities between sexual risk and the uncertain efficacy of '*on-demand*' use, (72) use of PrEP outside of engagement with medical and sexual health support in the form of STI screening and minimisation of PrEP related harm through kidney function tests, (99, 102) and general lack of PrEP user knowledge concerning drug resistance, adverse effects, STI exposure and toxicity (130). These complexities highlight the need for a comprehensive list of programme considerations and recommendations

across a range of services to support potential and existing PrEP service users along the care pathway. In particular there were mixed interpretations regarding the eligibility criteria and reasons for PrEP discontinuation, the necessity to obtain baseline measurements of patients during the initial consultation and report on these during follow up visits, as well as document and build upon the existing and emerging referral routes of patients. By standardising key processes within the wider system, this will allow for a more effective service through attainable resource allocation, thus providing a smoother, more robust programme delivery of PrEP, as can be seen in the PrEP service delivery model.

Two main aspects of service delivery have been brought to light during the review. The first is ensuring that PrEP candidates are able to access the system through effective referral routes and go on to receive suitable services that meet their needs. Mixed evidence exists with regard to PrEP and risk compensation, with the concept that PrEP use increases condomless sexual practices and STIs, which in turn undermines the positive aspects of PrEP and impacts on PrEP rollout among MSM (38, 134-142). However, the review underscores the importance of PrEP to MSM service users and how it should be considered as a commitment to protect oneself and others (54, 92, 108). Furthermore, PrEP provision in a service creates the opportunity for MSM to access sexual health care, testing, treatment, counselling regarding condom use and STI testing and psychological supports that would not be accessed otherwise (12, 60). Conversely, PrEP could also be considered and used as a gateway for individuals to engage in other health services that they may not have wanted to initially, for example with mental health and vaccination services (61). This has been highlighted in touch point 4 of the PrEP service delivery model. Hence the review has brought to the fore the importance of exploring a wide range of potential access routes to PrEP by including both diverse referral routes and services that can offer PrEP to MSM (55, 56, 60, 62) as well as showing that a wide range of healthcare providers can be utilised to prescribe PrEP within the desired safe spaces free from stigma and discrimination (52, 55, 56, 65, 82, 105, 120). The outer circle and touch point 2 of the PrEP service delivery model addresses these elements. Prescriber bias in determining eligibility can be reduced by

1 the implementation of electronic health record systems to flag up potential PrEP candidate and follow
2 up-care (62) as well as through shared decision-making (57, 68). Distribution of PrEP by qualified
3 prescribers who have developed positive therapeutic alliances with their patients based on a shared
4 decision-making approach underpins adherence to correct treatment regimens, (75) reduction of
5 stigma, (62, 78-80, 82, 96, 97) regular baseline assessments of STI rates, (99) risk behaviours, (62, 81,
6 95, 96) drug monitoring (TDM) and renal function (72, 84). Once established, the PrEP care pathway
7 can then be further supported by PrEP navigators to assist potential and current PrEP users through
8 bridging communications, building trust and providing necessary information between users and
9 relevant services (62, 67, 73, 92, 94, 95, 101), as shown in the outer circle of the PrEP service delivery
10 model. Studies indicate the need for task shifting between primary care staff and HIV specialists as
11 well as further training across all roles and professions in order to leave no one behind and facilitate
12 referrals to streamline the PrEP cascade (55, 57, 59-61, 67, 69, 72, 75-77, 79, 80, 94, 100). By adapting
13 healthcare providers' education and communication to target populations, a healthier rapport can be
14 maintained with the patient, ultimately leading to better health outcomes.

15
16 The second point to be considered regards technical issues around supporting adherence to
17 PrEP. The review highlights barriers to uptake and how adherence to PrEP regimens remains a
18 fundamental component for consideration of programme planning, budget and PrEP effectiveness,
19 alongside consideration of strategically situating PrEP interventions as stand-alone, and within,
20 existing prevention programmes (143). This is highlighted in touch point 3 of the PrEP service delivery
21 model. Service aspects required to boost adherence are centered on a tailored approach, which are
22 dependent on patient needs, (53, 87) regular education, (70, 92) regular contact between the PrEP
23 user and healthcare providers with frequent screening, renal function testing, TDM and patient
24 counselling, (55, 84, 88-92, 105, 111) all with a non-judgmental attitude (92). There is a need for
25 continued innovation, mindful of individual need and development of personalised engagement and
26 adherence strategies. Innovations include dosing aids using mobile phone technologies, (53, 89, 92,
27 106) pill boxes, (73, 103) calendars, (73, 93, 103, 108) existing drug routines/events, (88, 89, 92, 103,

108) alarms to assist MSM patients and the option to carry spare medication (66, 67, 73, 92, 103, 108, 113). These elements have been highlighted in touch point 3 of the PrEP service delivery model. Ultimately, there is a continued need to deepen our understanding of the biomedical, social and risk complexities of PrEP as a HIV prevention strategy for low to high risk MSM groups, and through a culturally sensitive approach. This is required in order to identify those in need and engage with them whilst mitigating stigma, (134, 144) determining eligibility, (143) and promoting self-assessment to ensure adequate adherence (57, 143).

Future Research Directions

In finer detail, although socio-economic demographic data was captured in studies, this was not a focal point of discussion throughout the articles and represents an area for further investigation. The majority of studies state that there is a need for further research into black and ethnic minorities' access to PrEP service provisions. Additionally, young MSM require further investigation as they are less likely to be seeking HIV/STI testing, diagnosis or treatment for HIV (145). While Amico et al (2018), Desrosiers et al (2018) and Refugio et al (2018) discuss interventions and techniques to help increase the uptake of PrEP among youths, namely through technology and apps, considerably more research needs to be done. At service level, the majority of service providers described positive attitudes towards PrEP prescribing with only two studies reporting that providers did not feel comfortable with the current procedures (61, 76). However, only 15 studies targeted healthcare providers. This highlights a major gap in the knowledge base with considerable more research needed to investigate the perspectives of healthcare professionals in the context of PrEP delivery. There is a clear and urgent need for research to outline a '*universal best approach*' for follow-up and termination consultations (57, 104).

Conclusion

The review highlights the complexities in providing optimal PrEP services for MSM. Environments free from stigma are important to the success of all aspects of PrEP delivery. Service aspects are underpinned by the need to understand informal and formal routes of PrEP use among MSM, understanding their barriers to uptake and retention, the importance of a positive therapeutic alliance between patient and prescriber in supporting patient initiation and adherence to PrEP regimes as well as the need for PrEP availability through different models of service delivery which are adapted to the MSM community and the providers involved. Findings here can be used to inform PrEP technical guidance to enhance programming across a range of modes of service delivery, in improving targeting low to high risk groups within the MSM communities, and in improving supporting medication adherence and STI screening. We make recommendations for future research directions as PrEP services are initiated and up-scaled globally.

Declarations

Ethics approval and consent to participate

“Not applicable”

Consent for publication

“Not applicable”

Availability of data and material

“The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request”

Competing interests

"The authors declare that they have no competing interests"

Funding

The work was funded by the Sexually Transmitted Infection Research Foundation (STIRF) United Kingdom. The funder was not involved in the design of the scoping review protocol, data collection and analysis, interpretation of the data or writing of the manuscript.

References

1. UNAIDS. Prevention gap report. 2016c; Available at:
http://www.unaids.org/sites/default/files/media_asset/2016-prevention-gap-report_en.pdf
2. UNAIDS. Strategy on the Fast Track to end AIDS 2016-2021. 2016d; Available at:
http://www.unaids.org/sites/default/files/media_asset/20151027_UNAIDS_PCB37_15_18_EN_rev1.pdf Accessed January 2019.
3. UNAIDS. 90-90-90: An ambitious treatment target to help end the AIDS epidemic. 2019; Available at: <https://www.unaids.org/en/resources/909090>. Accessed June 2019.
4. AIDSMAP. The UK is moving towards elimination of HIV transmission. 2017; Available at: <http://www.aidsmap.com/The-UK-is-moving-towards-elimination-of-HIV-transmission/page/3209286/>. Accessed July 2019.
5. UNAIDS. Global AIDS update. 2016a; Available at: <https://www.unaids.org/en/resources/documents/2016/Global-AIDS-update-2016>. Accessed June 2019.
6. CDC. HIV among gay and bisexual men. 2015; Available at: <https://www.cdc.gov/nchhstp/newsroom/docs/factsheets/cdc-msm-508.pdf>. Accessed January 2019.
7. Chris, B., Andrea, L. W., Damian, W. et al. The global HIV epidemics in men who have sex with men. The International Bank for Reconstruction and Development. 2011.
8. Peng, P., Su, S., Fiarley, C. et al. Global Estimate of the Acceptability of Pre-exposure Prophylaxis for HIV Among Men Who have Sex with Men: A Systematic Review and Meta-analysis. *AIDS Behav.* 2018; 22: 1063-1074.
9. Ncaids, N. and C., C. C. D. Update on the AIDS/STD epidemic in China and main response in control and prevention in December, 2015. *China J AIDS STD.* 2016; 22(2): 69.
10. UNAIDS. The gap report 2014. 2014; Available at: http://files.unaids.org/en/media/unaids/contentassets/documents/unaidspublication/2014/UNAIDS_Gap_report_en.pdf. Accessed June 2019.
11. UNFPA. Implementing comprehensive HIV and STI programmes with men who have sex with men: practical guidance for collaborative interventions. 2015; Available at: https://www.unfpa.org/sites/default/files/pub-pdf/MSMIT_for_Web.pdf. Accessed August 2019.
12. Freeborn, K. and Portillo, C. J. Does preexposure prophylaxis for HIV prevention in men who have sex with men change risk behaviour? A systematic review. *J Clin Nurs.* 2018; 27: 3254-3265.
13. Stover, J., Bollinger, L., Izazola, J. A. et al. What is required to end the AIDS epidemic as a public health threat by 2030? The cost and impact of the fast-track approach. *PLoS One.* 2016; 11(5): 20154893.
14. Davies, O. Pre-exposure Prophylaxis for HIV Prevention: Why, What, Who and How. *Infect Dis Ther.* 2016; 5: 406-416.
15. WHO. Guidance on pre-exposure oral prophylaxis (PrEP) for serodiscordant couples, men and transgender women who have sex with men at high risk of HIV: Recommendations for use in the context of demonstration projects. 2012; Available at: https://apps.who.int/iris/bitstream/handle/10665/75188/9789241503884_eng.pdf;jsessionid=AB43EE2B0490DA58A6109943FA6B2022?sequence=1. Accessed June 2019.
16. Grant, R. M., Lama, J. R., Anderson, P. L. et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *N Engl J Med.* 2010; 363(27): 2587-99.
17. Liu, A., Cohen, S., and Vittinghoff, E. Adherence, sexual behavior and HIV/STI incidence among men who have sex with men (MSM) and transgender women (TGW) in the US PrEP demonstration (Demo) project. 8th International AIDS Society Conference on HIV Pathogenesis, Treatment, and Prevention. Vancouver, 2015.

18. Molina, J. M., Capitant, C., Spire, B. et al. On-demand preexposure prophylaxis in men at high risk for HIV-1 infection. *N Engl J Med.* 2015; 373(23): 2237-2246.
19. McCormack, S. Pre-exposure prophylaxis to prevent the acquisition of HIV-1 infection (PROUD): effectiveness results from the pilot phase of a pragmatic open-label randomised trial. *Lancet.* 2016; 387: 53-60.
20. Trager, M., Schroeder, S., Wright, E. et al. Effects of Pre-exposure Prophylaxis for the Prevention of Human Immunodeficiency Virus Infection on Sexual Risk Behavior in Men Who Have Sex With Men: A Systematic Review and Meta-analysis. *Clin Infect Dis.* 2018; 67(5): 676-86.
21. Anderson, P. L., Glidden, D. V., and Liu, A. Emtricitabine-tenofovir concentrations and pre-exposure prophylaxis efficacy in men who have sex with men. *Sci Transl Med.* 2012; 4: 1-8.
22. Baeten, J. M. and Grant, R. Use of antiretrovirals for HIV prevention: what do we know and what don't we know? *Curr HIV/AIDS Rep.* 2013; 10: 142-51.
23. Charania, M. R., Crepaz, N., Guenther-Gray, C. et al. Efficacy of structural-level condom distribution interventions: a meta-analysis of U.S. and international studies 1998-2007. *AIDS Behav.* 2011; 15(7): 1283-97.
24. Ford, N., Irvine, C., Shubber, Z. et al. Adherence to HIV postexposure prophylaxis: a systematic review and meta-analysis. *AIDS.* 2014; 28(18): 2721-7.
25. Nugroho, A., Erasmus, V., Zomer, T. P., Wu, Q., and Richardus, J. H. Behavioral interventions to reduce HIV risk behavior for MSM and transwomen in Southeast Asia: a systematic review. *AIDS Care.* 2017; 29(1): 98-104.
26. Templeton, D. J., Millett, G. A., and Grulich, A. E. Male circumcision to reduce the risk of HIV and sexually transmitted infections among men who have sex with men. *Curr Opin Infect Dis.* 2010; 23(1): 45-52.
27. WHO. Guideline on when to start antiretroviral therapy and on pre-exposure prophylaxis for HIV. 2015; Available at: <http://apps.who.int/medicinedocs/documents/s22247en/s22247en.pdf>. Accessed June 2019.
28. WHO. Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection. Recommendations for a public health approach, second edition. 2016; Available at: <http://www.who.int/hiv/pub/arv/arv-2016/en/>. Accessed January 2019.
29. WHO. PrEP demonstration projects: a framework for country level protocol development. 2013; Available at: <https://apps.who.int/iris/handle/10665/112799>. Accessed June 2019.
30. Ding, Y., Yan, H., Ning, Z. et al. Low willingness and actual uptake of pre-exposure prophylaxis for HIV-1 prevention among men who have sex with men in Shanghai, China. *Biosci Trends.* 2016; 10(2): 113-9.
31. Holt, M. HIV pre-exposure prophylaxis and treatment as prevention: a review of awareness and acceptability among men who have sex with men in the Asia-Pacific region and the Americas. *Sex Health.* 2014; 11: 166-70.
32. Kirby, T. and Thornber-Dunwell, M. Uptake of PrEP for HIV slow among MSM. *Lancet.* 2014; 383: 399-400.
33. Young, I. and McDaid, L. How acceptable are antiretrovirals for the prevention of sexually transmitted HIV?: a review of research on the acceptability of oral pre-exposure prophylaxis and treatment as prevention. *AIDS Behav.* 2014; 18: 195-216.
34. Underhill, K., Morrow, K. M., Collieran, C. et al. A qualitative study of medical mistrust, perceived discrimination, and risk behavior disclosure to clinicians by U.S. male sex workers and other men who have sex with men: implications for biomedical HIV prevention. *J Urban Health.* 2015; 92(4): 667-86.
35. Amico, K. R. and Stirratt, M. J. Adherence to preexposure prophylaxis: current, emerging, and anticipated bases of evidence. *Clin Infect Dis.* 2014; 59(Supplement 1): S55-60.

36. Zhou, F., Gao, L., Li, S. et al. Willingness to accept HIV pre-exposure prophylaxis among Chinese men who have sex with men. *PLoS One*. 2012; 7(3): e32329.
37. Blumenthal, J. and Haubrich, R. Risk compensation in PrEP: an old debate emerges yet again. *Virtual Mentor*. 2014; 16: 909-15.
38. Marcus, J. L., Glidden, D. V., Mayer, K. H. et al. No evidence of sexual risk compensation in the iPrEx trial of daily oral HIV preexposure prophylaxis. *PLoS One*. 2013; 8(12): e81997.
39. Fonner, V. A., Dalglish, S. L., and Kennedy, C. E. Effectiveness and safety of oral HIV preexposure prophylaxis for all populations. *AIDS* 2016; 30: 1973-83.
40. Mugwanya, K. K. and Baeten, J. M. Safety of oral tenofovir disoproxil fumarate-based pre-exposure prophylaxis for HIV prevention. *Expert Opin Drug Saf*. 2016; 15(2): 265-73.
41. Eaton, L., Driffin, D., Smith, H. et al. Psychosocial factors related to willingness to use pre-exposure prophylaxis for HIV prevention among Black men who have sex with men attending a community event. *Sex Health*. 2014; 11(3): 244-251.
42. Grov, C., Whitfield, T., Rendina, H., Ventuneac, A., and Parsons, J. T. Willingness to Take PrEP and Potential for Risk Compensation Among Highly Sexually Active Gay and Bisexual Men...pre-exposure prophylaxis. *AIDS Behav*. 2015; 19(12): 2234-2244.
43. Holloway, I., Tan, D., Gildner, J. et al. Facilitators and Barriers to Pre-Exposure Prophylaxis Willingness Among Young Men Who Have Sex with Men Who Use Geosocial Networking Applications in California. *AIDS Patient Care STDs*. 2017; 31(12): 517-527.
44. Klevens, R., Martin, B., Doherty, R. et al. Factors Associated with Pre-exposure Prophylaxis in a Highly Insured Population of Urban Men Who Have Sex with Men, 2014. *AIDS Behav*. 2018; 22(4): 1201-1208.
45. Rimal, R. N. and Lapinski, M. K. Why health communication is important in public health. *Bulletin of the World Health Organisation*. 2009; 87: 247.
46. Trust, T. H. Make PrEP available. 2019; Available at: <https://www.tht.org.uk/our-work/our-campaigns/make-prep-available>. Accessed October 2019.
47. Anderson, S., Allen, P., Peckham, S., and Goodwin, N. Asking the right questions: scoping studies in the commissioning of research on the organisation and delivery of health services. *Health Res Policy Syst*. 2008; 6(7).
48. Arksey, H. and O'Malley, L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol*. 2005; 8: 19-32.
49. Daudt, H., van Mossel, C., and Scott, S. Enhancing the scoping study methodology: a large, inter-professional team's experience with Arksey and O'Malley's framework. *BMC Med Res Methodol*. 2013; 13(48).
50. Levac, D., Colquhoun, H., and O'Brien, K. K. Scoping studies: Advancing the methodology. *Implement Sci*. 2010; 5(69).
51. Brouwers, P. Improving the HIV Pre-Exposure Prophylaxis (PrEP) Cascade. 2015; Available at: <https://www.nimh.nih.gov/funding/grant-writing-and-application-process/concept-clearances/2015/improving-the-hiv-pre-exposure-prophylaxis-prep-cascade.shtml>. Accessed October 2019.
52. Anand, T., Nitpolprasert, C., Trachunthong, D. et al. A novel Online-to-Offline (O2O) model for pre-exposure prophylaxis and HIV testing scale up. *J Int AIDS Soc*. 2017; 20(1): 21326-21326.
53. Phanuphak, N., Sungsing, T., Jantarapakde, J. et al. Princess PrEP program: the first key population-led model to deliver pre-exposure prophylaxis to key populations by key populations in Thailand. *Sex Health*. 2018; 15(6): 542-555.
54. Tangmunkongvorakul, A., Chariyalertsak, S., Amico, R. K. et al. Facilitators and barriers to medication adherence in an HIV prevention study among men who have sex with men in the iPrEx study in Chiang Mai, Thailand. *AIDS Care*. 2013; 25(8): 961-967.

55. Hoffman, S., Guidry, J. A., Collier, K. L. et al. A Clinical Home for Preexposure Prophylaxis: Diverse Health Care Providers' Perspectives on the "Purview Paradox". *Int Assoc Provid AIDS Care*. 2016; 15(1): 59-65.
56. John, S. A., Rendina, H. J., Grov, C., and Parsons, J. T. Home-based pre-exposure prophylaxis (PrEP) services for gay and bisexual men: An opportunity to address barriers to PrEP uptake and persistence. *PLoS One*. 2017; 12(12): e0189794-e0189794.
57. Krakower, D. S., Ware, N. C., Maloney, K. M. et al. Differing Experiences with Pre-Exposure Prophylaxis in Boston Among Lesbian, Gay, Bisexual, and Transgender Specialists and Generalists in Primary Care: Implications for Scale-Up. *AIDS Patient Care STDs*. 2017; 31(7): 297-304.
58. Mullins, T. L. K., Zimet, G., Lally, M. et al. HIV Care Providers' Intentions to Prescribe and Actual Prescription of Pre-Exposure Prophylaxis to At-Risk Adolescents and Adults. *AIDS Patient Care STDs*. 2017; 31(12): 504-516.
59. Ojile, N., Sweet, D., and Kallail, K. J. A Preliminary Study of the Attitudes and Barriers of Family Physicians to Prescribing HIV Preexposure Prophylaxis. *Kans J Med*. 2017; 10(2): 40-42.
60. Parsons, J. T., John, S. A., Whitfield, T. H. F., Cienfuegos-Szalay, J., and Grov, C. HIV/STI counseling and testing services received by gay and bisexual men using pre-exposure prophylaxis (PrEP) at their last PrEP care visit. *Sex Transm Dis*. 2018; 45(12): 798-802.
61. Patel, R. R., Chan, P. A., Harrison, L. C. et al. Missed Opportunities to Prescribe HIV Pre-Exposure Prophylaxis by Primary Care Providers in Saint Louis, Missouri. *LGBT Health*. 2018; 5(4): 250-256.
62. Sun, C., Anderson, K., Bangsberg, D. et al. Access to HIV Pre-exposure Prophylaxis in Practice Settings: a Qualitative Study of Sexual and Gender Minority Adults' Perspectives. *J Gen Intern Med*. 2019.
63. Tellalian, D., Maznavi, K., Bredeek, U. F., and Hardy, W. D. Pre-Exposure Prophylaxis (PrEP) for HIV Infection: Results of a Survey of HIV Healthcare Providers Evaluating Their Knowledge, Attitudes, and Prescribing Practices. *AIDS Patient Care STDs*. 2013; 27(10): 553-559.
64. Bien, C., Patel, V., Blackstock, O., and Felsen, U. Reaching Key Populations: PrEP Uptake in an Urban Health Care System in the Bronx, New York. *AIDS Behav*. 2017; 21(5): 1309-1314.
65. Arnold, E. A., Hazelton, P., Lane, T. et al. A qualitative study of provider thoughts on implementing pre-exposure prophylaxis (PrEP) in clinical settings to prevent HIV infection. *PLoS One*. 2012; 7(7): e40603-e40603.
66. Desrosiers, A., Levy, M., Dright, A. et al. A Randomized Controlled Pilot Study of a Culturally-Tailored Counseling Intervention to Increase Uptake of HIV Pre-exposure Prophylaxis Among Young Black Men Who Have Sex with Men in Washington, DC. *AIDS Behav*. 2018.
67. Doblecki-Lewis, S. and Jones, D. Community Federally Qualified Health Centers as Homes for HIV Preexposure Prophylaxis: Perspectives from South Florida. *J Int Assoc Provid AIDS Care*. 2016; 15(6): 522-528.
68. Calabrese, S. K., Magnus, M., Mayer, K. H. et al. Putting PrEP into practice: Lessons learned from early-adopting U.S. providers' firsthand experiences providing HIV pre-exposure prophylaxis and associated care. *PLoS One*. 2016; 11(6).
69. Clement, M. E., Okeke, N. L., Munn, T. et al. Partnerships Between a University-Affiliated Clinic and Community-Based Organizations to Reach Black Men Who Have Sex With Men for PrEP Care. *J Acquir Immune Defic Syndr*. 2018a; 77(2): e25-e27.
70. Doblecki-Lewis, S., Liu, A., Feaster, D. et al. Healthcare Access and PrEP Continuation in San Francisco and Miami After the US PrEP Demo Project. *J Acquir Immune Defic Syndr*. 2017; 74(5): 531-538.

