STUDY PROTOCOL: KISUMU

Pharmacy delivery to expand the reach of PrEP in Kenya:

Pilot study

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ABREVIATIONS

3TC	Lamivudine
AIDS	Acquired Immunodeficiency Virus
AE	Adverse Event
ART	Antiretroviral Therapy
ARC	AIDS Related Complex
CCC	Comprehensive Care Clinic
CDC	Centers for Disease Control and Prevention (US)
CHCT	Couples HIV testing and Counseling
DAIDS	Division of AIDS (NIH)
DALY	Disability-Adjusted Life Year
DBS	Dried Blood Spots
EC	Ethics Committee
FDA	Food and Drug Administration (US)
FTC	Emtricitabine
FTC-TP	Emtricitabine-triphosphate
HIV	Human Immunodeficiency Virus
GEE	Generalized Estimating Equations
HTTP	Hypertext Transfer Protocol (presentation of web data)
ICER	Incremental Cost-Effectiveness Ratios
IRB	Institutional Review Board
KEMRI	Kenya Medical Research Institute
NACOSTI	National Commission of Science, Technology and Innovation
NIH	National Institutes of Health (US)
PEP	Post-exposure prophylaxis
PrEP	Pre-exposure prophylaxis
SAS	Statistical Analysis Software
STI	Sexually transmitted infection
TDF	Tenofovir
TFV-DP	Tenofovir diphosphate
UNAIDS	Joint United Nations Program on HIV/AIDS
US	United States
UW	University of Washington
VCT	Voluntary counseling and testing
WHO	World Health Organization

PROTOCOL SUMMARY

Maximizing access, minimizing costs of delivery, and reaching at-risk populations are key priorities for optimizing the public health impact of pre-exposure prophylaxis (PrEP) for HIV prevention. In Africa, PrEP is being added to an already-burdened public health infrastructure and the ability of the health systems to maximize PrEP access will necessitate finding novel delivery strategies. In feasibility evaluations of PrEP in Africa to date, major barriers to PrEP delivery include stigma, long waiting times, the costs of staffing, and healthcare providers' unfamiliarity with delivering prevention interventions.

In Kenya, retail pharmacies fill an important gap in the health care system, providing access to treatment of urgent conditions (e.g., evaluation and medication for STIs, upon presentation of a valid prescription), monitoring of chronic conditions (e.g., blood pressure testing), and preventative care (e.g., contraception). HIV testing is also now legally allowed at pharmacies through purchase of HIV self-tests or pharmacy provider-assisted HIV self-testing. Pharmacy-delivered care has many attributes that may be desirable for potential PrEP users, including convenience (as pharmacies outnumber clinics and have shorter waiting times), anonymity (compared to seeking PrEP at an HIV care center), and engagement (which may be greater for a preventative service at a pharmacy than at a clinic that prioritizes treating ill individuals). Pharmacies can offer free, subsidized, or fully fee-for-service care, and paying for a service could result in greater sustained consumer engagement. The core components of PrEP – including HIV testing, adherence and risk reduction counseling, assessment of side effects, and provision of refills – are within the scope of practice for pharmacists (including pharmaceutical technologists, common in sub-Saharan Africa), and one US model has demonstrated that PrEP can be provided by pharmacists, facilitated by oversight by a remote clinician.

In the second half of 2019, we conducted formative work among pharmacy providers and clients in Kenya to assess the feasibility and acceptability of pharmacy-based initiation and continuation of PrEP. Overall, the pharmacy providers and clients in our formative study strongly supported the idea of pharmacy-based PrEP delivery and felt it would be feasible so long as client privacy could be ensured and providers received training on how to deliver PrEP. In January 2020, we conducted a day-long stakeholder meeting – including regulators, other government agencies, pharmacy professional associations, pharmacy provider representatives, community members, and others – to assess the potential for and general framework of a pharmacy-based PrEP delivery model. This protocol reflects learning from that formative work and stakeholder meeting.

We hypothesize that pharmacies may offer a novel access point for PrEP delivery in Kenya, especially during the COVID-19 pandemic when individuals may fear visiting health facilities for fear of COVID-19 infection. With a multidisciplinary team, we propose an evaluation of pharmacy-based PrEP care –a stand-alone model with the following aim:

Aim 1a: We will conduct an initial pilot evaluation of pharmacy-based PrEP initiation and refills.

Approach: At two pharmacies in Kisumu, we will implement the novel care pathway for PrEP initiation developed from formative research and stakeholder engagement and measure PrEP initiations, consumer characteristics, retention in care, and adherence (up to n=150 people starting PrEP, followed for six months). *Hypothesis: Individuals will successfully initiate PrEP at pharmacies and be retained in care.*

Aim 1b: Within the Aim1a pilot pharmacies, we will probe potential weak points for pharmacy-based PrEP delivery, in domains relating to acceptability, fidelity, and costs.

Approach: We will conduct in-depth interviews with clients initiating (n=10/pharmacy) and refilling (n=10/pharmacy) PrEP, pharmacy providers (n=2/pharmacy), and clinicians providing remote oversight (n=1/pharmacy) (n=46 in total) and collect transcripts from consultations between pharmacy providers and remote clinicians via WhatsApp to explore experiences accessing or delivering pharmacy PrEP. We will use quantitative surveys to measure costs and cost preferences (of clients and pharmacy providers) associated with pharmacy-based PrEP initiation and refills.

Hypothesis: Understanding potential weak points for PrEP delivery in pharmacies will permit refinement of the delivery algorithm developed from the formative research and tested in Aim 1a.

Aim 1c: We will modify the care pathway to address weak points identified in Aim 1b and conduct an extended pilot evaluation of the refined care pathway.

Approach: We will implement the refined care pathway at a total of 6 pharmacies in Kisumu (2 from the initial pilot evaluation described in Aim 1a plus an additional 4 pharmacies). Clients who have been receiving PrEP services at the two Aim 1a pharmacies as part of Aim 1a will be allowed to continue their PrEP care under the refined model for the duration of this extended pilot evaluation. We will continue to measure the same client outcomes as in the initial pilot: PrEP initiations, consumer characteristics, retention in care, and adherence (up to 540 people starting PrEP under the refined care pathway, followed for six months). We will also assess the acceptability and feasibility of the refined care pathway through quantitative surveys with clients and pharmacy providers. *Hypothesis*: The refined care pathway will result in greater PrEP uptake and improve the acceptability and feasibility of the pharmacy PrEP model among clients and providers.

LAY SUMMARY

Pre-exposure prophylaxis (PrEP) is a powerful HIV prevention tool; PrEP delivery in low resource settings will require approaches that are time- and cost-efficient, for patients, care providers, and the health care system. In this highly innovative study, we propose a new delivery model for PrEP delivery that has never been explored in an African setting: pharmacy-based PrEP delivery (with remote physician oversight). Through formative research, we have developed a care pathway for pharmacy-based PrEP delivery that we plan on pilot testing, initially in two pharmacies in Kisumu (Aim 1a) and, later, six pharmacies in Kisumu. We hypothesize that pharmacy-based PrEP delivery will be acceptable and feasible in Kenya and that individuals who uptake PrEP in pharmacies will be retained in care.

ABSTRACT

Pre-Exposure Prophylaxis (PrEP) is a new HIV prevention method that works when taken as recommended. To take full advantage of public health benefit of PrEP for HIV prevention, there is need to prioritize access, minimize costs of delivery, and reach out to at-risk populations. In Africa, PrEP is being added to a public health infrastructure which is sometimes burdened by overcrowding and drug stock out. The ability of health systems to maximize PrEP access necessitates finding novel delivery strategies. Additionally, there exist major barriers to PrEP delivery, which includes stigma, long waiting times, costs of staffing and healthcare providers' unfamiliarity with delivering prevention interventions. In Kenya, and many other resource-limited countries, retail pharmacies (i.e., chemists) fill an important gap in the health care system providing first stop access to treatment, monitoring and preventive care of urgent and prolonged conditions. Potential PrEP users may desire pharmacy-delivered PrEP over facility-delivered PrEP for reasons including increased convenience, increased privacy and greater engagement compared to health facilities that focus on treating ill patients. Retail pharmacies can offer free, subsidized or affordable healthcare services. The core components of PrEP – including HIV testing, adherence and risk reduction counselling, assessment of side effects and provision of refills – are within the scope of practice for pharmaceutical technologists and pharmacists in Kenya. From prior formative qualitative research and a stakeholder meeting, we have developed a care pathway for pharmacy-based PrEP delivery (including initiation and refills), endorsed for piloting in a consultation meeting that included a wide spectrum of regulatory, professional, government, and community stakeholders in Kenya. We plan to pilot this care pathway in two retail pharmacies in Kisumu. Additionally, we plan to probe for potential weak points of pharmacy-based PrEP delivery, in domains relating to acceptability, fidelity, and costs. Thereafter, we will refine the care pathway tested in Aim 1a to address client- and provider-facing barriers identified in Aim 1b and implement it at 6 pharmacies in Kisumu.

BACKGROUND

Importance of the problem

More than two million persons become newly infected with HIV each year, the majority in Africa.[1] In Kenya, more than 1.5 million people are living with HIV,[2], making it the country with the fourth largest epidemic. The past five years have witnessed major strides in the development of highly-effective HIV prevention interventions, particularly using antiretroviral medications: antiretroviral therapy (ART) to decrease infectiousness and pre-exposure prophylaxis (PrEP) to prevent acquisition. Novel strategies to successfully and efficiently deliver these strategies, at scale, are needed to achieve maximum HIV prevention impact.

PrEP is an effective, recommended, and impactful strategy for HIV prevention.

PrEP has been demonstrated to be efficacious and safe for reducing HIV risk among men who have sex with men (MSM)[3], heterosexual men and women,[4,5] and injection drug users[6] in diverse geographic settings. In 2012, the US Food and Drug Administration approved combination tenofovir disoproxil fumarate/emtricitabine (TDF/FTC) as the first medication with a label indication for HIV prevention in adults[7] – an action followed by drug regulatory authorities in a number of other countries including Kenya (in December 2015). In 2015, the World Health Organization issued guidance recommending TDF-containing PrEP as an additional prevention option for all persons at high risk for acquiring HIV.[8]

Adherence is essential for PrEP efficacy. PrEP clinical trials had a wide range of results for estimates of PrEP's efficacy for HIV protection – explained by the degree to which the trial populations were adherent to PrEP.[9] Secondary analyses from clinical trials and demonstration studies have shown that PrEP is highly efficacious and safe when taken as prescribed: at the individual level, HIV protection is on the order of 90-100% in both MSM and heterosexual populations when PrEP adherence was high, as measured by the presence and quantity of PrEP in blood samples.[4,10,11] PrEP adherence and HIV prevention effectiveness have been higher than in prior clinical trials, in many cases very high, in open-label demonstration projects among HIV serodiscordant couples, MSM, and young women at risk for HIV,[12–14] which has been hypothesized to be a result of offering a strategy with demonstrated safety and effectiveness and without a placebo. In those PrEP demonstration studies, HIV incidence has been very low and visits were generally quarterly and brief, suggesting that many who initiate PrEP in the context of known safety and efficacy may not need intensive follow-up to achieve high adherence. In some high income settings (e.g., Sydney, San Francisco), delivery of PrEP at scale, layered onto high coverage of HIV testing and ART delivery, has resulted in substantial reductions in new HIV infections in the past five years.[15–17]

Strategies to effectively and efficiently deliver PrEP are needed, for all settings but particularly for settings with limited resources.

PrEP delivery can be expensive, in terms of costs for health systems and opportunity costs for PrEP users. For health systems, costs associated with PrEP include medication, staffing time, and laboratory testing. In addition, user opportunity costs – e.g., time away from work or childcare to wait, usually for many hours, at a public clinic for a PrEP visit – can be substantial. Mathematical modeling analyses from high-income settings have argued that, while PrEP is cost-effective when delivered to high-risk persons, it is still costly.[18–20] For developing country settings, PrEP costs are mitigated by the lower cost inputs from generic/non-branded or discounted medication pricing, lower staff salary costs, and more limited laboratory testing as recommended by WHO.[19,21] Nevertheless, reducing the costs of PrEP delivery are necessary to maximize its impact. In costing analyses we have conducted in East Africa,

we estimated the cost of adding PrEP to routine public health services using Ministry of Health (MOH) personnel, drug, and laboratory costs; the greatest proportion of the total costs was not medication but instead personnel (39%).[22] That finding emphasizes the need for efficiency in PrEP delivery, particularly given that public clinic medical staff in Kenya and similar settings are often highly over-stretched, because of competing priorities in overburdened health systems. Our modeling did not take into account client costs related to PrEP; however, we have learned through providing PrEP in studies to over 5000 individuals over the past 10 years that travel and time away from work and costs for getting to PrEP clinic visits can be a substantial challenge.[23,24] Efficient strategies to deliver PrEP could reduce costs, potentially improving client engagement and allow services to be available to a larger number of people as a result – and this kind of approach would be applicable in a variety of settings, in Africa and worldwide.

Diverse models for PrEP delivery are needed

Barriers to facility-based PrEP delivery include long travel distances, lack of privacy, and lengthy wait times [23,24]. In low-income countries, long travel distances to dispersed healthcare facilities can result in significant costs associated with transportation. Facilities are often overcrowded, which result in long wait times, rushed medical care, and a lack of anonymity that may deter individuals from returning to the healthcare facility for follow-up care. Time traveling and waiting is time away from work and children – resulting in substantial opportunity costs. Importantly, PrEP is an intervention for HIV uninfected individuals – in our experience and that of others, healthy persons report that they do not like frequenting healthcare facilities for HIV preventive care.[24] Recent PrEP demonstration projects from Africa have found poor retention in care, for reasons including challenges accessing PrEP at facilities for continuation.[25–28]

Diverse models have been developed for ART delivery to overcome similar barriers related to facility-based care.[29,30] Models of ART delivery that are not facility-based include home delivery of ART medication[31] and community-based care, ART adherence groups,[32] peer care coordinators,[33] and even drug-dispensing ATMs.[34] One previous study that explored the use of pharmacies to deliver ART medications in Nigeria found that this approach was feasible and that retention in care was high.[35] PrEP delivery is simpler than ART – with less testing, fewer complications, and without comorbidities – and thus is primed for simple delivery models.

Pharmacy-based PrEP delivery is a novel approach that could expand the reach of PrEP, respond to the needs of PrEP consumers, and improve PrEP continuation

Nearly half of all individuals in low-income countries seek healthcare at retail pharmacies.[36–38] In sub-Saharan Africa, pharmacies and licensed drug shops fill an important gap in the medical system and individuals often rely on and prefer the use of pharmacies over healthcare facilities to address their medical needs.[39] Pharmacies can address both urgent needs (e.g., evaluation and medication for sexually transmitted infections) and preventive care (e.g., contraception)[40] and have advantages over healthcare facilities, including increased convenience and anonymity.[41] Going to a pharmacy first to address a medical issue (e.g., symptoms of malaria) is common, and individuals often go to a healthcare facility only later if the issue is not resolved.

Advantages of pharmacy-based PrEP delivery may include increased convenience, privacy, and quality of care. In any given location, pharmacies often outnumber healthcare facilities and thus might be nearer to individuals interested in PrEP, saving both time and money.[41–46] Individuals also visit pharmacies for both non-medical and medical reasons, potentially enabling individuals who seek PrEP to maintain privacy and overcome barriers associated with PrEP stigma.[23,24] Pharmacies also have the advantage of being self-sustaining by offering subsidized or fee-for-service care, which may make them more responsive to client demands[47–49] and may result in sustained client engagement if individuals

value services purchased [50]. Finally, the delivery of PrEP in pharmacies expands choice of locations to access PrEP, enabling individuals to select their preferred model.

Pharmacy-based PrEP delivery is feasible and within the domain of care for Kenyan pharmacists. PrEP delivery has relatively few necessary components – HIV testing, adherence and risk reduction counseling, assessment of acute HIV infection and PrEP side effects, PrEP prescribing, and the provision of refills[51,52] – all can be done by pharmacists/pharmaceutical technologists in Kenya.[53] Pharmacies in Kenya are dispensing HIV self-tests on the market without a prescription,[54] and pharmacies are dispensing PrEP now by prescription (brought after a clinic visit). Developing a rigorous and evidence-based model for pharmacy-based PrEP now could head off unregulated development of private models. In the United States, one model of full-service pharmacy-based PrEP delivery has been successfully implemented through a collaborative practice agreement overseen by a remote clinician (**Fig. 1**), with standard PrEP services being done by the pharmacy and branch points for clients with complex medical or social issues to be sent to the overseeing clinician.[55–60] Pharmacy-based PrEP delivery is a client-centered model that is no less safe or rigorous than a clinic-based approach. A similar model could be highly successful for Africa.

