



# Novel Platforms for Biomedical HIV Prevention Delivery to Key Populations — Community Mobile Clinics, Peer-Supported, Pharmacy-Led PrEP Delivery, and the Use of Telemedicine

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## Abstract

**Purpose of Review** A gap exists between PrEP interest and PrEP uptake in key populations (KP) for HIV prevention that may be ascribed to PrEP delivery services not being acceptable. This review summarizes novel platforms for HIV prevention outside of the traditional health facilities environment.

**Recent Findings** Mobile health clinics provide highly acceptable integrated, KP-focused services at convenient locations with the potential of high PrEP uptake. Telemedicine and health apps decongest health systems and allow for personal agency and informed decision-making on personal health. Pharmacy-led PrEP delivery provides de-medicalized, confidential PrEP services at extended hours in community locations, from trusted medical professionals. Peer-supported delivery encourages continued PrEP use.

**Summary** Community-based, differentiated and de-medicalized PrEP delivery can address uptake and continued use barriers in key populations. Future research should assess scalability, cost-effectiveness and sustainability of these PrEP delivery platforms, as well as focus on ways to simplify PrEP provision.

**Keywords** PrEP delivery · Mobile clinic · Telemedicine · Peer-support · Pharmacy-led PrEP delivery · HIV self-testing

## Introduction

Biomedical HIV prevention, particularly highly efficacious pre-exposure prophylaxis (PrEP) products, has the potential to show great public health impact in key populations (KP). These populations, who remain disproportionately affected by the HIV pandemic, include men having sex with men (MSM), transgender people, people who engage in transactional sex, people who inject drugs, adolescent girls and young women (AGYW) and their partners. However, worldwide demonstration projects and implementation settings are indicating a gap between PrEP interest, PrEP uptake and adherence [1•]. This may be ascribed to PrEP delivery

services not being acceptable or feasible to these key populations [2]. One of the main lessons we have learned to date is that little is necessary to deliver oral PrEP, but that health-system barriers such as fear of stigma, judgmental interactions, criminalization, a lack of KP-focused HIV prevention, or service delivery at inconvenient locations or times; deter PrEP uptake and cause PrEP use interruptions [3, 4]. Accessibility to healthcare has been conceptualized as the level of approachability, availability, and appropriateness of service delivery [5, 6]. These include the implementation of appropriate demand creation strategies and counseling provided to the end-user, as well as the availability of on- or near-site support for other related services an individual might need [7]. De-medicalized, differentiated, community-based platforms for PrEP delivery might be able to meet this standard for key populations.

Currently, daily oral PrEP (either FTC/TDF: tenofovir disoproxil fumarate with emtricitabine; TDF/3TC: tenofovir disoproxil fumarate with lamivudine; or F/TAF: tenofovir alafenamide with emtricitabine) is the only PrEP modality approved by WHO and made available in countries with high HIV incidence [8]. WHO PrEP implementation tools

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stipulate that current PrEP program monitoring require individuals to interact with the healthcare system at least every 3 months for HIV testing and be provided with a supply of PrEP pills for up to 3 months [9, 10]. A review of multinational discreet choice experiment studies indicated that cost and PrEP dispensing site were the most important attributes in determining PrEP service design preference, while semi-annual HIV testing was preferred over frequent testing in a health facility [11•]. Differentiated models of PrEP delivery generally aim to provide more client-centered services and typically allow for PrEP delivery that differs based on location, provider, frequency, and intensity of engagement [12, 13]. Here, we describe recent novel biomedical HIV prevention platforms including community-based mobile clinics, peer-supported-, and pharmacy-led PrEP delivery, and the use of telemedicine and mobile health (mhealth) technology to generate demand and deliver PrEP.