71. Ojikutu, B., Bogart, L., Mayer, K. et al. Spatial Access and Willingness to Use Pre-Exposure Prophylaxis Among Black/African American Individuals in the United States: Cross-Sectional Survey. *JMIR Public Health Surveill.* 2019; 5(1): 1-8.
72. Paparini, S., Nutland, W., Rhodes, T., Nguyen, V., and Anderson, J. DIY HIV prevention: Formative qualitative research with men who have sex with men who source PrEP outside of clinical trials. *PLoS One.* 2018; 13(8): e0202830-e0202830.
73. Parisi, D., Warren, B., Leung, S. J. et al. A Multicomponent Approach to Evaluating a Pre-exposure Prophylaxis (PrEP) Implementation Program in Five Agencies in New York. *J Assoc Nurses AIDS Care.* 2018; 29(1): 10-19.
74. Adams, L. M. and Balderson, B. H. HIV providers' likelihood to prescribe pre-exposure prophylaxis (PrEP) for HIV prevention differs by patient type: a short report. *AIDS Care.* 2016; 28(9): 1154-1158.
75. Adams, L. M., Balderson, B. H., Brown, K., Bush, S. E., and Packett, B. J. Who Starts the Conversation and Who Receives Preexposure Prophylaxis (PrEP)? A Brief Online Survey of Medical Providers' PrEP Practices. *Health Educ Behav.* 2018; 45(5): 723-729.
76. Clement, M. E., Seidelman, J., Wu, J. et al. An educational initiative in response to identified PrEP prescribing needs among PCPs in the Southern U.S. *AIDS Care.* 2018b; 30(5): 650-655.
77. Grimm, J. and Schwartz, J. "It's Like Birth Control for HIV": Communication and Stigma for Gay Men on PrEP. *J Homosex.* 2018: 1-19.
78. Klassen, B. J., Lin, S. Y., Lachowsky, N. J. et al. Gay Men's Understanding and Education of New HIV Prevention Technologies in Vancouver, Canada. *Qual Health Res.* 2017; 27(12): 1775-1791.
79. Lelutiu-Weinberger, C. and Golub, S. A. Enhancing PrEP Access for Black and Latino Men Who Have Sex With Men. *J Acquir Immune Defic Syndr.* 2016; 73(5): 547-555.
80. Maloney, K. M., Krakower, D. S., Ziobro, D. et al. Culturally Competent Sexual Healthcare as a Prerequisite for Obtaining Preexposure Prophylaxis: Findings from a Qualitative Study. *LGBT Health.* 2017; 4(4): 310-314.
81. Raifman, J. R. G., Flynn, C., and German, D. Healthcare Provider Contact and Pre-exposure Prophylaxis in Baltimore Men Who Have Sex With Men. *Am J Prev Med.* 2017; 52(1): 55-63.
82. Hubach, R. D., Currin, J. M., Sanders, C. A. et al. Barriers to Access and Adoption of Pre-Exposure Prophylaxis for the Prevention of HIV Among Men Who Have Sex With Men (MSM) in a Relatively Rural State. *AIDS Education & Prevention.* 2017; 29(4): 315-329.
83. Beach, L. B., Greene, G. J., Lindeman, P. et al. Barriers and Facilitators to Seeking HIV Services in Chicago Among Young Men Who Have Sex with Men: Perspectives of HIV Service Providers. *AIDS Patient Care STDS.* 2018; 32(11): 468-476.
84. Aloysius, I., Savage, A., Zdravkov, J. et al. InterPrEP. Internet-based pre-exposure prophylaxis with generic tenofovir DF/emtricitabine in London: an analysis of outcomes in 641 patients. *J Virus Erad.* 2017; 3(4): 218-222.
85. Eaton, L. A., Matthews, D. D., Bukowski, L. A. et al. Elevated HIV Prevalence and Correlates of PrEP Use Among a Community Sample of Black Men who Have Sex with Men. *J Acquir Immune Defic Syndr.* 2018.
86. Levy, M. E., Watson, C. C., Glick, S. N. et al. Receipt of HIV prevention interventions is more common in community-based clinics than in primary care or acute care settings for Black men who have sex with men in the District of Columbia. *AIDS Care.* 2016; 28(5): 660-664.
87. Mayer, K., Safren, S., Elsesser, S. et al. Optimizing Pre-Exposure Antiretroviral Prophylaxis Adherence in Men Who Have Sex with Men: Results of a Pilot Randomized Controlled Trial of 'Life-Steps for PrEP'. *AIDS Behav.* 2017; 21(5): 1350-1360.
88. Elst, E., Mbogua, J., Operario, D. 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): 2162-2172.

89. Fuchs, J. D., Stojanovski, K., Vittinghoff, E. et al. A Mobile Health Strategy to Support Adherence to Antiretroviral Preexposure Prophylaxis. *AIDS Patient Care STDS*. 2018; 32(3): 104-111.
90. Landovitz, R. J., Beymer, M., Kofron, R. et al. Plasma Tenofovir Levels to Support Adherence to TDF/FTC Preexposure Prophylaxis for HIV Prevention in MSM in Los Angeles, California. *J Acquir Immune Defic Syndr*. 2017; 76(5): 501-511.
91. Pasipanodya, E. C., Jain, S., Sun, X. et al. Trajectories and Predictors of Longitudinal Preexposure Prophylaxis Adherence Among Men Who Have Sex With Men. *J Infect Dis*. 2018; 218(10): 1551-1559.
92. Gilmore, H. J., Liu, A., Koester, K. A. et al. Participant Experiences and Facilitators and Barriers to Pill Use Among Men Who Have Sex with Men in the iPrEx Pre-Exposure Prophylaxis Trial in San Francisco. *AIDS Patient Care STDs*. 2013; 27(10): 560-566.
93. Amico, K. R., McMahan, V., Goicochea, P. et al. Supporting study product use and accuracy in self-report in the iPrEx study: next step counseling and neutral assessment. *AIDS Behav*. 2012; 16(5): 1243-1259.
94. Witzel, T. C., Nutland, W., and Bourne, A. What qualities in a potential HIV pre-exposure prophylaxis service are valued by black men who have sex with men in London? A qualitative acceptability study. *Int J STD AIDS*. 2018; 29(8): 760-765.
95. Galea, J. T., Kinsler, J. J., Salazar, X. et al. Acceptability of pre-exposure prophylaxis as an HIV prevention strategy: barriers and facilitators to pre-exposure prophylaxis uptake among at-risk Peruvian populations. *Int J STD AIDS*. 2011; 22(5): 256-262.
96. Jaiswal, J., Griffin, M., Singer, S. N. et al. Structural Barriers to Pre-exposure Prophylaxis Use Among Young Sexual Minority Men: The P18 Cohort Study. *Curr HIV Res*. 2018; 16(3): 237-249.
97. Philbin, M. M., Parker, C. M., Parker, R. G. et al. Gendered Social Institutions and Preventive Healthcare Seeking for Black Men Who Have Sex with Men: The Promise of Biomedical HIV Prevention. *Arch Sex Behav*. 2018; 47(7): 2091-2100.
98. Raifman, J., Nunn, A., Oldenburg, C. E. et al. An Evaluation of a Clinical Pre-Exposure Prophylaxis Education Intervention among Men Who Have Sex with Men. *Health Serv Res*. 2018; 53(4): 2249-2267.
99. Bourne, A., Alba, B., Garner, A. et al. Use of, and likelihood of using, HIV pre-exposure prophylaxis among men who have sex with men in Europe and Central Asia: findings from a 2017 large geosocial networking application survey. *Sex Transm Infect* 2019; 0: 1-6.
100. Grov, C. and Kumar, N. HIV Pre-Exposure Prophylaxis (PrEP) Is Coming to Europe, but Are Gay Men Ready to Accept It? Qualitative Findings from Berlin, Germany. *Sexuality Research and Social Policy*. 2018; 15(3): 283-289.
101. Underhill, K., Morrow, K. M., Collieran, C. M. et al. Access to Healthcare, HIV/STI Testing, and Preferred Pre-Exposure Prophylaxis Providers among Men Who Have Sex with Men and Men Who Engage in Street-Based Sex Work in the US. *PLoS One*. 2014; 9(11).
102. Buttram, M. E. The informal use of antiretroviral medications for HIV prevention by men who have sex with men in South Florida: initiation, use practices, medications and motivations. *Cult Health Sex*. 2018; 20(11): 1185-1198.
103. Vaccher, S. J., Kaldor, J. M., Callander, D., Zablotska, I. B., and Haire, B. G. Qualitative Insights Into Adherence to HIV Pre-Exposure Prophylaxis (PrEP) Among Australian Gay and Bisexual Men. *AIDS Patient Care STDs*. 2018; 32(12): 519-528.
104. Karris, M. Y., Beekmann, S. E., Mehta, S. R., Anderson, C. M., and Polgreen, P. M. Are we prepped for preexposure prophylaxis (PrEP)? Provider opinions on the real-world use of PrEP in the United States and Canada. *Clin Infect Dis*. 2014; 58(5): 704-712.
105. Daughtridge, G. W., Conyngham, S. C., Ramirez, N., and Koenig, H. C. I Am Men's Health: Generating Adherence to HIV Pre-Exposure Prophylaxis (PrEP) in Young Men of Color Who Have Sex with Men. *J Int Assoc Provid AIDS Care*. 2015; 14(2): 103-107.

106. Liu, A. Y., Vittinghoff, E., von Felten, P. et al. Randomized Controlled Trial of a Mobile Health Intervention to Promote Retention and Adherence to Pre-exposure Prophylaxis among Young People at Risk for Human Immunodeficiency Virus: The EPIC Study. *Clin Infect Dis*. 2018.
107. Stekler, J. D., McMahan, V., Ballinger, L. et al. HIV Pre-exposure Prophylaxis Prescribing Through Telehealth. *J Acquir Immune Defic Syndr*. 2018; 77(5): e40-e42.
108. Amico, K. R., Miller, J., Balthazar, C. et al. Integrated Next Step Counseling (iNSC) for Sexual Health and PrEP Use Among Young Men Who Have Sex with Men: Implementation and Observations from ATN110/113. *AIDS Behav* 2018.
109. Rusie, L. K., Orenge, C., Burrell, D. et al. Preexposure Prophylaxis Initiation and Retention in Care Over 5 Years, 2012-2017: Are Quarterly Visits Too Much? *Clin Infect Dis*. 2018; 67(2): 283-287.
110. Smith, D. K., Toledo, L., Smith, D. J., Adams, M. A., and Rothenberg, R. Attitudes and Program Preferences of African-American Urban Young Adults About Pre-Exposure Prophylaxis (PrEP). *AIDS Education & Prevention*. 2012; 24(5): 408-421.
111. Marcus, J. L., Hurley, L. B., Hare, C. B. et al. Preexposure Prophylaxis for HIV Prevention in a Large Integrated Health Care System: Adherence, Renal Safety, and Discontinuation. *J Acquir Immune Defic Syndr*. 2016; 73(5): 540-546.
112. Mitchell, J. T., LeGrand, S., Hightow-Weidman, L. B. et al. Smartphone-Based Contingency Management Intervention to Improve Pre-Exposure Prophylaxis Adherence: Pilot Trial. *JMIR Mhealth Uhealth*. 2018; 6(9).
113. Dubov, A., Fraenkel, L., Yorick, R., Ogunbajo, A., and Altice, F. L. Strategies to Implement Pre-exposure Prophylaxis with Men Who Have Sex with Men in Ukraine. *AIDS Behav*. 2018; 22(4): 1100-1112.
114. Galindo, G. R., Walker, J. J., Hazelton, P. et al. Community member perspectives from transgender women and men who have sex with men on pre-exposure prophylaxis as an HIV prevention strategy: implications for implementation. *Implement Sci*. 2012; 7(1): 116-116.
115. Bhatia, R., Modali, L., Lowther, M. et al. Outcomes of Preexposure Prophylaxis Referrals From Public STI Clinics and Implications for the Preexposure Prophylaxis Continuum. *Sex Transm Dis*. 2018; 45(1): 50-55.
116. Hojilla, J. C. Optimizing the delivery of HIV pre-exposure prophylaxis (PrEP): An evaluation of risk compensation, disengagement, and the PrEP cascade (part 2). 2018b; Available at: https://search.proquest.com/docview/1990873737?accountid=12118;https://lomu-primo.hosted.exlibrisgroup.com/openurl/44JMU/44JMU_services_page??url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:dissertation&genre=dissertations+%26+theses&sid=ProQ:PsycINFO+&title=&title=Optimizing+the+delivery+of+HIV+pre-exposure+prophylaxis+%28PrEP%29%3A+An+evaluation+of+risk+compensation%2C+disengagement%2C+and+the+PrEP+cascade&issn=&date=2018-01-01&volume=&issue=&spage=&au=Hojilla%2C+J.+Carlo&isbn=978-0355142525&jtitle=&bttitle=&rft_id=info:eric/2017-54454-181&rft_id=info:doi/. Accessed 7th January 2019.
117. Kwakwa, H. A., Bessias, S., Sturgis, D. et al. Engaging United States Black Communities in HIV Pre-exposure Prophylaxis: Analysis of a PrEP Engagement Cascade. *J Natl Med Assoc*. 2018; 110(5): 480-485.
118. Spinelli, M. A., Scott, H. M., Vittinghoff, E. et al. Provider adherence to pre-exposure prophylaxis monitoring guidelines in a large primary care network. *Open Forum Infect Dis*. 2018; 5(6): 1-4.
119. Siegler, A. J., Bratcher, A., Weiss, K. M. et al. Location location location: an exploration of disparities in access to publicly listed pre-exposure prophylaxis clinics in the United States. *Ann Epidemiol*. 2018.

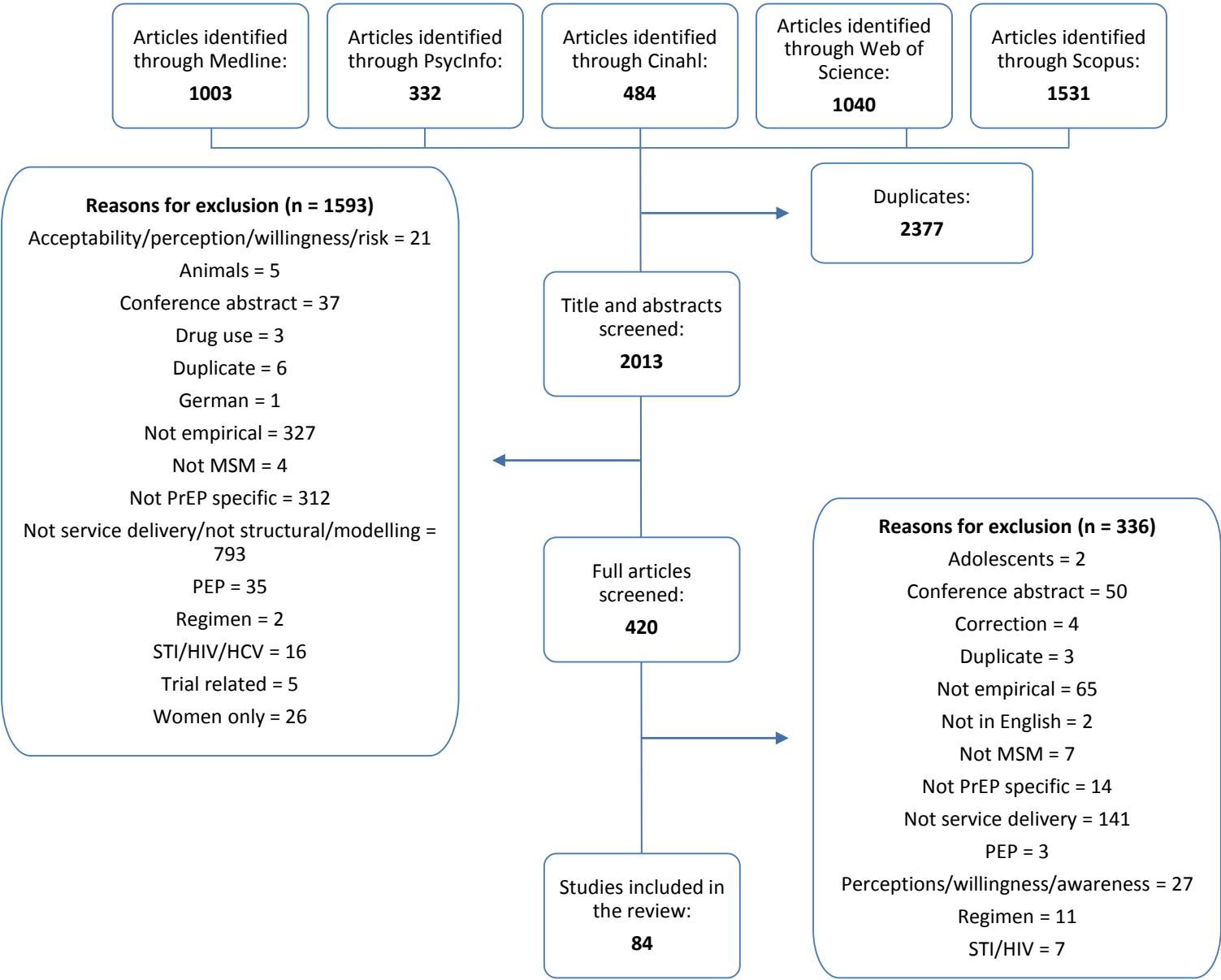
120. Newman, P. A., Guta, A., Lacombe-Duncan, A., and Tepjan, S. Clinical exigencies, psychosocial realities: negotiating HIV pre-exposure prophylaxis beyond the cascade among gay, bisexual and other men who have sex with men in Canada. *J Int AIDS Soc.* 2018; 21(11): e25211-e25211.
121. Chan, P. A., Glynn, T. R., Oldenburg, C. E. et al. Implementation of Preexposure Prophylaxis for Human Immunodeficiency Virus Prevention Among Men Who Have Sex With Men at a New England Sexually Transmitted Diseases Clinic. *Sex Transm Dis.* 2016; 43(11): 717-723.
122. Arnold, T., Brinkley-Rubinstein, L., Chan, P. A. et al. Social, structural, behavioral and clinical factors influencing retention in Pre-Exposure Prophylaxis (PrEP) care in Mississippi. *PLoS One.* 2017; 12(2): e0172354-e0172354.
123. Hojilla, J. C. Optimizing the delivery of HIV pre-exposure prophylaxis (PrEP): An evaluation of risk compensation, disengagement, and the PrEP cascade (part 1). 2018a; Available at: https://search.proquest.com/docview/1990873737?accountid=12118;https://ljmu-primo.hosted.exlibrisgroup.com/openurl/44JMU/44JMU_services_page??url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:dissertation&genre=dissertations+%26+theses&sid=ProQ:PsycINFO+&atitle=&title=Optimizing+the+delivery+of+HIV+pre-exposure+prophylaxis+%28PrEP%29%3A+An+evaluation+of+risk+compensation%2C+disengagement%2C+and+the+PrEP+cascade&issn=&date=2018-01-01&volume=&issue=&spage=&au=Hojilla%2C+J.+Carlo&isbn=978-0355142525&jtitle=&bttitle=&rft_id=info:eric/2017-54454-181&rft_id=info:doi/. Accessed 7th January 2019.
124. Golub, S. A., Gamarel, K. E., Rendina, H. J., Surace, A., and Lelutiu-Weinberger, C. L. From Efficacy to Effectiveness: Facilitators and Barriers to PrEP Acceptability and Motivations for Adherence Among MSM and Transgender Women in New York City. *AIDS Patient Care STDs.* 2013; 27(4): 248-254.
125. Kurtz, S. P. and Buttram, M. E. Misunderstanding of Pre-Exposure Prophylaxis Use Among Men Who Have Sex with Men: Public Health and Policy Implications. *LGBT Health.* 2016; 3(6): 461-464.
126. Merchant, R. C., Corner, D., Garza, E. et al. Preferences for HIV pre-exposure prophylaxis (PrEP) information among men-who-have-sex-with-men (MSM) at community outreach settings. *J Gay Lesbian Ment Health.* 2016; 20(1): 21-33.
127. Shover, C. L., Javanbakht, M., Shoptaw, S. et al. HIV Preexposure Prophylaxis Initiation at a Large Community Clinic: Differences Between Eligibility, Awareness, and Uptake. *Am J Public Health.* 2018; 108(10): 1408-1417.
128. Marcus, J. L., Levine, K., Grasso, C. et al. HIV Preexposure Prophylaxis as a Gateway to Primary Care. *Am J Public Health.* 2018; 108(10): 1418-1420.
129. Rivierez, I., Quatremere, G., Spire, B., Ghosn, J., and Rojas Castro, D. Lessons learned from the experiences of informal PrEP users in France: results from the ANRS-PrEPAGE study. *AIDS Care.* 2018; 30: 48-53.
130. Refugio, O. N., Kimble, M. M., Silva, C. L. et al. PrEPTECH: a telehealth-based initiation program for human immunodeficiency virus pre-exposure prophylaxis in young men of color who have sex with men. A pilot study of feasibility. *J Acquir Immune Defic Syndr.* 2018.
131. Ridgway, J. P., Almirol, E. A., Bender, A. et al. Which Patients in the Emergency Department Should Receive Preexposure Prophylaxis? Implementation of a Predictive Analytics Approach. *AIDS Patient Care STDs.* 2018; 32(5): 202-207.
132. Mutua, G., Sanders, E., Mugo, P. et al. Safety and adherence to intermittent pre-exposure prophylaxis (PrEP) for HIV-1 in African men who have sex with men and female sex workers. *PLoS One.* 2012; 7(4): e33103-e33103.
133. Sullivan, P. S., Driggers, R., Stekler, J. D. et al. Usability and Acceptability of a Mobile Comprehensive HIV Prevention App for Men Who Have Sex With Men: A Pilot Study. *JMIR Mhealth Uhealth.* 2017; 5(3): e26-e26.

134. Young, I., Flowers, P., and McDaid, L. M. Barriers to uptake and use of pre-exposure prophylaxis (PrEP) among communities most affected by HIV in the UK: findings from a qualitative study in Scotland. *BMJ Open*. 2014; 4(11): e005717.
135. Nodin, N., Carballo-Diequez, A., Ventuneac, A. M., Balan, I. C., and Remien, R. Knowledge and acceptability of alternative HIV prevention bio-medical products among MSM who bareback. *AIDS Care*. 2008; 20(1): 106-15.
136. Kojima, N., Davey, D. J., and Klausner, J. D. Pre-exposure prophylaxis for HIV infection and new sexually transmitted infections among men who have sex with men. *AIDS*. 2016; 30(14): 2251-2.
137. Holt, M., Murphy, D. A., Callander, D. et al. Willingness to use HIV pre-exposure prophylaxis and the likelihood of decreased condom use are both associated with unprotected anal intercourse and the perceived likelihood of becoming HIV positive among Australian gay and bisexual men. *Sex Transm Infect*. 2012; 88(4): 258-63.
138. Holt, M., Lea, T., Murphy, D. et al. Willingness to use HIV pre-exposure prophylaxis has declined among Australian gay and bisexual men: results from repeated national surveys, 2011-2013. *J Acquir Immune Defic Syndr*. 2014; 67(2): 222-6.
139. Hoff, C. C., Chakravarty, D., Bircher, A. E. et al. Attitudes towards PrEP and anticipated condom use among concordant HIV-negative and HIV-discordant male couples. *AIDS Patient Care STDs*. 2015; 29(7): 408-17.
140. Eaton, L. A. and Kalichman, S. Risk compensation in HIV prevention: implications for vaccines, microbicides, and other biomedical HIV prevention technologies. *Curr HIV/AIDS Rep*. 2007; 4(4): 165-72.
141. Cassell, M. M., Halperin, D. T., Shelton, J. D., and Stanton, D. Risk compensation: the Achilles' heel of innovations in HIV prevention? . *BMJ*. 2006; 332(7541): 605-7.
142. Bil, J. P., Davidovich, U., van der Veldt, W. M. et al. What do Dutch MSM think of preexposure prophylaxis to prevent HIV-infection? A cross-sectional study. *AIDS Behav*. 2015; 29(8): 955-64.
143. Eakle, R., Venter, F., and Rees, H. Pre-exposure prophylaxis (PrEP) in an era of stalled HIV prevention: Can it change the game? *Retrovirology*. 2018; 15(29).
144. Kippax, S. and Stephenson, N. Beyond the distinction between biomedical and social dimensions of HIV prevention through the lens of a social public health. *Am J Public Health*. 2012; 102: 789-99.
145. Marks, S. J., Merchant, R. C., Clark, M. A. et al. Potential Healthcare Insurance and Provider Barriers to Pre-Exposure Prophylaxis Utilization Among Young Men Who Have Sex with Men. *AIDS Patient Care STDs*. 2017; 31(11): 470-478.