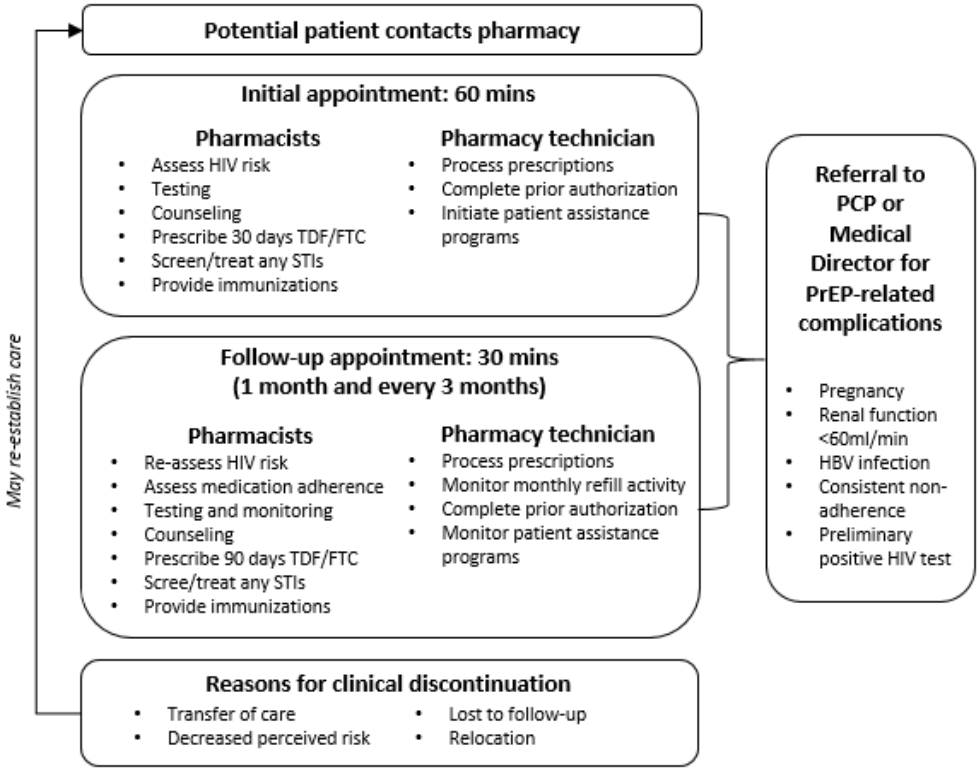

Fig. 1. Pharmacy-based PrEP care pathway, overseen by a remote physician, from Seattle *(adapted from (56))*

<u>The ongoing COVID-19 pandemic might affect the delivery and uptake of pharmacy-based PrEP</u>

We are currently in the midst of a global respiratory pandemic, coronavirus disease 2019 (COVID-19), which has dramatically changed the lives of individuals living in Kenya and other settings across the globe. Because COVID-19 is a newly emerging pandemic, the science on this new virus – including our understanding of transmission dynamics, treatment, and prevention – continues to evolve. What is

known, is that it COVID-19 is transmitted via respiratory droplets in the air or on surfaces, and that the risk of infection can be reduced with regular hand washing, social distancing, and wearing a face mask while in public settings. To help slow the risk of COVID-19 infection, Kenya (like many other countries) has implemented a number of measures including national curfews, road blocks, and stay at home orders.

This ongoing epidemic is likely to affect the care seeking and providing behaviors of pharmacy clients and providers in ways that might impact the delivery and uptake of pharmacy-based PrEP delivery. For example, during COVID-19 pharmacy clients might decrease access of pharmacy care if they fear infection in a public setting, or they may increase access of pharmacy care if they fear visiting health facilities for regular services. Similarly, pharmacy providers might be restricting pharmacy hours during COVID-19 to reduce risk of infection to staff and clients, or they may be increasing pharmacy hours if there is an increased demand for pharmacy services during this unique period. The delivery of pharmacy-based PrEP delivery during COVID-19 may also have a number of unique challenges, including space constraints (e.g., a well-ventilated private room for counseling and HIV testing or ensuring enough space for social distancing among clients), limited protective gear for pharmacy workers, and limited pharmacy access for clients (due to curfews and fear or using public transport). We aim to understand the impact of COVID-19 on the uptake and delivery of pharmacy services, including PrEP, during this unique time so that we can understand the generalizability of our pilot findings in a post-COVID-19 era or during another future global pandemic.

The prevalence of sexually transmitted infections (STI) among individuals at HIV risk in sub-Saharan Africa is very high; there are concerns that expanded PrEP delivery could increase the prevalence of STIs. In Africa, there additionally exists an STI and HIV syndemic, with STIs frequently foreshadowing HIV infections.[61–64] One of the populations most at risk of both HIV and STI infection in this region is adolescent girls and young women (AGYW), whose risk of HIV and STIs is roughly double or more than that of their male age-mates.[65,66] The vast majority of bacterial STIs are asymptomatic and thus remain undiagnosed and untreated.[67] The consequences of untreated bacterial STIs on sexual and reproductive health can be profound (especially among AGYW[68]) and include pelvic inflammatory disease, chronic pelvic pain, tubal infertility, pregnancy complications, fetal and neonatal death, and increased susceptibility to HIV.[61,64,69–72] In 2017, Kenya launched PrEP scale-up and currently has more individuals on PrEP than any other African country.[73,74] Evidence from different populations in different settings (e.g., men who have sex with men in high-income countries) suggests that the expansion of PrEP use may increase population-level STI prevalence if individuals at HIV risk forego using condoms for HIV prevention.[75–79] The Kenya Ministry of Health recognizes the need for increased STI control efforts with PrEP scale-up, but faces challenges including limited access to laboratory testing for STI diagnosis.

Findings from the Partners Scale-Up Project and MPYA Study

PrEP delivery in HIV clinics is associated with stigma. A main delivery point for PrEP in Kenya currently is HIV clinics. We have learned from qualitative work conducted among clients and providers in our Partners Scale-up Project that many PrEP users consider HIV clinics as spaces for HIV infected people, and thus feel uncomfortable attending these clinics as HIV uninfected persons. Additionally, PrEP users face difficulties fitting in when waiting for services at the HIV clinics since most of the health discussions focus on illness, not prevention and health (**Table 1**).

Table 1. HIV uninfected persons' concerns with accessing PrEP at HIV Comprehensive Care Clinics (Partners Scale-up Project)

"I told you that experience is difficult, because we normally go to the CCC and the CCC clinic is for HIV+ people and therefore there is no difference between that person who is infected and the one who is not" **– PrEP user: Female.**

"I used to fear because when people see me, they would think I am sick" **– PrEP user: Male.**

"There is still stigma with the negative patients coming to the CCC to take PrEP because they are associated with HIV+" **– Healthcare provider: Nurse.**

"I know there are a lot of people who really wish to take PrEP, but when they learn that it is being given at the CCC they just disappear, so having another place to dispense PrEP will help" **– Healthcare provider: Counselor**

Diverse options for PrEP delivery are desired among individuals taking PrEP. Preliminary qualitative data from PrEP users and providers in the Partners Scale-up Project and community leaders in the MPYA study have demonstrated the desire for locations other than HIV clinics for PrEP prescribing and refilling. **Table 2** demonstrates how PrEP users would like PrEP delivery to be as easy as access to condoms and separate from HIV clinics for increased privacy. **Table 2** additionally demonstrates community leaders' interest in pharmacies as a potential location for PrEP delivery and refill as a result of their easy accessibility, availability of pharmacists/pharmaceutical technologists for PrEP prescribing/refilling, and long open hours.

Table 2. PrEP users', providers', and counselors' desires for diverse PrEP delivery options (Partners Scale-up Project and MPYA study)

"PrEP should be made available just like condoms are easily accessible and available in dispensers" **–PrEP user, Partners Scale-up**

"I feel that PrEP should be delivered separately from the CCC [HIV clinic] … yes it should be delivered at a different point because of stigma" – **PrEP user, Partners Scale-up**

"Sometime there are those people who do not want others to know about their thing, so there should be a way that one can be treated from wherever they are even without coming to the clinic" – **PrEP user, Partners Scale-up**

"Community pharmacies would work [for PrEP delivery] because they are easily accessible and the pharmacists are always available ... some of them work until late hours" – **NGO program officer, MPYA**

"For refill maybe we… observe how they are faring with the product [PrEP] then after 3 times … she can pick it at any given point like dispensaries and pharmacies around where they live because nowadays there are so many all over" **– Community-based organization leader, MPYA**

Pharmacy-based delivery of PrEP is of interest to communities. We recently conducted two anonymous, telephone-based, community surveys in Western Kenya (PrIYA study) with young women and men (<25 years) who had a phone and had agreed to be part of mSurvey – a national polling organization that connects to mobile phones in Kenya and pays a small amount for survey completion. In the June 2018 survey 515 individuals participated, and in the January 2019 survey 2274 individuals participated. None of these individuals were otherwise part of our ongoing research studies. In both surveys, PrEP knowledge was high: in the June 2018 survey, 83% of individuals had heard of PrEP and 43% knew someone on PrEP; in the January 2019 survey, 69% of individuals had heard of PrEP. The majority (58%) of individuals in the January 2019 survey said they would be willing to pay for PrEP and

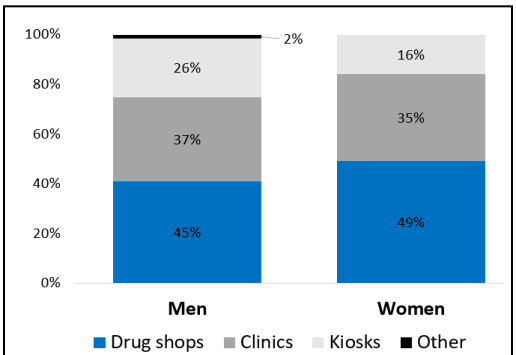

Fig. 2. Preferred PrEP locations
(mSurvey results)

35% visited a retail pharmacy ("drug shop") every 2-3 months. Interestingly, almost half of individuals who were familiar with PrEP in the June 2018 survey thought that people would most prefer to get PrEP from retail pharmacies compared to other locations (e.g., clinics) (**Fig. 2**).

Findings from formative research on pharmacy-based PrEP delivery

As formative research for this project, in the second half of 2019 we conducted in-depth interviews with pharmacy clients (n=40) and pharmacy providers (n=12) to understand their health seeking behaviors (clients), interactions with clients and commonly provided services (providers), and attitudes towards pharmacy-based PrEP delivery (both). We interviewed client who currently purchase pharmacy products and services, self-reported being HIV negative, and were identified as at-risk for HIV using the Rapid Assessment and Screening Tool (RAST). We interviewed pharmacy providers who currently provide services at retail pharmacies. Study participants were recruited from four different areas of Thika and Kisumu: urban informal settlements, urban non-informal settlements, peri-urban areas, and rural areas. Exactly half of the pharmacy clients recruited were male, and half were under the age of 25. Participants were interviewed one-on-one by a trained Kenyan qualitative researcher. All interviews took place in a private room, were audio recorded, and subsequently transcribed verbatim. Major themes were identified inductively using content analysis. Some of the main findings are summarized below.

Pharmacies are often clients' first resort for care-seeking; clients' preference for pharmacy-care is multifaceted. The majority (78%, 31/40) of clients reported that when they are ill, they first seek care at retail pharmacies and only seek care at healthcare facilities if their symptoms persist and/or worsen. Most (75%, 30/40) clients also reported seeking preventive care at retail pharmacies, most commonly through purchase of contraceptives. Clients identified six characteristics that underlie their preference for pharmacy care over facility-based care: 1) convenience (e.g., more locations, longer opening hours, faster service times); 2) privacy (e.g., less crowded, purpose of visit not obvious to on-lookers); 3) customer service (e.g., pharmacy providers are "friendly", "kind", and "not in a hurry"); 4) rapport (clients have ongoing, personal relationships with pharmacy providers who know their medical history); 5) flexibility (e.g., pharmacies work to provide services within clients' budget, some offer credit); and 6) autonomy (more client decision-making power in terms of timing and location of care, more negotiation power with pharmacy providers when deciding treatment plan, ability to seek care elsewhere if dissatisfied with services.)

Overall, pharmacy clients and providers strongly support the idea of pharmacy-based PrEP delivery, especially because the demand for PrEP is already there. Participants felt that the same six aforementioned advantages to general pharmacy care would also apply to pharmacy-based PrEP delivery, with many heavily emphasizing that pharmacy-based PrEP delivery would help circumvent HIV/PrEP stigma currently associated with HIV clinics, where PrEP is currently delivered. Providers reported that clients are already requesting PrEP at their pharmacies, and two providers said that they sell PrEP on demand. Clients similarly expressed interest in acquiring PrEP at retail pharmacies, with one client reporting that she had already purchased PrEP at a pharmacy previously. Overall, participants found pharmacy-based PrEP delivery highly acceptable, with 83% (10/12) of providers saying they would offer PrEP at their pharmacies and 95% (38/40) clients expressing support for this idea.

Clients' main recommendation for pharmacy-based PrEP delivery was to ensure client privacy and that providers are properly trained to deliver PrEP. When asked about undergoing HIV testing, counseling, and adherence and side effect assessments at a pharmacy, most clients reported that they would be comfortable so long as these activities occurred in a private consultation room and they felt sure that the provider would maintain their confidentiality. Clients also stressed that providers must

have the proper training to conduct these activities. Other ideas for increasing client comfort with pharmacy-based PrEP included offering HIV self-testing and ensuring consistency of provider at follow-up visits.

Providers felt that delivering PrEP in pharmacies would be feasible so long as they have sufficient content knowledge of PrEP and staff to handle any additional workload. Providers supported the idea of pharmacy-based PrEP delivery being overseen by a remote clinician with PrEP expertise. In general, providers reported that they could deliver PrEP using the same practices they currently use to deliver other drugs (e.g., pill counts and phone calls to assess adherence, referrals of clients experiencing serious side effects). Half of providers also desired additional training on HIV testing and counseling to deliver PrEP. All providers (12/12) supported the idea of oversight by a remote PrEP clinician, with several calling for resources like a standardized checklist to ensure that clients meet eligibility criteria and clinical safety requirements to receive PrEP.

Findings from stakeholder meeting pharmacy-based PrEP delivery

In January of 2020, we convened 19 stakeholders from regulatory agencies and suppliers (e.g., National AIDS & STI Control Programme, Pharmacy & Poisons Board, Kenya Medical Laboratory Technology & Technicians Board, Kenya Medical Practitioners & Dentists Council, Kenya Medical Supplies Agency), professional bodies (e.g., Kenya Pharmaceutical Association, Pharmaceutical Society of Kenya, Kenya Medical Association), PrEP implementing partners (JHPIEGO, Clinton Health Access Initiative), healthcare and pharmacy providers, Civil Society Organizations. The purpose of this meeting was to build consensus around a model for pharmacy-based PrEP initiations and pharmacy-based PrEP refills that could be pilot tested in Kenya. Following presentations on the role of PrEP in Kenya's national plan for HIV prevention, results from the formative research, and a mock care pathway for pharmacy-based PrEP delivery, participants were divided into small groups to brainstorm potential barriers and solutions—both for pilot testing and, if successful, for eventual scale-up—of pharmacy-based PrEP delivery. The outcomes from the stakeholder meeting are summarized below.

Stakeholders were supportive of the idea of pharmacy-based PREP delivery. There was overwhelming consensus that pilot work to better understand whether pharmacy-based PrEP initiation and refills could be done successfully. Importantly, no meeting attendee objected to trying pharmacy-based PrEP delivery. Stakeholders were in favor of a pilot test of pharmacy-based PrEP delivery and felt it would help identify matters requiring further clarification before further scale up.

Stakeholders identified potential challenges and solutions to pharmacy-based PrEP delivery for both the pilot study and, if successful, for larger scale up (Table 3). Anticipated challenges primarily centered on pharmacy provider knowledge and skills to deliver PrEP and lack of guidelines specifying, for example, what type of HIV test is permissible for initiation of PrEP at pharmacies, how pharmacies would procure and document PrEP, and reporting requirements. Stakeholders suggested numerous ways forward that could be incorporated into the pilot study. With respect to scaling up pharmacy-based PrEP delivery, stakeholders also suggested potential solutions, many of which would require the cooperation of local and national policymakers.