## Mobile Clinics

Community-based mobile health clinics are acceptable models for delivering healthcare to vulnerable populations (especially in lower- and middle-income countries) who do not normally frequent public health clinics, such as people who engage in transactional sex or inject drugs, men, and young people [14–17]. Adolescent and young people have rated sexual and reproductive health services, including HIV prevention, delivered from mobile clinics to be more acceptable than conventional clinics [18]. Mobile health clinics are more likely to tailor services to the individual, triage services for efficiency, and provide same-day PrEP initiation. Mobile clinics commonly have shorter visit times, provided services at times and locations convenient to target populations, have higher amounts of debut HIV testers, and were better at attracting men and younger populations [18–20]. The convenient community locations serviced by mobile clinics eliminate logistical barriers to healthcare engagement, such as transport or making appointments, especially for AGYW from under-resourced areas.

Beyond providing differentiated community-based service, mobile clinics generally provide integrated, key-population friendly (i.e., adolescent-friendly services, representative of key populations, etc.) sexual and reproductive health services that use community engagement strategies to attract clients [1•, 4, 9]. Contraception provision and STI (sexually transmitted infections) testing has been described in numerous demonstration studies as the gateway to PrEP uptake and persistent use [8, 21, 22]. AGYW and people who engage in transactional sex especially prefer to obtain PrEP in clinic locations where they receive contraceptives as it may reflect comfort with trusted and familiar spaces [23]. When PrEP was provided at a mobile clinic in Cape

Town as part of an integrated sexual and reproductive health service, AGYW described it as a de-medicalized service that fit more conveniently into their daily lives [14, 24]. AGYW on the POWER PrEP demonstration study in South Africa described that having sexual and reproductive health services in the community made it feel like the service was focused on them and their health needs, and with the mobile clinic entering the spaces of adolescents and young people's naturally occurring networks, demand creation and peer-support for PrEP uptake were automatically generated [3, 24]. Uptake of PrEP for key populations is further facilitated when services at mobile clinics are provided in a culturally appropriate, client-centered, and friendly manner by community-based trusted health providers. In the POWER study, 96% of interested AGYW offered PrEP from a mobile clinic had same-day PrEP initiation [25]. Mobile clinics have been found to be highly effective in reaching target populations for PrEP uptake; however, more work is needed in supporting retention through these services [15]. Mobile health clinics are mobile by nature and as they are based in the community, face broader community challenges (e.g. community riots, severe weather conditions), and together with the high mobility of adolescent and young people's lives, coordination of PrEP refill visits were constrained at times [24].

## Peer-Supported PrEP Delivery

Health decisions in adolescent and young people are highly influenced by social motivation (peers), and managing their sexual relationships are often prioritized over their sexual health and HIV prevention [26, 27]. Therefore, successful programs need to include tailored counseling practices that strengthen AGYW's relational agency and internal locus of control over their PrEP decisions [3, 28, 29]. Recent studies have shown the value of peer support, agency and esteem building to encourage effective PrEP engagement [1•, 30, 31]. Peer-supported PrEP models have been used in the form of (1) peer PrEP clubs and (2) peer-navigators within established health facilities. Peer PrEP clubs create a safe environment for users to navigate various areas of PrEP use while developing a sense of empowerment and generally include creating adherence strategies, mitigating stigma around PrEP, and navigating family and intimate relationship issues [15, 30]. In this regard, the HPTN082 study in South Africa and Zimbabwe found that attendance of a peer-led adherence club (69% of participants) was associated with PrEP continuation in AGYW at three months with 84% having detectable tenofovir (higher than in any placebo-controlled trials in this population) [32].

Peers are often considered reliable sources of information due to their non-judgmental approach and shared lived

experiences, and clients believe that peers will link them to culturally and youth competent clinical settings. Peer-navigators ensure that target populations feel represented and welcomed within clinic settings as a strategy to overcome perceived barriers (especially for AGYW, young MSM and transgender populations) of feeling stigmatized and misunderstood by healthcare providers [33]. In the Theta Nami project (South Africa), peer-navigators approached adolescent and young people in the community, engaged them on HIV prevention methods while identifying and minimizing barriers to healthcare uptake which led to 89% (of 6871 young people) welcoming health promotion from a peer [34]. Peer-navigators among minority groups were seen as a trusted source of information (by 73% of participants) and a useful resource in navigating the healthcare system allowing for PrEP access to populations that might not easily seek out healthcare in traditional clinical settings where they feel under-represented [5, 35]. This strategy in the Princess PrEP program (in Thailand) promoted PrEP access for transgender people and was assessed as an effective strategy for the de-medicalization of PrEP as patients are engaging with individuals who “truly understands KP’s lifestyle” [5]. The benefits of a peer-supported approach are increased PrEP uptake as well as effective use and is in line with the idea of a client-centered approach [5].