Table I 'Search Terms and Strategy'

Search	Search terms	Results
1	PrEP OR "pre-exposure prophylaxis" OR tenofovir OR truvada OR emtricitabine OR "TDF" OR "FTC"	13833
2	homosexual* OR "men who have sex with men" OR MSM OR gay OR bisexual	51188
3	1+2	1003
Databases were searched using the appropriate subject headings and/or keywords or text words for the above search groups. Example search (Medline) conducted on 03/08/2018		

Figure 1 Flowchart



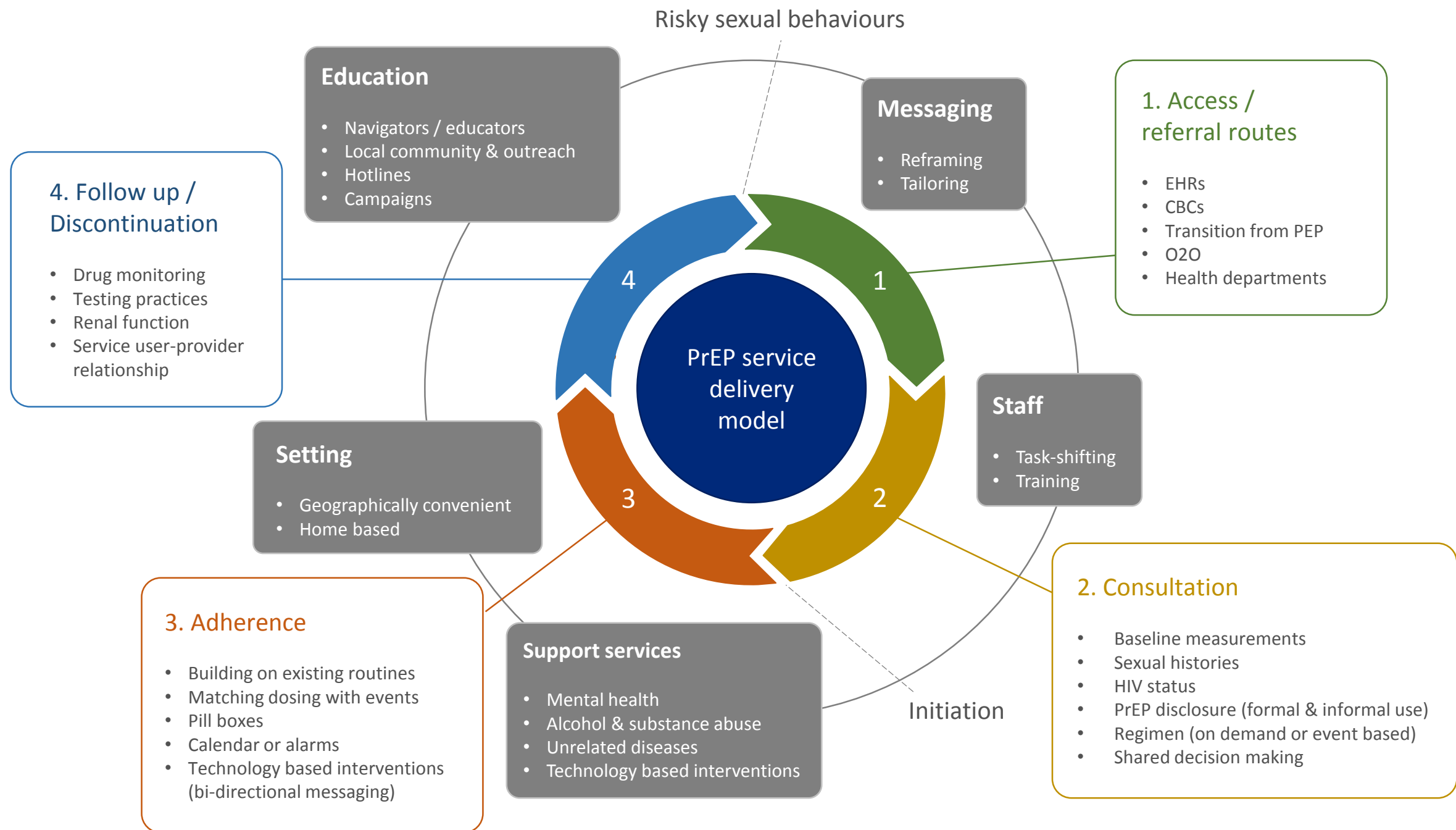


Table I 'Search Terms and Strategy'

Search	Search terms	Results
1	PrEP OR "pre-exposure prophylaxis" OR tenofovir OR truvada OR emtricitabine OR "TDF" OR "FTC"	13833
2	homosexual* OR "men who have sex with men" OR MSM OR gay OR bisexual	51188
3	1+2	1003
Databases were searched using the appropriate subject headings and/or keywords or text words for the above search groups. Example search (Medline) conducted on 03/08/2018		

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Authors	Article details	Key issues	Themes	Aims and findings
Adams, L. M. and B. H. Balderson	HIV providers' likelihood to prescribe pre-exposure prophylaxis (PrEP) for HIV prevention differs by patient type: a short report; AIDS Care; 2016; 28 (9); pp. 1154-1158	<ul style="list-style-type: none">• Prescribing habits and eligibility• Support services	<ul style="list-style-type: none">• PrEP service aspects, settings and staff• PrEP prescriber experiences, therapeutic alliance and care planning	The article examined perceptions of frontline HIV care providers about PrEP and their likelihood of prescribing it to different patient groups. Findings suggest that providers' willingness to prescribe PrEP varies by patient group. There is a need for further research to determine barriers to receiving complete PrEP endorsement, along with exploration into factors that may prevent providers from prescribing PrEP to heterosexuals and IDUs.
Adams, L. M., B. H. Balderson, K. Brown, S. E. Bush and B. J. Packett	Who Starts the Conversation and Who Receives Preexposure Prophylaxis (PrEP)? A Brief Online Survey of Medical Providers’ PrEP Practices; Health Education & Behavior; 2018; 54 (5); 723-729	<ul style="list-style-type: none">• Prescribing habits and eligibility• Relationship with patient• Staffing and service allocation	<ul style="list-style-type: none">• PrEP service aspects, settings and staff	The article discusses how PrEP uptake continues to accelerate and will likely provide evolving opportunities for wide-scale HIV prevention. Future work should continue to explore attitudes about and barriers to PrEP among providers and patients alike. While outreach efforts to raise general awareness about PrEP should be ongoing, PrEP is still unknown to many people. It is therefore necessary for providers to start the conversation to ensure that people who may benefit from PrEP know about it and can partake in it. Extending equitable knowledge and access to PrEP across groups at risk for HIV throughout the US should remain a continued goal for HIV prevention.
Aloysius, I., A. Savage, J. Zdravkov, R. Korologou-Linden, A. Hill, R. Smith, V. Houghton-Price, M. Boffito and N. Nwokolo	InterPrEP. Internet-based pre-exposure prophylaxis with generic tenofovir DF/emtricitabine in London: an analysis of outcomes in 641 patients; Journal of Virus Eradication; 2017; 3 (4); pp. 218-222	<ul style="list-style-type: none">• Staffing and service allocation	<ul style="list-style-type: none">• PrEP service aspects, settings and staff	The article evaluated the service of informal PrEP use at 56 Dean Street, London. In 336 person-years of follow-up, there were no new cases of HIV and no serious adverse events. The recreational drug use reported by those taking generic PrEP decreased during PrEP use. However, there was a 10% increase in individuals diagnosed with an STI during PrEP follow-up, compared to those diagnosed in the 3 months before starting PrEP. The price of branded PrEP from Gilead is prohibitively high for most at-risk individuals. Online generic PrEP provides an opportunity for patients to access HIV prevention more affordably. A safe network of online suppliers and appropriate monitoring will enable individuals at risk of HIV infection to access an effective means of prevention as an interim solution until PrEP is available on the NHS to all who need it. Similar methods of access to generics could be established in other countries where branded PrEP is not available.
Amico, K. R., V. McMahan, P. Goicochea, L. Vargas, J. L. Marcus, R. M. Grant and A. Liu	Supporting study product use and accuracy in self-report in the iPrEx study: next step counseling and neutral assessment; AIDS & Behavior; 2012; 16 (5); pp. 1243-1259	<ul style="list-style-type: none">• Health communication and education• Service structure or model• Social media, apps and technology	<ul style="list-style-type: none">• PrEP service aspects, settings and staff• PrEP adherence within formal service structures• Multi-disciplinary and innovative PrEP care pathways	The study synthesized all available data concerning current adherence support approaches and messaging at the study sites if the iPrEx Adherence Working Group (AWG). The authors evaluated the feasibility and acceptability of NSC and NA, which provides adherence support. NSC was well recieved, while only certain aspects of NA were accepted. In terms of factors facilitating the integration of PrEP into daily life, the most commonly recorded facilitator was incorporation into one’s existing daily routine, which could include linking tablet taking to a meal, waking in the morning, or some other regularly occurring event. The most frequently reported barrier was therefore disruption in routine. Some common strategies used at sites for promoting adherence was to work out specific dose times.
Amico, K. R., J. Miller, C. Balthazar, P. A. Serrano, J. Brothers, S. Zollweg and S. Hosek	Integrated Next Step Counseling (iNSC) for Sexual Health and PrEP Use Among Young Men Who Have Sex with Men: Implementation and Observations from ATN110/113; AIDS and Behavior; 2018	<ul style="list-style-type: none">• Service structure or model• Support services• Tailoring	<ul style="list-style-type: none">• PrEP service aspects, settings and staff• PrEP adherence within formal service structures• Multi-disciplinary and innovative PrEP care pathways	The study assessed the success of iNSC among YMSM. Completed case report forms by iNSC counselors at study visits were used for data collection. Sessions noted 'commitment to staying negative' as a motivator for taking PrEP. The most common challenge was the assumption that partners were also negative. The most common need was greater access to sexual health clinics and services. Facilitators for adherence included carrying doses, which was challenged by alcohol and drug use.

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Anand, T., C. Nitpolprasert, D. Trachunthong, S. J. Kerr, S. Janyam, D. Linjongrat, L. B. Hightow-Weidman, P. Phanuphak, J. Ananworanich and N. Phanuphak	A novel Online-to-Offline (O2O) model for pre-exposure prophylaxis and HIV testing scale up; Journal of the International AIDS Society; 2017; 20 (1); p. 21326	<ul style="list-style-type: none"> • Service structure or model • Social media, apps and technology • Staffing and service allocation • Support services • Tailoring 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • Multi-disciplinary and innovative PrEP care pathways 	The article evaluated the effect of a novel Adam’s Love Online-to-Offline (O2O) model on PrEP and HIV testing uptake among Thai MSM and TG and identifies factors associated with PrEP uptake. The authors found that greater attention should be placed on increasing PrEP awareness through public health campaigns targeting MSM with high-risk behaviours. Extending online promotions and outreach through existing social media networks of community-based sites staff and popular online platforms used for seeking sex are critical to reach, engage and scale up PrEP among high-risk groups in the future. Results demonstrate that PrEP uptake was unrelated with risk behaviours including drug use, condom-use behaviour, number of sexual partners and STI history, in contrast to previously published studies that have found PrEP acceptability to be correlated with higher-risk behaviours. More efforts are therefore needed to build self-risk assessment abilities and encourage PrEP uptake among these vulnerable MSM and TG groups, a significant consideration for the next generation of Adam’s Love O2O platform. Further, the O2O model was less successful at engaging MSM and TG with lower education to PrEP services, indicating future tailoring of the model for wider PrEP scale up. The study demonstrates that Adam’s Love O2O model is highly effective in linking online at-risk MSM and TG to PrEP and HIV testing services, using eCounseling and booking as ‘bridging steps’ likely by overcoming the barriers and challenges to PrEP uptake.
Arnold, E. A., P. Hazelton, T. Lane, K. A. Christopoulos, G. R. Galindo, W. T. Steward and S. F. Morin	A qualitative study of provider thoughts on implementing pre-exposure prophylaxis (PrEP) in clinical settings to prevent HIV infection; 2012; Plos One; 7 (7); e40603	<ul style="list-style-type: none"> • Health communication and education • Prescribing habits and eligibility • Staffing and service allocation • Support services • Tailoring 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • Multi-disciplinary and innovative PrEP care pathways 	The authors explored how medical and service providers understand research results and plan to develop clinical protocols to prescribe, support and monitor adherence for patients on PrEP. Topics discussed with healthcare providers included assessing clinician impressions of PrEP and CDC guidance, considerations of cost, office capacity, dosing schedules, and following patients over time. The study found that there was minimal demand for PrEP at the time the interviews were conducted. There were disputes as to the eligibility of patients for PrEP, stating that current models of care, which do not involve routine frequent office visits, were not well suited for prescribing PrEP. Providers detailed the need to build capacity and were concerned about monitoring side effects and adherence. They also noted that community education campaigns needed to be tailored to effectively reach specific vulnerable populations.
Arnold, T., L. Brinkley-Rubinstein, P. A. Chan, A. Perez-Brumer, E. S. Bologna, L. Beauchamps, K. Johnson, L. Mena and A. Nunn	Social, structural, behavioral and clinical factors influencing retention in Pre-Exposure Prophylaxis (PrEP) care in Mississippi; Plos One; 2017; 12 (2); p. e0172354;	<ul style="list-style-type: none"> • Health communication and education 	<ul style="list-style-type: none"> • Multi-disciplinary and innovative PrEP care pathways 	The article assessed structural, social, behavioral, and clinical factors that may have affected individuals’ uptake, adherence, and retention in PrEP care. The authors’ findings suggest that structural factors such as insurance, costs and co-payments as well as social factors such as relationship dynamics and stigma impacted PrEP uptake and retention in PrEP care. Behavioral factors including sexual risk behaviors and clinical factors such as actual and perceived side effects also affected participant’s decisions about starting and continuing to take PrEP. Additionally, participants reported many unintentional positive, health-related spill-over effects of taking PrEP and many of the MSM who had discontinued PrEP use re-initiated after participating in the study. Addressing structural factors such as cost or access to payment assistance programs, social factors such as stigma and relationship dynamics, and clinical and behavioral factors such as anticipated or experienced side effects of PrEP medication and sexual risk behaviors is imperative. Outreach enabled re-engagement of several patients in PrEP care who had previously been lost to follow-up. Future research to promote PrEP uptake and retention in care should address social, structural, behavioral and clinical factors.

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Beach, L. B., G. J. Greene, P. Lindeman, A. K. Johnson, C. N. Adames, M. Thomann, P. C. T. Washington and G. Phillips li	Barriers and Facilitators to Seeking HIV Services in Chicago Among Young Men Who Have Sex with Men: Perspectives of HIV Service Providers; AIDS Patient Care & STDS; 2018; 32 (11); pp. 468-476	<ul style="list-style-type: none"> • Health communication and education • Peer and social networks • Relationship with patient • Service structure or model • Staffing and service allocation • Tailoring 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The article assesses how providers perceive these facilitators and barriers to HIV services. Results of the study highlight potential opportunities for interventions to address barriers related to health system characteristics on the microsystem level (i.e., programming designed to increase individual understanding about lack of invincibility and building their capacity and knowledge for how to seek HIV services), the mesosystem level (i.e., providers working together to increase an individual’s trust of the medical system and ensuring confidentiality), and the macrosystem level (i.e., ensure comprehensive services are available to all individuals). The identification of community outreach and geography and transportation as barriers suggests that researchers and evaluators should consider incorporating community surveys and geospatial analysis into evaluations to better understand how the meso-, macro-, and exosystems influence engagement outcomes. Findings from these studies could then inform future efforts to address these barriers. Results indicate that providers report that complex, inter-related factors affect YMSM’s decision making for why YMSM choose to engage in HIV care.
Bhatia, R., L. Modali, M. Lowther, N. Glick, M. Bell, S. Rowan, K. Keglovitz and J. Schneider	Outcomes of Preexposure Prophylaxis Referrals From Public STI Clinics and Implications for the Preexposure Prophylaxis Continuum; Sexually Transmitted Diseases; 2018; 45 (1); pp. 50-55	<ul style="list-style-type: none"> • Prescribing habits and eligibility • Referral • Service structure or model • Support services • Tailoring 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • Multi-disciplinary and innovative PrEP care pathways 	The authors developed a PrEP active referral mechanism, for at risk patients to be signposted to PrEP community partner sites. The article therefore describes the outcomes of the implementation model, framed in the context of an adapted PrEP continuum. The data demonstrate that a PrEP active referral mechanism from public STI clinics to PrEP partner sites is feasible and reaches high-risk individuals. Further work addressing barriers to linkage, particularly among youth, is needed to optimize engagement along the PrEP continuum.
Bien, C., V. Patel, O. Blackstock and U. Felsen	Reaching Key Populations: PrEP Uptake in an Urban Health Care System in the Bronx, New York; AIDS & Behavior; 2017; 5; pp. 1309-1314	<ul style="list-style-type: none"> • Prescribing habits and eligibility • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff 	The study used a clinic database and chart review to identify individuals prescribed PrEP. Findings showed a large increase in PrEP prescribing over time, but overall PrEP prescribing was low. PrEP prescriptions occurred across a range of clinical settings, and that most PrEP prescribing occurred in primary care centers and a single sexual health center. There is a need to identify effective strategies to increase PrEP prescription in both primary care and subspecialty settings and to better engage populations at high risk for HIV infection ahead of a PrEP scale up.
Bourne, A., B. Alba, A. Garner, G. Spiteri, A. Pharris and T. Noori	Use of, and likelihood of using, HIV pre-exposure prophylaxis among men who have sex with men in Europe and Central Asia: findings from a 2017 large geosocial networking application survey; Sexually Transmitted Infections; 2019	<ul style="list-style-type: none"> • Health communication and education • Prescribing habits and eligibility • Relationship with patient • Support services 	<ul style="list-style-type: none"> • PrEP prescriber experiences, therapeutic alliance and care planning 	The study examined the current use of PrEP, likelihood of future use and indicators of potential PrEP candidacy among an opportunistic sample of men who have sex with men in Europe and central Asia. Further research is required that examines HIV/STI testing practices and other health monitoring of people accessing PrEP online. Findings indicate that the odds of engaging in chemsex, having received an STI diagnosis or previous use of PEP were all significantly higher among men using PrEP compared with those who were not. A large proportion of men are accessing PrEP outside of traditional healthcare settings, posing a challenge for routine monitoring.

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Buttram, M. E.	The informal use of antiretroviral medications for HIV prevention by men who have sex with men in South Florida: initiation, use practices, medications and motivations; Culture, Health & Sexuality; 2018; 20 (11); pp. 1185-1198	<ul style="list-style-type: none"> • Health communication and education • Relationship with patient • Social media, apps and technology 	<ul style="list-style-type: none"> • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The authors examined the phenomena of gay and other men who have sex with men using antiretroviral medications informally, without a prescription. Participants described using a range of medications not approved for PrEP and combining several medications as an HIV prevention ‘cocktail’. Intermittent or sporadic use of antiretroviral medication, inconsistent access to medication and the use of medications not approved for PrEP may potentially leave men with less protection against HIV infection, and contribute to HIV transmission, resistance or adverse effects including drug toxicity, drug interactions and hypersensitivity reactions. Efforts should be made to enhance access to this HIV prevention technology. As more individuals start using PrEP, informal antiretroviral medication use and related concerns – including adherence, diversion and antiretroviral medication resistance – must be considered. Enthusiasm for biomedical HIV interventions among gay and other MSM appears to be high. Building on this enthusiasm, efforts should be made by researchers, public health officials and community and social services agencies to increase PrEP awareness and acceptability and decrease informal use and diversion.
Calabrese, S. K., M. Magnus, K. H. Mayer, D. S. Krakower, A. I. Eldahan, L. A. Gaston Hawkins, N. B. Hansen, T. S. Kershaw, K. Underhill, J. R. Betancourt and J. F. Dovidio	Putting PrEP into practice: Lessons learned from early-adopting U.S. providers' firsthand experiences providing HIV pre-exposure prophylaxis and associated care; Plos One; 2016; 11 (6)	<ul style="list-style-type: none"> • Health communication and education • Level of knowledge • Prescribing habits and eligibility • Relationship with patient • Service structure or model • Staffing and service allocation • Support services • Tailoring 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The study explored PrEP providers' first hand experiences relative to commonly-cited barriers. Nearly all providers indicated that they were self-educated with respect to PrEP. Rather than participating in formal training, their knowledge about PrEP was obtained through a combination of reading relevant literature, attending professional talks and conferences, consulting with colleagues, and treating HIV-positive patients with the same antiretroviral medication. Providers described their experience of initiating and monitoring patients on PrEP favorably and were keen to continue prescribing PrEP. They described various models of implementation within and between health centers, including collaboration between infectious disease specialists and primary care providers.
Chan, P. A., T. R. Glynn, C. E. Oldenburg, M. C. Montgomery, A. E. Robinette, A. Almonte, J. Raifman, L. Mena, R. Patel, K. H. Mayer, L. S. Beauchamps and A. S. Nunn	Implementation of Preexposure Prophylaxis for Human Immunodeficiency Virus Prevention Among Men Who Have Sex With Men at a New England Sexually Transmitted Diseases Clinic; Sexually Transmitted Diseases; 2016; 43 (11); pp. 717-723	<ul style="list-style-type: none"> • Health communication and education • Peer and social networks • Support services 	<ul style="list-style-type: none"> • Multi-disciplinary and innovative PrEP care pathways 	The study assessed PrEP uptake among MSM presenting for services at a STD clinic. To promote PrEP among MSM, PrEP education and counseling were integrated into standard care at our STD clinic. We found that acceptability of PrEP education was high among MSM, as most patients were amenable to receiving PrEP education. Nonetheless, the overall rate of PrEP uptake was low, similar to other reports in STD clinic settings. PrEP uptake was lower among racial and ethnic minorities, likely reflecting a combination of individual- and structural-level factors including insurance status. The most common reason individuals were not interested in PrEP was low perceived HIV risk. Results of this study highlight barriers to uptake and opportunities for enhancing STD clinic-based PrEP programs. Interventions that improve understanding of HIV risk perception may enhance uptake. In addition, future studies should also evaluate PrEP retention in care and adherence outside of research settings. From a programmatic perspective, low PrEP uptake in our clinic highlights opportunities to improve PrEP education.
Clement, M. E., N. L. Okeke, T. Munn, M. Hunter, K. Alexis, A. Corneli, A. C. Seña, K. McGee and M. S. McKellar	Partnerships Between a University-Affiliated Clinic and Community-Based Organizations to Reach Black Men Who Have Sex With Men for PrEP Care; Journal of Acquired Immune Deficiency Syndromes; 2018; 77 (2); e25-e27	<ul style="list-style-type: none"> • Health communication and education • Level of knowledge • Prescribing habits and eligibility • Referral • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The authors sought to demonstrate the value of community partnerships to reach those at greatest risk for HIV infection. They found that the most common referral source for Black and Black MSM patients was through CBCs, demonstrating that community partnerships can be a valuable avenue for patient recruitment. While large-scale efforts are needed to improve PrEP awareness and linkage to care, CBCs can play a critical role in reaching populations at high risk with messages about PrEP. Further research and programmatic support should be granted to CBCs to help them reach the population most affected by HIV.

Table II 'Supplemental Table of Included Studies: Issues, Themes and Findings'

Clement, M. E., J. Seidelman, J. Wu, K. Alexis, K. McGee, N. L. Okeke, G. Samsa and M. S. McKellar	An educational initiative in response to identified PrEP prescribing needs among PCPs in the Southern U.S; AIDS Care; 2018; 30 (5); pp. 650-655	<ul style="list-style-type: none"> • Health communication and education • Prescribing habits and eligibility • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning 	The study examined existing knowledge about PrEP prescribing patterns among PCPs. It identified lack of knowledge about PrEP as the largest barrier to prescribing. Almost all PCPs were willing to prescribe PrEP, and most felt that additional training would encourage them to start prescribing. Using an educational campaign to train PCPs, the authors found that the rate of those prescribing PrEP doubled between the initial and repeated survey 11 months later. Among PCPs who underwent an on-site training, the rate of those prescribing was greater than 50%.
Daughtridge, G. W., S. C. Conyngham, N. Ramirez and H. C. Koenig	I Am Men's Health: Generating Adherence to HIV Pre-Exposure Prophylaxis (PrEP) in Young Men of Color Who Have Sex with Men; Journal of the International Association of Providers of AIDS Care; 2015; 14 (2); pp. 103-107	<ul style="list-style-type: none"> • Peer and social networks • Social media, apps and technology • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The study aimed to generate adherence to PrEP among high-risk YMSM in a community setting by conducting the Youth Health Empowerment Project. The Project was a PrEP program targeting young Black MSM at high risk of HIV. Following participation in the program, adherence to PrEP was excellent, with a weighted average of 73%. This adherence was sustained over time with 88% still maintaining their regimen after 28 weeks.
Desrosiers, A., M. Levy, A. Dright, M. Zumer, N. Jallah, I. Kuo, M. Magnus and M. Siegel	A Randomized Controlled Pilot Study of a Culturally-Tailored Counseling Intervention to Increase Uptake of HIV Pre-exposure Prophylaxis Among Young Black Men Who Have Sex with Men in Washington, DC; AIDS and Behavior; 2018; 23; pp. 105-115	<ul style="list-style-type: none"> • Referral • Social media, apps and technology • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • Multi-disciplinary and innovative PrEP care pathways 	To explore whether a culturally-tailored counseling center for young Black MSM positively impacted access and uptake of PrEP. The study found that when PrEP counseling is performed in a culturally competent setting by a culturally sensitive counselor, this can further improve PrEP uptake in young BMSM.
Doblecki-Lewis, S. and D. Jones	Community Federally Qualified Health Centers as Homes for HIV Preexposure Prophylaxis: Perspectives from South Florida; Journal of the International Association of Providers of AIDS Care; 2016; 15 (6); pp. 522-528	<ul style="list-style-type: none"> • Health communication and education • Prescribing habits and eligibility • Relationship with patient • Social media, apps and technology • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The article explored the feasibility, acceptability, and uptake of PrEP among healthcare staff. During the focus group participants generally felt PrEP implementation was feasible at their sites, although demand for PrEP was reported to be low and several barriers to implementation were identified including stigma, concern about risk compensation, and difficulty of obtaining accurate risk assessment to identify PrEP candidates.