Table 3. Potential challenges and solutions to pharmacy-based PrEP delivery, according to stakeholder meeting attendees

Delivery component	Potential challenge	Potential solution: pilot	Potential solution: scale up
Promoting pharmacy-based PrEP	• Most pharmacies receive their promotional materials from suppliers. • Existing limitations on how pharmacies can advertise products/services. • CCCs may be reluctant to inform PrEP clients about pharmacy-based PrEP if trying to reach PrEP target numbers.	• Word-of-mouth promotion (e.g., PrEP providers at the affiliated CCC) • Ask customers seeking services indicating HIV risk-related sexual behaviors (e.g., condoms, emergency contraception) if they might be interested in PrEP. • Display posters within the confines of the pharmacy.	• NASCOP works with pharmacies to create PrEP materials for display. • NASCOP works with counties so PrEP promotional materials can be displayed without a county-level license. • MOH helps spread knowledge of pharmacy-based PrEP delivery through national awareness campaigns. • PPB revises advertisement restrictions for PrEP. • Pair pharmacies with CCCs so pharmacy-based PrEP users count toward CCC targets.
HIV testing	• No existing framework for pharmacies to do HIV rapid testing (e.g., Determine, First Response), although some already doing. • Only select pharmacies currently providing assisted HIV self-testing (blood- or oral-based). • No guidelines stating that PrEP can be initiated based on the results of an HIV self-test. • Concerns over counterfeit HIV self-tests.	• Select pilot pharmacies already certified to do assisted HIV self-testing. • Could consider a special approval from regulatory agencies to offer HIV rapid testing at pharmacies for the pilot.	• MOH develops guidelines so that pharmacies can conduct HIV rapid testing, which currently is provided in many pharmacies for ~one-fifth the price of HIV self-tests. • MOH could limit PrEP delivery to pharmacies that are certified to do assisted HIV self-testing and obtain their HIV self-testing kits through KEMSA. • PPB could reclassify the HIV self-testing so treated like any other HIV test.
Counseling	• Pharmacy providers not trained on PrEP counseling. • No privacy at some pharmacies for counseling. • Pharmacies have a business approach,	• Train pilot pharmacies on PrEP counseling, per NASCOP guidelines. • Pilot pharmacies should have a private counseling space to offer	• MOH requires pharmacy providers to be trained on PrEP delivery in order to deliver PrEP. MOH customizes NASCOP training to fit the retail pharmacy setting.

	gets in the way of counseling. • Existing counseling prompted by clients, not pharmacy providers.	PrEP.	
Prescribing	• Pharmacy providers are not trained on how to prescribe PrEP (and not allowed to prescribe). • Who will bear the costs of prescription? (incentives for pharmacies if get drug for free)	• Train pharmacy providers on how to prescribe using a checklist and remote clinician oversight. • Charge small consulting fee that covers counseling and dispensing. • Allow pharmacies to charge for HIV testing (necessary for prescription).	• PPB reschedules PrEP so that it can be sold without a prescription. • Pharmacy providers purchase PrEP from a generic manufacturer. • Pair pharmacies with CCC clinics for co-signing and oversight. • Remote PrEP clinicians (MOH supported?) for remote oversight and co-signing.
Dispensing	• Retail pharmacies not registered in the Master Facility List (MFL) and thus lack codes necessary to: (1) acquire PrEP through KEMSA, and (2) report dispensing. • Current retail pharmacy records do not tend to track clients over time. • Some clients move between pharmacies. • Clients might not be able to afford 3-months PrEP at a time.	• Link pilot pharmacies with CCCs; have pharmacies use CCC MFL code to obtain PrEP; then CCC reports the drugs dispensed. • Set up unique tracking system for pilot. • Have clients pay only for testing & a consulting/dispensing fee; make PrEP drug free.	• Give pharmacies MFL codes. • Use system similar to diabetes for tracking prescriptions over time (e.g., “PrEP card”). • MOH provides PrEP to pharmacies for free. • MOH establishes minimum criteria that pharmacy providers must meet in order to deliver PrEP (e.g., completion of NASCOP PrEP training).
Oversight/Referrals	• Many retail pharmacies lack formal connections to PrEP facilities. • Clinicians busy, hard to reach when called. • Cost of oversight? Who pays? • Ethics – how do you know pharmacies will use when needed? • Who is the clinician?	• Link pharmacies with specific CCC. • Have study-staff clinician on call. • Monitor the frequency of calls and record the content.	• PrEP clinician hotline? • WhatsApp group for PrEP clinicians and pharmacy providers? • Include cost of oversight in the consultation/dispensing fee client pays to pharmacy.
Other/over-arching	• Some pharmacies only have one staff member working at a time. • Pharmacy providers may lack knowledge	• Pharmacy providers selected for this pilot will be trained on PrEP delivery and provided with a standardized checklist to walk them	• MOH establishes minimum criteria (e.g., possession of a private consultation room, completion of NASCOP training) that pharmacy establishments and

	about PrEP and/or skills to conduct HIV testing and counseling. Some pharmacy providers may discriminate against clients, especially marginalized key populations (e.g., MSM, commercial sex workers). • Currently, there are no regulations for pharmacy-based PrEP delivery.	through each step. • Pharmacy providers will also be connected to a remote PrEP clinician who can answer any questions they have and receive referrals of complex clients.	providers must meet to deliver PrEP. • MOH requires pharmacy-based PrEP providers to undergo a sensitization training on PrEP stigma/discrimination. • MOH establishes guidelines for pharmacy-based PrEP delivery, including any price regulation and accountability mechanisms (e.g., in cases of client mismanagement).

Stakeholders helped refine a care pathway to be pilot tested. The care pathway is illustrated in **Fig. 3** with the core components detailed in **Table 4**. The checklist pharmacy providers will use to assess PrEP eligibility (both at initiation and refills) is included in **Appendix III.**

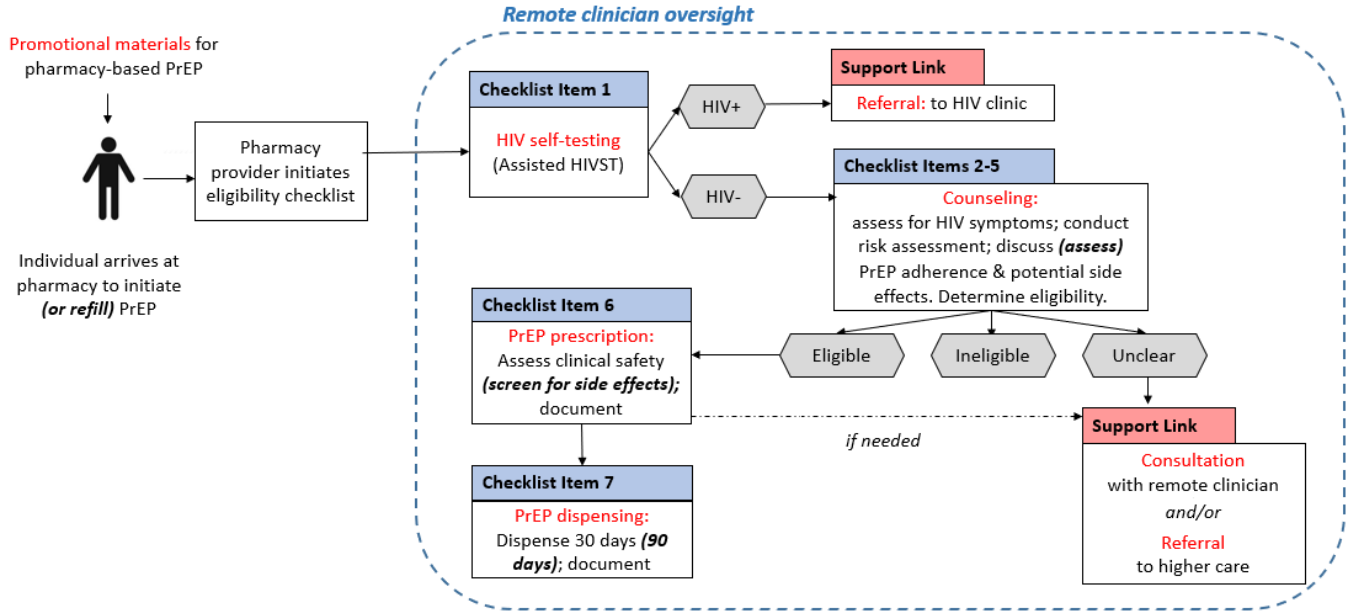

Fig. 3. Care pathway for pharmacy-based PrEP delivery

Table 4. Core components of pharmacy-based PrEP delivery

Oversight With clinician input, we developed a checklist tool that walks pharmacy providers through each step required to initiate a client on PrEP and/or refill an existing PrEP prescription. All checklist items need to be completed in order for the client to receive PrEP. If at any point the pharmacy provider has questions, s/he can consult with a remote clinician and/or refer the client for care.	**Testing**	Assisted self-testing for HIV using rapid blood or oral fluid tests (optional STI testing).
	Counseling	Includes risks and benefits associated with PrEP, PrEP adherence, recognizing symptoms of acute HIV infection, behavioral risk assessment (using Kenya's PrEP Rapid Screening Tool - RAST[80]), and side effects assessment.
	Prescribing	Prescribing of PrEP drugs for those initiating PrEP for the first time and continuation of prescriptions for clients coming in for refills.
	Dispensing/ Refilling	PrEP drugs dispensed/refilled by pharmacy provider; reliable drug supply required.

Preliminary findings from Aims 1a, 1b, and conversations with PrEP policy makers from the Kenya MOH, WHO, and PEPFAR. In Aim 1c, we propose refining the care pathway implemented in the Aim 1a pilot to address (1) challenges reported by the clients and providers we interviewed and surveyed in Aim 1b and (2) evidence gaps identified by representatives from the Kenya Ministry of Health (MOH), WHO, and PEPFAR. The identified challenges and proposed refinements to how PrEP delivery is implemented (i.e., "implementation strategies") are summarized in table below:

Challenge Identified	Proposed Refinement to Model	Implementation Strategy Name[1]
Some clients cannot afford the fee study pharmacies are charging for PrEP (300 Kenyan schillings/~$2.75 USD).	Eliminate the pharmacy fee.	"Free PrEP"
Some clients felt uncomfortable completing the HIV risk assessment for PrEP (which includes highly sensitive questions about sexual behaviors) verbally with the pharmacy providers.	Give clients the option to self-administer this questionnaire, with review by pharmacy provider who can ask questions if needed.	"Optional Self-RAST" ("RAST" stands for "Risk Assessment Screening Tool")
Some prospective PrEP clients who do not know their HIV status are hesitant to undergo HIV testing at a pharmacy for fear for testing positive there.	Give prospective PrEP clients the option to complete an initial HIV self-test at home, and provide those who accept this offer an HIV self-test kit free of charge.	"Optional Initial Self-Test"
Some client populations with HIV risk—especially adolescent girls and young women—are not being reached by this model.	Incentivize PrEP clients to refer their peers to study pharmacies to learn about PrEP.	"Peer Referral"
The oral-fluid HIV self-tests being used in our pilots have a lower sensitivity than blood-based HIV self-tests.	Switch to using blood-based HIV self-tests (and continue to have pharmacy providers assist clients with conducting these).	"Assisted Blood-Based HIV Self-Testing"
Some clients who undergo screening for PrEP are found to be post-exposure prophylaxis (PEP) candidates and have to be referred to public HIV clinics for PEP access (because pharmacies do not currently offer PEP).	Add PEP services to study pharmacies so that they can keep PEP clients engaged in care and offer them PrEP upon PEP completion.	"PEP-as-a-Bridge-to-PrEP"
Pharmacies receive a high volume of clients seeking testing and/or treatment for sexually transmitted infections (STIs) and currently have no way to formally test and diagnosis these clients.	At a subset of 2 study pharmacies, offer clients seeking STI testing and/or treatment free STI testing and treatment with optional PrEP screening.	"STI Testing-as-a-Bridge-to-PrEP"

[1]For the extended pilot (Aim 1c), we define each of these implementation strategies prior to asking providers for their feedback on them in the baseline and follow-up questionnaires (Appendices XIX and XX).

The refined care pathway we propose implementing in an extended pilot study (Aim 1c) is illustrated in Fig. 4 with the new implementation strategies (refinements) highlighted in yellow.

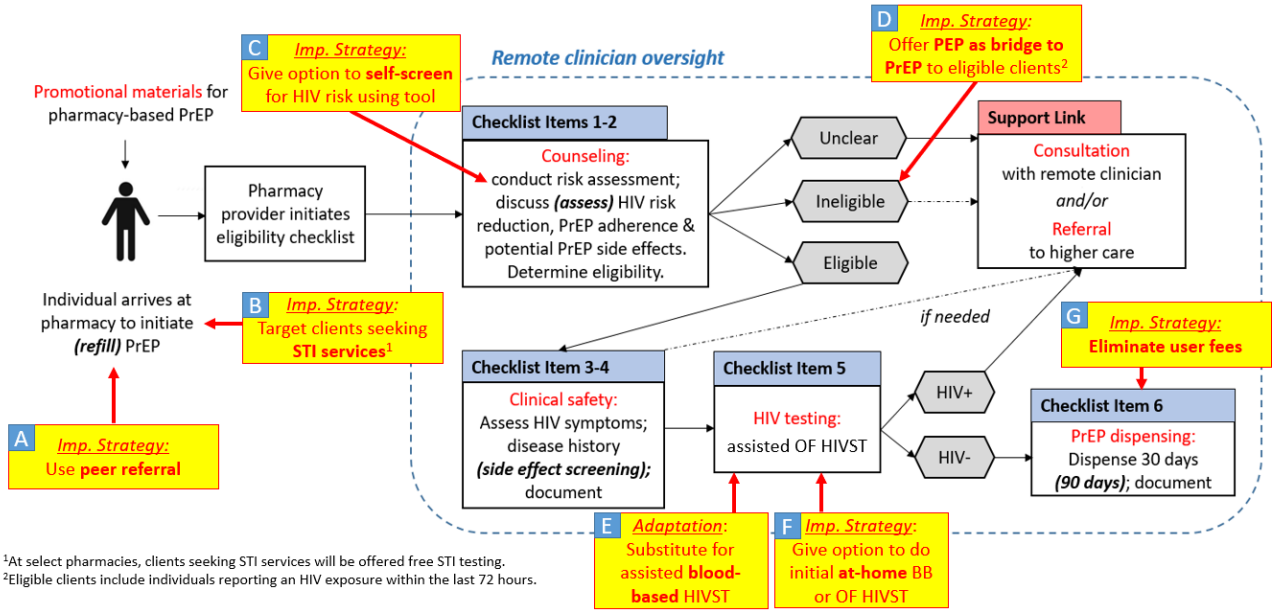

Fig. 4. Refined care pathway for pharmacy-based PrEP delivery for extended pilot study (Aim 1c)

METHODS

Taking PrEP to scale will require simplifying and diversifying models for delivery to achieve options that are affordable, accessible, and meet the needs of clients and health systems. We have assembled a multidisciplinary team to test pharmacy-based models as alternative strategies for PrEP delivery. **We hypothesize that pharmacy-based PrEP delivery will be feasible, acceptable, and preferred.**

Study Objectives

1. To test pathways for pharmacy-based PrEP delivery – both initiation and refill – through pilot studies (Aim 1a).

2. To identify weak points for pharmacy-based PrEP delivery, in domains relating to acceptability, fidelity, and costs (Aim 1b).

3. To test a refined care pathway for pharmacy-based PrEP initiation and refills through an extended pilot study (Aim 1c)

Hypothesis. Individuals will be interested in pharmacy-based PrEP delivery and will successfully initiate and refill PrEP at pharmacies and be retained in care. Understanding the potential weak points for PrEP delivery in pharmacies will permit refinement of the care pathway, and this refined pathway will result in greater PrEP uptake and improve the acceptability and feasibility of the pharmacy PrEP model among clients and providers.

Research Questions

- What is the uptake of pharmacy-based PrEP delivery among eligible pharmacy clients? (Aim 1a) Do model refinements result in greater uptake? (Aim 1c)

- What does PrEP retention and adherence look like among individuals who started PrEP at pharmacies? (Aim 1) Do model refinements result in increased PrEP retention and adherence? (Aim 1c)

- Could pharmacy-based PrEP refills increase PrEP retention and adherence compared to facility-based PrEP refills? (Aims 1a & 1c)

- What is the fidelity of pharmacy-based PrEP delivery? (Aim 1b)

- What is the acceptability of pharmacy-based PrEP delivery among both pharmacy clients and providers? (Aim 1b) Do model refinements result in greater acceptability? (Aim 1c)

- What is the cost of pharmacy-based PrEP delivery and how much might pharmacy clients and providers be willing to pay for/provide PrEP at pharmacies? (Aim 1b)

Study Design

This study is a one-arm intervention trial, or pilot study. There is no comparison arm in this pilot

study. The intervention we are testing was developed from extensive formative research, including analysis of data from in-depth qualitative interviews and a stakeholder meeting. We hope to use the information gained from this research to inform development of a larger randomized trial, which will include a comparison arm.

Setting

We will conduct the research for this study in Kisumu (**Fig. 5**). Kisumu is a major urban center located in Western Kenya, surrounded by a large fishing and farming area, thus both an urban and rural population. HIV prevalence in Kisumu is among the highest in Kenya, at 21%. In Kisumu County, where Kisumu town is located, there are 119 retail community, 7 wholesale, and 27 hospital pharmacies.

Fig. 5. Study setting.

The site has a team with extensive experience in the provision of PrEP to diverse populations, beginning with the Partners PrEP Study clinical trial,[4] continuing to the open-label Partners Demonstration Project,[81] and current leadership of the Partners Scale-Up Project, MPYA study, POWER project, and others. The site has technical expertise related to PrEP, community engagement with diverse populations (with high recruitment and retention >90%), and collaborative experience working with health providers outside of its own research clinics – precisely the components necessary for this work.

Fig. 6. Retail pharmacy in Kenya
Source: www.howwemadeitinafrica.com

As described, the location has numerous private, retail pharmacies that are high quality, well-stocked, and capable of implementing pharmacy-based PrEP delivery (example: **Fig. 6**). Finally, the site has extensive experience with the development of PrEP delivery models in Kenya – members of study teams have been deeply involved in the Kenya PrEP guideline process, including the clinical delivery guidelines.[52] All work proposed will be done adhering to the minimal safety package defined in those guidelines – analogous to the pharmacy-based checklist model from the US (**Fig. 1**).[55,57]

Pilot pharmacies

Pharmacy selection

For Aim 1a, we will select two retail pharmacies of different sizes in Kisumu to conduct our pilot: (1) one medium-sized pharmacy (~100 customers/day), and (2) one large pharmacy (~500 customers/day) (=2 pharmacies in total). For Aim 1c (extended pilot), we will select four additional pharmacies, for a total of six pharmacies: four medium ones (~50 customers/day) and two large ones (~100 customers/day). In order for pharmacies to be eligible for study participation, they must: 1) be properly licensed with a fulltime licensed pharmacy provider, 2) have a private counseling space where HIV testing and PrEP counseling can occur, and 3) must be already certified to provide provider-assisted HIV self-testing. The majority of licensed retail pharmacies in Kenya have a private counseling room in the back that is regularly used to counsel clients on sensitive topics including, STI treatment, HIV self-testing, and family planning, amongst other things. Then, the lead provider at each pharmacy selected must agree to: 1) offer PrEP (with relevant providers undergoing project training), 2) allow a trained research

assistant to collect client data (e.g., self-reported adherence, dried blood spot samples), and 3) allow one or more pharmacy staff members to participate in a confidential and voluntary in-depth interview about their experiences delivering PrEP (Aim 1a only), a confidential survey about their experiences delivering PrEP (Aim 1c only), and a monitored WhatsApp group with the remote clinician providing PrEP oversight (Aim 1a and 1c). Pharmacies that participate in the extended pilot (Aim 1c) must agree to offer post-exposure prophylaxis or "PEP" (with relevant providers undergoing project training), and two of the four pharmacies that participate in the extended pilot (Aim 1c) must also agree to offer STI testing (again, with relevant providers undergoing project training).