Demonstration studies show that PrEP delivery can be simplified and do not necessarily require delivery in a clinic setting [1•]. This might mean that PrEP programs can potentially move beyond the previously mentioned peer-supported PrEP model, to allow for peer-led PrEP delivery. Effective peer-led PrEP delivery models include peer-led education, counseling and navigation to PrEP care [15]. Possible strategies to implement peer-led PrEP delivery could include packaging it within proven effective models such as the Information-Motivation-Behavioral-skills (IMB) model where PrEP information and motivation techniques are contextually and practically adapted to suit a participant’s life, and used to inform HIV prevention [15, 36]. An example of this would be, offering a participant PrEP along with information adapted to their context, adherence support that speaks to participants own motivation for having initiated PrEP, and practical solutions for setting up adherence reminders, which are relevant to specific lifestyles and delivered by a peer [5, 15]. In Namibia and Vietnam, trained peer-navigators would meet with clients (people who engage in transactional sex or adolescents) and provide in-person drop off of HIV self-test kits and PrEP refills, while another peer would provide information on PrEP use online [37].

Peer-supported PrEP delivery methods are said to be limited because they require an initial investment of resources [34] — identifying youth from the community and doing intensive training over a period. However, the scale-up and sustainability of KP/peer-led programs might be feasible and

necessary for higher impact HIV prevention, but will necessitate endorsement from international and national guidelines [38•]. While peer-led PrEP delivery models are still in early development, it has significant potential in encouraging agency in PrEP uptake and increased adherence to PrEP through its client-centered and inclusive support model [32, 38•].

## Pharmacy-Led PrEP Delivery

Pharmacy-led PrEP delivery (and HIV testing) offers an alternative platform for access and rapid PrEP initiation allows community pharmacists to identify people at high risk of HIV, to provide quick and easy testing and dispense oral PrEP [39]. Benefits of a pharmacy-led PrEP model include extended operating hours of pharmacies, lower barriers to access as the pharmacy is conveniently located, perceived as neutral and non-stigmatizing environments, high approachability of pharmacists who are viewed as trusted medical professionals, and able to reach diverse populations [40•, 41, 42]. Pharmacy-led PrEP delivery, which has been piloted in the USA through collaboration with nurse practitioners and physician assistants, shows high levels of retention [41, 42]. This model has the potential to further increase uptake and access to key populations, specifically people who inject drugs, men who have sex with men [40], and AGYW.

Pharmacy-led models would be ideal in under-resourced, overburdened settings, as the model would enable integration, task-shifting, and de-medicalization of the entire PrEP service [2]. The pharmacy-led model is efficient, providing highly accessible clinical settings for preventative services [39] and in some regions (such as California), no external involvement of a clinician is needed in the prescription of PrEP [43]. “One-step PrEP” in Seattle found that most men who have sex with men (MSM) don’t have a primary care provider to access PrEP from, and interest in PrEP was significantly associated with willingness to be screened for PrEP by a pharmacist [44]. Acceptability, feasibility, and interest in HIV testing in community pharmacies is particularly high among populations with the highest risk of HIV such as minority groups, people who have never tested before, and those reporting high HIV stigma (people who inject drugs or engage in transactional sex, or men who have sex with men) [41, 42, 45, 46]. A recent systematic review indicated that pharmacies are making significant progress in HIV prevention for people who inject drugs through the distribution of clean syringes and referrals to social and medical services [40•]. In addition, AGYW in Africa frequently opt for emergency contraception available in a pharmacy rather than attending a clinic, indicating that this population could find the pharmacy-led PrEP model beneficial as

it alleviates the fear of judgment and the need for anonymity when accessing sexual and reproductive services, which are challenged at traditional clinics [21]. Other pharmacy-led models, such as those that provide vaccine and contraceptive services provide an ideal entry point for the integration of PrEP and HIV testing and can be leveraged to expand awareness and access to integrated preventative services, especially at the community level [43].