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Doblecki-Lewis, S., A. Liu, D. Feaster, S. E. Cohen, G. Cardenas, O. Bacon, E. Andrew and M. A. Kolber	Healthcare Access and PrEP Continuation in San Francisco and Miami After the US PrEP Demo Project; Journal of Acquired Immune Deficiency Syndromes; 2017; 74 (5); pp. 531-538	<ul style="list-style-type: none"> • Level of knowledge • Prescribing habits and eligibility • Relationship with patient • Service structure or model • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff 	The study reports the findings of a follow up survey from a PrEP demonstration project, administered 4-6 months after study completion. PrEP interest remained high among a large majority of respondents and did not significantly differ by geographic location, age, race, ethnicity, income, or insurance status. PrEP access following study completion, however, was variable. Many participants, particularly white participants and those from the San Francisco site, were able to successfully transition into PrEP care outside of the study, although one-third did encounter a gap between study completion and initiation of PrEP from another source. For the majority, PrEP was obtained through PCPs, and those who successfully obtained PrEP generally felt that the process was “easy” or “very easy,” suggesting that once a PCP was accessed and a plan for PrEP was initiated, significant barriers were not commonly encountered. The most significant bottleneck to continued PrEP engagement occurred with access to a medical provider were geographic and socioeconomic disparities in access to PrEP. Addressing these barriers will be required to achieve levels of PrEP engagement sufficient for a meaningful public health impact and to ensure distribution of PrEP access that includes communities most at risk of HIV.
Dubov, A., L. Fraenkel, R. Yorick, A. Ogunbajo and F. L. Altice	Strategies to Implement Pre-exposure Prophylaxis with Men Who Have Sex with Men in Ukraine; AIDS & Behavior; 2018; 4; pp. 110-1112	<ul style="list-style-type: none"> • Service structure or model • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP adherence within formal service structures 	The study looked to understand Ukrainian MSM preferences in order to inform program development and facilitation of the successful delivery of PrEP. The findings indicate that PrEP uptake is most likely to be successful when PrEP is affordable, its implementation is targeted and provided as “on demand” with associated education, and when more thorough medical care and related testing is provided to at-risk (and traditionally marginalized) populations.
Eaton, L. A., D. D. Matthews, L. A. Bukowski, M. R. Friedman, C. J. Chandler, D. L. Whitfield, J. M. Sang and R. D. Stall	Elevated HIV Prevalence and Correlates of PrEP Use Among a Community Sample of Black Men who Have Sex with Men; Journal of Acquired Immune Deficiency Syndromes; 2018; 79; pp. 339-346	<ul style="list-style-type: none"> • Prescribing habits and eligibility • Service structure or model • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP adherence within formal service structures 	The article assessed and evaluated variables associated with PrEP use in a large, community-based sample of Black MSM. Findings show that around 1 of 3 Black MSM are unaware of the availability of PrEP, and only 10-20% are accessing PrEP. It is evident that to optimize PrEP, comprehensive strategies to following patients prescribed PrEP are needed. Trials of PrEP efficacy and delivery typically include well-resourced approaches to patient engagement including high levels of patient monitoring. Implementing a comprehensive plan for providing PrEP (eg, quarterly check-ins, adherence support, and sexual risk reduction counseling) poses greater challenges.
Elst, E., J. Mbogua, D. Operario, G. Mutua, C. Kuo, P. Mugo, J. Kanungi, S. Singh, J. Haberer, F. Priddy and E. Sanders	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 & Behavior; 2013; 6; pp. 2162-2172	<ul style="list-style-type: none"> • Health communication and education • Service structure or model • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The study explored experiences of MSM and FSW who use PrEP. Whilst the findings show that acceptability of PrEP is high, they highlight a number of factors that might impede adherence and potential scale-up. These include the social impacts such as stigma and the complexities of adherence. PrEP interventions must consider the synergies between the drug, the individual user’s behavior, the societal context, adherence, and social harms as a result of taking PrEP outside the research setting. Behavioral and social interventions that address the contextual realities of PrEP users will be fundamental in building effective and sustainable programs and policies for wide PrEP implementation.

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Fuchs, J. D., K. Stojanovski, E. Vittinghoff, V. M. McMahan, S. G. Hosek, K. R. Amico, A. Kouyate, H. J. Gilmore, S. P. Buchbinder, R. T. Lester, R. M. Grant and A. Y. Liu	A Mobile Health Strategy to Support Adherence to Antiretroviral Preexposure Prophylaxis; AIDS Patient Care & STDs; 2018; 32 (3); pp. 104-111	<ul style="list-style-type: none"> • Social media, apps and technology 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The study evaluated a mobile health intervention (iText) that utilized weekly bidirectional text or e-mail support messages to encourage pre-exposure prophylaxis (PrEP) adherence among participants in the multi-site iPrEx open-label extension study. The authors found iText to be feasible and acceptable, particularly among younger participants and participants of color. A majority preferred receiving messages by SMS over e-mail and while some participants chose receiving generic messages that inquired whether they were okay or not, most selected PrEP-specific language in those messages.
Galea, J. T., J. J. Kinsler, X. Salazar, S. J. Lee, M. Giron, J. N. Sayles, C. Cáceres, W. E. Cunningham, J. T. Galea, J. J. Kinsler, X. Salazar, S. J. Lee, M. Giron, J. N. Sayles, C. Cáceres and W. E. Cunningham	Acceptability of pre-exposure prophylaxis as an HIV prevention strategy: barriers and facilitators to pre-exposure prophylaxis uptake among at-risk Peruvian populations; International Journal of STD & AIDS; 2011; 22 (5); pp. 256-262	<ul style="list-style-type: none"> • Relationship with patient • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP prescriber experiences, therapeutic alliance and care planning 	The authors found a wide range of attitudes and opinions regarding PrEP acceptability. Important potential barriers to PrEP included high out-of-pocket cost, partial efficacy and fear of side-effects. Stigma and discrimination associated with PrEP use, mistrust of health-care professionals and a belief that PrEP would result in a decrease in condom use were concerns for MSM and TG.
Galindo, G. R., J. J. Walker, P. Hazelton, T. Lane, W. T. Steward, S. F. Morin and E. A. Arnold	Community member perspectives from transgender women and men who have sex with men on pre-exposure prophylaxis as an HIV prevention strategy: implications for implementation; Implementation Science; 2012; 7 (1); p. 116	<ul style="list-style-type: none"> • Health communication and education • Service structure or model • Tailoring 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • Multi-disciplinary and innovative PrEP care pathways 	The study explored social and cultural influences that may play a role in their decision to use or not to use PrEP as an HIV prevention strategy. Findings identify that the communities most impacted by the HIV epidemic are knowledgeable about PrEP; that questions and concerns regarding medical mistrust and side effects are addressed; that PrEP is accessible financially; and that PrEP is a complete intervention package inclusive of education, condom promotion and linkage to care. Even with clinically proven individual-level efficacy, if not packaged, implemented, and sustained properly, PrEP could increase HIV health disparities at the population level that it initially had the potential to eliminate.
Gilmore, H. J., A. Liu, K. A. Koester, K. R. Amico, V. McMahan, P. Goicochea, L. Vargas, D. Lubensky, S. Buchbinder and R. Grant	Participant Experiences and Facilitators and Barriers to Pill Use Among Men Who Have Sex with Men in the iPrEx Pre-Exposure Prophylaxis Trial in San Francisco; AIDS Patient Care & STDs; 2013; 27 (10); pp. 560-566	<ul style="list-style-type: none"> • Health communication and education • Relationship with patient • Social media, apps and technology • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The study sought to understand individual and contextual factors influencing study product use in this community. Facilitators to pill taking included having clear motivation to take the pill to help answer an important scientific question; accurate information about the study pill; skills for pill-taking, either antecedent to or developed while in the study, including establishing a routine; and strong positive relationships with the study team and engaging in the counseling they offered. Barriers included changes in routine; side effects or intercurrent illnesses; stress; and rarely, stigma. Adherence has been described as the “Achilles heel” of PrEP; optimizing adherence will be critical to maximizing the public health impact of PrEP implementation.

Table II 'Supplemental Table of Included Studies: Issues, Themes and Findings'

Golub, S. A., K. E. Gamarel, H. J. Rendina, A. Surace and C. L. Lelutiu-Weinberger	From Efficacy to Effectiveness: Facilitators and Barriers to PrEP Acceptability and Motivations for Adherence Among MSM and Transgender Women in New York City; AIDS Patient Care & STDs; 2013; 27 (4); pp. 248-254	<ul style="list-style-type: none"> • Health communication and education • Service structure or model • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • Multi-disciplinary and innovative PrEP care pathways 	The study examined potential facilitators and barriers to pre-exposure prophylaxis (PrEP) use and their association with PrEP acceptability and motivations for adherence. Overall, 55.4% of participants reported willingness to take PrEP. The most highly endorsed barriers to PrEP use were health concerns, including both long-term impacts and short-term side effects, questions about PrEP's impact on future drug resistance, and concerns that PrEP does not provide complete protection against HIV. The most highly endorsed facilitator was free access to PrEP, followed by access to support services such as regular HIV testing, sexual health care/monitoring, and access to one-on-one counseling. Participants of color rated both barriers and facilitators as more important than their White counterparts. The findings from this study underscore the importance of implementing clinical guidelines for the provision of PrEP, which would include monitoring side effects and adherence, as well as the provisions of ongoing HIV testing and sexual health counseling.
Grimm, J. and J. Schwartz	It's Like Birth Control for HIV: Communication and Stigma for Gay Men on PrEP; Journal of Homosexuality; 2018; pp. 2-20	<ul style="list-style-type: none"> • Health communication and education • Level of knowledge • Peer and social networks • Relationship with patient • Social media, apps and technology 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The article investigates the experiences of gay men who have adopted PrEP. The findings demonstrate that stigma plays a substantial role in participants' experiences with PrEP. Men are learning of PrEP through news media outlets—instead relying heavily on interpersonal networks. Furthermore, they identified that healthcare providers need training to allow them to understand and effectively communicate with their MSM patients. Findings also suggest that some healthcare providers have limited knowledge of PrEP. A campaign aimed at mitigating that stigma could be especially beneficial. The authors recommend that health care providers should be trained in minimizing the expression of stigmatizing attitudes and should increase their knowledge of PrEP.
Grov, C. and N. Kumar	HIV Pre-Exposure Prophylaxis (PrEP) Is Coming to Europe, but Are Gay Men Ready to Accept It? Qualitative Findings from Berlin, Germany; Sexuality Research and Social Policy; 2018; 15 (3); pp. 283-289	<ul style="list-style-type: none"> • Relationship with patient • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP prescriber experiences, therapeutic alliance and care planning 	The article discussed how the rollout of PrEP is a complex process involving a range of factors including educating those who would benefit from about it, educating providers about how to talk about PrEP with their patients, sustaining affordable methods for patients to obtain PrEP, achieving optimal adherence for those on PrEP, and maintaining retention in the health care system such that PrEP recipients (people who may be otherwise healthy) return for quarterly medical visits to remain on PrEP. The authors found that there was high interest in PrEP among men in the study and that some are finding ways to obtain it without governmental approval.
Hoffman, S., J. A. Guidry, K. L. Collier, J. E. Mantell, D. Boccher-Lattimore, F. Kaighobadi and T. G. M. Sandfort	A Clinical Home for Preexposure Prophylaxis: Diverse Health Care Providers' Perspectives on the "Purview Paradox"; Journal of the International Association of Providers of AIDS Care; 2016; 15 (1); pp. 59-65	<ul style="list-style-type: none"> • Level of knowledge • Purview Paradox • Relationship with patient • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The study explored issues related to PrEP roll-out, including who should provide it and in what settings among clinicians. The providers identified specific skills they thought necessary for those who would prescribe PrEP. To obtain these skills, training and education will be required as well as sexual history-taking, which is arguably important for individual and public health, beyond HIV risk. Ultimately, a public health approach to HIV prevention and sexual health would view PrEP as one of many tools that should be available to people who are at high risk for HIV infection, wherever they are seeking medical care.

Table II 'Supplemental Table of Included Studies: Issues, Themes and Findings'

Hojilla, J. C.	Optimizing the delivery of HIV pre-exposure prophylaxis (PrEP): An evaluation of risk compensation, disengagement, and the PrEP cascade: HIV serodisclosure among MSM and transgender women on HIV PrEP; AAI10282719; 2018; pp. 11-32	<ul style="list-style-type: none"> • Social media, apps and technology 	<ul style="list-style-type: none"> • Multi-disciplinary and innovative PrEP care pathways 	The study identified baseline factors associated with participant non-disclosure and lack of knowledge of partner status; risk factors of PrEP disengagement among MSM; and prognostic indicators for discontinuation in care among MSM enrolled in a clinic-based cohort. The findings suggest a higher prevalence of non-disclosure and lack of knowledge of partner status among PrEP users. Substantive differences in the prevalence of non-disclosure and lack of knowledge of partner status across study regions was also observed. Prevalence for both were particularly high in Thailand, the Andes, and Brazil. Differences may reflect a complex array and interaction between structural barriers, such as the availability of testing services, and sociocultural factors, like attitudes towards disclosing or asking about sensitive topics particularly in the context of a sexual encounter, homophobia, and HIV stigma. Additionally, the availability of internet and phone application-based social networks for finding sexual partners may also have contributed to the variability across regions. Lastly, the significant associations between relationship characteristics and discussions about HIV status underscore the importance of how dyadic factors influence HIV prevention efforts. Risk reduction counseling provided in conjunction with PrEP should help patients develop feasible strategies to reduce their risk.
Hojilla, J. C.	Optimizing the delivery of HIV pre-exposure prophylaxis (PrEP): An evaluation of risk compensation, disengagement, and the PrEP cascade: Stimulant use is associated with PrEP disengagement in men who have sex with men and transgender women; AAI10282719; 2018; pp. 33-51	<ul style="list-style-type: none"> • Prescribing habits and eligibility • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff 	The study identified baseline factors associated with participant non-disclosure and lack of knowledge of partner status; risk factors of PrEP disengagement among MSM; and prognostic indicators for discontinuation in care among MSM enrolled in a clinic-based cohort. The authors found strong evidence to suggest that stimulant use is associated with PrEP disengagement. An association between binge drinking and PrEP disengagement was also observed. The findings underscore the need for a comprehensive approach to prevention that combines PrEP with behavioral interventions to mitigate disengagement and optimize its public health benefit.
Hojilla, J. C., D. Vlahov, P. Crouch, C. Dawson-Rose, K. Freeborn and A. Carrico	HIV Pre-exposure Prophylaxis (PrEP) Uptake and Retention Among Men Who Have Sex with Men in a Community-Based Sexual Health Clinic; AIDS & Behavior; 2018; 4; pp. 1096-1099	<ul style="list-style-type: none"> • Staffing and service allocation 	<ul style="list-style-type: none"> • Multi-disciplinary and innovative PrEP care pathways 	The article characterized key steps of the pre-exposure prophylaxis (PrEP) cascade and to identify correlates of retention in care. The authors observed a high uptake among individuals who sought PrEP services at the clinic, consistent with what others have reported previously. However, structural barriers to access, like cost, remain challenging for many patients. Despite the availability of PrEP navigators at the clinic who helped patients access insurance and drug assistance programs, a sizeable proportion (22%) did not initiate PrEP.
Hubach, R. D., J. M. Currin, C. A. Sanders, A. R. Durham, K. E. Kavanaugh, D. L. Wheeler and J. M. Croff	Barriers to Access and Adoption of Pre-Exposure Prophylaxis for the Prevention of HIV Among Men Who Have Sex With Men (MSM) in a Relatively Rural State; AIDS Education & Prevention; 2017; 29 (4); pp. 315-329	<ul style="list-style-type: none"> • Health communication and education • Peer and social networks • Relationship with patient • Service structure or model • Social media, apps and technology • Staffing and service allocation • Tailoring 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The article discusses how despite the shown efficacy of PrEP in preventing HIV in at-risk populations, MSM residing in relatively rural states perceive substantial barriers to accessing PrEP. The social environment, specifically in regards to stigma from within the LGBT community and from medical providers, was frequently discussed as a prominent factor influencing PrEP access and adoption. MSM in Oklahoma perceive substantial barriers to adopting PrEP, which may be similar to other states with similar urban/rural proportions. Accessing quality, LGBT-sensitive care can help mitigate potential barriers; however, it still requires providers implementing PrEP within their practice.

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Jaiswal, J., M. Griffin, S. N. Singer, R. E. Greene, I. L. Z. Acosta, S. K. Kaudeyr, F. Kapadia and P. N. Halkitis	Structural Barriers to Pre-exposure Prophylaxis Use Among Young Sexual Minority Men: The P18 Cohort Study; Current HIV Research; 2018; 16 (3); pp. 237-249	<ul style="list-style-type: none"> • Health communication and education • Relationship with patient • Service structure or model • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The article identifies and discusses the individual-level factors of the slow uptake of PrEP. This extends to structural drivers and wider HIV prevention strategies. While almost all participants indicated awareness of PrEP, only 14% had ever used PrEP. PrEP use was associated with lower concerns about health care access, particularly paying for PrEP. Those with greater concerns talking with their provider about their sexual behaviors were less likely to use PrEP. Prior to the introduction of PrEP, the message from health care providers regarding sexual risk among MSM predominantly revolved around overcoming barriers to condom use, and were often fear-based. It is critical for providers who prescribe PrEP to initiate conversations about sexual risk in an open, non-judgmental way with all patients who may benefit from PrEP. This will demand that many providers reframe previous “safer sex” messages that spoke exclusively to the use of condoms to include biomedical prevention strategies (e.g.. PEP and PrEP).
John, S. A., H. J. Rendina, C. Grov and J. T. Parsons	Home-based pre-exposure prophylaxis (PrEP) services for gay and bisexual men: An opportunity to address barriers to PrEP uptake and persistence; Plos One; 2017; 12 (12); pp. 1-14	<ul style="list-style-type: none"> • Health communication and education • Level of knowledge • Prescribing habits and eligibility • Purview Paradox • Relationship with patient • Service structure or model • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The study sought to identify whether GBM in a nationwide cohort who have not yet initiated PrEP (n= 906) would prefer to get PrEP-related care from a primary care provider (PCP) compared to a specialist clinic or provider. The authors found that more than half of participants would prefer to receive PrEP-related care from a PCP; however, nearly three-quarters of men preferred to receive PrEP persistence care via HB-PrEP services. As men who are interested in receiving HB-PrEP would still need to go to a healthcare provider for their first visit for PrEP prescription, these data are relevant for both PrEP uptake and persistence among GBM. In response to the providers’ perspectives, including the “purview paradox” indicating confusion for the best place for patients to receive PrEP-related care, GBM in this sample indicated interest in care from both PCPs and specialists. Meaningful barriers of concern about frequent medical check-ups were associated with preferring a PCP for PrEP-related care, but men who perceived a barrier to bringing up the topic of PrEP with a doctor preferred a specialist clinic or provider more than a PCP. HB-PrEP was more appealing for younger men and those engaged in sexual HIV transmission risk, suggesting HB-PrEP could help reach GBM most vulnerable to HIV and most in need of PrEP. The expansion of HB-PrEP has potential to increase PrEP uptake and persistence among GBM, particularly for men with barriers to clinic-based care and higher intentions to initiate PrEP.
Karris, M. Y., S. E. Beekmann, S. R. Mehta, C. M. Anderson and P. M. Polgreen	Are we prepped for preexposure prophylaxis (PrEP)? Provider opinions on the real-world use of PrEP in the United States and Canada; Clinical Infectious Diseases: An Official Publication of the Infectious Diseases of America; 2014; 58 (5); pp. 704-712	<ul style="list-style-type: none"> • Prescribing habits and eligibility 	<ul style="list-style-type: none"> • PrEP prescriber experiences, therapeutic alliance and care planning 	The study evaluated the current practices and attitudes of PrEP among infectious disease experts who are members of the Emerging Infections Network (EIN). The authors found that strong support exists for PrEP, but very few clinicians (9%) had actually provided it. Additionally, a wide range of PrEP practices existed among those who have or would give PrEP, including differences in deciding who is eligible for PrEP, how persons on PrEP are followed up, and how PrEP is discontinued. Barriers to the provision of PrEP were many, with concerns about PrEP efficacy in the real world being the greatest concern.

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Klassen, B. J., S. Y. Lin, N. J. Lachowsky, R. S. Hogg, D. M. Moore, E. A. Roth, J. B. Edward and S. A. Chown	Gay Men’s Understanding and Education of New HIV Prevention Technologies in Vancouver, Canada; Qualitative Health Research; 2017; 27 (12); pp. 1775-1791	<ul style="list-style-type: none"> • Health communication and education • Level of knowledge • Peer and social networks • Prescribing habits and eligibility • Relationship with patient • Service structure or model • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The study explored the acceptability of New Prevention Technologies (NPT). Participants placed much emphasis on informal education from partners and peers, and the necessity of peer support to effective and acceptable NPT education. Participants mentioned peer support, often in the form of community outreach groups. Thus, peer education, prevention conversations, and support need to be encouraged and fostered within the community, as this will likely expand awareness and use of NPTs. Participants learnt about NPTs through a wide variety of sources including the Internet, healthcare providers, community organizations, sexual partners, and peers. NPT education should incorporate strong, factual information with personal testimony of NPT use, and would balance quality with ease of access. Stigma remains a major barrier to NPT use and education acceptability at various levels, and may be addressed through the promotion of community support and dialogue, along with early adopter testimony, and the challenging of stigma at its structural roots of marginalization.
Krakower, D. S., N. C. Ware, K. M. Maloney, I. B. Wilson, J. B. Wong and K. H. Mayer	Differing Experiences with Pre-Exposure Prophylaxis in Boston Among Lesbian, Gay, Bisexual, and Transgender Specialists and Generalists in Primary Care: Implications for Scale-Up; AIDS Patient Care & STDs; 2017; 31 (7); pp. 297-304	<ul style="list-style-type: none"> • Health communication and education • Level of knowledge • Prescribing habits and eligibility • Purview Paradox • Service structure or model 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The study explored how PCPs approach decisions about prescribing PrEP to MSM and their experiences with PrEP provision. A major finding was that LGBT specialists and generalist PCPs in the same city were at vastly different stages of adopting PrEP into clinical practice 2 years after FDA approval. This has important implications for the scale-up of PrEP nationally. Thus, a deeper understanding of ways to engage generalists in PrEP provision could facilitate wider and more equitable access to PrEP, particularly in areas with limited access to LGBT specialists, such as rural areas. The authors found that LGBT specialists had successfully incorporated PrEP provision for MSM into primary care, whereas generalists in the same locale had limited experience with PrEP. Generalists expressed interest, however, in becoming proficient in PrEP, given their self-perception as preventive medicine experts. Both types of providers articulated similar prescribing dilemmas that may be amenable to solutions based on shared decision-making, which could leverage PCPs’ pre-existing expertise with this decision-making paradigm.
Kurtz, S. P. and M. E. Buttram	Misunderstanding of Pre-Exposure Prophylaxis Use Among Men Who Have Sex with Men: Public Health and Policy Implications; 2016; LGBT Health; 3 (6); pp. 461-464	<ul style="list-style-type: none"> • Health communication and education 	<ul style="list-style-type: none"> • Multi-disciplinary and innovative PrEP care pathways 	The article solicited information about the HIV testing and prevention practices of MSM at high risk for HIV. Of those who had heard of it, few understood PrEP to be a physician-prescribed regimen; most believed it to be a pill taken before and/or after sex and acquired on the street or through HIV-positive friends. National and community-based information campaigns and health navigation resources are critical to ensure that diverse at-risk groups are reached with culturally relevant knowledge. Strategies are needed to overcome other structural barriers to efficacious PrEP uptake, including the standardization of insurance coverage, and a reduction in cost disparities across the high-risk groups for whom PrEP could dramatically reduce the number of new infections.
Kwakwa, H. A., S. Bessias, D. Sturgis, G. Walton, R. Wahome, O. Gaye and M. Jackson	Engaging United States Black Communities in HIV Pre-exposure Prophylaxis: Analysis of a PrEP Engagement Cascade; Journal of National Medical Association; 2018; 110 (5); pp. 480-485	<ul style="list-style-type: none"> • Health communication and education • Prescribing habits and eligibility • Referral • Service structure or model 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • Multi-disciplinary and innovative PrEP care pathways 	The article examined the process of accessing PrEP for a majority Black population in an urban community health center setting. In this study, the lower percentage of high-risk referred patients who completed the access process and initiated PrEP suggests a need for support and facilitation at each step of the PrEP engagement cascade, particularly for populations with steeper fall-off such as those who have never heard of PrEP, non-Hispanic Black MSM and women. It is critical that the necessary effort be invested in engaging this community despite a potentially greater degree of difficulty. If health services fail to improve PrEP utilisation among racial/ethnic minorities, existing disparities in HIV prevalence stand to grow.