Pharmacy provider training

The pharmacy providers who will deliver PrEP and/or PEP (Aim 1c only) in the pilot study will undergo a training based on the Kenya MOH PrEP training (which our team helped develop) and Partners Scale-Up Project training (used at public clinics).[82] All individuals at the pilot pharmacies who plan on implementing pharmacy-based PrEP/PEP delivery must complete the training. The training will cover: 1) a review on how to perform assisted HIV self-testing, 2) how and where to refer individuals for HIV care if they test HIV-positive, 3) how to counsel individuals interested in initiating PrEP or PEP (Aim 1c only), including screening for PrEP/PEP eligibility using the standardized checklist, 4) how to refer individuals with complex medical backgrounds and/or side effects to the remote clinician, how to use and access the remote clinician, and 5) how to dispense drugs to individuals starting PrEP or PEP (Aim 1c only) for the first time (one-month drug supply) and individuals returning for PrEP refills (three-month drug supply), and 6) how to maintain proper safety precautions during the COVID-19 outbreak. Additionally, pharmacy providers participating in the pilot will complete training by members of the Kisumu research team on research ethics and the importance of confidentiality, as well as consistent protocols for PrEP/PEP record keeping, including instructions on how to complete and securely store the pharmacy-based PrEP/PEP delivery prescribing checklists (**Appendix III. Prescribing checklist**), referral forms (**Appendix IV. Referral form**), and the remote clinician contact forms (**Appendix V. Remote clinician form**). All other research-related activities at the pharmacy (e.g., completion of informed consent documents and the quantitative questionnaires) will be completed by a full-time research assistant (trained by the Kisumu team on research methods and ethics) stationed full-time at the pilot pharmacies.

Participant eligibility & recruitment -

For Aim 1a, we aim to enroll up to 150 clients in total across the two Aim 1a pharmacies (**Table 5**). We will stop enrolling participants in the pilot once we achieve the desired sample size Aim 1a sample sizes. This sample size is similar to that we have used in other pilot studies to test the feasibility and acceptability of new health intervention. For Aim 1c (extended pilot study), we aim to enroll up to 540 new clients, and to extend to Aim 1a enrollees the option to continue refilling PrEP at pilot pharmacies so long as they still meet study and PrEP eligibility criteria and complete the Aim 1c informed consent process.

Table 5. Number of clients to be enrolled at pilot pharmacies

	Enrollment location	Study site	Pharmacy size	# Clients	Total Clients
Aim 1a	Pharmacy A	Kisumu	Medium	~75	Up to 150
	Pharmacy B	Kisumu	Large	~75	
Aim 1c (extended pilot)	Pharmacy A*	Kisumu	Medium	~90	Up to 540
	Pharmacy B*	Kisumu	Large	~90	
	Pharmacy C	Kisumu	Medium	~90	
	Pharmacy D	Kisumu	Medium	~90	
	Pharmacy E	Kisumu	Medium	~90	
	Pharmacy F	Kisumu	Large	~90	

*Will be invited to participate in the extended pilot (Aim 1c)

All participating pharmacies will continue to provide PrEP for 6 months following enrollment of each participant (**Fig. 7**). The eligibility criteria and recruitment plan for the pilot and pilot evaluation activities are outlined for clients and providers in **Table 6** and **Table 7**, respectively.

Table 6. Client eligibility, recruitment, and evaluation

	Pilot		Pilot Evaluation Component	
	Eligibility	**Recruitment**	**Quantitative Survey & DBS**	**In-depth Interview (Aim 1b)**
Aim 1a and Aim 1c (n=2 pharmacies for Aim 1a and n=6 pharmacies for Aim 1c)	• ≥18 years • Interested in initiating PrEP at a pilot pharmacy (Aim 1a) or interested in initiating PrEP or PEP or undergoing STI testing at a pilot pharmacy (Aim 1c) • Meets all criteria (e.g., tests HIV-negative) for PrEP initiation on the checklist (Aim 1a) or for PrEP, PEP, and/or STI testing (Aim 1c). • Able & willing to provide written informed consent[1]	• Display posters that encourage customers to ask their pharmacy provider about PrEP • Have pharmacy providers ask customers buying HIV self-tests, emergency contraception, or STI treatment if they are interested in initiating PrEP at the time of check-out • Peer referral incentives (Aim 1c only) • Offer free STI testing with optional PrEP screening to clients seeking STI diagnosis or treatment services ("STI Testing-as-a-Bridge-to-PrEP", Aim 1c only) • Offer PEP to clients seeking PEP and/or reporting a recent HIV exposure, encouraging those who accept and complete the PEP treatment regimen to consider taking PrEP ("PEP-as-a-Bridge-to-PrEP", Aim 1c only) • Other strategies developed from the formative research and stakeholder meeting	At each study visit, RAs stationed at the pharmacy will conduct the quantitative survey with and collect the DBS samples from participants. *Up to four surveys and four DBS samples will be collected from each client enrolled in the Aim 1a pilot. Up to four surveys and four DBS samples will be collected from each client enrolled in the Aim 1c extended pilot.*	Study staff will identify a sample of enrollees to invite to participate in an in-depth interview.[2] RAs will approach these individuals to see if they are interested in participating. *At each Aim 1a pharmacy, up to 10 clients who initiate PrEP and 10 clients who also refill PrEP will be interviewed during Aim 1a (n=40 client interviews total).*

[1]By signing the consent form (**Appendices I-II**), Aim 1a participants agree to 1) receive PrEP services (e.g., HIV testing); 2) complete a quantitative survey; and 3) give a DBS sample. Participants from Aim 1a pharmacies additionally consent to being invited to participate in an in-depth interview about their PrEP care experiences. By signing the consent form for the extended pilot (Appendices XII and XIII), Aim 1c participants agree to 1) receive PrEP, PEP, or STI testing services; 2) complete a quantitative survey; and 3) give a DBS sample. All participants must provide written on electronic consent to participate in study activities.

[2]We will purposely sample clients of different ages, sex, and duration of PrEP use to reflect a range of experiences and perspectives on pharmacy-based PrEP delivery.

Table 7. Provider eligibility and recruitment plan

		Pilot Evaluation Component	
	Eligibility[1]	**In-depth Interview**	**WhatsApp Group**
Pharmacy providers from Aim 1a and Aim 1c pharmacies	• ≥18 years • Provides PrEP at a pilot pharmacy or provides PrEP, PEP, and/or STI testing at a pilot pharmacy (Aim 1c) • Able & willing to provide consent	Prior to agreeing to be part of the Aim 1a pilot study, providers will be informed that they will be invited at a later time to participate in a confidential in-depth interview. Study staff will identify a sample of providers to invite to participate in an in-depth interview. RAs will approach these individuals to see if they are interested in participating. *At each Aim 1a pharmacy, we will interview 2 pharmacy providers and 1-2 clinicians providing remote oversight during Aim 1a (n=8 provider interviews total).*	Prior to agreeing to be part of the Aim 1a pilot study and Aim 1c extended pilot study, providers will be informed that, if they desire, they may contact each other via a WhatsApp group created and accessible to study staff for the purposes of understanding the kinds of support pharmacy providers request in initiating clients on PrEP and/or refilling PrEP prescriptions. Providers are not obligated to use this WhatsApp group but may instead opt to contact each other through other means (e.g., phone calls), the content of which will not be known to study staff during Aim 1a. For Aim 1c, providers will consent to having study-related phone consultations audio recorded for subsequent transcription. *The total number of providers participating in the WhatsApp group will depend on the number of pharmacy providers who are trained at each pilot Aim 1a and Aim 1c pilot pharmacy to deliver PrEP (likely 1-2 individuals) and the number of clinicians providing remote oversight to these pharmacies (likely 1-2). We therefore anticipate that approximately 16 providers will participate in the WhatsApp group during Aim 1a and approximately 48 providers will participate in the WhatsApp group during Aim 1c.*
Remote oversight clinicians for Aim 1a and Aim 1c pharmacies	• ≥18 years • PrEP clinician at a project-affiliated CCC who provides remote oversight to a pilot pharmacy • Able & willing to provide consent		

[1]Eligibilty criteria for participating in an in-depth interview and/or the study WhatsApp Group. All participants must provide written or electronic consent to participate in study activities. To continue participating in the extended pilot (Aim 1c), pharmacy providers and clinicians who participated in the Aim 1a pilot will need to be re-consented using the Aim 1c informed consent form (Appendices

Pilot procedures

We have chosen single-arm trials for this study (i.e., no comparison pharmacies) because this study is focused on testing the feasibility of pharmacy-based PrEP delivery and refining care pathways for this delivery model; ongoing PrEP delivery work in HIV care centers can serve as a general comparison in terms of demographics, retention, and adherence.

Study visits

Aim 1a pilot:
All Aim 1a participants will complete a maximum of four study visits: at months 0, 1, 4, and 7 (**Fig. 7**). Participants from Aim 1a pharmacies will initiate PrEP at a pilot pharmacy and be instructed to return to the pharmacy one month later (the Kenya standard); thereafter, they will return quarterly to test for HIV and refill their PrEP drugs.

Aim 1c pilot:
Aim 1c participants include the following two populations:

- Client Population A - Individuals who did not participate in the Aim 1a pilot: These participants will initiate PEP, PrEP, and/or undergo STI testing at a pilot pharmacy and be followed for up to 6 months. They will complete a maximum of four study visits: an initiation visit and follow-up visits at 1, 4, and 7 months post-initiation (Fig. 7).
- Client Population B – Individuals who participated in the Aim 1a pilot: At their last study visit for the Aim 1a pilot, these individuals will be informed that they can opt to continue receiving PrEP refills at the pilot pharmacy during the extended pilot study but that, to participate in the extended pilot study, they will need to complete a new informed consent form. During the extended pilot study, participants will be followed for a maximum of 6 months and complete up to 3 study visits (in addition to the ones they had during Aim 1a). **Figure 8** illustrates the study visit schedule and maximum number of study visits participants will have depending on what month they enrolled in the Aim 1a or Aim 1c pilot. Individuals who, after completing their M7 visit in Aim 1a pilot, continued taking PrEP at a clinic will be notified by study staff about the option to obtain PrEP refills at a pilot pharmacy during the extended study. If any such individual stopped taking PrEP since their M7 study visit for Aim 1a, but is interested in re-initiating PrEP at a pilot pharmacy during the extended pilot, s/he will be invited to return to the pharmacy to undergo PrEP screening and, if eligible, will be enrolled in the extended pilot and follow the study visit schedule for new initiators (i.e., starting with a M0 visit).

Both pilots (Aim 1a and 1c):
At all study visits that occur at a pharmacy, the pharmacy provider will use the PrEP prescribing/refilling checklist (with remote clinician oversight) when delivering PrEP services (**Table 8, Appendix III. Prescribing checklist**). At their last study visit, participants refill PrEP at the pharmacy (receiving a 3-month supply or a 1-month supply, depending on whether their last visit is a M1 visit or a quarterly follow-up visit), complete endline assessments, and be referred to public CCCs for PrEP continuation. Throughout the study, the CCC will be a referral point for the pilot pharmacy providers should they have any concerns or questions about PrEP clients.

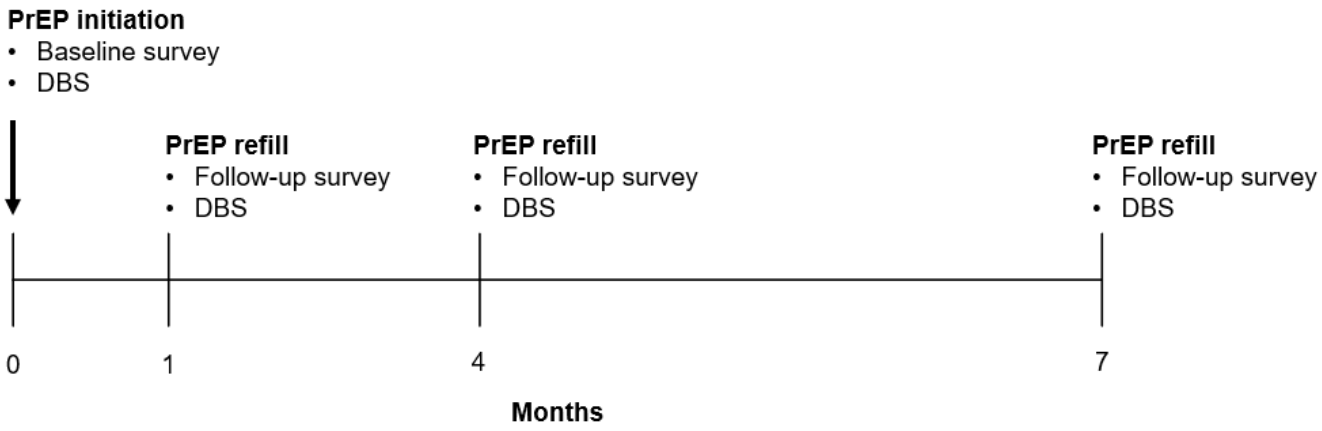

Fig. 7. Timeline of participant enrollment and follow-up

	Original pilot studies (Aim 1a)														Extended pilot study (Aim 1c)							
Study month → Enrollment month ↓	Nov '20	Dec '20	Jan '21	Feb '21	Mar '21	Apr '21	May '21	Jun '21	Jul '21	Aug '21	Sept '21	Oct '21	Nov '21	Dec '21	Jan '22	Feb '22	Mar '22	Apr '22	May '22	Jun '22	Jul '22	Max # of study visits
Nov '20	M0	M1			M4			M7[a]			M10[b]			M13[b]			M16[c,d]			M19[d,e]		6
Dec '20		M0	M1			M4			M7[a]			M10[b]			M13[c,d]			M16[d]			M19[d,e]	7
Jan '21			M0	M1			M4			M7[a]			M10[b]			M13[c,d]			M16[d,e]			6
Feb '21				M0	M1			M4			M7[a]			M10[b]			M13[c,d]			M16[d,e]		6
Mar '21					M0	M1			M4			M7[a]			M10[c]			M13			M16[d,e]	7
Apr '21						M0	M1			M4			M7[a]			M10[c]			M13[e]			6
May '21							M0	M1			M4			M7[a]			M10[c]			M13[e]		6
Jun '21								M0	M1			M4			M7[c]			M10			M13[e]	5
Jul '21									M0	M1			M4			M7[c]			M10[e]			5
Aug '21										M0	M1			M4			M7[c]			M10[e]		5
Sept '21											M0	M1			M4[c]			M7			M10[e]	5
Oct '21												M0	M1			M4[c]			M7[e]			4
Nov '21													M0	M1			M4[c]			M7[e]		4
Dec '21														M0	M1[c]			M4			M7[e]	4
Jan '22															M0	M1			M4[e]			3
Feb '22																M0	M1			M4[e]		3
Mar '22																	M0	M1			M4[e]	3
Apr '22																		M0	M1[e]			2
May '22																			M0	M1[e]		2
Jun '22																				M0	M1[e]	2
Jul '22																					M0[f]	1

[a]Participant's last study visit as part of Aim 1a/Aim 2 pilot. At this visit, participant receive a 3-month supply of PrEP and is instructed to go to a public clinic for their next follow-up visit if they wish to continue taking PrEP.
[b]If participant continued PrEP, these visits would have occurred at a clinic. They are shown here only to explain how the participant's PrEP schedule might continue under the extended pilot study (Aim 1c).
[c]To receive PrEP at this visit, participant will need to be re-consented using the extended pilot consent forms.
[d]Assumes participant continued talking PrEP at a clinic following their M7 visit. If client stopped taking PrEP after their M7 visit and/or does not return to a pilot pharmacy to participate in the extended pilot, then this and all subsequent visits will not occur. If client stopped taking PrEP after their M7 visit but wishes to re-initiate PrEP in the extended pilot, participant will be re-enrolled in the study (Aim 1c) and follow the study visit schedule for new initiators (i.e., starting with a M0 visit).
[e]Participant's last study visit. At this visit, participant will receive a 3-month supply of PrEP and be instructed to go to a public clinic for their next follow-up visit if they wish to continue taking PrEP.
[f]Participant's first (and only) study visit. At this visit, participant will receive a 1-month supply of PrEP and be instructed to go to a public clinic for their M1 follow-up visit if they wish to continue taking PrEP.

Fig. 8. Participant study visits based on enrollment month

PrEP checklist

In order for pharmacy providers to prescribe PrEP (both at initiation and follow-up visits), they must ensure the individual seeking PrEP meets the criteria on a checklist, summarized in **Table 8** (also found in **Appendix III. Prescribing checklist**), which we developed in collaboration with Kenyan stakeholders (including clinicians, pharmacy providers, etc.) at the stakeholder meeting and updated for

the extended pilot (Aim 1c) to reflect the Kenya national guidelines for PrEP, which allow pregnant and breastfeeding women to initiate PrEP, and the guidelines for PEP.