Research shows that pharmacists, given the appropriate training, were prepared to deliver PrEP services, and able to identify people who needed PrEP based on their accessibility to unique data within the community [47, 48]. However, challenges to a pharmacy-led PrEP model include the need for laboratory-based testing and monitoring that requires clinician-based service delivery, and provider reluctance to allow PrEP to be dispensed without prior medical consultation. In a US-based study, pharmacists provided clients with a PrEP prescription and scheduled appointments with a clinician for baseline labs 6 weeks later. While close to 90% started their PrEP within 1 week, only one-third attended their clinic appointment, potentially highlighting the avoidance of traditional clinic settings [39]. Existing policy and scopes of practice for pharmacists pose as barriers in countries where current policies do not permit pharmacists to dispense PrEP without a prescription. There was hesitancy from pharmacists in discussing and identifying sexual risk and effectively linking customers who test positive for HIV [40•]. Although pharmacy-led PrEP has theoretically proven to be viable, the implementation in resource constraint setting may be more challenging, however, not impossible. For example, in a low-income settings, regular out-of-pocket payments for health services are a major barrier to access, and pharmacy-led PrEP delivery services may not be financially feasible for young people even if it is preferred [49]. To this end, achieving pharmacy-led PrEP delivery implementation across varying resource settings will require policy change in conjunction with private-public partnerships, collaborative practice agreements and innovative solutions such as telemedicine and online consultations regarding PrEP to mitigate access barriers [40•].

## Mobile Apps, Telemedicine and Home-Based HIV Prevention

Novel technology-based strategies are being employed to circumvent the multiple structural barriers and foster sustained engagement with key populations through scaled-up, tailored, and acceptable PrEP delivery [50–53]. Mobile health applications (mhealth), telemedicine, and online-to-offline models have been piloted as acceptable platforms for PrEP uptake and use. Telemedicine utilizes technology to promote and support long-distance healthcare in PrEP

end-users [52, 54]. Telemedicine has overcome barriers for PrEP uptake in some key populations by skipping potentially judgmental, non-confidential clinical settings at inconvenient times and replace it with healthcare consultations via mhealth apps and video conference calls with laboratory testing in facilities or at-home STI/HIV self-test kits [55, 56]. A recent discreet choice experiment (DCE) in Cape Town among AGYW, young men who have sex with men, and young pregnant women indicated heterogeneity in PrEP delivery site preference, however, indicated a preference for online follow-up, and adherence support (compared to in-person) was significantly associated with choosing an ideal PrEP delivery platform.

Mobile health technologies for HIV prevention have been used to increase awareness of available sexual health services, ensure privacy and to decrease awkwardness in HIV self-risk assessments with a health provider present [57]. Some mhealth platforms have applied a PrEP Information-Motivation-Behavior-skills (IBM) model tailored to key populations to promote PrEP adherence or reduction in risk behaviors [57–59]. mHealth applications use videos, games, animation, or chatbots to deliver personalized care to users in the form of self-risk evaluation, pill-taking reminders, addressing peer and social norms, considering disclosure, or scheduling follow-up health appointments [60]. Telehealth aims to reach individuals at high risk of HIV acquisition and promote PrEP uptake by connecting persons directly to providers and connecting providers to other providers or specialists for clinical training or support. An online-to-offline model (Adam's Love) was piloted for PrEP and HIV testing uptake among Thai men who have sex with men and transgender people [61]. The online-to-offline model reached people online and those interested in free PrEP and/or HIV testing services contacted Adam's Love online staff, received real-time PrEP online counseling, and completed online bookings for receiving services at one of the four community-based clinics in Bangkok based on their preference. A majority (76.4%) of those who completed online bookings checked in at the private, by-appointment service and received PrEP [61].