Table II 'Supplemental Table of Included Studies: Issues, Themes and Findings'

Landovitz, R. J., M. Beymer, R. Kofron, K. R. Amico, C. Psaros, L. Bushman, P. L. Anderson, R. Flynn, D. P. Lee, R. K. Bolan, W. C. Jordan, C. Tseng, R. Dierst-Davies, J. Rooney and A. R. Wohl	Plasma Tenofovir Levels to Support Adherence to TDF/FTC Preexposure Prophylaxis for HIV Prevention in MSM in Los Angeles, California; Journal of Acquired Immune Deficiency Syndromes; 2017; 76 (5); pp. 501-511	<ul style="list-style-type: none"> • Service structure or model 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff 	The authors explored strategies that identify and intervene with those challenged by adherence to daily medication of PrEP. Results showed that 75.1% of participants were retained in the PrEP cohort and 65.5% maintained adherence up to week 48. Younger and African-American participants were less likely to have protective drug levels. The study showed that PrEP was acceptable and well tolerated in a diverse population of MSM and that Drug level monitoring has the potential to allow targeting of additional adherence support to those struggling with daily tablet adherence.
Lelutiu-Weinberger, C. and S. A. Golub	Enhancing PrEP Access for Black and Latino Men Who Have Sex With Men; Journal of Acquired Immune Deficiency Syndromes; 2016; 73 (5); pp. 547-555	<ul style="list-style-type: none"> • Health communication and education • Relationship with patient • Social media, apps and technology • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The study examined the differences in perceived barriers and facilitators to PrEP access for Black and Latino MSM compared to other MSM. Compared to other MSM, Black and Latino MSM (56% of the sample) were more likely to have public insurance and access health care via public clinics; were more likely to regard having to talk to their doctor about their sex life as a barrier to PrEP; less likely to endorse agency in medical decision-making; more likely to report PrEP stigma and concerns regarding PrEP efficacy; were more likely to consider access to free sexual health care and additional supportive services, e.g., counseling or text-based support. Increasing interest in PrEP may involve high-quality education about PrEP efficacy, and increased engagement by trusted community members and representatives.
Levy, M. E., C. C. Watson, S. N. Glick, I. Kuo, L. Wilton, R. A. Brewer, S. D. Fields, V. Criss and M. Magnus	Receipt of HIV prevention interventions is more common in community-based clinics than in primary care or acute care settings for Black men who have sex with men in the District of Columbia; AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV; 2016; 28 (5); pp. 660-664	<ul style="list-style-type: none"> • Relationship with patient • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP prescriber experiences, therapeutic alliance and care planning 	The study investigates the utilisation of HIV prevention and general care services among a non clinic-based sample of Black MSM. The majority of men (76%) had accessed primary care, acute care, or a community-based clinic in the last six months despite barriers to care. However, there were disparities by setting in the provision of services to Black MSM, with greater receipt of HIV prevention services at community-based clinics than in primary care or acute care settings. Conversely, general preventive services were obtained more frequently in primary care settings than at community-based clinics. Black MSM were less likely than other MSM to disclose sexual behaviors to providers, and those who do not disclose sexual behaviors are less likely to discuss HIV, disclose their HIV status, and obtain HIV testing. Only half of HIV-negative participants were offered an HIV test.
Liu, A. Y., E. Vittinghoff, P. von Felten, K. R. Amico, P. L. Anderson, R. Lester, E. Andrew, I. Estes, P. Serrano, J. Brothers, S. Buchbinder, S. Hosek and J. D. Fuchs	Randomized Controlled Trial of a Mobile Health Intervention to Promote Retention and Adherence to Pre-exposure Prophylaxis among Young People at Risk for Human Immunodeficiency Virus: The EPIC Study; Clinical Infectious Diseases: An Official Publication of the Infectious Diseases Society of America; 2018	<ul style="list-style-type: none"> • Social media, apps and technology 	<ul style="list-style-type: none"> • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The study evaluate the impact of a youth-tailored, bidirectional text-messaging intervention (PrEPmate) on study retention and PrEP adherence. Participants who received PrEPmate were more likely to be retained at study visits and achieve protective PrEP levels over 36 weeks. The beneficial impact of PrEPmate did not differ significantly by baseline characteristics including age, race/ethnicity, education, and insurance. Although rates of sexual risk behaviors and STIs were high at baseline, overall risk declined in the study, with similar declines observed in both arms. Bidirectional SMS-based PrEP support was found to be active in increasing PrEP retention and adherence among youth at risk for HIV. Future implementation science research is needed to evaluate the impact of PrEPmate when implemented in more diverse geographic and clinic settings, including internationally, and assess contextual factors which may influence the implementation, effectiveness, and scale-up of PrEPmate.

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Maloney, K. M., D. S. Krakower, D. Ziobro, J. G. Rosenberger, D. Novak and K. H. Mayer	Culturally Competent Sexual Healthcare as a Prerequisite for Obtaining Preexposure Prophylaxis: Findings from a Qualitative Study; LGBT Health; 2017; 4 (4); pp. 310-314	<ul style="list-style-type: none"> • Health communication and education • Level of knowledge • Relationship with patient 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The authors aimed to explore factors influencing discussions about PrEP between MSM and their healthcare providers. Participants identified PCPs as the preferred source for information about PrEP. However, an emergent theme was the need for a non-judgmental relationship with a PCP before disclosure of sexual orientation and discussions about sexual health, including HIV prevention and PrEP, could occur. Online focus groups with geographically diverse members of a partner- seeking website for MSM suggest that barriers to communicating about sexual health between MSM and providers may be limiting access to PrEP and could exacerbate inequities in PrEP uptake. Improved patient–provider communication about sexual orientation and sexual behaviors might increase PrEP use among MSM, particularly for MSM without access to LGBT-specialized providers.
Marcus, J. L., L. B. Hurley, C. B. Hare, D. P. Nguyen, T. Phengrasamy, M. J. Silverberg, J. E. Stoltey and J. E. Volk	Preexposure Prophylaxis for HIV Prevention in a Large Integrated Health Care System: Adherence, Renal Safety, and Discontinuation; JAIDS: Journal of Acquired Deficiency Syndrome; 2016; 73 (5); pp. 540-546	<ul style="list-style-type: none"> • Social media, apps and technology • Support services 	<ul style="list-style-type: none"> • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The study assessed pharmacy refill adherence and discontinuation, decreases in estimated glomerular filtration rate (eGFR), and sexually transmitted infection (STI)/HIV incidence. The authors observed no HIV infections during 850 person-years of ongoing PrEP use. Adherence was 92% overall; however, Black race/ethnicity, higher TDF/FTC co-payments, and smoking were associated with lower adherence. They found that PrEP is being accessed by a primarily male, White, and older population, indicating that outreach is needed to others at risk for HIV infection, including female, Black, and younger individuals. Adherence is high, but strategies are needed to increase affordability, facilitate PrEP access during gaps in insurance coverage, and support adherence.
Marcus, J. L., K. Levine, C. Grasso, D. S. Krakower, V. Powell, K. T. Bernstein, S. Boswell and K. H. Mayer	HIV Preexposure Prophylaxis as a Gateway to Primary Care; American Journal of Public Health; 2018; 108 (10); pp. 1418-1420	<ul style="list-style-type: none"> • Support services 	<ul style="list-style-type: none"> • Multi-disciplinary and innovative PrEP care pathways 	The authors determine whether PrEP use is associated with use of non–HIV-related health care. They found that PrEP use was independently associated with increased receipt of primary care, including influenza vaccination, tobacco and depression screening, and glucose testing, but not haemoglobin A1c testing. The benefits of PrEP may extend to behavioral health, mental health, and prevention and treatment of other infectious and chronic diseases. In addition to efforts to integrate PrEP prescribing into primary care, efforts may be warranted to ensure uptake of recommended primary care among PrEP users.
Marks, S. J., R. C. Merchant, M. A. Clark, T. Liu, J. G. Rosenberger, J. Bauermeister and K. H. Mayer	Potential Healthcare Insurance and Provider Barriers to Pre-Exposure Prophylaxis Utilization Among Young Men Who Have Sex with Men; AIDS Patient Care & STDs; 2017; 31 (11); pp. 470-478	<ul style="list-style-type: none"> • Prescribing habits and eligibility 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff 	The study examined potential healthcare insurance and provider barriers to PrEP utilisation among YMSM. As expected, PrEP use was associated with higher levels of condomless sex, access to health insurance, and access to a primary healthcare provider. The authors state that although PrEP offers an effective and safe means of intervention, utilization remains lower than is required to curb the HIV epidemic. Findings identified disparities in access to healthcare by age, race/ethnicity, education, and region. Specifically, older YMSM, blacks and Hispanics, those with fewer years of formal education, and residents of the southern and the western United States were more likely to lack healthcare access.
Mayer, K., S. Safren, S. Elsesser, C. Psaros, J. Tinsley, M. Marzinke, W. Clarke, C. Hendrix, S. Wade Taylor, J. Haberer and M. Mimiaga	Optimizing Pre-Exposure Antiretroviral Prophylaxis Adherence in Men Who Have Sex with Men: Results of a Pilot Randomized Controlled Trial of 'Life-Steps for PrEP'; AIDS & Behavior; 2017; 5; pp. 1350-1360	<ul style="list-style-type: none"> • Staffing and service allocation • Support services • Tailoring 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • Multi-disciplinary and innovative PrEP care pathways 	The study evaluated a cognitive behavioral intervention condition or a time and session-matched comparison counseling intervention. Findings showed that adherence was high for both the intervention and the controlled group. However, plasma tenofovir levels were significantly higher in the intervention group at 6 months, yet at completion of the study, this was not significant. Medication adherence was high across a cognitive-behavioral (Life-Steps) and time-matched counseling intervention for PrEP adherence, with some evidence suggesting superiority of Life-Steps in this pilot RCT.

Table II 'Supplemental Table of Included Studies: Issues, Themes and Findings'

Merchant, R. C., D. Corner, E. Garza, W. Guan, K. H. Mayer, L. Brown and P. A. Chan	Preferences for HIV pre-exposure prophylaxis (PrEP) information among men-who-have-sex-with-men (MSM) at community outreach settings; Journal of Gay & Lesbian Mental Health; 2016; 20 (1); pp. 21-33	<ul style="list-style-type: none"> • Health communication and education • Relationship with patient • Service structure or model • Social media, apps and technology 	<ul style="list-style-type: none"> • Multi-disciplinary and innovative PrEP care pathways 	The article explored the interest in learning more about PrEP and preferences in receiving information about PrEP among HIV-uninfected MSM. The authors found that observed that among MSM recruited through community outreach, HIV sexual risk-taking was significant, yet self-perceived PrEP knowledge was low and interest in learning more about PrEP was moderate. Most preferred learning about PrEP and being provided local PrEP clinic information through electronic media. However, receipt of PrEP information alone did not appear to motivate these men into presenting to a local clinic for PrEP evaluation. They advocated for an increased effort to educate MSM in the community about HIV PrEP preferentially through electronic outlets. Primary care providers should feel comfortable addressing the topic with their patients, and public health efforts should focus on production of electronic educational media with an emphasis on linkage to care.
Mitchell, J. T., S. LeGrand, L. B. Hightow-Weidman, M. S. McKellar, A. D. M. Kashuba, M. Cottrell, T. McLaurin, G. Satapathy and F. J. McClernon	Smartphone-Based Contingency Management Intervention to Improve Pre-Exposure Prophylaxis Adherence: Pilot Trial; JMIR Mhealth and Uhealth; 2018; 6 (9); p. e10456	<ul style="list-style-type: none"> • Social media, apps and technology 	<ul style="list-style-type: none"> • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The authors developed and pilot-tested a smartphone-based intervention, known as mSMART, that targets PrEP adherence. mSMART is the first PrEP adherence intervention administered via smartphones to integrate contingency management. The authors found that adherence scored improved for 30% of participants, and adherence did not worsen for any participant. Although our findings indicate that mSMART is a promising intervention to improve adherence rates, the results are preliminary and future studies are needed to demonstrate efficacy. These studies should also consider our findings indicating areas in which mSMART can be adapted to more comprehensively meet the needs of young MSM prescribed PrEP.
Mullins, T. L. K., G. Zimet, M. Lally, J. Xu, S. Thornton and J. A. Kahn	HIV Care Providers' Intentions to Prescribe and Actual Prescription of Pre-Exposure Prophylaxis to At-Risk Adolescents and Adults; AIDS Patient Care & STDs; 2017; 31 (12); pp. 504-516	<ul style="list-style-type: none"> • Level of knowledge • Prescribing habits and eligibility • Purview Paradox • Service structure or model • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff 	The authors explored intentions to prescribe PrEP to adolescents and adults and sought to identify the actual prescription of PrEP. They found that clinicians reported higher intention to prescribe, and more experience prescribing, PrEP to adults versus adolescents, and several modifiable factors, such as provider-level barriers and concerns about cost and insurance coverage, were associated with intention to prescribe PrEP to youth. Clinicians reported greater intention to prescribe PrEP to adults compared with adolescents, and the authors identified a number of modifiable factors associated with intention to prescribe and actual prescription of PrEP to adolescents that should be addressed to increase provision of PrEP to youth. Furthermore, they found that multi-disciplinary teams and behavioral interventions are not necessary for delivering PrEP and that this was associated with intention to prescribe and actual prescription of PrEP suggests that clinicians view these elements as barriers to prescribing PrEP. To address this potential barrier to PrEP prescription, brief, streamlined, and effective behavioral interventions that can be delivered with PrEP need to be developed and disseminated.
Mutua, G., E. Sanders, P. Mugo, O. Anzala, J. E. Haberer, D. Bangsberg, B. Barin, J. F. Rooney, D. Mark, P. Chetty, P. Fast and F. H. Priddy	Safety and adherence to intermittent pre-exposure prophylaxis (PrEP) for HIV-1 in African men who have sex with men and female sex workers; Plos On; 2012; 7 (4); p. e33103	<ul style="list-style-type: none"> • Service structure or model • Social media, apps and technology 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • Multi-disciplinary and innovative PrEP care pathways 	The article examined safety and adherence data from the first trial of an intermittent PrEP regimen among Kenyan MSM and FSW. The data suggest that although adherence is lower with fixed intermittent than with daily regimens, whilst adherence to post-coital doses was 26%. Additional drug level data, qualitative data on adherence barriers, and better methods to measure sexual activity are necessary to determine whether adherence to post-coital PrEP could be comparable to more standard regimens.

Table II 'Supplemental Table of Included Studies: Issues, Themes and Findings'

Newman, P. A., A. Guta, A. Lacombe-Duncan and S. Tepjan	Clinical exigencies, psychosocial realities: negotiating HIV pre-exposure prophylaxis beyond the cascade among gay, bisexual and other men who have sex with men in Canada; Journal of the International AIDS Society; 2018; 21 (11); p. e25211	<ul style="list-style-type: none"> • Health communication and education • Peer and social networks • Service structure or model • Social media, apps and technology • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • Multi-disciplinary and innovative PrEP care pathways 	The authors sought to understand the experiences of users and non-users of PrEP. Regardless of PrEP use, participants generally described having multiple partners, using condoms inconsistently and employing a range of strategies for managing sexual risk, including condom use. Some participants who had not initiated PrEP use described HIV risk behaviours and the use of testing, but demonstrated low perceived risk and no anxiety about acquiring HIV. All PrEP users and some non-users reported seeking out information in scientific (e.g. academic journals) and/or community-based sources (AIDS service organization websites). Most participants who sought out PrEP did not report barriers in linkage to care nor discriminatory reactions from healthcare providers. PrEP access was facilitated by an urban environment with many LGBTQ-friendly services and physicians, many of whom also provide care to people living with HIV. PrEP users described various strategies for taking their medication, often borne of trial-and-error, while non-PrEP users generally anticipated that adherence would not be a concern. Other findings covered retention, discontinuation, stigma and the impact of PrEP on sexual practices and relationships.
Ojikutu, B., L. Bogart, K. Mayer, T. Stopka, P. Sullivan and Y. Ransome	Spatial Access and Willingness to Use Pre-Exposure Prophylaxis Among Black/African American Individuals in the United States: Cross-Sectional Survey; JMIR Public Health and Surveillance; 2019; 5 (1)	<ul style="list-style-type: none"> • Health communication and education • Peer and social networks • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff 	The study determined the association between proximity to PrEP-prescribing clinics and willingness to use PrEP among black individuals. The findings demonstrate that black individuals with higher spatial access to PrEP-prescribing clinics were more willing to use this intervention. Scaling up of PrEP prescription at clinics in areas where black individuals reside is necessary to increase access to PrEP.
Ojile, N., D. Sweet and K. J. Kallail	A Preliminary Study of the Attitudes and Barriers of Family Physicians to Prescribing HIV Preexposure Prophylaxis; Kansas Journal of Medicine; 2017; 10 (2); pp. 40-42	<ul style="list-style-type: none"> • Health communication and education • Level of knowledge • Prescribing habits and eligibility • Purview Paradox • Relationship with patient • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • Multi-disciplinary and innovative PrEP care pathways 	The authors assessed the attitudes and perceived barriers of family physicians in Kansas towards prescribing PrEP to high risk patient populations. Fifty-three percent of family physicians take a sexual history on new patients less than frequently, and only 35% frequently ask about the use of safe sex practices. Only 29% frequently ask if the patient has sex with men, women, or both. Seventy-six percent of respondents would be willing to prescribe PrEP. While 59% of participants agreed that PrEP belongs in the primary care domain of treatment, 71% agreed that they had limited or no knowledge of PrEP guidelines.
Paparini, S., W. Nutland, T. Rhodes, V. Nguyen and J. Anderson	DIY HIV prevention: Formative qualitative research with men who have sex with men who source PrEP outside of clinical trials; Plos One; 2018; 13 (8); p. e0202830	<ul style="list-style-type: none"> • Health communication and education • Peer and social networks • Service structure or model • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • Multi-disciplinary and innovative PrEP care pathways 	The articles aims to understand the information and support needs of MSM who currently are, or who have recently, self-obtained and self-administered PrEP. The authors found that DIY PrEP users are highly motivated "early adopters" who are keen and able to experiment with new strategies for HIV prevention, even in the context of partial information and the need for significant personal motivation. Yet the discussions also highlighted that participants depend on crucial peer support to obtain a prevention technology that was promoted through community engagement in clinical trials rather than as a public health intervention. This highlights the need for tailored interventions as well as further research and analysis to better understand how DIY PrEP users can be supported to ensure the best possible outcomes from these informal practices. Understanding how to harness community activism and clinical partnerships in different contexts remains key to maximizing the HIV prevention impact of informal PrEP. The findings suggest that participants felt that the diffusion of information on how to access PrEP was initiated and sustained by their communities.

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Parisi, D., B. Warren, S. J. Leung, T. Akkaya-Hocagil, Q. Qin, I. Hahn and L. Stevens	A Multicomponent Approach to Evaluating a Pre-exposure Prophylaxis (PrEP) Implementation Program in Five Agencies in New York; JANAC; Journal of the Association of Nurses in AIDS Care; 2018; 29 (1)	<ul style="list-style-type: none"> • Health communication and education • Referral • Relationship with patient • Service structure or model • Social media, apps and technology • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The study determined the practicality of using PrEP as an HIV prevention intervention for adult MSM who were at high risk for acquiring HIV infection. Findings showed that 86% of clients assessed for eligibility were enrolled in TPIP. Participants found it easy to take a pill every day, attend routine medical visits, test for HIV and STIs, and deal with the side effects of PrEP. Although 77% of participants did not have insurance issues, participants who were uninsured and underinsured encountered issues with high deductibles/copayments and lack of coverage for medical visits and testing. TPIP staff stressed the necessity of having a PrEP navigator who could assist clients with resources, such as assistance with paying for medications, medical visits, and testing. TPIP demonstrated that clients could adhere to PrEP and have positive outcomes. Agency feedback demonstrated the need for an agency-wide implementation strategy to effectively develop a PrEP program. TPIP played a pivotal role in laying the foundation for statewide implementation of PrEP. Throughout the program, PrEP was delivered as part of a comprehensive prevention plan that included consistent and correct condom use, safer-sex practices, risk-reduction counseling, and routine screening for HIV and other STIs that could facilitate HIV transmission.
Parsons, J. T., S. A. John, T. H. F. Whitfield, J. Cienfuegos-Szalay and C. Grov	HIV/STI counseling and testing services received by gay and bisexual men using pre-exposure prophylaxis (PrEP) at their last PrEP care visit; Sexually Transmitted Diseases; 2018; 45 (12); pp. 798-802	<ul style="list-style-type: none"> • Health communication and education • Purview Paradox • Relationship with patient • Service structure or model • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning 	The study examined where PrEP-using GBM in New York City access PrEP care services, and determine the comprehensiveness of their routine PrEP maintenance care. The findings highlighted that there is also a need for reducing barriers to the provision of comprehensive PrEP care services to patients. The majority of PrEP-using MSM did not receive comprehensive care consisting of a discussion about their sexual behavior, blood and urine samples, and both rectal and oral swabs at their last PrEP care visit. Compared to men who more recently initiated PrEP, those who have been on PrEP longer, engaged in more CAS, and received care from a specialized clinic were more likely to receive comprehensive care.
Pasipanodya, E. C., S. Jain, X. Sun, J. Blumenthal, E. Ellorin, K. Corado, M. P. Dube, E. S. Daar, S. R. Morris and D. J. Moore	Trajectories and Predictors of Longitudinal Preexposure Prophylaxis Adherence Among Men Who Have Sex With Men; Journal of Infectious Diseases; 2018; 218 (10); pp. 1551-1559	<ul style="list-style-type: none"> • Social media, apps and technology • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The study sought to identify trajectories of PrEP adherence among individuals receiving adherence texts, explore factors associated with patterns of adherence, and examine study-end attitudes toward PrEP and the text-messaging intervention. The model identified that classes with higher text-reported adherence had higher drug concentrations. Younger age and minority race were associated with lower adherence, and individuals in classes with lower adherence had greater baseline levels of depression, substance use concerns, and sexual risk.
Patel, R. R., P. A. Chan, L. C. Harrison, K. H. Mayer, A. Nunn, L. A. Mena and W. G. Powderly	Missed Opportunities to Prescribe HIV Pre-Exposure Prophylaxis by Primary Care Providers in Saint Louis, Missouri; LGBT Health; 2018; 5 (4); pp. 250-256	<ul style="list-style-type: none"> • Health communication and education • Level of knowledge • Prescribing habits and eligibility • Purview Paradox • Referral • Relationship with patient • Service structure or model • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The authors explored whether patients seeking PrEP at an ID specialty clinic were engaged in primary care, if they had asked their PCPs about PrEP before seeking specialty care, and to identify the reasons why patients did not ask their PCPs for PrEP and why PCPs had declined to prescribe PrEP. Findings highlighted that individuals seeking PrEP faced numerous barriers to obtaining PrEP from PCPs in metropolitan Saint Louis, Missouri. Major barriers included not having a PCP, having a PCP who was unaware of and/or perceived PrEP to be a specialist's responsibility, not knowing a PCP could prescribe PrEP, and having a PCP but not feeling comfortable discussing sexual behaviors. Forty-eight percent of these at-risk patients asked for PrEP from their PCPs, but were not prescribed it, creating a large missed PrEP- prescribing opportunity by PCPs.

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Phanuphak, N., T. Sungsing, J. Jantarapakde, S. Pengnonyang, D. Trachunthong, P. Mingkwanrungruang, W. Sirisakyot, P. Phiayura, P. Seekaew, P. Panpet, P. Meekrua, N. Praweprai, F. Suwan, S. Sangtong, P. Brutrat, T. Wongsri, P. R. Na Nakorn, S. Mills, M. Avery and R. Vannakit	Princess PrEP program: the first key population-led model to deliver pre-exposure prophylaxis to key populations by key populations in Thailand; Sexual Health; 2018; 15 (6); pp. 542-555	<ul style="list-style-type: none"> • Referral • Service structure or model • Social media, apps and technology • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The article investigates the uptake, retention and adherence to PrEP services from the Princess PrEP program implemented by trained MSM and M2F TG community health workers in community health centres throughout Thailand. Findings showed that age >25 years, being MSM and having at least a Bachelors degree significantly increased retention to PrEP and condomless sex did not change over the 12-month period. Retention in PrEP programs is a concern, especially among TGW and those who were young or with lower levels of education; innovative tools are needed to support these populations. STI screening and treatment infrastructures must be immediately strengthened and programs and health systems should advocate for access to cheaper molecular-based STI testing. To scale-up and sustain KP-led PrEP programs, strong endorsement from international and national guidelines is necessary.
Philbin, M. M., C. M. Parker, R. G. Parker, P. A. Wilson, J. Garcia and J. S. Hirsch	Gendered Social Institutions and Preventive Healthcare Seeking for Black Men Who Have Sex with Men: The Promise of Biomedical HIV Prevention; Archives of Sexual Behavior; 2018; 7; pp. 2091-2100	<ul style="list-style-type: none"> • Level of knowledge • Relationship with patient • Service structure or model 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning 	The study examined the healthcare system and the labor market as two gendered institutions that influence Black MSM’s preventive healthcare practices and show how Black MSM are negatively impacted by heteronormatively gendered institutional processes in health care and labor market settings. Two primary findings emerged from the study. The first is that the labor market systematically excluded the men in the sample, which limited their ability to access employer-sponsored healthcare. Such discrimination may promote overt demonstrations of masculinity that increase their HIV vulnerability and decrease healthcare seeking. Secondly, healthcare systems are not structured to promote preventive healthcare for men, particularly Black MSM. In fact, they constrained men’s access to primary providers and were usually tailored to women. Applying a structural, gendered lens to men’s health—in addition to the more frequently researched individual or interpersonal levels—provides insight into factors that affect healthcare seeking and HIV prevention for Black MSM.
Raifman, J., A. Nunn, C. E. Oldenburg, M. C. Montgomery, A. Almonte, A. L. Agwu, R. Arrington-Sanders, P. A. Chan and R. Arrington-Sanders	An Evaluation of a Clinical Pre-Exposure Prophylaxis Education Intervention among Men Who Have Sex with Men; Health Services Research; 2018; 53 (4); 2249-2267	<ul style="list-style-type: none"> • Health communication and education • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The authors evaluated the impact of PrEP education intervention on PrEP awareness and use among MSM attending a STD clinic. The intervention increased PrEP awareness by 24% and increased PrEP use by 5%. There is a need for interventions to increase PrEP awareness and use, especially among MSM who are racial and ethnic minorities in STD clinics, primary care practices, and other settings providing sexual health care.
Raifman, J. R. G., C. Flynn and D. German	Healthcare Provider Contact and Pre-exposure Prophylaxis in Baltimore Men Who Have Sex With Men; American Journal of Preventive Medicine; 2017; 52 (1); 55-63	<ul style="list-style-type: none"> • Health communication and education • Level of knowledge • Relationship with patient • Service structure or model • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning 	The article determined whether healthcare provider or CBC contact was associated with PrEP awareness among MSM. Findings highlight the need to support healthcare providers’ PrEP knowledge and ability to discuss PrEP with key populations at risk of HIV as well as to address racial disparities in PrEP awareness. Policymakers can also improve PrEP implementation by encouraging government organisations and other professional groups to issue PrEP recommendations.