Table 8. Checklist for pharmacy PrEP prescribing and refilling. Month (M)

• **HIV risk**: at risk *(determined using the Kenya Rapid Assessment and Screening Tool, RAST)*
• **Recent HIV exposure**: if yes, screen for PEP instead
• **Counseling**: completed *(e.g., risk reduction, PrEP adherence, etc.)*
• **HIV status**: negative *(confirmed with assisted HIV self-testing at pharmacy)*
• **HIV symptoms**: none
• **Clinical safety & side effect assessment:** confirmed *(e.g., no known kidney disease)*
• **Records:** completed *(for prescribing and dispensing)*

Interventions

During Aim 1c, we will incorporate the following interventions to increase demand for PrEP:

- Peer Referral (**Aim 1c only**) – Participants coming for a refill visit will be given the option to engage in a peer referral program. Those who choose to participate will receive up to 5 referral slips (**Appendix XXI**) at each follow-up visit to distribute to their peers, along with an Information Sheet about the peer referral component of this study (**Appendix XXII**), and will receive a small incentive for each of their peers that presents their referral slip at a pilot pharmacy and enquires about PrEP. The incentive will be paid even if the referred peer does not ultimately initiate PrEP.
- PEP-as-a-Bridge-to-PrEP (**Aim 1c only**): Pharmacy providers will be trained to deliver post-exposure prophylaxis (PEP) to individuals seeking PEP and/or reporting a recent HIV exposure and encourage such clients to return for PrEP.
- STI Testing-as-a-Bridge-to-PrEP (**Aim 1c only**) – We will select a subset of 2 pharmacies at which pharmacy customers seeking STI diagnosis or treatment services will be offered free STI testing plus PrEP screening. Participants who accept STI testing (for C. trachomatis and N. gonorrhoeae) can receive it even if they decline being screened for PrEP. Participants that accept STI testing will self-collect a urine sample in a private pharmacy room. All pharmacy providers will be trained on how to explain urine sample self-collection and contact courier service for sample delivery. Couriers will then deliver samples to the nearby study clinic for STI testing (for both C. trachomatis and N. gonorrhoeae). Only participants who test positive for an STI will receive a call from study physician, who will confirm their identity, screen for potential drug allergies/interactions, and write a STI treatment prescription that will be sent electronically to the participant's choice pilot pharmacy for dispensing of free treatment.

During the Aim 1a and Aim 1c pilots, at each study visit, participants will receive the core components of pharmacy-based PrEP delivery identified in the stakeholder engagement meeting (**Table 4**) and incorporated into the care pathway for pharmacy-based PrEP delivery (**Fig. 3 and Fig. 4**).

- Counseling – on PrEP or PEP adherence and HIV risk reduction. Specifically, counseling will include PrEP/PEP side effect profiles, how to take PrEP/PEP, what to do if PrEP/PEP side effects are experienced, and the importance of not sharing PrEP/PEP to optimize potential efficacy and to reduce the chances of developing resistance through suboptimal HIV suppression. Depending on the study visit, this will be provided by a pharmacy provider. All individuals who administer this counseling will have completed PrEP and PEP training, per NASCOP guidelines.
- Assisted HIV self-testing – will be provided at each study visit to clients wishing to initiate PrEP or PEP and/or refill PrEP by a pharmacy provider trained on HIV self-testing. During the Aim 1a pilot, clients will receive either assisted blood-based or assisted oral-fluid HIV self-testing. During Aim

1c, only assisted blood-based HIV self-testing will be used. With assisted HIV self-testing, pharmacy clients (including study participants) test for HIV in the presence of and with the support of a pharmacy provider using a self-testing kit purchased at the pharmacy (during Aim 1a) or provided free of cost at the pharmacy (during Aim 1c). Provider-assisted HIV self-testing (using both blood-based and oral-fluid kits) is already ongoing in Kenya, and thus pharmacies included in the pilot must already be certified to conduct this assisted self-testing. We are using assisted HIV self-testing in these pilots because technically only laboratory technologists are allowed to conduct rapid HIV testing in Kenya according to national guidelines (as determined at our stakeholder meeting). In Aim 1c, we are switching to blood-based HIV self-testing to assuage ongoing concerns about the sensitivity of oral fluid-based HIV self-testing among key decision-makers, such as the Kenya MOH and WHO.

- Optional initial at-home HIV self-testing (**Aim 1c only**) – Clients interested in initiating PrEP at a pilot pharmacy during Aim 1c will have the option to take home an HIV self-testing kit (blood-based or oral-fluid) and complete the self-test at home before undergoing assisted HIV self-testing with a pharmacy provider as required for PrEP initiation. Findings from several PrEP implementation studies in Kenya, including the formative research conducted for this study and preliminary findings from Aim 1b, suggest that some clients are uncomfortable testing for HIV at a pharmacy without knowing their HIV status. Giving clients the option to learn of their HIV status in the privacy of their homes may help lower this barrier to PrEP initiation. Clients who opt to complete an initial HIV self-test at home will receive the kit free of charge.

- PrEP/PEP prescribing – including determination of clinical safety and screening for potential PrEP/PEP side effects. To prescribe PrEP /PEP at initiation and follow-up visits, pharmacy providers must complete the checklist for PrEP/PEP prescribing (**Table 9**, **Appendix III. Prescribing checklist**) and keep record of the prescription.
- PrEP/PEP dispensing – once the checklist for PrEP/PEP prescribing (**Table 9**) has been completed, pharmacy providers can dispense PrEP or PEP. At PrEP initiation visits, pharmacy providers will only dispense a 1-month supply of PrEP, per Kenya MOH guidelines. At all follow-up visits, pharmacy providers will dispense a 3-month supply of PrEP. At PEP initiation visits, pharmacy providers (in Aim 1c) will dispense a 1-month supply of PEP, per Kenya MOH guidelines.
- Oversight/referral – A Kenyan study clinician with experience in PrEP and PEP prescribing will be available 24/7 for consultation throughout the pharmacy PrEP delivery pilots. Pharmacy providers with any questions about PrEP or PEP eligibility or side effects can call the remote clinician for free using a number provided, or can consult with the PrEP clinician via a study-created WhatsApp group. All pharmacy providers will be trained on when consultation with the remote clinician is appropriate and how to share questions or concerns via the WhatsApp group without identifying patient information. Pharmacy providers will be trained to record the content of their discussions with the remote clinician using a specific study form (**Appendix V. Remote clinician form**). Pharmacy providers will also be given referral forms for nearby CCCs, which they can use to refer participants should they test HIV-positive or should they experience any PrEP side effects. Again, pharmacy providers will be trained to record any referrals to CCC using specific study forms (**Appendix VI. Referral form**).
- DBS samples – Trained research assistants will collect dried blood spot (DBS) samples to measure blood-level of PrEP adherence.

To remind participants to refill their PrEP drugs at pharmacies or to return for follow-up after being dispensed PEP, we will use retention methods used in Kenyan PrEP clinics (e.g., telephone reminders

for missed appointments). At the final follow-up visit before the end of the extended pilot study, we will do active tracing to have final data on all participants. Participants that are contacted via active tracing will still complete quantitative questionnaires (including DBS sample collection) so that we can understand the reasons why they might not have returned to the pharmacy for PrEP refills or following PEP dispensing; these participants that we actively trace, however, will not count towards our PrEP retention measurement.

Individuals interested in initiating PrEP or PEP and/or refilling PrEP at pharmacies, but not interested in participating in study-related activities (including quantitative surveys or DBS collection) will be referred to a nearby CCC for free PrEP or PEP care. The total number of such individuals will be tracked over time, but no other information will be collected from them.

Although the PrEP and PEP medications and potentially HIV self-tests for this pilot study will be provided by NASCOP via the Kenya Medical Supplies Agency (KEMSA), a consulting fee will be associated with pharmacy-based PrEP delivery in our initial pilot study (Aim 1a, as is the case with other pharmacy-based services) to reflect the real-world sustainability of the delivery model. This fee will be agreed upon in a meeting with participating pharmacy providers and may vary by pharmacy depending on the clientele of that pharmacy (i.e., urban, high-income pharmacies may charge more for pharmacies in informal settlements). From preliminary conversations with pharmacy providers, we estimate that this fee may be between 200-500 KSH, however, if HIV self-tests are not provided for by NASCOP via KEMSA, then this fee may be between 300-700 KSH. During Aim 1c, to assess the impact of removing client fees on PrEP initiation and continuation, the study will cover this consulting fee and participants will not pay any out-of-pocket expenses to receive PrEP, PEP, or STI testing and treatment.

Condoms will be available for purchase at all participating pilot pharmacies, but not included in the package of PrEP services provided in this study.

The interventions that participants receive at each study visit are summarized in **Table 9:.**

Table 9. Interventions received at each study visit. Month (M)

Study intervention	Study visit*			
	M0	**M1**	**M4**	**M7**
Counseling: on PrEP use and side effects, PrEP adherence, HIV risk reduction	X	X	X	X
Testing: for HIV, STIs (if available), and hepatitis B (if available)	X	X	X	X
Safety oversight: ensuring that PrEP is not contraindicated (e.g., history of renal disease, diabetes)	X	X	X	X
PrEP/PEP prescribing: if all checklist items completed.	X			
PrEP dispensing: 30-day supply at initiation; 90-day supply at follow-up visits	X	X	X	
PEP dispensing: 30-day supply	X			
STI testing (optional): if client arrives seeking STI diagnosis and/or treatment services	X			
Consultation with remote clinician and/or referral to CCC: for complex PrEP cases	X	X	X	X
Dried blood spot sampling: for measurement of PrEP adherence	X	X	X	X
Social harm: reports of physical, sexual, or verbal violence	X	X	X	X

*Aim 1a participants who opt to participate in the extended pilot (Aim 1c) will continue to receive the M7 study interventions on a quarterly basis until the study's end

PrEP medication

Tenofovir disoproxil fumarate (or TDF, 9-[(R)-2-[[bis [[(isopropoxycarbonyl) oxy] methoxy] phosphinyl]

methoxy] propyl] adenine fumarate), emtricitabine (or FTC, 5-fluoro-1-(2R,5S)-[2-(hydroxymethyl)-1,3-oxatholan-5-yl]cytosine), and lamivudine (or 3TC, 2',3'-dideoxy-3'-thiacytidine 4-Amino- 1-[(2R,5S)- 2-(hydroxymethyl)- 1,3-oxathiolan-5-yl]- 1,2-dihydropyrimidin- 2-one) are reverse transcriptase inhibitors that have been approved for the treatment of HIV infection in humans in Kenya and the United States. A fixed-dose, oral co-formulation of FTC/TDF (Truvada®) has also been approved for HIV prevention in Kenya and the United States. The World Health Organization recommends TDF-containing medications as PrEP, which includes TDF combined with FTC as well as potentially TDF alone and TDF combined with lamivudine (or 3TC, a medication closely related to FTC). Any TDF-containing medications that align with WHO and Kenya national guidelines for PrEP will be used in this study. PrEP will be prescribed for once-daily use. Study medication will be provided by the Kenya Ministry of Health and stored in accordance with the drug manufacturer's recommendations.

PrEP discontinuation

PrEP continuation will be according to Kenya PrEP guidelines. Use of PrEP may be interrupted by the site investigators, trained pharmacy providers, or remote clinician due to safety concerns for the participant or use of concomitant medications that could interfere with PrEP or present a safety concern. For female participants that report pregnancy during the pilot studies, PrEP care will be discontinued at the participating pilot pharmacy and the pharmacy provider will refer these women to the nearest antenatal care clinic for care (including PrEP care). All treatment interruptions will be documented.

Referral to continued PrEP care

For participants that continue to return to the pilot pharmacies for PrEP refills, at their final pharmacy PrEP refill visit before the study's end, pharmacy providers will dispense another 3-month PrEP supply (assuming the individual meets the criteria on the prescribing checklist, **Appendix III. Prescribing checklist**) and then will refer participants to a nearby public CCC for free continued PrEP care (**Appendix IV. Referral form**).

PEP medication

Tenofovir disoproxil fumarate (or TDF, 9-[(R)-2-[[bis [[(isopropoxycarbonyl) oxy] methoxy] phosphinyl] methoxy] propyl] adenine fumarate) and dolutegravir (or DTG, 1,2-bis(2-methylphenyl)guanidine) are reverse transcriptase inhibitators that, in combination with lamivudine (or 3TC, 2',3'-dideoxy-3'-thiacytidine 4-Amino- 1-[(2R,5S)- 2-(hydroxymethyl)- 1,3-oxathiolan-5-yl]- 1,2-dihydropyrimidin- 2-one)—an integrase strand transfer inhibitor—have been approved for use as HIV post-exposure prophylaxis in Kenya among individuals age 15 or older or weighing 35 kg or more. For women and adolescent girls of childbearing potential, the Kenyan guidelines recommend a regimen that substitutes 3TC for atazanavir/ritonavir (or ATV/r, 3,12-bis(1,1-dimethylethyl)-8-hydroxy-4,11-dioxo-9-(phenylmethyl)-6-((4-(2-pyridinyl)phenyl)methyl)-2,5,6,10,13-pentaazatetradecanedioic acid dimethyl ester). PEP will be prescribed for once-daily use, and participants found eligible for PEP will be dispensed a one-month supply, as per Kenya national guidelines. Study medication will be provided by the Kenya Ministry of Health and stored in accordance with the drug manufacturer's recommendations.

Referral for continued PEP care

During the extended pilot (Aim 1c), any individual who is found eligible for PEP but who declines to initiate PEP at a pilot pharmacy will be referred to an HIV comprehensive care clinic. Any participant who is dispensed PEP at less than 1 month before study endline will be instructed to go to an HIV comprehensive care clinic for PEP follow-up care and given a referral form (Appendix VII. Referral form).

Data Collection

Quantitative client surveys & DBS (Aims 1a and 1c)

Trained research assistants (RAs) stationed at pilot pharmacies will approach eligible individuals and invite them to participate in the study. They will review the informed consent form (**Appendix I for Aim 1a and Appendices XII and XIII for Aim 1c**) with these individuals and answer any questions they may have regarding participation. Once written informed consent is obtained, RAs will conduct a structured quantitative survey with the participant (**Appendix VI. Questionnaire: Baseline for Aim 1a and Appendix XVII for Aim 1c**). (The timing of the survey for each pilot is outlined above in **Fig. 7**.) **Table 10** outlines the information we will collect in these surveys, including information to be collected in the follow-up questionnaire (**Appendix VII. Questionnaire: Follow-up for Aim 1a and Appendix XVIII for Aim 1a**). All quantitative data will be collected on a tablet using CommCare (Dimagi, Cambridge, USA), an electronic data collection platform. At each study visit, RAs will also collect a DBS sample from participants. PrEP adherence will be assessed using self-reported drug adherence in quantitative surveys and batched drug levels in DBS samples at PrEP initiation and follow-up visits. Dried blood spots and plasma from batched drug levels will be processed and analyzed for tenofovir drug levels.

Table 10. Information collected in the quantitative surveys. Month (M)

	Study visit			
Information collected	**M0**	**M1**	**M4**	**M7**
Socio-demographic: gender, age, education, employment	X			
Alcohol use: # days in past week, alc. problem screen (RAPS4-Q4)	X	X	X	X
Depression: PHQ-9 depression screening tool, often used in SSA	X	X	X	X
Relationship: partner status, social support, partner violence	X	X	X	X
Sexual behaviors: sex frequency, condom use, sexual power, STI history	X	X	X	X
Fertility intentions: # children (& goal #), pregnancy history, current contraception	X	X	X	X
HIV stigma: scale + disclosure to fam./friends & adverse effects	X	X	X	X
COVID-19 assessment: prevention measures, risk, impact on health seeking	X	X	X	X
PrEP adherence: pills missed (past week)		X	X	X
Clinical safety: pregnancy, history of kidney disease, etc.	X	X	X	X
Potential drug side effects: nausea, vomit, dizziness, headache		X	X	X
Social harm: reports of physical, sexual, or verbal violence		X	X	X
Costs: $ spent at last pharmacy/clinic visit, willingness to pay (see **Table 10**)	X	X	X	X
Implementation strategies: acceptability and feasibility (Aim 1c only)	X	X	X	X

*For Aim1a participants who opt to participate in the extended pilot (Aim 1c), we will continue to collect the same information as shown for M7 above on a quarterly basis until the study's end.

Costs (Aim 1a and 1c)

To measure costs and cost preferences associated with pharmacy-based PrEP deliver, we have included questions related to participants' expenditures on health goods/services (at clinics or pharmacies) and their willingness to pay for pharmacy-based PrEP delivery in the quantitative surveys (**Table 10, Appendix VI. Questionnaire: Baseline, Appendix VII. Questionnaire: Follow-up; Appendix XVII: Baseline questionnaire for Aim 1c participants, Appendix XVIII: Follow-up questionnaire for Aim 1c participants**). Additionally, we will conduct two quantitative surveys with the lead staff member of each Aim 1a pilot pharmacy (n=4): 1) shortly after the pharmacy training on pilot procedures and before the first participant is enrolled, and 2) at study completion, seven months after

the last participant has been enrolled. **Table 11** details the costs we will measure in surveys for providers and clients. All surveys will be conducted by trained research assistants on tablets using CommCare, an electronic data collection platform.

Table 11. Pharmacy-based PrEP delivery costs measured

Client costs	Provider costs
● Service(s)/item(s) purchased at most recent pharmacy visit, & amount spent on each	● Service(s)/item(s) provided by the pharmacy, & the cost of these services
● Travel time, time away from work, child care, & other costs associated with pharmacy PrEP visit	● Overhead costs (including salaries and space) of running a pharmacy
● Perceptions on price at which pharmacy-based PrEP was provided in the pilot	● Perceptions on price at which pharmacy-based PrEP was provided in the pilot
● Price willing to pay for pharmacy-based PrEP	● Price willing to provide pharmacy-based PrEP
	● Time spent recruiting PrEP clients and with each PrEP client for PrEP initiation (including counseling) and refills

Standardized patient actors (Aim 1a only)

To measure fidelity of the Aim 1a pharmacy-based PrEP delivery intervention (i.e., counseling, HIV testing, safety assessment), we will use unannounced standardized patient actors. Standardized patient actors have been shown to accurately measure care and assess provider performance in a variety of settings, including PrEP research in Kenya.[84–90] The use of standardized patient actors is advantageous in this study because it enables us to identify weak points in our pharmacy-based PrEP delivery care pathway for individuals and scenarios that are of particular interest (e.g., pregnant women, or individuals who test HIV positive). While pharmacy providers will not know that the standardized patient actor is an actor at the time of that individual's study visit, providers will be informed of and agree to this study procedure when they agree to participate in the pilot study.