Many projects using health technology acknowledge that testing persons vulnerable to HIV is the first step for PrEP initiation and ongoing HIV testing is an essential part of PrEP delivery. HIV self-testing, a process in which an individual performs a HIV rapid diagnostic test and interprets the result in private, is an emerging approach that is well accepted by diverse groups (including PrEP users), is potentially cost-effective, and empowering for those who may not otherwise test [62–64]. Though there may be concerns around HIV self-testing such as false-negative test result or inadequate linkage to resources such as counseling, confirmatory testing, and treatment for HIV positive individuals, it poses the potential to increase HIV testing globally

and de-medicalizing and decentralizing PrEP follow-ups [62]. Some studies provided HIV self-tests to key populations who engaged with programs through social media and mhealth interactions, delivered to their homes with guidance on use [65]. In Brazil, PrEP delivery to adolescent key populations was adapted during the covid-19 pandemic to include HIV self-testing and PrEP courier delivery after online peer recruitment. PrEP use initiation and support were offered online by peer-navigators and a PrEP team consisting of nurses, doctors, pharmacists, and social workers [66]. Courier delivery has the potential to decongest the primary healthcare system as well as allow for convenient and private PrEP services to end-users [67]. These models have a high potential to be replicated and scaled up among key populations.

## Conclusion and Future Directions

In this review, we summarized recent literature on projects providing PrEP outside of the traditional health facilities environment. Community-based, de-medicalized, differentiated delivery of HIV prevention was explored via community-based mobile health clinics, pharmacy-led PrEP, peer-to-peer delivery, and the use of telemedicine and mHealth. These approaches aimed at addressing access barriers, especially for key populations, including convenience, confidentiality, stigma, peer support, and KP-friendly and -focused services, and simplification of PrEP delivery. Discreet choice experiment studies have shown PrEP delivery heterogeneity and that there will need to be a level of choice for different groups of people assessing how delivery fits into their daily lives and seen as convenient at a given time.

Mobile health clinics provided highly acceptable integrated, KP-focused services at convenient locations and times with the potential of high PrEP uptake. Telemedicine and health apps have the potential to decongest health systems, make PrEP delivery feel less diseased focused, and allow for personal agency and informed decision-making on personal health. The future of PrEP delivery for key populations will most likely favor a pharmacy-led model, which will be enhanced through the use of telemedicine and mhealth, and community mobile clinics for referrals to integrated sexual and reproductive health services. In this regard, work is needed on streamlining PrEP delivery through reconsidering the extent clinical (laboratory-related) monitoring is needed for oral and future PrEP products. Encouragement for cooperation between private and public health sectors will be needed to ensure that cost of HIV self-tests and PrEP is subsidized for vulnerable populations in lower- and middle-income countries. We would recommend meaningful engagement with key populations in specific areas implementing novel differentiated PrEP delivery to

achieve sustainable mechanisms that respond to the specific needs of the end-users. In some locations, community-based sexual health clinics providing key-populations friendly services such as the 56 Dean Street clinic (London, UK) [68] and the Princess PrEP project (Thailand) [38•] report high PrEP uptake in key populations. Community engagement and mobilization initiatives in conjunction with PrEP delivery services are more effective in population-level HIV prevention as it creates awareness of PrEP not only as demand creation for the target population, and allows for less HIV-related stigma and greater social support for PrEP use from the significant people in their lives (family, peers and partners) [7]. In addition, taking into consideration that HIV testing, including HIV self-tests, contraception, and treatment of STI's are the gateway to PrEP uptake, and building these into delivery models would enhance both PrEP and overall sexual public health impact.

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## Declarations

**Ethics Approval and Consent to Participate** This is a review and no human subjects were involved in the production of this research piece. No consent to participate or for publication applicable.

**Conflict of Interest** The authors have no conflicts of interest to declare.

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