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Refugio, O. N., M. M. Kimble, C. L. Silva, J. E. Lykens, C. Bannister and J. D. Klausner	PrEPTECH: a telehealth-based initiation program for human immunodeficiency virus pre-exposure prophylaxis in young men of color who have sex with men. A pilot study of feasibility; Journal of Acquired Immune Deficiency Syndromes; 2018; 80; pp. 40-45	<ul style="list-style-type: none"> • Relationship with patient • Social media, apps and technology 	<ul style="list-style-type: none"> • Multi-disciplinary and innovative PrEP care pathways 	The study investigated the feasibility of PrEPTECH, an intervention that uses telehealth to initiate and deliver PrEP medication, as well as promote PrEP adherence. PrEPTECH provides unique services that differ from the few other telehealth-based PrEP programs, including customizable daily reminders and online education. The study reported that at least 75% felt that PrEPTECH was confidential, fast, convenient, and easy to use. Less than 15% personally experienced PrEP stigma during the study. The median time to PrEP initiation was 46 days. Sexually transmitted infection positivity was 20% and 19% at baseline and 90 days, respectively. No HIV infections were detected.
Ridgway, J. P., E. A. Almirol, A. Bender, A. Richardson, J. Schmitt, E. Friedman, N. Lancki, I. Leroux, N. Pieroni, J. Dehlin and J. A. Schneider	Which Patients in the Emergency Department Should Receive Preexposure Prophylaxis? Implementation of a Predictive Analytics Approach; AIDS Patient Care and STDs; 2018; 32 (5); pp. 202-207	<ul style="list-style-type: none"> • Social media, apps and technology • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • Multi-disciplinary and innovative PrEP care pathways 	The authors developed and implemented an electronic risk score to identify Emergency Department patients who are potential candidates for PrEP. The study found that of the 51 patients who completed risk assessment, 68.6% (35/51) were interested in PrEP, 17.6% (9/51) scheduled a PrEP appointment, and 7.8% (4/51) successfully initiated PrEP. The measured number of successful PrEP initiations is likely an underestimate, as it does include patients who initiated PrEP with outside providers or referred acquaintances for PrEP care. It was concluded that individuals who seek care in the Emergency Department are often at disproportionate risk for HIV. They have the potential to play a crucial role in HIV prevention by identifying and linking high-risk HIV-negative clients to PrEP care and require further research to outline the future role in PrEP service provision.
Rivierez, I., G. Quatremere, B. Spire, J. Ghosn and D. Rojas Castro	Lessons learned from the experiences of informal PrEP users in France: results from the ANRS-PrEPAGE study; AIDS Care; 2018; 30; pp. 48-53	<ul style="list-style-type: none"> • Support services 	<ul style="list-style-type: none"> • Multi-disciplinary and innovative PrEP care pathways 	The study explored the subjective experience and the underlying logic behind informal PrEP use through a community-based approach. The results indicate that avoiding transmission while improving the quality of sex-life was essential for participants allowed them to overcome legal barriers to obtain PrEP. However, despite a proximity to well-informed groups, some jeopardized their health by adopting wrong regimens or by using drugs that were not approved for PrEP. The results support the need for a harmonized European AIDS policy around PrEP and provide information for the support of PrEP use in future implementation programs.
Rusie, L. K., C. Orengo, D. Burrell, A. Ramachandran, M. Houlberg, K. Keglovitz, D. Munar and J. A. Schneider	Preexposure Prophylaxis Initiation and Retention in Care Over 5 Years, 2012-2017: Are Quarterly Visits Too Much?; Clinical Infectious Diseases; 2018; 67 (2); 283-287	<ul style="list-style-type: none"> • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP adherence within formal service structures 	The article provides descriptive information on retention in care patterns in routine clinical care and to explore some of the baseline factors related to retention that may inform clinical practice, mathematical models, and future retention in PrEP care prevention interventions. The authors reported that with respect to PrEP retention in care, just under half (43%) were retained in care for ≥12 months, yet only 15% had high visit constancy (clinic visit in all 4 quarters) consistent with CDC guidelines during the first 12 months of PrEP care. Factors associated with PrEP visits in ≥1 quarter included the number of other comorbid conditions and insurance.
Shover, C. L., M. Javanbakht, S. Shoptaw, R. K. Bolan, L. Sung-Jae, J. T. Parsons, J. Rendina and P. M. Gorbach	HIV Preexposure Prophylaxis Initiation at a Large Community Clinic: Differences Between Eligibility, Awareness, and Uptake; American Journal of Public Health; 2018; 108 (10); pp. 1409-1417	<ul style="list-style-type: none"> • Prescribing habits and eligibility • Service structure or model 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff 	The article characterized the uptake of PrEP in a community setting and to identify disparities in PrEP use by demographic and behavioral factors associated with increased HIV risk. The findings suggest that whilst there are disparities in PrEP use among young MSM and transgender people of color, PrEP uptake is increasing generally. As PrEP is acceptable to those who use sex drugs, interventions providing PrEP services including retention and adherence support targeting these individuals have the potential to reduce HIV transmission.

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Siegler, A. J., A. Bratcher, K. M. Weiss, F. Mouhanna, L. Ahlschlager and P. S. Sullivan	Location location location: an exploration of disparities in access to publicly listed pre-exposure prophylaxis clinics in the United States; Annals of Epidemiology; 2018	<ul style="list-style-type: none"> • Service structure or model • Social media, apps and technology • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff 	The authors described the geographic distribution of PrEP clinics in the United States. They also explored how the density of PrEP-providing clinics aligns with race, income, insurance status, and urban city in comparison to the overall population, to estimated numbers of MSM eligible for PrEP, and to new HIV diagnoses. Findings reported that most (43/50) states had less than one PrEP-providing clinic per 100,000 population. Among states, the median was two clinics per 1000 PrEP-eligible men who have sex with men. Differences between disease burden and service provision were seen for counties with higher proportions of their residents living in poverty, lacking health insurance, identifying as African American, or identifying as Hispanic/Latino. The Southern region accounted for over half of all new HIV diagnoses but only one-quarter of PrEP-providing clinics.
Smith, D. K., L. Toledo, D. J. Smith, M. A. Adams and R. Rothenberg	Attitudes and Program Preferences of African-American Urban Young Adults About Pre-Exposure Prophylaxis (PrEP); AIDS Educaiton & Prevention; 2012; 24 (5); pp. 408-421	<ul style="list-style-type: none"> • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP adherence within formal service structures 	The article to elicits attitudes about, and preferences for, PrEP services from a key group of potential users in the United States. The authors focus on inner-city, African-American young adult men and women at risk for HIV transmission because of their sexual and drug-related behaviors. In these focus groups of young African-American men and women, substantial interest in PrEP was reported among both heterosexuals and MSM. Interest in PrEP was associated with its cost, effectiveness, and ease of accessing services and medication near to their homes or by public transportation. The successful introduction of clinically delivered HIV prevention methods for African-American young adults at risk of HIV acquisition requires an understanding not only of their current beliefs about HIV acquisition and its related sexual risk and protective behaviors, but also their beliefs about medication use and challenges and opportunities related to their access to health care.
Spinelli, M. A., H. M. Scott, E. Vittinghoff, A. Y. Liu, A. Morehead-Gee, R. Gonzalez and S. P. Buchbinder	Provider adherence to pre-exposure prophylaxis monitoring guidelines in a large primary care network; Open Forum Infectious Diseases; 2018; 5 (6)	<ul style="list-style-type: none"> • Prescribing habits and eligibility • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • Multi-disciplinary and innovative PrEP care pathways 	The study examined test ordering of PrEP in a primary care network. The authors found that providers did not order HIV testing before almost one-quarter of PrEP initiations and that panel management was associated with higher testing. Although they discovered suboptimal HIV and STI testing in a primary care population, data suggest the promise of panel management, which could address disparities in PrEP testing. Future research into innovative population management strategies could help minimize PrEP’s potential risks and maximize its preventive impact.
Stekler, J. D., V. McMahan, L. Ballinger, L. Viquez, F. Swanson, J. Stockton, B. Crutsinger-Perry, D. Kern and J. D. Scott	HIV Pre-exposure Prophylaxis Prescribing Through Telehealth; Journal of Acquired Immune Deficiency Syndromes; 2018; 77 (5); pp. e40-e42	<ul style="list-style-type: none"> • Social media, apps and technology 	<ul style="list-style-type: none"> • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The article described our preliminary experience using a telehealth approach to prescribe PrEP. The program showed preliminary evidence of the feasibility and acceptability of a telehealth approach to PrEP prescribing that promotes HIV counselors as PrEP experts. The approach is flexible as it provides to the specialist and the transition of time and effort to less-expensive staff who are content experts in HIV and sexual health. Telehealth participants had similar baseline characteristics compared with other participants, but they were significantly less likely to return for their 3-month follow-up. Although conceivable this was due to the physical absence of the physician at the initial visit, it is more likely associated with participant factors that led to the client choosing to be seen on an alternate day. Work is needed to develop strategies to promote PrEP adherence and persistence among persons at highest risk of HIV acquisition and identify individuals most likely to benefit from those strategies.
Sullivan, P. S., R. Driggers, J. D. Stekler, A. J. Siegler, T. Goldenberg, S. J. McDougal, J. Caucutt, J. Jones and R. Stephenson	Usability and Acceptability of a Mobile Comprehensive HIV Prevention App for Men Who Have Sex With Men: A Pilot Study; JMIR Mhealth and Uhealth; 2017; 5 (3); p. e26	<ul style="list-style-type: none"> • Health communication and education • Service structure or model • Social media, apps and technology • Support services 	<ul style="list-style-type: none"> • Multi-disciplinary and innovative PrEP care pathways 	The study evaluated the usability and acceptability of a theory-based Android mobile phone app for HIV prevention. The content of the app was thought of positively overall, with 88% finding the level of detail and 81% finding the assessment recommendations to be useful or very useful. Additionally, 66% felt the app content helped them to stick to an HIV prevention plan. Most participants felt the app was a good balance of personal and professional language (71%) and the information was easy to understand (90%). Very few participants reported they would probably or definitely not download it again (5%), not recommend the app to a friend (3%), or not continue to use the app themselves (13%).

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Sun, C., K. Anderson, D. Bangsberg, K. Toevs, D. Morrison, C. Wells, P. Clark and C. Nicolaidis	Access to HIV Pre-exposure Prophylaxis in Practice Settings: a Qualitative Study of Sexual and Gender Minority Adults’ Perspectives; Journal of General Intern Medicine; 2019	<ul style="list-style-type: none"> • Level of knowledge • Prescribing habits and eligibility • Purview Paradox • Referral • Relationship with patient • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The study identifies barriers and facilitators of PrEP access by examining sexual and gender minority patients’ experiences with accessing health care systems and engaging with providers about PrEP in a variety of practice settings. Participants described the centrality of patient-provider relationships to positive experiences around PrEP, the necessity of personally advocating to access PrEP, and the experience of system-level barriers to PrEP access. Participants also made several suggestions to improve PrEP access including improving provider engagement with sexual and gender minority patients, encouraging providers to initiate conversations about PrEP, and increasing awareness of medication financial support.
Tangmunkongvorakul, A., S. Chariyalertsak, R. K. Amico, P. Saokhieo, V. Wannalak, T. Sangangamsakun, P. Goicochea and R. Grant	Facilitators and barriers to medication adherence in an HIV prevention study among men who have sex with men in the iPrEx study in Chiang Mai, Thailand; AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV; 2013; 25 (8); pp. 961-967	<ul style="list-style-type: none"> • Peer and social networks • Support services • Tailoring 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The authors conducted the study to better understand the characteristics of iPrEx participants specifically from this underserved population in Thailand, and gain insights into their experiences of trying to take a daily tablet as part of this blinded PrEP trial. PrEP has the potential to transform HIV prevention interventions. Findings suggest that that participants held generally positive attitudes toward the iPrEx study and study medication and related this to high rates of adherence to the daily regimen. Participants also reflected on the provision of quality health care as part of participation in the trial, as well as support from clinical research staff, family and friends as helpful in supporting high rates of study medication adherence. Discourse concerning challenges to adherence included medication taking behavior, which was contextualized by lifestyle, living arrangement, social life, social stigma in terms of being mistakenly identified as HIVpositive or unintentional disclosure of sexual identity to family and friends, and relationship conflicts with partners. As PrEP use in HIV-negative individuals is in its nascent stages, further study is needed to explore risks and benefits, strategies to boost medication adherence, long-term effects, and how to best pair PrEP with STI prevention.
Tellalian, D., K. Maznavi, U. F. Bredeek and W. D. Hardy	Pre-Exposure Prophylaxis (PrEP) for HIV Infection: Results of a Survey of HIV Healthcare Providers Evaluating Their Knowledge, Attitudes, and Prescribing Practices; AIDS Patient Care & STDS; 2013; 27 (10); pp. 553-559	<ul style="list-style-type: none"> • Health communication and education • Level of knowledge • Prescribing habits and eligibility • Purview Paradox • Staffing and service allocation 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • PrEP adherence within formal service structures 	The study evaluated provider knowledge, attitudes, perceptions, and prescribing practices regarding PrEP. Only 13% of respondents felt that PrEP was the “most effective” method for reducing HIV acquisition, while 47% felt that expanding HIV testing would be the most effective method. A scenario was provided regarding a healthy, 50-year- old heterosexual female in a monogamous relationship with an HIV-positive partner who does not use condoms. Sixty percent of respondents indicated that they would provide PrEP to a female patient in this setting. Twenty- six percent would not provide PrEP based on lack of scientific evidence, and 14% would not provide PrEP for other reasons.
Underhill, K., K. M. Morrow, C. M. Colleran, R. Holcomb, D. Operario, S. K. Calabrese, O. Galarraga and K. H. Mayer	Access to Healthcare, HIV/STI Testing, and Preferred Pre-Exposure Prophylaxis Providers among Men Who Have Sex with Men and Men Who Engage in Street-Based Sex Work in the US; Plos One; 2014; 9 (11)	<ul style="list-style-type: none"> • Health communication and education • Level of knowledge • Prescribing habits and eligibility • Referral • Relationship with patient • Service structure or model • Staffing and service allocation • Support services 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • Multi-disciplinary and innovative PrEP care pathways 	The study explored healthcare access, HIV/STI testing, unmet healthcare needs, and preferred PrEP providers. MSWs primarily accessed care in Emergency Departments, substance use clinics, correctional institutions, and walk-in clinics. Rates of HIV testing were high, but MSWs reported low access to other STI testing, low insurance coverage, and unmet healthcare needs including primary care, substance use treatment, and mental health services. MSM not engaging in sex work were more likely to report access to primary and specialist care. Rates of HIV testing among these MSM were slightly lower, but they reported more STI testing, more insurance coverage, and fewer unmet needs. Preferred PrEP providers for both groups included primary care physicians, infectious disease specialists, and psychiatrists. MSWs were also willing to access PrEP in substance use treatment and Emergency Department settings.

Table II ‘Supplemental Table of Included Studies: Issues, Themes and Findings’

Vaccher, S. J., J. M. Kaldor, D. Callander, I. B. Zablotska and B. G. Haire	Qualitative Insights Into Adherence to HIV Pre-Exposure Prophylaxis (PrEP) Among Australian Gay and Bisexual Men; AIDS Patient Care & STDS; 2018; 32 (12); pp. 519-528	<ul style="list-style-type: none"> • Peer and social networks • Relationship with patient • Service structure or model • Social media, apps and technology 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning • PrEP adherence within formal service structures • Multi-disciplinary and innovative PrEP care pathways 	The article investigated factors that shaped PrEP users pill-taking experiences and explored the reasons these specific factors aided or diminished adherence. Participants portrayed PrEP in an overwhelmingly positive light, focusing on strategies that helped them maintain good adherence, despite other barriers they may have faced. There was an underlying sense of individuals taking ownership of their PrEP use, actively investigating different routines to determine the most suitable dosing strategy, and creating contingency plans if they were unable to access PrEP in their usual or preferred manner. Participants relied on various support networks and sought out information from a number of sources to ensure they had a good understanding of PrEP. Finally, while some participants reported side effects that led to the discontinuation of PrEP, or problems with disclosure that impacted on their ability to take PrEP as desired, the general consensus was that PrEP was broadly beneficial to their lives, and individuals would do all that they could to maintain high levels of adherence and take PrEP as required for the foreseeable future.
Witzel, T. C., W. Nutland and A. Bourne	What qualities in a potential HIV pre-exposure prophylaxis service are valued by black men who have sex with men in London? A qualitative acceptability study; International Journal of STD & AIDS; 2018; 29 (8); pp. 760-765	<ul style="list-style-type: none"> • Relationship with patient • Service structure or model • Support services • Tailoring 	<ul style="list-style-type: none"> • PrEP service aspects, settings and staff • PrEP prescriber experiences, therapeutic alliance and care planning 	The authors sought to understand the dimensions of acceptability of a potential PrEP service for Black MSM in London. The findings highlighted the importance of proximity and anonymity; quality, efficiency and reassurance; and understanding, empathy and identity to participants. These relate, respectively, to preferences regarding clinic location and divisions from community, features of service delivery and staff characteristics. Careful consideration in regards to components used in service development will facilitate ongoing engagement. Interpersonal skills of staff are central to service acceptability, particularly when staff are perceived to be from similar cultural backgrounds as their patients.

MSM – men who have sex with men; YMSM – young men who have sex with men; HCP – healthcare provider/professional; PCP – primary care provider; FSW – female sex worker; MSW – male sex worker; TG – transgender; TGW – transgender woman; M2F – male to female; F2M – female to male; CBC – community-based clinic; RCT – randomised control trial; PEP – post-exposure prophylaxis; GBM – gay and bisexual men; TPIP – Targeted PrEP Implementation Programme; iPrEX – implementation study; EMR – electronic medical records; iNSC – integrated Next Step Counselling; CRF – case report form; O2O – online to offline; NHS – National Health Service; IDU – intravenous drug user; NA – Neutral Assessment; STD – sexually transmitted disease; HB-PrEP – home based pre-exposure prophylaxis; CAS – condomless anal sex.

Table III Study Details

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Adams, L. M. and B. H. Balderson	HIV providers' likelihood to prescribe pre-exposure prophylaxis (PrEP) for HIV prevention differs by patient type: a short report; AIDS Care; 2016; 28 (9); pp. 1154-1158	Journal article	Quantitative	Cross sectional	Professional Association of HIV care providers	260 prescribers	PrEP eligible MSM				US	Both	Private health insurance and public health coverage
Adams, L. M., B. H. Balderson, K. Brown, S. E. Bush and B. J. Packett	Who Starts the Conversation and Who Receives Preexposure Prophylaxis (PrEP)? A Brief Online Survey of Medical Providers' PrEP Practices; Health Education & Behavior; 2018; 54 (5); 723-729	Journal article	Quantitative	Cross sectional	Professional Association of HIV care providers	342 prescribers	PrEP eligible MSM				US	Both	Private health insurance and public health coverage
Aloysius, I., A. Savage, J. Zdravkov, R. Korologou-Linden, A. Hill, R. Smith, V. Houghton-Price, M. Boffito and N. Nwokolo	InterPrEP. Internet-based pre-exposure prophylaxis with generic tenofovir DF/emtricitabine in London: an analysis of outcomes in 641 patients; Journal of Virus Eradication; 2017; 3 (4); pp. 218-222	Journal article	Quantitative	Cross sectional	Clinic			641 HIV negative	81% White	37 (32-45) years old	London, UK	Urban	Healthcare to all through NHS
Amico, K. R., V. McMahan, P. Goicochea, L. Vargas, J. L. Marcus, R. M. Grant and A. Liu	Supporting study product use and accuracy in self-report in the iPrEx study: next step counseling and neutral assessment; AIDS & Behavior; 2012; 16 (5); pp. 1243-1259	Journal article	Qualitative	Intervention evaluation	Trial (iPrEx)	37 study staff (20 counselors; 8 nurses; 9 study clinicians)	iPrEx staff using iNSC				Brazil; Ecuador; Peru; South Africa; Thailand; US	Both	Multiple

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Amico, K. R., J. Miller, C. Balthazar, P. A. Serrano, J. Brothers, S. Zollweg and S. Hosek	Integrated Next Step Counseling (iNSC) for Sexual Health and PrEP Use Among Young Men Who Have Sex with Men: Implementation and Observations from ATN110/113; AIDS and Behavior; 2018	Journal article	Qualitative	Intervention evaluation	Trial (iPrEx)			178	10% White; 23% Hispanic/Latino; 67% Black/African American	19 (15-22) years old	US	Both	Private health insurance and public health coverage
Anand, T., C. Nitpolprasert, D. Trachunthong, S. J. Kerr, S. Janyam, D. Linjongrat, L. B. Hightow-Weidman, P. Phanuphak, J. Ananworanich and N. Phanuphak	A novel Online-to-Offline (O2O) model for pre-exposure prophylaxis and HIV testing scale up; Journal of the International AIDS Society; 2017; 20 (1); p. 21326	Journal article	Quantitative	Cross sectional	HIV educational website; eCounseling platforms; integrated social media networks			272,568	Not mentioned	27 (23-33) years old	Thailand	Both	Universal healthcare through 3 government schemes
Arnold, E. A., P. Hazelton, T. Lane, K. A. Christopoulos, G. R. Galindo, W. T. Steward and S. F. Morin	A qualitative study of provider thoughts on implementing pre-exposure prophylaxis (PrEP) in clinical settings to prevent HIV infection; 2012; Plos One; 7 (7); e40603	Journal article	Qualitative	Cross sectional	Referrals and snowball sampling	22 PCPs (HIV specialists, community health clinic providers, and public health officials)	Seeing high numbers of MSM and TG women				California, US	Urban	Private health insurance and public health coverage

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Arnold, T., L. Brinkley-Rubinstein, P. A. Chan, A. Perez-Brumer, E. S. Bologna, L. Beauchamps, K. Johnson, L. Mena and A. Nunn	Social, structural, behavioral and clinical factors influencing retention in Pre-Exposure Prophylaxis (PrEP) care in Mississippi; Plos One; 2017; 12 (2); p. e0172354;	Journal article	Qualitative	Cross sectional	PrEP program at LGBT clinic			30	83% African American	26.6 years old	Mississippi, US	Urban	Private health insurance and public health coverage
Beach, L. B., G. J. Greene, P. Lindeman, A. K. Johnson, C. N. Adames, M. Thomann, P. C. T. Washington and G. Phillips II	Barriers and Facilitators to Seeking HIV Services in Chicago Among Young Men Who Have Sex with Men: Perspectives of HIV Service Providers; AIDS Patient Care & STDS; 2018; 32 (11); pp. 468-476	Journal article	Qualitative	Intervention evaluation	Department of Public Health	19 key informants	YMSM				Illinois, US	Urban	Private health insurance and public health coverage
Bhatia, R., L. Modali, M. Lowther, N. Glick, M. Bell, S. Rowan, K. Keglovitz and J. Schneider	Outcomes of Preexposure Prophylaxis Referrals From Public STI Clinics and Implications for the Preexposure Prophylaxis Continuum; Sexually Transmitted Diseases; 2018; 45 (1); pp. 50-55	Journal article	Quantitative	Retrospective cross sectional	Clinic			137	7% Asian; 18% White; 32% Hispanic; 38% Black	29 years old	Illinois, US	Urban	Private health insurance and public health coverage
Bien, C., V. Patel, O. Blackstock and U. Felsen	Reaching Key Populations: PrEP Uptake in an Urban Health Care System in the Bronx, New York; AIDS & Behavior; 2017; 5; pp. 1309-1314	Journal article	Quantitative	Retrospective	HIV clinical cohort database			108	29% Black; 36% Hispanic	28 (IQR 24-37) years old	New York, US	Urban	Private health insurance and public health coverage

Table III 'Supplemental Table of Included Studies: Study Details'