Case scripts

In consultation with Kenyan medical PrEP providers, we have developed case scripts informed by previously conducted formative research. We developed scripts for four distinct participant populations hypothesized to benefit most from pharmacy-based services:

(1) Young woman, seeking emergency contraception
(2) Man who has sex with other men, presenting for STI treatment
(3) Young man, seeking sexual performance enhancing drugs (e.g., Viagra)
(4) Young woman, has trouble doing HIV test

Actors

We will train 4-6 study staff (not participating in research related to this project) as standardized patient actors. These staff will participate in a standardized patient actor training (conducted by a trainer with years of experience) on case scripts that detail key elements of pharmacy-based PrEP delivery, including general PrEP inquires, eligibility requirements, symptoms of PrEP side effects, and PrEP non-adherence. The study staff that volunteer to be standardized actors have to not be living with HIV and must agree to HIV testing at the pilot pharmacies; we will take every precaution to ensure their HIV status remains confidential should one of these individuals test HIV positive at a pilot pharmacies. The number of actors (N=4) and visits (2 visits/actor, =8 visits in total) we are proposing for this assessment is consistent with similar evaluations conducted in other settings.[84]

Unannounced visits

The patient actors will visit the Aim 1a pilot pharmacies two times: 1) once to initiate PrEP, and 2) a second time to refill their PrEP drug supply. The patient actors will complete all steps in the pharmacy-based PrEP delivery care pathway that would be completed by any other PrEP client.

Standardized patient checklist

At the end of each unannounced visit, standardized patients will complete a debriefing visit with a research assistant collecting data for the pilot study. This debriefing visit will occur on the same day of the actor's unannounced visit, in a private setting outside the pilot pharmacy. At this debriefing visit (which will be audio recorded), the standardized patient actor will complete two checklists with the research assistant: 1) a technical checklist that identifies what services they were offered and how much they paid, and 2) a checklist that assess the quality of care, including duration of the visit and the actors' perceptions of how they were treated by the pharmacy PrEP provider (summarized in **Table 12**, **Appendix XIV. Standardized Patient Actor Checklist**). The technical checklists will vary slightly for PrEP initiation (enrollment) and PrEP refill (follow-up) to account for the different services associated with these visits. All checklist data will be collected electronically on a tablet or phone using CommCare, an electronic data platform. The audio recordings from the debriefing visit with be transcribed so that can be later used to supplement the checklist data.

Table 12. Standardized fidelity checklists items (PrEP initiation)

Technical assessment	*Quality of care assessment*
● Asked if they were interested in initiating PrEP	● Greeted when entered pharmacy
● Tested for HIV	● Pharmacist made eye contact and smiled
● Counseled on importance of PrEP adherence	● Pharmacist explained why providing services
● Counseled on potential side effects of PrEP	● Pharmacist did not use judging or stigmatizing language
● Screening for pre-existing health conditions, including COVID-19 symptoms	● Patient felt that privacy was maintained throughout their visit
● Received 1-month (initiation) or 3-month (refill) PrEP supply	● Interactions with the pharmacists were not rushed
	● Measures were in place for COVD-19 protection.

In-depth interviews (Aim 1b)

We will conduct in-depth qualitative interviews with clients and providers (both pharmacy providers and clinicians providing remote oversight) who participated in the Aim 1a pilot to explore their experiences with this new PrEP delivery model and understand the acceptability of pharmacy-based PrEP. In client interviews (**Appendix VIII. In-Depth Interview Guide: Clients**), we will assess perceptions of quality of care, attitudes towards paying for pharmacy-based PrEP delivery, and their interest in continuing to receive PrEP at pharmacies. In provider interviews (**Appendix IX. In-Depth Interview Guide: Providers, Appendix X. In-Depth Interview Guide: Clinicians**), we will assess pharmacy providers' attitudes toward providing PrEP and interest in continuing to provide PrEP at pharmacies or remote oversight. The topics to be discussed during these interviews are summarized in **Table 13**. All pharmacy providers that participate in these in-depth interviews will sign documents of informed consent (**Appendix II**); consent for the in-depth qualitative interviews was included in the consent for participation in the pilot study for pharmacy clients (**Appendix I**).

All qualitative interviews will be conducted in the participant's preferred language (English, Dholuo or Kiswahili) by trained research assistants using pre-piloted, semi-structured guides. Each interview will be audio recorded, transcribed, and translated into English by study team members who will also

routinely complete debriefing reports[83] to accelerate real-time learning. Dr. Ngure, an experienced behavioral scientist who has led our qualitative research in Thika for the past decade, will supervise these interviews in collaboration with Dr. Kwena, a social scientist based in Kisumu.

Table 13. Topics to be discussed during qualitative interviews

Services received	• Description of client services received at pharmacy (e.g., greeting, counseling, screening, dispensing, etc.)
Likes/dislikes of pharmacy-based PrEP delivery	• Discussion of client and provider preferences related to pharmacy-based PrEP delivery – what worked, what did not work, elements of services that were or were not appreciated or convenient.
Quality of services	• Discussion of how clients were treated by pharmacists, including participants' attitudes on how comfortable and confident pharmacists seemed providing PrEP services.
Cost of pharmacy-based PrEP	• Discussion of the costs associated with pharmacy-based PrEP delivery – did clients find them reasonable? Would provider be willing to continue to provide PrEP at these costs? How might the costs be adjusted?
Future interest in pharmacy-based PrEP	• Discussion of where clients might want to access PrEP in the future: standard of care clinic-based delivery or preference for the new model of pharmacy-based PrEP delivery?
COVID-19 impact	• Discussion of how the COVID-19 outbreak affected healthcare seeking behaviors, including participants' ability to access PrEP at pilot pharmacies.

WhatsApp Group (Aim 1a and 1c)

Prior to agreeing to be part of this pilot study, providers will be informed that, if they desire, they may contact each other via a WhatsApp group created and accessible to study staff for the purposes of understanding the kinds of support pharmacy providers request in initiating clients on PrEP and/or refilling PrEP prescriptions. Providers are not obligated to use this WhatsApp group but may instead opt to contact each other through other means (e.g., phone calls). By signing the consent form for Aim 1c, pharmacy providers and remote study clinicians consent to having any study-related phone consultation recorded and subsequently transcribed for analysis. Study staff will export any conversation threads (hereafter, "transcripts") from the study-created WhatsApp group for analysis. All pharmacy provider and remote clinicians that participate in this WhatsApp Group will sign documents of informed consent (**Appendix II**).

Quantitative provider surveys (Aim 1c only)

For Aim 1c, we will conduct baseline and monthly follow-up surveys (Appendices XIX and XX) with pharmacy providers who are involved in the delivery of PrEP, PEP, and/or STI testing at a pilot pharmacy (n=up to 2 providers surveyed per pilot pharmacy, or 12 survey participants total). These surveys will collect basic demographic information about the providers, their assessments of acceptability and feasibility of the care pathway refinements (peer referral, PEP-as-a-bridge-to-PrEP, STI testing-as-a-bridge-to-PrEP, optional client self-administration of the HIV risk assessment tool, optional initial HIV self-test at home, provider assisted blood-based HIV self-testing), and their willingness to charge for pharmacy-based PrEP services. All surveys will be conducted by trained research assistants on tablets using CommCare, an electronic data collection platform. For the handful of survey questions that are open-ended, the research assistant will audio record the participant's response. These audio recordings will be subsequently transcribed, translated to English (if necessary), and stored securely.

Data Analysis & Outcomes

Quantitative client surveys & DBS (Aims 1a and 1c)

Table 14 shows the study outcomes that will be obtained from the quantitative surveys (**Appendix VI. Questionnaire: Baseline, Appendix VII. Questionnaire: Follow-up for Aim 1a and Appendices XVII and XVIII for Aim 1c**) and DBS data. For Aims 1a and 1c, we will calculate the number of participants who initiated PrEP at pilot pharmacies, and the proportion of these who: returned for PrEP refills, were adherent to PrEP, and experienced any PrEP side effects or study-related social harms. Additionally, we will measure the percentage of participants that elected to complete STI testing, the percentage of these that tested positive for an STI (either *C. trachomatis* or *N. gonorrhoeae*), and the percentage of these who linked to a pilot pharmacy for free STI treatment.

- PrEP initiation. We will report the socio-demographic characteristics of participants who initiate PrEP at pharmacies (Aim 1a) and compare those with the sociodemographic characteristics of participants from our other studies who have initiated PrEP at healthcare facilities.

- PrEP refills. We will report the socio-demographic characteristics of participants who refilled PrEP at a pharmacy and compare those with the sociodemographic characteristics of participants from our other studies who have refilled PrEP at healthcare.

- PrEP discontinuation. For individuals who are in known HIV serodiscordant relationships, if a participant discontinues PrEP use because their HIV infected partner has initiated and sustained ART for >6 months (the Kenya standard for discontinuing PrEP), this participant will be considered PrEP-adherent. Similarly, if PrEP is discontinued for safety reasons (but not adherence reasons) as determined by the pharmacy providers and confirmed by the remote clinician, follow-up thereafter will be censored, since the subject will not be able to be assessed for adherence to PrEP.

Adjusted analyses will be done as needed, controlling for potential confounders based on our prior work assessing correlates of PrEP use: demographics (e.g., age, educational level), sexual behaviors (e.g., condom use, MSM, number of partners), medical status (e.g., depression), and beliefs (e.g., risk perception, PrEP efficacy). We will assess specifically for gender as a key variable. Stata or R will be used for all analyses.

We will take a random sample of 10% of the DBS samples and measure concentrations of tenofovir diphosphate (TFV-DP) and emtricitabine triphosphate (FTC-TP) using validated liquid chromatography tandem mass spectrometry (LC-MS/MS), which has become the gold standard for research evaluations of PrEP adherence.[10,11] Any concentrations of TFV-DP in a DBS punch >700 fmol will be considered PrEP adherent.[10] All DBS samples that we collect from study participants will initially be stored in a secure freezer at the Kisumu study site. However, the DBS samples that are randomly selected for TFV-DP and FTC-TP drug concentration testing will be shipped to a laboratory for analysis.

Table 14. Outcomes from quantitative survey and DBS samples (Aim 1a and 1c)

	Aim(s)	Definition	Data Source(s)	Timing
PrEP initiation	Aim 1a	# of participants that initiated PrEP at pilot pharmacies	• Quant survey • Pharm records	M0
PrEP retention	Aim 1a	% of participants who return to the pilot pharmacies for PrEP refills	• Quant survey • Pharm records	M1, M4, M7
PrEP	Aim 1a	• % of participants that missed no pills in	• Quant survey	M1, M4, M7

adherence		previous week • % of participants that refill drugs at pharmacy • % of DBS samples with drug concentrations indicating adherence	• Pharm records • DBS	
Selection of STI testing	Aim 1a	• % of participants that selected to test for STIs at their pharmacy PrEP visit o % of STIs among participants who tested • % of participants who tested positive to received free STI treatment from the pilot pharmacy	• Quant survey • Pharm records	N/A
PEP initiation	Aim 1c	# of participants that initiated PEP at enrollment at a pilot pharmacy	• Quant survey	M0
PrEP initiation following PEP	Aim 1c	# of participants that initiated PrEP at a pilot pharmacy and, at a later study visit, initiated PrEP	• Quant survey	M0, M1, M4, M7
STI testing	Aim 1c	# of participants that underwent STI testing at enrollment at a pilot pharmacy	• Quant survey	M0
Concurrent STI testing and PrEP initiation	Aim 1c	# of participants that underwent STI testing at enrollment at a pilot pharmacy and initiated PrEP at that same visit	• Quant survey	M0
PrEP initiation following STI testing	Aim 1c	# of participants that underwent STI testing at a pilot pharmacy and, at a later study visit, initiated PrEP	• Quant survey	M0, M1, M4, M7
Acceptability & feasibility of implementation strategies used in the refined care pathway	Aim 1c	Median rating of each implementation strategy (i.e., care pathway refinement shown in Figure 4)	• Quant survey	M0, M1, M4, M7
*Aim 1a participants who opt to participate in the extended pilot (Aim 1c) will continue to contribute data at quarterly follow-up visits until the study's end.				

Costs (Aim 1a and 1c)

We will use descriptive statistics to summarize the various aspects of pharmacy-based PrEP delivery costs (**Table 11**). We will use multivariable regression models to determine the socio-demographic characteristics of PrEP clients (collected in the baseline quantitative survey) that might be associated with cost-related outcomes (e.g., willingness to pay).

Standardized patient actors (Aim 1a only)

For each pharmacy, we will calculate the percentage of actors who received the items on the technical and quality-of-care checklists (**Appendix XI. Standardized Patient Actor Checklist**). We will pre-determine what items on the checklist are essential for pharmacy-based PrEP delivery and calculate the percentage of actors who received all of these services. We will also supplement the findings from the checklist with insights (i.e., quotes) shared during the debriefing meeting and captured in the audio recordings/transcripts of these meetings. Additionally, we will identify key areas of our care pathway that will require additional training, modification, or reinforcement during implementation.

In-depth interviews (Aim 1b), WhatsApp group (Aim 1a and 1c), and phone consultation transcripts (Aim 1c only)

Interview transcripts, WhatsApp transcripts, and phone consultation transcripts will be reviewed separately by two qualitative researchers, who will ensure completeness. These researchers will

immerse themselves in the data through repeated readings of the transcripts and create a preliminary codebook of inductive[84,85] and deductive[86–88] codes to capture client and provider experiences of pharmacy-based PrEP delivery, including barriers and facilitators. A sample of transcripts will be double-coded independently by two or more researchers, with coding discrepancies identified and resolved via consensus. During this process, the codebook will be refined, with existing codes combined, separated, or eliminated and new codes added as needed to capture emerging themes.[89,90] Thereafter, remaining transcripts will be coded in Dedoose (Los Angeles, California, USA) and Atlas.ti (Berlin, Germany). Study team have extensive experience analyzing qualitative data to inform intervention development.[24,91–112]

Quantitative provider surveys (Aim 1c only)

We will calculate median provider ratings for each survey item assessing acceptability and/or feasibility of the model refinements. We will also assess change in providers' ratings over time, and we will calculate median willingness to charge for pharmacy-based PrEP services. Excel, Stata, or R will be used for all quantitative analyses. We will qualitatively analyze the transcriptions of provider responses to open-ended questions using content analysis.

Participant retention and withdrawal

The Kisumu site will develop retention methods tailored to and most efficient for the local study setting. Retention activities may include explanation of the study visit schedule and procedural requirements during the informed consent process and re-emphasis at each study visit, collection and updating of locator information, and use of appropriate and timely visit reminder mechanisms (including phone calls and text messages). To provide complete information at the end of the study, efforts will be made to have a final follow-up visit for each participant.

Participants may voluntarily withdraw from the study for any reason at any time. The site Investigators also may withdraw participants from the study in order to protect their safety and/or if they are unwilling or unable to comply with required study procedures. Reasons for withdrawal will be recorded.

Limitations

These pilot studies have some potential limitations that are important to note. First, the pharmacies and pharmacy providers selected to participate in these pilot studies will be selected on specific criteria and may not be generalizable to all private pharmacies and pharmacy providers throughout Kenya. For example, all pharmacies participating in these pilots must be registered with the different Kenyan pharmaceutical boards, thus the findings from this study cannot extend to non-registered pharmacies or drug kiosks – which will unlikely to be able to legally deliver PrEP in a real-world setting without registration anyways.

Additionally, the remote PrEP clinicians that will oversee any questions pharmacy providers may have about pharmacy-based PrEP delivery will be PrEP experts within the Kenya PrEP delivery setting and might not be representative of all remote clinicians available for consultation if pharmacy-based PrEP delivery is to be scaled throughout Kenya. However, since these PrEP clinicians just have to be available remotely and not in person, it should be feasible to have a rotation of PrEP experts available for consultation if this model is to be scaled-up in Kenya.

Finally, in these pilot studies, the PrEP drugs and HIV self-tests are being provided by the Kenya Ministry of Health, and thus the price pilot participants pay for pharmacy-based PrEP delivery in Aim 1a

is just a mark-up that covers the overhead of pharmacy PrEP storage and providers' time. This model, where the Ministry of Health provides PrEP and HIV self-test kits to private pharmacies for distribution, might not be feasible if pharmacy-based PrEP delivery is to be scaled nationally in Kenya. Thus, the future price of pharmacy-based PrEP may differ from that in this pilot study (i.e., it will likely increase), which may influence (i.e., decrease) PrEP uptake and retention among individuals who access PrEP at pharmacies.

SAFETY

PrEP

Multinational studies demonstrated that PrEP (including FTC/TDF) was safe for use in heterosexual men and women from Kenya and Uganda. There were no statistically significant differences in the frequency of deaths, serious adverse events, adverse events overall, or key laboratory adverse events (specifically, creatinine elevation and phosphorus decrease) for those receiving PrEP compared to those receiving placebo in the Partners PrEP study.

For the purposes of this study, only serious adverse events (SAEs) will be documented. SAEs felt to be related to PrEP will result in temporary hold of PrEP. In the case of temporary holds, the hold will continue until the event is stabilized or resolved. If the event resolves, PrEP may be reinitiated at the discretion of the Data Monitoring Committee (see "Study oversight" below), resuming safety monitoring. The severity of clinical symptoms will be scored using the DAIDS Table (July 2017 Version) for Grading the Severity of Adult and Pediatric AEs. Reporting on adverse events to relevant IRBs will be according to relevant regulations.

Pregnancy

Animal and human data, including from the Partners PrEP Study and Partners Demonstration Project, suggest safety of FTC/TDF when used by HIV infected women during pregnancy and breastfeeding. Other studies are exploring detailed safety of PrEP use in pregnancy. In the pilot evaluations described in Aims 1a, we excluded pregnant and breastfeeding women because it was felt, at the time, that assessing the PrEP eligibility of pregnant women was outside of the scope of care of pharmacy providers in Kenya. However, through consultation with members of the Kenya Ministry of Health and other PrEP stakeholders, we have come to the realization excluding pregnant women from those pilot studies was unnecessary for two reasons. First, Kenya's current national PrEP guidelines allow pregnant women to be initiated on PrEP, in line with WHO recommendations. In fact, the guidelines explicitly state, "Pregnancy and breastfeeding are not contraindications to provision of PrEP. Pregnant or breastfeeding women whose sexual partners are HIV positive or are at high risk of HIV infection may benefit from PrEP as part of combination prevention of HIV infection", and throughout Kenya, PrEP is regularly prescribed to pregnant and breastfeeding women, for example, at family planning and antenatal care clinics. Second, within the Kenya national PrEP guidelines, the criteria that individuals must meet to qualify for PrEP do not vary based on the prospective client's pregnancy status. As such, pharmacy providers in this pilot study would not need any additional training beyond that which we provided in Aim 1a in order to safely initiate pregnant and breastfeeding women on PrEP. Lastly, excluding pregnant and breastfeeding women from our extended pilot study (Aim 1c) who otherwise meet both study and PrEP eligibility criteria (i.e., who test negative for HIV, are determined to be at high risk of HIV using the Kenya Risk Assessment Screening Tool, and who have no other PrEP contraindications) may represent a greater risk to them than including them in the study would, as it would constitute denying them access to PrEP—a drug that has been found to reduce the risk of getting HIV by sex by about 99% (CDC, 2021). For these reasons, we propose allowing pregnant and breastfeeding women to participate in our extended pilot study (Aim 1c).

Social harm considerations

We have extensively considered the risk of social harm related to both PrEP use and the delivery and prescribing of PrEP at pharmacies, including risks of depression/anxiety and disclosure and stigma. Our extensive experience with longitudinal follow-up of heterosexual HIV serodiscordant couples and women at risk mitigates some of this risk, and we found very little risk of social harms or anxiety related

to HIV self-testing in our pilot evaluation, among couples. Analyses of social harm related to pharmacy-based PrEP delivery will be done overall, by sex and by relationship status, given the potential for differential gendered and relationship risks. In the event of a clinical need (e.g., side effects, symptoms of a sexually transmitted infection), participants will be referred to nearby HIV clinics for care.

HUMAN SUBJECTS CONSIDERATIONS

The protocol, informed consent forms (for pilot participation and for interviews of participants and providers), and patient education and recruitment materials will be reviewed and approved by the institutional review boards at the University of Washington and at KEMRI. All participants will provide written informed consent before participation in the pilot and quantitative/qualitative interviews. Participants will be informed the purpose of the study, the procedures to be followed and the risks and benefits of participation. The consents forms will be translated into Kiswahili. Specifically, the participants will be informed that this novel study will answer critical questions on acceptability, feasibility, and costs of pharmacy-based PrEP delivery in Kenya.

Study oversight

This study will be subject to oversight by an independent data monitoring committee that will periodically review data from the study, including study execution, adherence, HIV incidence, PrEP/PEP side effects, serious adverse events and social harms by study arm. We have had a Data Monitoring Committee for many of our other ongoing studies. The independent data monitoring committee will provide recommendations to the study team as part of periodic reviews. Reports from all reviews will be provided for submission to overseeing IRBs/ECs.

Risks

Participants may become embarrassed, worried, or anxious when completing their HIV risk assessment and/or receiving HIV counseling at pharmacies. They also may become worried or anxious while waiting for their HIV test results at the pharmacy. Individual counseling and discussions of study participation may raise issues in individuals. Participants who learn that they have HIV may experience anxiety or depression related to their test results. At all study sites, individual and couples-based HIV counseling will be provided by pharmacists who have been trained in specific issues related to HIV risk, HIV acquisition, and care of HIV serodiscordant couples, including stigma, blame, methods to avoid transmission, and available support services.

Although study sites will make every effort to protect participant privacy and confidentiality, it is possible that participants' involvement in the study could become known to others, particularly as this project will be conducted at community-based settings. There is a possibility that social harms may result (i.e., because participants could become known as participating in a pilot involving HIV prevention). For example, participants could be treated unfairly or discriminated against, or could have problems being accepted by their families and/or communities. Understanding the risk/benefit balance for confidential delivery of PrEP services in community settings is an explicit goal of this project. Moreover, we have extensive experience with the strategies to minimize the potential for social harms in populations participating in HIV prevention studies.

Risks and side effects related to PrEP include gastrointestinal intolerance and rarely more serious side effects; these are detailed on the package insert and this project is not testing PrEP itself but its delivery. The medical risks of HIV testing using blood collection are small.

Protection against risk

The study team has extensive experience with counseling about HIV risk, PrEP, and strategies for HIV prevention in general. Study procedures will include qualitative interviews and prospective follow-up,

HIV testing, blood collection, assessment of uptake and adherence to PrEP for HIV prevention. PrEP will be provided by the study site and will follow Kenya clinical guidelines. Counseling about antiretroviral-based HIV prevention will include messaging describing the benefits of all strategies, based on evolving available data and national policies / national roll-out of antiretrovirals (including earlier treatment and PrEP) for HIV prevention.

For data collection, standardized questionnaires will be used that will include questions on sensitive topics, including sexual behavior, depression, alcohol use, and stigma. We have extensive experience with these questionnaires from our prior studies and the expertise and counseling resources required to attend to study participants (e.g., those with depression). We have published on very low rates of social harm and intimate partner violence in our prospective studies of HIV serodiscordant couples, which likely reflects the counseling available to couples; for women at risk, we have extensive experience with management of potential social harms, through our prevention studies (detailed in Preliminary Results and also experience in clinical trials such as ASPIRE, the MTN study of the dapivirine vaginal ring for HIV prevention).

The risks from the anticipated activities will be no greater than in our previous studies; in fact, given the proven prevention benefits of PrEP and now national roll-out in Kenya, risks are anticipated to be less than in some of our prior studies. We feel the risks associated with the study are small. The benefits are consistent with clinical care benefits and cultural expectations and they follow the established standard with IRB approval in our other studies. We therefore believe the balance of benefit and risk is appropriate.

Benefits

All pilot participants will benefit by having novel access to PrEP during the study period. HIV prevention practices, according to national guidelines, will be provided to all participants enrolled in this study. This will include risk reduction counseling, addressing sexually transmitted infections (STIs), and access to condoms. There are also possible benefits from ongoing access to HIV risk reduction counseling and other prevention services at the pilot pharmacies. In addition, participants and others also may benefit in the future from information learned from this study. There may be no other direct benefits to participants in this study.

Care for persons identified as HIV infected

This study will identify persons who are infected with HIV, either as part of the study screening process or during follow-up of enrolled participants. Study staff will provide participants with their HIV test results in the context of post-test counseling. Persons identified as HIV infected during the study screening process, but who do not meet eligibility criteria or who do not wish to enroll in the study, will be referred to nearby clinics where they can receive free HIV care and treatment services. For participants who are HIV infected and who also become pregnant during follow-up, every effort will be made to facilitate access to programs for preventing mother-to-child HIV transmission for appropriate antiretroviral treatment to reduce the probability of HIV transmission from mother to child.

Benefits to the community

An important goal of this study is to achieve the study objectives in a way that provides benefits to the community that endure beyond the proposed study lifetime regardless of the specific outcome of the study. Some of these community benefits include development of optimized approaches to HIV prevention care and community awareness of comprehensive HIV prevention.

Importance of the knowledge to be gained

Knowledge gained from the studies proposed in this application will include information about optimal delivery of PrEP for HIV prevention, which may have substantial impact on the global burden of HIV.

Treatment for injury

Participants will be asked to inform the clinic staff if they feel they have been injured because of taking part in the study. Injuries may also be identified during laboratory testing, medical histories, and physical examinations. Treatment for adverse events related to study participation will be provided by the treatment clinic. If treatment is required that is beyond the capacity of the clinic, the clinic staff will refer the participant to appropriate services or organizations that can provide care for the injury.

Study records

Implementation investigators will maintain, and store in a secure manner, complete, accurate, and current study records throughout the study. Study records include administrative documentation and regulatory documentation as well as documentation related to each participant enrolled in the cohort, including informed consent forms, data forms, notations of all contacts with the participant, and all other source documents.

Confidentiality

Every effort will be made to protect participant privacy and confidentiality to the extent possible. Personal identifying information will be retained at the local study site and not forwarded to the University of Washington Coordinating Center. The site will use its standard operating procedure for confidentiality protection that reflects the input of study staff and community representatives to identify potential confidentiality issues and strategies to address them.

All study-related information will be stored securely at the study sites. All participant information will be stored in areas with limited access. Data collection, administrative forms, laboratory specimens, and other reports will be identified only by a coded number to maintain participant confidentiality. All records that contain names or other personal identifiers, such as locator forms and informed consent forms, will be stored separately from study records identified by code number. All local databases will be secured with password-protected access systems. Forms, lists, logbooks, appointment books, and any other listings that link participant ID numbers to other identifying information will be stored in a separate, locked file in an area with limited access.

Dissemination Plan

The study team for this award is committed to public dissemination of results of pilot studies, to participants, local stakeholders in Kenya, the global scientific community, and US, Kenyan, and global policymakers. Dissemination of pilot results will follow principles of good participatory practice. Results will be published in conference abstracts and peer-reviewed journals. Study results will be disseminated through presentations to local stakeholders and policymakers in Kenya, including the Ministry of Health.

TIMELINE

Table 16. Timeline of activities	Year 1 (2021)				Year 2 (2022)			
Data collection activity	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
AIM 1a: Pilot								
Train pharmacists on pharmacy-based PrEP delivery								
Pilot of pharmacy-based PrEP delivery								
AIM 1b: Identify pilot weak points								
Acceptability: Qualitative interviews with consumer								
Costs: Use of quantitative surveys at baseline and follow-up								
Model Refinement								
Aim 1c: Extended pilot								
Train pharmacists on pharmacy-based PrEP/PEP delivery								
Pilot of refined pharmacy-based PrEP delivery model								

BUDGET

Table 17. Pilot budget

Item	Year 1	Year 2	Year 3	Total
Salaries	$27,642	$29,801	$175026	**$232451**
Travel	$4,135	$4,135	$5368	**$13638**
Supplies	$9,502	$10,749	$15842	**$36093**
Pharmacy support	$2,000	$2,000	$4000	**$8,000**
Participant reimbursement	$1,000	$1,000	$5179	**$7,179**
Other expenses	$12,949	$9,902	$32485	**$55336**
TOTAL	$64,508	$65,338	**$236899**	**$366745**

BUDGET JUSTIFICATION

PERSONNEL COSTS

PERSONNEL

Prof. Elizabeth Bukusi, Principal Investigator
She is the KEMRI PI and will work in association with the Co-investigators in the overall implementation of the Project. She is responsible for overseeing the progress of the study and the chief liaison with the local government and other regulatory bodies.

Study Coordinator

The Study Coordinator is responsible for the smooth functioning of the project, coordinating communications with regulatory boards, staff, and investigators, assisting investigators with implementation, planning and problem-solving on behalf of the PI to ensure project goals are met. Providing protocol guidance to staff, supervising and monitoring staff performance general day-to-day study administration.

Vincent Momanyi & Peris Otieno, Field Research Assistants

The field research assistants will be responsible for recruiting of the participants to the study by using known working strategies. They will also be responsible for conducting the scheduled qualitative interviews for the participants.

Alfred Obiero, Administrator

This administrator will be responsible for assisting in overall planning for the project in liaison with the Project coordinator, budget preparation, maintaining of proper audit trail for study funds and expenditures, generate monthly invoices, and other financial reports as required in the subcontract. He will also be responsible for the handling and accounting for the field imprest given to the project.

Denis Ochola, HRM

The Human Resource Manager is responsible for the recruitment of personnel and all staff related issues such as disciplinary, medical insurance, salaries, and remuneration among others.

Grace Waititu, Chief Admin Officer -Nairobi

The Finance & Admin Manager is based in Nairobi and is instrumental in terms of procurement of equipment and fast tracking of project payments to suppliers. She forwards letters to the headquarters and follow up payments on behalf of the Kisumu site. She also facilitates staff contracts, subcontracts, and petty cash advances. In collaboration with the Study Coordinator and the PI she will ensure timely sub-contract agreements; budget preparation and monitoring of line items to ensure they conform to budgets.

Dr. Zachary Kwena, Social Scientist

The Social Scientist will support all the qualitative aspects of the study. This is in line with the requirement of the KEMRI IRB to ensure that any qualitative study engages a social scientist.

Fringe Benefit Rate

KEMRI contract employees receive a 20% gratuity at the end of their contract. The employees also get part of the National Social Security Fund payment which is a mandatory statutory deduction. The employees will also get a medical cover to cater for their medical needs while under the contract.

Workers Injury Benefit Insurance

According to the Workers Injury Benefit Act of Kenya, it is a legal requirement for every employer to get a workers' injury benefit insurance cover for all their employees. The insurance cover is based on the total salaries payable per year.

Medical Insurance

The staff requires medical insurance cover. The cover will be necessary to take care of the staff in case they are taken ill and need medical attention. It will also make the staff to be healthier and more productive in the Study and hence a motivation for high performance.

Cell phone airtime

Communication costs includes cost of making calls to the stakeholders involved in the Study and giving as well as receiving the necessary feedback for the Study. It involves making calls using mobile phones to mobilize potential participants.

Internet Costs

The internet costs will be about $ 2,526 to facilitate internet communication through emails and skype calls. This will ensure all correspondence of the study are done in a timely manner.

Training Costs

The study will incur about $ 4,526 on the training costs which will include training of the staff on the protocol, SOPSs and other relevant issues related to the study. The cost will cater for venue and training materials required.

Stakeholders Meeting

The study will incur about $ 4,526 on stakeholders meeting to discuss PrEP implementation at the pharmacy and get feedback on areas requiring improvements and necessary changes. The cost will cater for venue and meeting materials required.

Archival Costs

The study will incur about $ 669 on preparation for archival of study materials as required by the local IRBs.

Translation and Transcription Costs

The study will incur about $ 1,895 for the translation and transcription of the study work. Translation costs include the translation of participant consent forms from English language to Dholuo and Kiswahili languages. These are the common languages spoken by participants in Kisumu region. It also includes the translation of the recorded in-depth interviews into English language. The transcription costs will include costs of transcribing the recorded interviews to written versions.

Utilities

The study will incur approximately $ 2,000 for the utilities. This will include space use of the facility,

electricity, water, and refreshments needed for the smooth functioning of the study.

Local Travel

The principal investigator resides in Nairobi but makes regular trips to Kisumu. The cost caters for travelling and per diems paid to her to facilitate her movements. It also helps in facilitating other study travel arrangements such as visiting different pharmacies and attending relevant project trainings and meetings such as presentation of the study at the IRB level, among others.

IDI Materials

In depth Interviews will require materials such as headphones, voice recorders and batteries for efficiency. These are estimated to cost approximately $ 1,579.

Printing & Stationery

Printing and stationery costs includes cost for reams of paper and cartridge for initially printing of the consent forms, it also involves photocopying of the consent forms to be administered to the Study participants.

Participants Reimbursements

The participant reimbursements will include cost of transport and time for the scheduled in-depth interviews planned.

Laptops
The study will require laptops for writing reports and transcription and transcribing of the in-depth interviews.

8% Administrative Cost

This budget line will help the host institution KEMRI to meet part of the costs associated with providing support to this project, it will help in meeting costs such fixed line telephone bills, payments processing, utility bills, security, necessary reviews, bank charges, payroll processing costs etc.

BUDGET JUSTIFICATION FOR THIS AMENDMENT

The increased number of pharmacies and sample size will have implications on the budget in terms of pharmacy support, participant reimbursement and supplies. We expect the cost to increase as indicated in the budget. The additional cost is being funded by the Bill & Melinda Gates Foundation.