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Bourne, A., B. Alba, A. Garner, G. Spiteri, A. Pharris and T. Noori	Use of, and likelihood of using, HIV pre-exposure prophylaxis among men who have sex with men in Europe and Central Asia: findings from a 2017 large geosocial networking application survey; Sexually Transmitted Infections; 2019	Journal article	Quantitative	Cross sectional	Gay social network			10, 562	Not mentioned	All ages	France; Russia; UK; Italy; Turkey; Ukraine; Germany; Belgium; Belarus; Spain; Netherlands; Denmark; Switzerland; Portugal; Sweden; Other	Both	Multiple
Buttram, M. E.	The informal use of antiretroviral medications for HIV prevention by men who have sex with men in South Florida: initiation, use practices, medications and motivations; Culture, Health & Sexuality; 2018; 20 (11); pp. 1185-1198	Journal article	Qualitative	Cross sectional	Health and social service agencies; LGBT community centre; community groups			30	23% Black; 37% White; 40% Hispanic	38 (18-62) years old	California, US	Urban	Private health insurance and public health coverage

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Calabrese, S. K., M. Magnus, K. H. Mayer, D. S. Krakower, A. I. Eldahan, L. A. Gaston Hawkins, N. B. Hansen, T. S. Kershaw, K. Underhill, J. R. Betancourt and J. F. Dovidio	Putting PrEP into practice: Lessons learned from early-adopting U.S. providers' firsthand experiences providing HIV pre-exposure prophylaxis and associated care; Plos One; 2016; 11 (6)	Journal article	Mixed methods	Cross sectional	Purposive, targeted, email sampling	18 HCPs who had prescribed PrEP	MSM; people who exchange sex; drug users; M2F TG				US	Both	Private health insurance and public health coverage
Chan, P. A., T. R. Glynn, C. E. Oldenburg, M. C. Montgomery, A. E. Robinette, A. Almonte, J. Raifman, L. Mena, R. Patel, K. H. Mayer, L. S. Beauchamps and A. S. Nunn	Implementation of Preexposure Prophylaxis for Human Immunodeficiency Virus Prevention Among Men Who Have Sex With Men at a New England Sexually Transmitted Diseases Clinic; Sexually Transmitted Diseases; 2016; 43 (11); pp. 717-723	Journal article	Quantitative	Cross sectional	Clinic			234	4% Asian; 9% Black/African American; 77% White	32.3 (18-72) years old	Rhode Island, US	Urban	Publically funded
Clement, M. E., N. L. Okeke, T. Munn, M. Hunter, K. Alexis, A. Corneli, A. C. Seña, K. McGee and M. S. McKellar	Partnerships Between a University-Affiliated Clinic and Community-Based Organizations to Reach Black Men Who Have Sex With Men for PrEP Care; Journal of Acquired Immune Deficiency Syndromes; 2018; 77 (2); e25-e27	Journal article	Quantitative	Retrospective cohort	Clinic			91 (including GBM)	5% Hispanic/Latino; 42% non-Hispanic/White; 46% non-Hispanic/Black	31 (19-66) years old	North Carolina, US	Urban	Private health insurance and public health coverage

Table III 'Supplemental Table of Included Studies: Study Details'

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Clement, M. E., J. Seidelman, J. Wu, K. Alexis, K. McGee, N. L. Okeke, G. Samsa and M. S. McKellar	An educational initiative in response to identified PrEP prescribing needs among PCPs in the Southern U.S; AIDS Care; 2018; 30 (5); pp. 650-655	Journal article	Quantitative	Cross sectional	Duke University Health System	115 PCPs	PCPs running PrEP educational campaign				North Carolina, US	Urban	Private health insurance and public health coverage
Daughtridge, G. W., S. C. Conyngham, N. Ramirez and H. C. Koenig	I Am Men's Health: Generating Adherence to HIV Pre-Exposure Prophylaxis (PrEP) in Young Men of Color Who Have Sex with Men; Journal of the International Association of Providers of AIDS Care; 2015; 14 (2); pp. 103-107	Journal article	Quantitative	Intervention cohort	Community program			20	4% American Indian; 4% Asian; 9% White; 9% Hispanic/Latino; 57% Black/African American	21 years old	Pennsylvania, US	Urban	Private health insurance and public health coverage
Desrosiers, A., M. Levy, A. Dright, M. Zumer, N. Jallah, I. Kuo, M. Magnus and M. Siegel	A Randomized Controlled Pilot Study of a Culturally-Tailored Counseling Intervention to Increase Uptake of HIV Pre-exposure Prophylaxis Among Young Black Men Who Have Sex with Men in Washington, DC; AIDS and Behavior; 2018; 23; pp. 105-115	Journal article	Quantitative	RCT	Jack'd, Grindr, Tinder and Adam4Adam social networking applications			50 HIV negative	Black/African American	16-25 years old	Washington, US	Urban	Private health insurance and public health coverage

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Doblecki-Lewis, S. and D. Jones	Community Federally Qualified Health Centers as Homes for HIV Preexposure Prophylaxis: Perspectives from South Florida; Journal of the International Association of Providers of AIDS Care; 2016; 15 (6); pp. 522-528	Journal article	Qualitative	Cross sectional	HIV-servicing community health centres	22 service providers, administrators or case managers	Recruited based on job role. At least one prescribing provider				Florida, US	Urban	Private health insurance and public health coverage
Doblecki-Lewis, S., A. Liu, D. Feaster, S. E. Cohen, G. Cardenas, O. Bacon, E. Andrew and M. A. Kolber	Healthcare Access and PrEP Continuation in San Francisco and Miami After the US PrEP Demo Project; Journal of Acquired Immune Deficiency Syndromes; 2017; 74 (5); pp. 531-538	Journal article	Quantitative	Cross sectional	Trial (US PrEP Demo Project)			173 former participants	Asian 2.9%; Black 9.9%; White 77.8%	All ages	California and Florida, US	Urban	Private health insurance and public health coverage
Dubov, A., L. Fraenkel, R. Yorick, A. Ogunbajo and F. L. Altice	Strategies to Implement Pre-exposure Prophylaxis with Men Who Have Sex with Men in Ukraine; AIDS & Behavior; 2018; 4; pp. 110-1112	Journal article	Quantitative	Cross sectional	LGBT NGO mailing lists; advertisements on websites; social networking applications			1,184	Not mentioned	28.6 years old	Ukraine	Both	Universal healthcare system
Eaton, L. A., D. D. Matthews, L. A. Bukowski, M. R. Friedman, C. J. Chandler, D. L. Whitfield, J. M. Sang and R. D. Stall	Elevated HIV Prevalence and Correlates of PrEP Use Among a Community Sample of Black Men who Have Sex with Men; Journal of Acquired Immune Deficiency Syndromes; 2018; 79; pp. 339-346	Journal article	Quantitative	Cross sectional	Gay pride event			4184 HIV negative	Black/African American	34.7 years old	Pennsylvania; Michigan; Washington; Georgia; Texas; Tennessee, US	Urban	Private health insurance and public health coverage

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Elst, E., J. Mbogua, D. Operario, G. Mutua, C. Kuo, P. Mugo, J. Kanungi, S. Singh, J. Haberer, F. Priddy and E. Sanders	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 & Behavior; 2013; 6; pp. 2162-2172	Journal article	Qualitative	Cross sectional	Exploratory data from RCT			51 (including FSW)	Black	26 (18-46) years old	Kenya, Africa	Urban	Public healthcare
Fuchs, J. D., K. Stojanovski, E. Vittinghoff, V. M. McMahan, S. G. Hosek, K. R. Amico, A. Kouyate, H. J. Gilmore, S. P. Buchbinder, R. T. Lester, R. M. Grant and A. Y. Liu	A Mobile Health Strategy to Support Adherence to Antiretroviral Preexposure Prophylaxis; AIDS Patient Care & STDS; 2018; 32 (3); pp. 104-111	Journal article	Mixed methods	Intervention evaluation	Trial (iPrEx)			52	Hispanic/Latino 11%; Black 13%; White 68%	49 (21-66) years old	California and Illinois, US	Urban	Private health insurance and public health coverage
Galea, J. T., J. J. Kinsler, X. Salazar, S. J. Lee, M. Giron, J. N. Sayles, C. Cáceres, W. E. Cunningham, J. T. Galea, J. J. Kinsler, X. Salazar, S. J. Lee, M. Giron, J. N. Sayles, C. Cáceres and W. E. Cunningham	Acceptability of pre-exposure prophylaxis as an HIV prevention strategy: barriers and facilitators to pre-exposure prophylaxis uptake among at-risk Peruvian populations; International Journal of STD & AIDS; 2011; 22 (5); pp. 256-262	Journal article	Qualitative	Cross sectional	Community outreach			17 (also included 15 FSW and 13 M2F TG)	Not mentioned	33 years old	Peru	Urban	Mixed health system: Ministry of Health, EsSalud, the Armed Forces (FFAA), National Police (PNP) and the private sector

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Galindo, G. R., J. J. Walker, P. Hazelton, T. Lane, W. T. Steward, S. F. Morin and E. A. Arnold	Community member perspectives from transgender women and men who have sex with men on pre-exposure prophylaxis as an HIV prevention strategy: implications for implementation; Implementation Science; 2012; 7 (1); p. 116	Journal article	Qualitative	Cross sectional	Community; word of mouth; flyers at social service groups; street			30 HIV negative and unknown status (includes M2F TG)	20% White; 33% Latino; 43% Black	36.1 (21-58) years old	California, US	Urban	Private health insurance and public health coverage
Gilmore, H. J., A. Liu, K. A. Koester, K. R. Amico, V. McMahan, P. Goicochea, L. Vargas, D. Lubensky, S. Buchbinder and R. Grant	Participant Experiences and Facilitators and Barriers to Pill Use Among Men Who Have Sex with Men in the iPrEx Pre-Exposure Prophylaxis Trial in San Francisco; AIDS Patient Care & STDs; 2013; 27 (10); pp. 560-566	Journal article	Qualitative	Cross sectional	Trial (iPrEx)			52	7% Asian; 12% African American; 15% Hispanic/Latino; 66% White	43 (22-66) years old	California, US	Urban	Private health insurance and public health coverage
Golub, S. A., K. E. Gamarel, H. J. Rendina, A. Surace and C. L. Lelutiu-Weinberger	From Efficacy to Effectiveness: Facilitators and Barriers to PrEP Acceptability and Motivations for Adherence Among MSM and Transgender Women in New York City; AIDS Patient Care & STDs; 2013; 27 (4); pp. 248-254	Journal article	Mixed methods	Cross sectional	Trial (iPrEx)			177 (including 7 M2F TG)	21% Latino; 38% Black	34.8 (18-58) years old	New York, US	Urban	Private health insurance and public health coverage

Table III 'Supplemental Table of Included Studies: Study Details'

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Grimm, J. and J. Schwartz	It's Like Birth Control for HIV: Communication and Stigma for Gay Men on PrEP; Journal of Homosexuality; 2018; pp. 2-20	Journal article	Qualitative	Cross sectional	Advertisements on Grindr and Scruff			39 HIV negative	6% Middle East or North African; 19% Latino; 69% White	35 years old	US	Both	Private health insurance and public health coverage
Grov, C. and N. Kumar	HIV Pre-Exposure Prophylaxis (PrEP) Is Coming to Europe, but Are Gay Men Ready to Accept It? Qualitative Findings from Berlin, Germany; Sexuality Research and Social Policy; 2018; 15 (3); pp. 283-289	Journal article	Qualitative	Cross sectional	Referrals from HIV prevention/treatment and LGBT advocacy organizations; advertising on MSM sexual networking website; peer-to-peer referral			20 (HIV negative and HIV positive)	Not mentioned	35.9 (24-54) years old	Germany	Urban	Universal multi-payer health care system paid for by a combination of statutory and private health insurance
Hoffman, S., J. A. Guidry, K. L. Collier, J. E. Mantell, D. Boccher-Lattimore, F. Kaighobadi and T. G. M. Sandfort	A Clinical Home for Preexposure Prophylaxis: Diverse Health Care Providers' Perspectives on the "Purview Paradox"; Journal of the International Association of Providers of AIDS Care; 2016; 15 (1); pp. 59-65	Journal article	Qualitative	Cross sectional	Co-investigators and members of expert panel initially contacted clinicians in their settings and networks	30 PCPs and HIV specialists	MSM; IDUs; high risk heterosexual women and men				New York, US	Urban	Private health insurance and public health coverage
Hojilla, J. C.	Optimizing the delivery of HIV pre-exposure prophylaxis (PrEP): An evaluation of risk compensation, disengagement, and the PrEP cascade: HIV serodisclosure among MSM and transgender women on HIV PrEP;	PhD	Quantitative	Retrospective	Trial (iPrEx)			1,184	Not mentioned	30 years old	Brazil; Ecuador; Peru; South Africa; Thailand; USA	Both	Multiple

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
	AAI10282719; 2018; pp. 11-32												
Hojilla, J. C.	Optimizing the delivery of HIV pre-exposure prophylaxis (PrEP): An evaluation of risk compensation, disengagement, and the PrEP cascade: Stimulant use is associated with PrEP disengagement in men who have sex with men and transgender women; AAI10282719; 2018; pp. 33-51	PhD	Quantitative	Retrospective cross sectional	Trial (iPrEx)			330	57% Latino/Hispanic	29 (19-70) years old	Brazil; Ecuador; Peru; South Africa; Thailand; USA	Both	Multiple
Hojilla, J. C., D. Vlahov, P. Crouch, C. Dawson-Rose, K. Freeborn and A. Carrico	HIV Pre-exposure Prophylaxis (PrEP) Uptake and Retention Among Men Who Have Sex with Men in a Community-Based Sexual Health Clinic; AIDS & Behavior; 2018; 4; pp. 1096-1099	Journal article	Quantitative	Retrospective cross sectional	Self-referred; offered PrEP by clinicians			344	65% White; 74% non-Hispanic	31 years old	California, US	Urban	Nurse-led community based clinic that provides free sexual health services

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Hubach, R. D., J. M. Currin, C. A. Sanders, A. R. Durham, K. E. Kavanaugh, D. L. Wheeler and J. M. Croff	Barriers to Access and Adoption of Pre-Exposure Prophylaxis for the Prevention of HIV Among Men Who Have Sex With Men (MSM) in a Relatively Rural State; AIDS Education & Prevention; 2017; 29 (4); pp. 315-329	Journal article	Qualitative	Cross sectional	Internet-based directed marketing; purposive approaches; electronic advertisements placed on a variety of social and sexual networking websites; flyers in LGBT venues			20 (includes GBM)	Black/African American 5%; Native American/Alaskan 10%; White/non-Hispanic 80%	36.4 (22-66) years old	Oklahoma, US	Rural	Private health insurance and public health coverage
Jaiswal, J., M. Griffin, S. N. Singer, R. E. Greene, I. L. Z. Acosta, S. K. Kaudeyr, F. Kapadia and P. N. Halkitis	Structural Barriers to Pre-exposure Prophylaxis Use Among Young Sexual Minority Men: The P18 Cohort Study; Current HIV Research; 2018; 16 (3); pp. 237-249	Journal article	Quantitative	Longitudinal cohort	Trial			492	Asian 7.7%; White 25%; Black 27%; Hispanic/Latino 32%	22.47 years old	New York, US	Urban	Private health insurance and public health coverage
John, S. A., H. J. Rendina, C. Grov and J. T. Parsons	Home-based pre-exposure prophylaxis (PrEP) services for gay and bisexual men: An opportunity to address barriers to PrEP uptake and persistence; Plos One; 2017; 12 (12); pp. 1-14	Journal article	Quantitative	Longitudinal cohort	Trial (One Thousand Strong)			906 HIV negative (includes GBM)	Black 7%; Latino 12%; White 72%	41.9 years old	US	Both	Private health insurance and public health coverage
Karris, M. Y., S. E. Beekmann, S. R. Mehta, C. M. Anderson and P. M. Polgreen	Are we prepped for preexposure prophylaxis (PrEP)? Provider opinions on the real-world use of PrEP in the United States and Canada; Clinical Infectious Diseases: An Official	Journal article	Quantitative	Cross sectional	Provider-based network of infectious disease physicians; Emerging Infections Network	573 infectious disease physicians	Infectious diseases				US; Canada	Both	Private health insurance and public health coverage

Table III 'Supplemental Table of Included Studies: Study Details'

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
	Publication of the Infectious Diseases of America; 2014; 58 (5); pp. 704-712												
Klassen, B. J., S. Y. Lin, N. J. Lachowsky, R. S. Hogg, D. M. Moore, E. A. Roth, J. B. Edward and S. A. Chown	Gay Men's Understanding and Education of New HIV Prevention Technologies in Vancouver, Canada; Qualitative Health Research; 2017; 27 (12); pp. 1775-1791	Journal article	Qualitative	Longitudinal cohort	Trial (Momentum Health Study)			15 HIV negative	Not mentioned	38 (22-58) years old	Vancouver, Canada	Urban	Provincial and territorial systems of publicly funded health care
Krakower, D. S., N. C. Ware, K. M. Maloney, I. B. Wilson, J. B. Wong and K. H. Mayer	Differing Experiences with Pre-Exposure Prophylaxis in Boston Among Lesbian, Gay, Bisexual, and Transgender Specialists and Generalists in Primary Care: Implications for Scale-Up; AIDS Patient Care & STDs; 2017; 31 (7); pp. 297-304	Journal article	Qualitative	Cross sectional	Purposive sampling from a community health centre	31 service providers and PCPs	LGBT patients				Massachusetts, US	Urban	Private health insurance and public health coverage
Kurtz, S. P. and M. E. Buttram	Misunderstanding of Pre-Exposure Prophylaxis Use Among Men Who Have Sex with Men: Public Health and Policy Implications; 2016; LGBT Health; 3 (6); pp. 461-464	Journal article	Qualitative	Cross sectional	GPS-based social networking applications (e.g., Grindr, SCRUFF			31 HIV negative/unknown status	19% White; 23% African American/B lack; 55% Hispanic	27.2 years old	Florida, US	Urban	Private health insurance and public health coverage

Table III 'Supplemental Table of Included Studies: Study Details'

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Kwakwa, H. A., S. Bessias, D. Sturgis, G. Walton, R. Wahome, O. Gaye and M. Jackson	Engaging United States Black Communities in HIV Pre-exposure Prophylaxis: Analysis of a PrEP Engagement Cascade; Journal of National Medical Association; 2018; 110 (5); pp. 480-485	Journal article	Quantitative	Cross sectional	Referrals from city health centre PrEP program			785 (485 male)	4% Hispanic; 8% White; 88% Black	26 years old	Pennsylvania, US	Urban	Free primary care and HIV specialist services
Landovitz, R. J., M. Beymer, R. Kofron, K. R. Amico, C. Psaros, L. Bushman, P. L. Anderson, R. Flynn, D. P. Lee, R. K. Bolan, W. C. Jordan, C. Tseng, J. R. Dierst-Davies, J. Rooney and A. R. Wohl	Plasma Tenofovir Levels to Support Adherence to TDF/FTC Preexposure Prophylaxis for HIV Prevention in MSM in Los Angeles, California; Journal of Acquired Immune Deficiency Syndromes; 2017; 76 (5); pp. 501-511	Journal article	Quantitative	Intervention cohort (PrEP-based and PEP based cohorts)	Trial (PATH-PrEP)			329 (includes PEP users; 1 M2F TG)	11% Black/African American; 28% Hispanic/Latino; 50% White	34 (20-69) years old	California, US	Urban	Private health insurance and public health coverage
Lelutiu-Weinberger, C. and S. A. Golub	Enhancing PrEP Access for Black and Latino Men Who Have Sex With Men; Journal of Acquired Immune Deficiency Syndromes; 2016; 73 (5); pp. 547-555	Journal article	Quantitative	Cross sectional	Flyers in local venues; placement of study ads on websites and mobile applications, e.g. Grindr, Adam4Adam, or Craigslist; outreach at bars, events, community-based organisations; participant referral			491	23% Latino; 33% Black/African American; 37% White	All ages	New York, US	Urban	Private health insurance and public health coverage

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Levy, M. E., C. C. Watson, S. N. Glick, I. Kuo, L. Wilton, R. A. Brewer, S. D. Fields, V. Criss and M. Magnus	Receipt of HIV prevention interventions is more common in community-based clinics than in primary care or acute care settings for Black men who have sex with men in the District of Columbia; AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV; 2016; 28 (5); pp. 660-664	Journal article	Quantitative	Cross sectional	PrEP project (Pursuing Real and Innovative Ideas to Remove Structural Barriers for Men)			75	Black	26 (18-60) years old	Washington, US	Urban	Private health insurance and public health coverage
Liu, A. Y., E. Vittinghoff, P. von Felten, K. R. Amico, P. L. Anderson, R. Lester, E. Andrew, I. Estes, P. Serrano, J. Brothers, S. Buchbinder, S. Hosek and J. D. Fuchs	Randomized Controlled Trial of a Mobile Health Intervention to Promote Retention and Adherence to Pre-exposure Prophylaxis among Young People at Risk for Human Immunodeficiency Virus: The EPIC Study; Clinical Infectious Diseases: An Official Publication of the Infectious Diseases Society of America; 2018	Journal article	Quantitative	RCT (EPIC study - PrEPmat e vs Standard of Care arms)	Ruth M. Rothstein CORE Center, a public health clinic focused on HIV prevention, care, and research			121	28% Black; 36% Latino	24.2 (18-29) years old	Illinois, US	Urban	Private health insurance and public health coverage
Maloney, K. M., D. S. Krakower, D. Ziobro, J. G. Rosenberger, D. Novak and K. H. Mayer	Culturally Competent Sexual Healthcare as a Prerequisite for Obtaining Preexposure Prophylaxis: Findings from a Qualitative Study; LGBT Health;	Journal article	Qualitative	Cross sectional	Sexual networking website			24	13% Hispanic/Latino; 88% White	48 (40-52) years old	US	Both	Private health insurance and public health coverage

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
	2017; 4 (4); pp. 310-314												
Marcus, J. L., L. B. Hurley, C. B. Hare, D. P. Nguyen, T. Phengrasamy, M. J. Silverberg, J. E. Stoltey and J. E. Volk	Preexposure Prophylaxis for HIV Prevention in a Large Integrated Health Care System: Adherence, Renal Safety, and Discontinuation; JAIDS: Journal of Acquired Deficiency Syndrome; 2016; 73 (5); pp. 540-546	Journal article	Quantitative	Cohort	Clinic			972	4% Black; 10% Asian; 12% Hispanic; 70% White	37.5 (18-68) years old	California, US	Both	Integrated health care system
Marcus, J. L., K. Levine, C. Grasso, D. S. Krakower, V. Powell, K. T. Bernstein, S. Boswell and K. H. Mayer	HIV Preexposure Prophylaxis as a Gateway to Primary Care; American Journal of Public Health; 2018; 108 (10); pp. 1418-1420	Journal article	Quantitative	Cross sectional	Clinic			5,857 (2,047 PrEP users)	Black 5%; Asian 6%; Hispanic 14%	33 years old	Boston, Massachusetts	Urban	Private health insurance and public health coverage
Marks, S. J., R. C. Merchant, M. A. Clark, T. Liu, J. G. Rosenberger, J. Bauermeister and K. H. Mayer	Potential Healthcare Insurance and Provider Barriers to Pre-Exposure Prophylaxis Utilization Among Young Men Who Have Sex with Men; AIDS Patient Care & STDs; 2017; 31 (11); pp. 470-478	Journal article	Quantitative	Cross sectional	Social media			1,197 HIV negative (80 PrEP users)	12% Black; 29% Hispanic; 39% White	18-24 years old	US	Both	Private health insurance and public health coverage

Table III 'Supplemental Table of Included Studies: Study Details'

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Mayer, K., S. Safren, S. Elsesser, C. Psaros, J. Tinsley, M. Marzinke, W. Clarke, C. Hendrix, S. Wade Taylor, J. Haberer and M. Mimiaga	Optimizing Pre-Exposure Antiretroviral Prophylaxis Adherence in Men Who Have Sex with Men: Results of a Pilot Randomized Controlled Trial of 'Life-Steps for PrEP'; AIDS & Behavior; 2017; 5; pp. 1350-1360	Journal article	Quantitative	RCT	Community outreach; advertisements; flyers; social media; clinic			39	2% Black/African American; 8% Hispanic/Latino; 86% White	38.4 (25-50) years old	New England (Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut), US	Both	Private health insurance and public health coverage
Merchant, R. C., D. Corner, E. Garza, W. Guan, K. H. Mayer, L. Brown and P. A. Chan	Preferences for HIV pre-exposure prophylaxis (PrEP) information among men-who-have-sex-with-men (MSM) at community outreach settings; Journal of Gay & Lesbian Mental Health; 2016; 20 (1); pp. 21-33	Journal article	Quantitative	Cross sectional	Gay pride event; bars and nightclubs			209	1% Asian; 8% Black/African American; 10% Hispanic; 75% White	30 (24-44) years old	Rhode Island, US	Urban	Private health insurance and public health coverage
Mitchell, J. T., S. LeGrand, L. B. Hightow-Weidman, M. S. McKellar, A. D. M. Kashuba, M. Cottrell, T. McLaurin, G. Satapathy and F. J. McClernon	Smartphone-Based Contingency Management Intervention to Improve Pre-Exposure Prophylaxis Adherence: Pilot Trial; JMIR Mhealth and Uhealth; 2018; 6 (9); p. e10456	Journal article	Mixed methods	RCT	Community advertisements; word of mouth			10	20% Asian; 70% White	24.1 years old	US	Both	Private health insurance and public health coverage

Table III 'Supplemental Table of Included Studies: Study Details'

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Mullins, T. L. K., G. Zimet, M. Lally, J. Xu, S. Thornton and J. A. Kahn	HIV Care Providers' Intentions to Prescribe and Actual Prescription of Pre-Exposure Prophylaxis to At-Risk Adolescents and Adults; AIDS Patient Care & STDs; 2017; 31 (12); pp. 504-516	Journal article	Mixed methods	Cross sectional	Research network (National Institutes of Health funded Adolescent Medicine Trials Network for HIV/AIDS Interventions (ATN))	56 clinicians	Provided care to HIV infected youth				US	Both	Private health insurance and public health coverage
Mutua, G., E. Sanders, P. Mugo, O. Anzala, J. E. Haberer, D. Bangsberg, B. Barin, J. F. Rooney, D. Mark, P. Chetty, P. Fast and F. H. Priddy	Safety and adherence to intermittent pre-exposure prophylaxis (PrEP) for HIV-1 in African men who have sex with men and female sex workers; Plos On; 2012; 7 (4); p. e33103	Journal article	Quantitative	RCT	Centres that provide comprehensive HIV prevention package to at-risk research volunteers			72 (includes FSW)	Black	26 (18-46) years old	Kenya, Africa	Both	Public healthcare
Newman, P. A., A. Guta, A. Lacombe-Duncan and S. Tepjan	Clinical exigencies, psychosocial realities: negotiating HIV pre-exposure prophylaxis beyond the cascade among gay, bisexual and other men who have sex with men in Canada; Journal of the International AIDS Society; 2018; 21 (11); p. e25211	Journal article	Qualitative	Exploratory cross sectional	Flyers; community outreach; word of mouth			29 (GBM or PrEP user)	21% 'person of colour'; 79% White	36.7 years old	Toronto, Canada	Both	Provincial and territorial systems of publicly funded health care
Ojikutu, B., L. Bogart, K. Mayer, T. Stopka, P. Sullivan and Y. Ransome	Spatial Access and Willingness to Use Pre-Exposure Prophylaxis Among Black/African American Individuals in the United States: Cross-Sectional Survey; JMIR Public	Journal article	Quantitative	Cross sectional	Probability-based, online, nonvolunteer Web panel			787	Black/African American	34 years old	US	Both	Private health insurance and public health coverage

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
	Health and Surveillance; 2019; 5 (1)												
Ojile, N., D. Sweet and K. J. Kallail	A Preliminary Study of the Attitudes and Barriers of Family Physicians to Prescribing HIV Preexposure Prophylaxis; Kansas Journal of Medicine; 2017; 10 (2); pp. 40-42	Journal article	Quantitative	Observational cross sectional	Email through practice based research network of family physicians	20 service providers	Prescribing PrEP to high risk individuals				Kansas, US	Both	Private health insurance and public health coverage
Paparini, S., W. Nutland, T. Rhodes, V. Nguyen and J. Anderson	DIY HIV prevention: Formative qualitative research with men who have sex with men who source PrEP outside of clinical trials; Plos One; 2018; 13 (8); p. e0202830	Journal article	Qualitative	Cross sectional	Advertisements on social networking applications			20	0.5% Black/African; 1% Indian; 80% White	29-56 years old	London, UK	Urban	Healthcare to all through NHS
Parisi, D., B. Warren, S. J. Leung, T. Akkaya-Hocagil, Q. Qin, I. Hahn and L. Stevens	A Multicomponent Approach to Evaluating a Pre-exposure Prophylaxis (PrEP) Implementation Program in Five Agencies in New York; JANAC; Journal of the Association of Nurses in AIDS Care; 2018; 29 (1)	Journal article	Quantitative	Intervention evaluation	TIIP			171 (includes M2F TG)	9% Asian; 13% Hispanic; 15% Black; 60% White	All ages	New York, US	Urban	Private health insurance and public health coverage

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Parsons, J. T., S. A. John, T. H. F. Whitfield, J. Cienfuegos-Szalay and C. Grov	HIV/STI counseling and testing services received by gay and bisexual men using pre-exposure prophylaxis (PrEP) at their last PrEP care visit; Sexually Transmitted Diseases; 2018; 45 (12); pp. 798-802	PhD	Quantitative	Cross sectional	Advertising; gay concentrated neighborhoods and settings (e.g., gay bars, pride events, at LGBT communitybased venues); digital recruitment (gay hookup websites and apps); social media			104 GBM	13% Black; 27% Latino; 52% White	32.5 (21-61) years old	New York, US	Urban	Private health insurance and public health coverage
Pasipanodya, E. C., S. Jain, X. Sun, J. Blumenthal, E. Ellorin, K. Corado, M. P. Dube, E. S. Daar, S. R. Morris and D. J. Moore	Trajectories and Predictors of Longitudinal Preexposure Prophylaxis Adherence Among Men Who Have Sex With Men; Journal of Infectious Diseases; 2018; 218 (10); pp. 1551-1559	Journal article	Quantitative	RCT	Clinic			181	15% Black; 81% White	34.98 years old	California, US	Both	Private health insurance and public health coverage
Patel, R. R., P. A. Chan, L. C. Harrison, K. H. Mayer, A. Nunn, L. A. Mena and W. G. Powderly	Missed Opportunities to Prescribe HIV Pre-Exposure Prophylaxis by Primary Care Providers in Saint Louis, Missouri; LGBT Health; 2018; 5 (4); pp. 250-256	Journal article	Quantitative	Cross sectional	Clinic			102	3% Asian; 3% Hispanic/Latino; 31% Black; 58% White	29 (25-34) years old	Missouri, US	Urban	Private health insurance and public health coverage

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Phanuphak, N., T. Sungsing, J. Jantarapakde, S. Pengnonyang, D. Trachunthong, P. Mingkwanrungruang, W. Sirisakyot, P. Phiayura, P. Seekaew, P. Panpet, P. Meekruea, N. Praweprai, F. Suwan, S. Sangtong, P. Brutrat, T. Wongsri, P. R. Na Nakorn, S. Mills, M. Avery and R. Vannakit	Princess PrEP program: the first key population-led model to deliver pre-exposure prophylaxis to key populations in Thailand; Sexual Health; 2018; 15 (6); pp. 542-555	Journal article	Quantitative	Intervention evaluation	Community Health Centres			1,697 (1,467 MSM)	95% Thai	28.8 years old	Thailand	Rural	Universal health coverage in public funded health facilities
Philbin, M. M., C. M. Parker, R. G. Parker, P. A. Wilson, J. Garcia and J. S. Hirsch	Gendered Social Institutions and Preventive Healthcare Seeking for Black Men Who Have Sex with Men: The Promise of Biomedical HIV Prevention; Archives of Sexual Behavior; 2018; 7; pp. 2091-2100	Journal article	Qualitative	Ethnographic	Clinic	17 community stakeholders (outreach workers, community mobilizers, healthcare professionals)	HIV prevention and/or BMSM health	31	Black	29 years old	New York, US	Urban	Private health insurance and public health coverage
Raifman, J., A. Nunn, C. E. Oldenburg, M. C. Montgomery, A. Almonte, A. L. Agwu, R. Arrington-Sanders, P. A. Chan and R. Arrington-Sanders	An Evaluation of a Clinical Pre-Exposure Prophylaxis Education Intervention among Men Who Have Sex with Men; Health Services Research; 2018; 53 (4); 2249-2267	Journal article	Quantitative	Intervention evaluation	Self-reported data on PrEP awareness and use from STD clinic intake forms			316	20% White; 34% Latino; 50% Black	All ages	Rhode Island, US	Both	Private health insurance and public health coverage

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Raifman, J. R. G., C. Flynn and D. German	Healthcare Provider Contact and Pre-exposure Prophylaxis in Baltimore Men Who Have Sex With Men; American Journal of Preventive Medicine; 2017; 52 (1); 55-63	Journal article	Quantitative	Cross sectional	Baltimore MSM National HIV Behavioral Surveillance data			401	Hispanic 5%; White 25%; Black 60%	34 years old	Maryland, US	Urban	Private health insurance and public health coverage
Refugio, O. N., M. M. Kimble, C. L. Silva, J. E. Lykens, C. Bannister and J. D. Klausner	PrEPTECH: a telehealth-based initiation program for human immunodeficiency virus pre-exposure prophylaxis in young men of color who have sex with men. A pilot study of feasibility; Journal of Acquired Immune Deficiency Syndromes; 2018; 80; pp. 40-45	Journal article	Quantitative	Longitudinal cross sectional	Grindr; posters; flyers at gay venues; word of mouth			25 HIV negative YMSM	Black/African American 8%; White 16%; Asian 32%; Hispanic/Latino 40%	22 (18-25) years old	California, US	Urban	Cost-free PrEP services through telehealth
Ridgway, J. P., E. A. Almirol, A. Bender, A. Richardson, J. Schmitt, E. Friedman, N. Lancki, I. Leroux, N. Pieroni, J. Dehlin and J. A. Schneider	Which Patients in the Emergency Department Should Receive Preexposure Prophylaxis? Implementation of a Predictive Analytics Approach; AIDS Patient Care and STDs; 2018; 32 (5); pp. 202-207	Journal article	Quantitative	Cross sectional	EMR from Emergency Departments			164 potential candidates for HIV prevention services	Latino 4%; White 4%; Black/African American 90%	25.4 years old	Illinois, US	Urban	Private health insurance and public health coverage

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Rivierez, I., G. Quatremere, B. Spire, J. Ghosn and D. Rojas Castro	Lessons learned from the experiences of informal PrEP users in France: results from the ANRS-PrEPAGE study; AIDS Care; 2018; 30; pp. 48-53	Journal article	Qualitative	Cross sectional	Community based organisations; social media			24	Not mentioned	38.5 (30-43) years old	France	Both	Universal health care largely financed by government national health insurance
Rusie, L. K., C. Orengo, D. Burrell, A. Ramachandran, M. Houlberg, K. Keglovitz, D. Munar and J. A. Schneider	Preexposure Prophylaxis Initiation and Retention in Care Over 5 Years, 2012-2017: Are Quarterly Visits Too Much?; Clinical Infectious Diseases; 2018; 67 (2); 283-287	Journal article	Quantitative	Cross sectional	Clinic			5,583	Asian 6%; Black 16%; Hispanic 16%; White 58%	All ages	Illinois, US	Urban	Private health insurance and public health coverage
Shover, C. L., M. Javanbakht, S. Shoptaw, R. K. Bolan, L. Sung-Jae, J. T. Parsons, J. Rendina and P. M. Gorbach	HIV Preexposure Prophylaxis Initiation at a Large Community Clinic: Differences Between Eligibility, Awareness, and Uptake; American Journal of Public Health; 2018; 108 (10); pp. 1409-1417	Journal article	Quantitative	Cross sectional	Community clinic (The Los Angeles LGBT Center)			19,875 (includes TG)	Black/African American 7%; Asian 9%; Hispanic/Latino 32%; White 42%	All ages	California, US	Urban	Free and low-cost HIV and STI testing
Siegler, A. J., A. Bratcher, K. M. Weiss, F. Mouhanna, L. Ahlschlager and P. S. Sullivan	Location location: an exploration of disparities in access to publicly listed pre-exposure prophylaxis clinics in the United States; Annals of Epidemiology; 2018	Journal article	Quantitative	Cross sectional	National database (PrEP Locator)			2,094	Differences across counties and States discussed	Not mentioned	US	Both	Private health insurance and public health coverage

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Smith, D. K., L. Toledo, D. J. Smith, M. A. Adams and R. Rothenberg	Attitudes and Program Preferences of African-American Urban Young Adults About Pre-Exposure Prophylaxis (PrEP); AIDS Educaiton & Prevention; 2012; 24 (5); pp. 408-421	Journal article	Qualitative	Cross sectional	Ongoing study			19 (also includes 58 mixed gender)	African American	21 (18-24) years old	Georgia, US	Urban	Private health insurance and public health coverage
Spinelli, M. A., H. M. Scott, E. Vittinghoff, A. Y. Liu, A. Morehead-Gee, R. Gonzalez and S. P. Buchbinder	Provider adherence to pre-exposure prophylaxis monitoring guidelines in a large primary care network; Open Forum Infectious Diseases; 2018; 5 (6)	Journal article	Quantitative	Cross sectional	Clinic			405	Asian 8%; African American 13%; 26% Latino; 36% White	34 years old	California, US	Urban	Private health insurance and public health coverage
Stekler, J. D., V. McMahan, L. Ballinger, L. Viquez, F. Swanson, J. Stockton, B. Crutsinger-Perry, D. Kern and J. D. Scott	HIV Pre-exposure Prophylaxis Prescribing Through Telehealth; Journal of Acquired Immune Deficiency Syndromes; 2018; 77 (5); pp. e40-e42	Letter to Editor	Quantitative	Cross sectional	Clinic telephone and email inquiries; other community-based organizations; following HIV testing appointments			48 (10 telehealth participants; 38 Gay City PrEP clients)	Telehealth: 20% White, 20% Asian, 30% Hispanic; Gay City PrEP clients: 5% Asian, 29% Hispanic, 42% White	Telehealth: 30 (20-38) years old; Gay City PrEP clients: 27 (19-46) years old	California, US	Urban	Private health insurance and public health coverage
Sullivan, P. S., R. Driggers, J. D. Stekler, A. J. Siegler, T. Goldenberg, S. J. McDougal, J. Caucutt, J. Jones and R. Stephenson	Usability and Acceptability of a Mobile Comprehensive HIV Prevention App for Men Who Have Sex With Men: A Pilot Study; JMIR Mhealth and Uhealth; 2017; 5 (3); p. e26	Journal article	Mixed methods	Intervention evaluation	Social media; sexual networking mobile phone app			121	Hispanic/Latino 8%; Asian 10%; Black/African American 21%; White 52%	28 (24-34) years old	Georgia; California, US	Urban	Private health insurance and public health coverage

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Sun, C., K. Anderson, D. Bangsberg, K. Toevs, D. Morrison, C. Wells, P. Clark and C. Nicolaidis	Access to HIV Pre-exposure Prophylaxis in Practice Settings: a Qualitative Study of Sexual and Gender Minority Adults’ Perspectives; Journal of General Intern Medicine; 2019	Journal article	Qualitative	Cross sectional	AIDS service organizations; LGBTQcommunity centers; local health departments; word of mouth; print flyers; social media			27 (sexual and gender minorities)	Latino 19%; White 70%	38 (21-67 years old)	Oregon, US	Both	Private health insurance and public health coverage
Tangmunkongvorakul, A., S. Chariyalertsak, R. K. Amico, P. Saokhieo, V. Wannalak, T. Sangangamsakun, P. Goicochea and R. Grant	Facilitators and barriers to medication adherence in an HIV prevention study among men who have sex with men in the iPrEx study in Chiang Mai, Thailand; AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV; 2013; 25 (8); pp. 961-967	Journal article	Qualitative	Cross sectional	Trial (iPrEx)			14 (focus groups); 32 (interviews); both HIV negative	Not mentioned	19-37 years old	Chiang Mai, Thailand	Urban	Universal health coverage in public funded health facilities
Tellalian, D., K. Maznavi, U. F. Bredeek and W. D. Hardy	Pre-Exposure Prophylaxis (PrEP) for HIV Infection: Results of a Survey of HIV Healthcare Providers Evaluating Their Knowledge, Attitudes, and Prescribing Practices; AIDS Patient Care & STDS; 2013; 27 (10); pp. 553-559	Journal article	Quantitative	Cross sectional	Research network (American Academy of HIV Medicine)	189 HIV HCPs	Prescribing PrEP to high risk individuals				US	Both	Private health insurance and public health coverage

Table III 'Supplemental Table of Included Studies: Study Details'

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
Underhill, K., K. M. Morrow, C. M. Colleran, R. Holcomb, D. Operario, S. K. Calabrese, O. Galarraga and K. H. Mayer	Access to Healthcare, HIV/STI Testing, and Preferred Pre-Exposure Prophylaxis Providers among Men Who Have Sex with Men and Men Who Engage in Street-Based Sex Work in the US; Plos One; 2014; 9 (11)	Journal article	Qualitative	Cross sectional	Outreach in entertainment venues, sex work venues; community-based organizations; clinics;advertising in local media serving MSM			38 (focus groups - 17 MSM); 26 (interviews - 25 MSM); includes MSWs	MSM focus groups: 12% Hispanic/Latino, 29% African American, 71% White; MSM interviews: 4% Asian, 12% African American, 24% Hispanic/Latino, 76% White	MSM focus groups: 39 (27-61) years old; MSM interviews: 33 (21-70) years old	Rhode Island, US	Urban	Private health insurance and public health coverage
Vaccher, S. J., J. M. Kaldor, D. Callander, I. B. Zablotska and B. G. Haire	Qualitative Insights Into Adherence to HIV Pre-Exposure Prophylaxis (PrEP) Among Australian Gay and Bisexual Men; AIDS Patient Care & STDS; 2018; 32 (12); pp. 519-528	Journal article	Qualitative	Cross sectional	Advertisements on online social networking sites; contacting participants in PrEP implementation studies who had consented to be contacted for other research			24 HIV negative GBM	Not mentioned	38 (18-53) years	Sydney, Australia	Urban	Public healthcare
Witzel, T. C., W. Nutland and A. Bourne	What qualities in a potential HIV pre-exposure prophylaxis service are valued by black men who have sex with men in London? A qualitative acceptability study; International Journal of STD & AIDS; 2018; 29 (8); pp. 760-765	Journal article	Qualitative	Cross sectional	Gay-specific geolocation social networking applications (apps); social media; PROUD study mailing list through the Medical Research			25	Black	31.1 (18-45) years old	London, UK	Urban	Healthcare to all through NHS

Table III ‘Supplemental Table of Included Studies: Study Details’

Authors	Title	Article type	Study details			HCP		MSM			Geography		
			Method	Design	Recruited from	Number	Targeting	Number	Race	Age	Location	Urban/rural	Health system
					Council Clinical Trials Unit								

MSM – men who have sex with men; YMSM – young men who have sex with men; HCP – healthcare provider/professional; PCP – primary care provider; FSW – female sex worker; MSW – male sex worker; TG – transgender; TGW – transgender woman; M2F – male to female; F2M – female to male; CBC – community-based clinic; RCT – randomised control trial; PEP – post-exposure prophylaxis; GBM – gay and bisexual men; TPIP – Targeted PrEP Implementation Programme; iPrEX – implementation study; EMR – electronic medical records; iNSC – integrated Next Step Counselling; CRF – case report form; O2O – online to offline; NHS – National Health Service; IDU – intravenous drug user; NA – Neutral Assessment; STD – sexually transmitted disease; HB-PrEP – home based pre-exposure prophylaxis; CAS – condomless anal sex.



Change of authorship request form (pre-acceptance)

Please read the important information on page 4 before you begin

This form should be used by authors to request any change in authorship including changes in corresponding authors. Please fully complete all sections. Use black ink and block capitals and provide each author’s full name with the given name first followed by the family name.

Please note: In author collaborations where there is formal agreement for representing the collaboration, it is sufficient for the representative or legal guarantor (usually the corresponding author) to complete and sign the Authorship Change Form on behalf of all authors.

Section 1: Please provide the current title of manuscript
(For journals: Please provide the manuscript ID, title and/or DOI if available.)
(For books: Please provide the title, ISBN and/or DOI if available.)

Manuscript ID no. in case of unpublished manuscript:	AIBE-D-19-006006R2
DOI in case of published manuscript:	
ISBN (for books):	

Title: Pre-exposure Prophylaxis (PrEP) for HIV prevention among men who have sex with men (MSM): a scoping review on PrEP service delivery and programming.

Section 2: Please provide the previous authorship, in the order shown on the manuscript before the changes were introduced. Please indicate the corresponding author by adding (CA) behind the name.

	First name(s)	Family name	ORCID or SCOPUS id, if available
1 st author	Alyson	Hillis	
2 nd author	Marie Claire	Van Hout	
3 rd author	Jennifer	Germain	
4 th author	Vivian	Hope	
5 th author	James	McVeigh	
6 th author			
7 th author			

Please use an additional sheet if there are more than 7 authors.

Change of authorship request form (pre-acceptance)

Section 3: Please provide a justification for change. Please use this section to explain your reasons for changing the authorship of your manuscript, e.g. what necessitated the change in authorship? Please refer to the (journal) policy pages for more information about authorship. Please explain why omitted authors were not originally included and/or why authors were removed on the submitted manuscript.

Marie Claire Van Hout was made corresponding author on the editorial manager portal. When this happened, her name was moved to second author. Previously Marie Claire Van Hout was the final author (as per the title page uploaded prior to the first round of reviews). The discrepancy was noticed during the most recent resubmission.

Section 4: Proposed new authorship. Please provide your new authorship list in the order you would like it to appear on the manuscript. Please indicate the corresponding author by adding (CA) behind the name. If the corresponding author has changed, please indicate the reason under section 3.

	First name(s)	Family name (this name will appear in full on the final publication and will be searchable in various abstract and indexing databases)
1 st author	Alyson	Hillis
2 nd author	Jennifer	Germain
3 rd author	Vivian	Hope
4 th author	James	McVeigh
5 th author	Marie Claire	Van Hout
6 th author		
7 th author		

Please use an additional sheet if there are more than 7 authors.

Change of authorship request form (pre-acceptance)

Section 5: Author contribution, Acknowledgement and Disclosures. Please use this section to provide a new disclosure statement and, if appropriate, acknowledge any contributors who have been removed as authors and ensure you state what contribution any new authors made (if applicable per the journal or book (series) policy). **Please ensure these are updated in your manuscript - after approval of the change(s) - as our production department will not transfer the information in this form to your manuscript.**

New acknowledgements:

N/A

New Disclosures (financial and non-financial interests, funding):

N/A

New Author Contributions statement (if applicable per the journal policy):






N/A

State 'Not applicable' if there are no new authors.

Change of authorship request form (pre-acceptance)

Section 6: Declaration of agreement. All authors, unchanged, new and removed *must* sign this declaration.

(NB: Please print the form, sign and return a scanned copy. Please note that signatures that have been inserted as an image file are acceptable as long as it is handwritten. Typed names in the signature box are unacceptable.) * Please delete as appropriate. Delete all of the bold if you were on the original authorship list and are remaining as an author.

	First name	Family name		Signature	Affiliated institute	Date
1 st author	Alyson	Hillis	I agree to the proposed new authorship shown in section 4 /and the addition/removal*of my name to the authorship list.		Faculty of Health, Public Health Institute Liverpool John Moores University Liverpool	13/01/2020
2 nd author	Jennifer	Germain	I agree to the proposed new authorship shown in section 4 /and the addition/removal*of my name to the authorship list.		Faculty of Health, Public Health Institute Liverpool John Moores University Liverpool	13/01/2020
3 rd author	Vivian	Hope	I agree to the proposed new authorship shown in section 4 /and the addition/removal*of my name to the authorship list.		Faculty of Health, Public Health Institute Liverpool John Moores University Liverpool	13/01/2020
4 th authors	James	McVeigh	I agree to the proposed new authorship shown in section 4 /and the addition/removal*of my name to the authorship list.		Faculty of Health, Public Health Institute Liverpool John Moores University Liverpool	13/01/2020
5 th author	Marie Claire	Van Hout	I agree to the proposed new authorship shown in section 4 /and the addition/removal*of my name to the authorship list.		Faculty of Health, Public Health Institute Liverpool John Moores University Liverpool	13/01/2020
6 th author			I agree to the proposed new authorship shown in section 4 /and the addition/removal*of my name to the authorship list.			
7 th author			I agree to the proposed new authorship shown in section 4 /and the addition/removal*of my name to the authorship list.			

Please use an additional sheet if there are more than 7 authors.

Change of authorship request form (pre-acceptance)

Important information. Please read.

- Please return this form, fully completed, to Springer Nature. We will consider the information you have provided to decide whether to approve the proposed change in authorship. We may choose to contact your institution for more information or undertake a further investigation, if appropriate, before making a final decision.
- By signing this declaration, all authors guarantee that the order of the authors are in accordance with their scientific contribution, if applicable as different conventions apply per discipline, and that only authors have been added who made a meaningful contribution to the work.
- Please note, we cannot investigate or mediate any authorship disputes. If you are unable to obtain agreement from all authors (including those who you wish to be removed) you must refer the matter to your institution(s) for investigation. Please inform us if you need to do this.
- If you are not able to return a fully completed form within **30 days** of the date that it was sent to the author requesting the change, we may have to withdraw your manuscript. We cannot publish manuscripts where authorship has not been agreed by all authors (including those who have been removed).
- Incomplete forms will be rejected.