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STUDY PROTOCOL: THIKA

Pharmacy delivery to expand the reach of PrEP in Kenya:

Pilot study

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TABLE OF CONTENTS

ABREVIATIONS

3TC	Lamivudine
AIDS	Acquired Immunodeficiency Virus
AE	Adverse Event
ART	Antiretroviral Therapy
ARC	AIDS Related Complex
CCC	Comprehensive Care Clinic
CDC	Centers for Disease Control and Prevention (US)
CHCT	Couples HIV testing and Counseling
DAIDS	Division of AIDS (NIH)
DALY	Disability-Adjusted Life Year
DBS	Dried Blood Spots
EC	Ethics Committee
FDA	Food and Drug Administration (US)
FTC	Emtricitabine
FTC-TP	Emtricitabine-triphosphate
HIV	Human Immunodeficiency Virus
GEE	Generalized Estimating Equations
HTTP	Hypertext Transfer Protocol (presentation of web data)
ICER	Incremental Cost-Effectiveness Ratios
IRB	Institutional Review Board
KEMRI	Kenya Medical Research Institute
NACOSTI	National Commission of Science, Technology and Innovation
NIH	National Institutes of Health (US)
PEP	Post-exposure prophylaxis
PrEP	Pre-exposure prophylaxis
SAS	Statistical Analysis Software
STI	Sexually transmitted infection
TDF	Tenofovir
TFV-DP	Tenofovir diphosphate
UNAIDS	Joint United Nations Program on HIV/AIDS
US	United States
UW	University of Washington
VCT	Voluntary counseling and testing
WHO	World Health Organization

PROTOCOL SUMMARY

Maximizing access, minimizing costs of delivery, and reaching at-risk populations are key priorities for optimizing the public health impact of pre-exposure prophylaxis (PrEP) for HIV prevention. In Africa, PrEP is being added to an already-burdened public health infrastructure and the ability of the health systems to maximize PrEP access will necessitate finding novel delivery strategies. In feasibility evaluations of PrEP in Africa to date, major barriers to PrEP delivery include stigma, long waiting times, the costs of staffing, and healthcare providers' unfamiliarity with delivering prevention interventions.

In Kenya, retail pharmacies fill an important gap in the health care system, providing access to treatment of urgent conditions (e.g., evaluation and medication for STIs, upon presentation of a valid prescription), monitoring of chronic conditions (e.g., blood pressure testing), and preventative care (e.g., contraception). HIV testing is also now legally allowed at pharmacies through purchase of HIV self-tests or pharmacy provider-assisted HIV self-testing. Pharmacy-delivered care has many attributes that may be desirable for potential PrEP users, including convenience (as pharmacies outnumber clinics and have shorter waiting times), anonymity (compared to seeking PrEP at an HIV care center), and engagement (which may be greater for a preventative service at a pharmacy than at a clinic that prioritizes treating ill individuals). Pharmacies can offer free, subsidized, or fully fee-for-service care, and paying for a service could result in greater sustained consumer engagement. The core components of PrEP – including HIV testing, adherence and risk reduction counseling, assessment of side effects, and provision of refills – are within the scope of practice for pharmacists (including pharmaceutical technologists, common in sub-Saharan Africa), and one US model has demonstrated that PrEP can be provided by pharmacists, facilitated by oversight by a remote clinician.

In the second half of 2019, we conducted formative work among pharmacy providers and clients in Kenya to assess the feasibility and acceptability of pharmacy-based initiation and continuation of PrEP. Overall, the pharmacy providers and clients in our formative study strongly supported the idea of pharmacy-based PrEP delivery and felt it would be feasible so long as client privacy could be ensured and providers received training on how to deliver PrEP. In January 2020, we conducted a day-long stakeholder meeting – including regulators, other government agencies, pharmacy professional associations, pharmacy provider representatives, community members, and others – to assess the potential for and general framework of a pharmacy-based PrEP delivery model. This protocol reflects learning from that formative work and stakeholder meeting.

We hypothesize that pharmacies may offer a novel access point for PrEP delivery in Kenya, especially during the COVID-19 pandemic when individuals may fear visiting health facilities for fear of COVID-19 infection. With a multidisciplinary team, we propose two parallel evaluations of pharmacy-based PrEP care – one as a stand-alone model and one as a refill-only model – with the following aims:

Aim 1a: We will conduct an initial pilot evaluation of pharmacy-based PrEP initiation and refills.

Approach: At two pharmacies in Kiambu County, Kenya we will implement the novel care pathway for PrEP initiation developed from formative research and stakeholder engagement and measure PrEP initiations, consumer characteristics, retention in care, and adherence (up to n=150 people starting PrEP, followed for six months). *Hypothesis: Individuals will successfully initiate PrEP at pharmacies and be retained in care.*

Aim 1b: Within the Aim1a pilot pharmacies, we will probe potential weak points for pharmacy-based PrEP delivery, in domains relating to acceptability, fidelity, and costs.

Approach: We will conduct in-depth interviews with clients initiating (n=10/pharmacy) and refilling (n=10/pharmacy) PrEP, pharmacy providers (n=2/pharmacy), and clinicians providing remote oversight (n=1/pharmacy) (n=46 in total) and collect transcripts from consultations between pharmacy providers and remote clinicians via WhatsApp to explore experiences accessing or

delivering pharmacy PrEP. We will use unannounced standardized patient actors to explore fidelity (of counseling, HIV testing, safety assessment), and use quantitative surveys to measure costs and cost preferences (of clients and pharmacy providers) associated with pharmacy-based PrEP initiation and refills. *Hypothesis: Understanding potential weak points for PrEP delivery in pharmacies will permit refinement of the delivery algorithm developed from the formative research and tested in Aim 1a.*

Aim 1c: We will modify the care pathway to address weak points identified in Aim 1b and conduct an extended pilot evaluation of the refined care pathway.

Approach: We will implement the refined care pathway at a total of 6 pharmacies in Kiambu County (2 from the initial pilot evaluation described in Aim 1a plus an additional 4 pharmacies). Clients who have been receiving PrEP services at the two Aim 1a pharmacies as part of Aim 1a or Aim 2a will be allowed to continue their PrEP care under the refined model for the duration of this extended pilot evaluation. We will continue to measure the same client outcomes as in the initial pilot: PrEP initiations, consumer characteristics, retention in care, and adherence (up to 540 people starting PrEP under the refined care pathway, followed for six months). We will also assess the acceptability and feasibility of the refined care pathway through quantitative surveys with clients and pharmacy providers. Hypothesis: The refined care pathway will result in greater PrEP uptake and improve the acceptability and feasibility of the pharmacy PrEP model among clients and providers.

Aim 2a: We will conduct a pilot evaluation of pharmacy-based PrEP refills only.

Approach: At the same time, we conduct Aim 1a, we will implement the care pathway for PrEP refills at two public healthcare facilities in Kiambu County. This pathway was developed from formative research and stakeholder engagement. In this pathway, PrEP users who initiate or refill PrEP at two public HIV clinics (up to n=200) will have the *option* of pharmacy-based PrEP refills (3-month supply); we will measure selection of pharmacy refills and follow participants for 6 months, comparing PrEP retention, adherence, and safety between those who chose clinic and pharmacy refills. *Hypothesis: Many PrEP users will select pharmacy-based PrEP refills, which will result in equivalent PrEP retention, adherence and safety as clinic-based refills.*

Aim 2b: We will conduct interviews with Aim 2a participants who did not opt to use pharmacy-based PrEP refills to understand factors that influenced their decision (e.g., barriers) and their perceived acceptability of this refills-only model.

Approach: At study endline, we will conduct in-depth interviews with 30 clients who enrolled into the study at an Aim 2a public healthcare facility and who returned for at least one PrEP refill but did not opt to get that refill at a pilot pharmacy. We will use semi-structured interview guides to solicit details about clients' decision-making process, acceptability and feasibility of obtaining/delivering PrEP via this care pathway, and suggested improvements. Hypothesis: Understanding clients' reasons for not refilling PrEP at retail pharmacies will permit insight into the potential reach of this care pathway and help inform future iterations of this model.

We will collate information from these two approaches in a final stakeholder meeting to assess the potential ways forward with pharmacy-based PrEP delivery in Kenya

LAY SUMMARY

Pre-exposure prophylaxis (PrEP) is a powerful HIV prevention tool; PrEP delivery in low resource settings will require approaches that are time- and cost-efficient, for patients, care providers, and the health care system. In this highly innovative study, we propose a new delivery model for PrEP delivery that has never been explored in an African setting: pharmacy-based PrEP delivery (with remote clinician oversight). Through formative research, we have developed a care pathway for pharmacy-based PrEP delivery that we plan on pilot testing initially in four Kenyan pharmacies (2 in Thika and 2 in Kisumu) and later refining and pilot testing at 12 Kenyan pharmacies (6 in Thika and 6 in Kisumu). We hypothesize that pharmacy-based PrEP delivery will be acceptable and feasible in Kenya and that individuals who uptake PrEP in pharmacies will be retained in care.

ABSTRACT

Pre-Exposure Prophylaxis (PrEP) is a new HIV prevention method that works when taken as recommended. To take full advantage of public health benefit of PrEP for HIV prevention, there is need to prioritize access, minimize costs of delivery, and reach out to at-risk populations. In Africa, PrEP is being added to a public health infrastructure which is sometimes burdened by overcrowding and drug stock outs; the ability of health systems to maximize PrEP access necessitates finding novel delivery strategies. Additionally, there exist major barriers to PrEP delivery, which includes stigma, long waiting times, costs of staffing and healthcare providers' unfamiliarity with delivering prevention interventions. In Kenya, and many other resource-limited countries, retail pharmacies (i.e., chemists) fill an important gap in the health care system providing first stop access to treatment, monitoring and preventive care of urgent and prolonged conditions. Potential PrEP users may desire pharmacy-delivered PrEP over facility-delivered PrEP for reasons including increased convenience, increased privacy and greater engagement compared to health facilities that focus on treating ill patients. Retail pharmacies can offer free, subsidized or affordable healthcare services. The core components of PrEP – including HIV testing, adherence and risk reduction counselling, assessment of side effects and provision of refills – are within the scope of practice for pharmaceutical technologists and pharmacists in Kenya. From prior formative qualitative research and a stakeholder meeting, we have developed a care pathway for pharmacy-based PrEP delivery (including initiation and refills), endorsed for piloting in a consultative meeting that included a wide spectrum of regulatory, professional, government, and community stakeholders in Kenya. We plan to pilot this care pathway in four retail pharmacies in Kiambu County, Kenya. Additionally, we plan to probe for potential weak points of pharmacy-based PrEP delivery, in domains relating to acceptability, fidelity, and costs. Thereafter, we will refine the pharmacy-based PrEP initiations-plus-refills model (the one tested in Aim 1a) to address client- and provider-facing barriers identified in Aim 1b and implement it in 6 pharmacies in Kiambu County.

BACKGROUND

Importance of the problem

More than two million persons become newly infected with HIV each year, the majority in Africa.[1] In Kenya, more than 1.5 million people are living with HIV,[2] making it the country with the fourth largest epidemic. The past five years have witnessed major strides in the development of highly-effective HIV prevention interventions, particularly using antiretroviral medications: antiretroviral therapy (ART) to decrease infectiousness and pre-exposure prophylaxis (PrEP) to prevent acquisition. Novel strategies to successfully and efficiently deliver these strategies, at scale, are needed to achieve maximum HIV prevention impact.

PrEP is an effective, recommended, and impactful strategy for HIV prevention

PrEP has been demonstrated to be efficacious and safe for reducing HIV risk among men who have sex with men (MSM)[3], heterosexual men and women,[4,5] and injection drug users[6] in diverse geographic settings. In 2012, the US Food and Drug Administration approved combination tenofovir disoproxil fumarate/emtricitabine (TDF/FTC) as the first medication with a label indication for HIV prevention in adults[7] – an action followed by drug regulatory authorities in a number of other countries including Kenya (in December 2015). In 2015, the World Health Organization issued guidance recommending TDF-containing PrEP as an additional prevention option for all persons at high risk for acquiring HIV.[8]

Adherence is essential for PrEP efficacy. PrEP clinical trials had a wide range of results for estimates of PrEP's efficacy for HIV protection – explained by the degree to which the trial populations were adherent to PrEP.[9] Secondary analyses from clinical trials and demonstration studies have shown that PrEP is highly efficacious and safe when taken as prescribed: at the individual level, HIV protection is on the order of 90-100% in both MSM and heterosexual populations when PrEP adherence was high, as measured by the presence and quantity of PrEP in blood samples.[4,10,11] PrEP adherence and HIV prevention effectiveness have been higher than in prior clinical trials, in many cases very high, in open-label demonstration projects among HIV serodiscordant couples, MSM, and young women at risk for HIV,[12–14] which has been hypothesized to be a result of offering a strategy with demonstrated safety and effectiveness and without a placebo. In those PrEP demonstration studies, HIV incidence has been very low and visits were generally quarterly and brief, suggesting that many who initiate PrEP in the context of known safety and efficacy may not need intensive follow-up to achieve high adherence. In some high income settings (e.g., Sydney, San Francisco), delivery of PrEP at scale, layered onto high coverage of HIV testing and ART delivery, has resulted in substantial reductions in new HIV infections in the past five years.[15–17]

Strategies to effectively and efficiently deliver PrEP are needed, for all settings but particularly for settings with limited resources

PrEP delivery can be expensive, in terms of costs for health systems and opportunity costs for PrEP users. For health systems, costs associated with PrEP include medication, staffing time, and laboratory testing. In addition, user opportunity costs – e.g., time away from work or childcare to wait, usually for many hours, at a public clinic for a PrEP visit – can be substantial. Mathematical modeling analyses from high-income settings have argued that, while PrEP is cost-effective when delivered to high-risk persons, it is still costly.[18–20] For developing country settings, PrEP costs are mitigated by the lower cost inputs from generic/non-branded or discounted medication pricing, lower staff salary costs, and more limited laboratory testing as recommended by WHO.[19,21] Nevertheless, reducing the costs of PrEP delivery are necessary to maximize its impact. In costing analyses we have conducted in East Africa,

we estimated the cost of adding PrEP to routine public health services using Ministry of Health (MOH) personnel, drug, and laboratory costs; the greatest proportion of the total costs was not medication but instead personnel (39%).[22] That finding emphasizes the need for efficiency in PrEP delivery, particularly given that public clinic medical staff in Kenya and similar settings are often highly over-stretched, because of competing priorities in overburdened health systems. Our modeling did not take into account client costs related to PrEP; however, we have learned through providing PrEP in studies to over 5000 individuals over the past 10 years that travel and time away from work and costs for getting to PrEP clinic visits can be a substantial challenge.[23,24] Efficient strategies to deliver PrEP could reduce costs, potentially improving client engagement and allow services to be available to a larger number of people as a result – and this kind of approach would be applicable in a variety of settings, in Africa and worldwide.

Diverse models for PrEP delivery are needed

Barriers to facility-based PrEP delivery include long travel distances, lack of privacy, and lengthy wait times [23,24]. In low-income countries, long travel distances to dispersed healthcare facilities can result in significant costs associated with transportation. Facilities are often overcrowded, which result in long wait times, rushed medical care, and a lack of anonymity that may deter individuals from returning to the healthcare facility for follow-up care. Time traveling and waiting is time away from work and children – resulting in substantial opportunity costs. Importantly, PrEP is an intervention for HIV uninfected individuals – in our experience and that of others, healthy persons report that they do not like frequenting healthcare facilities for HIV preventive care.[24] Recent PrEP demonstration projects from Africa have found poor retention in care, for reasons including challenges accessing PrEP at facilities for continuation.[25–28]

Diverse models have been developed for ART delivery to overcome similar barriers related to facility-based care.[29,30] Models of ART delivery that are not facility-based include home delivery of ART medication[31] and community-based care, ART adherence groups,[32] peer care coordinators,[33] and even drug-dispensing ATMs.[34] One previous study that explored the use of pharmacies to deliver ART medications in Nigeria found that this approach was feasible and that retention in care was high.[35] PrEP delivery is simpler than ART – with less testing, fewer complications, and without comorbidities – and thus is primed for simple delivery models.

Pharmacy-based PrEP delivery is a novel approach that could expand the reach of PrEP, respond to the needs of PrEP consumers, and improve PrEP continuation

Nearly half of all individuals in low-income countries seek healthcare at retail pharmacies.[36–38] In sub-Saharan Africa, pharmacies and licensed drug shops fill an important gap in the medical system and individuals often rely on and prefer the use of pharmacies over healthcare facilities to address their medical needs.[39] Pharmacies can address both urgent needs (e.g., evaluation and medication for sexually transmitted infections) and preventive care (e.g., contraception)[40] and have advantages over healthcare facilities, including increased convenience and anonymity.[41] Going to a pharmacy first to address a medical issue (e.g., symptoms of malaria) is common, and individuals often go to a healthcare facility only later if the issue is not resolved.

Advantages of pharmacy-based PrEP delivery may include increased convenience, privacy, and quality of care. In any given location, pharmacies often outnumber healthcare facilities and thus might be nearer to individuals interested in PrEP, saving both time and money.[41–46] Individuals also visit pharmacies for both non-medical and medical reasons, potentially enabling individuals who seek PrEP to maintain privacy and overcome barriers associated with PrEP stigma.[23,24] Pharmacies also have the advantage of being self-sustaining by offering subsidized or fee-for-service care, which may make them more responsive to client demands[47–49] and may result in sustained client engagement if individuals

value services purchased [50]. Finally, the delivery of PrEP in pharmacies expands choice of locations to access PrEP, enabling individuals to select their preferred model.

Pharmacy-based PrEP delivery is feasible and within the domain of care for Kenyan pharmacists. PrEP delivery has relatively few necessary components – HIV testing, adherence and risk reduction counseling, assessment of acute HIV infection and PrEP side effects, PrEP prescribing, and the provision of refills[51,52] – all can be done by pharmacists/pharmaceutical technologists in Kenya.[53] Pharmacies in Kenya are dispensing HIV self-tests on the market without a prescription,[54] and pharmacies are dispensing PrEP now by prescription (brought after a clinic visit). Developing a rigorous and evidence-based model for pharmacy-based PrEP now could head off unregulated development of private models. In the United States, one model of full-service pharmacy-based PrEP delivery has been successfully implemented through a collaborative practice agreement overseen by a remote clinician (**Fig. 1**), with standard PrEP services being done by the pharmacy and branch points for clients with complex medical or social issues to be sent to the overseeing clinician.[55–60] Pharmacy-based PrEP delivery is a client-centered model that is no less safe or rigorous than a clinic-based approach. A similar model could be highly successful for Africa.

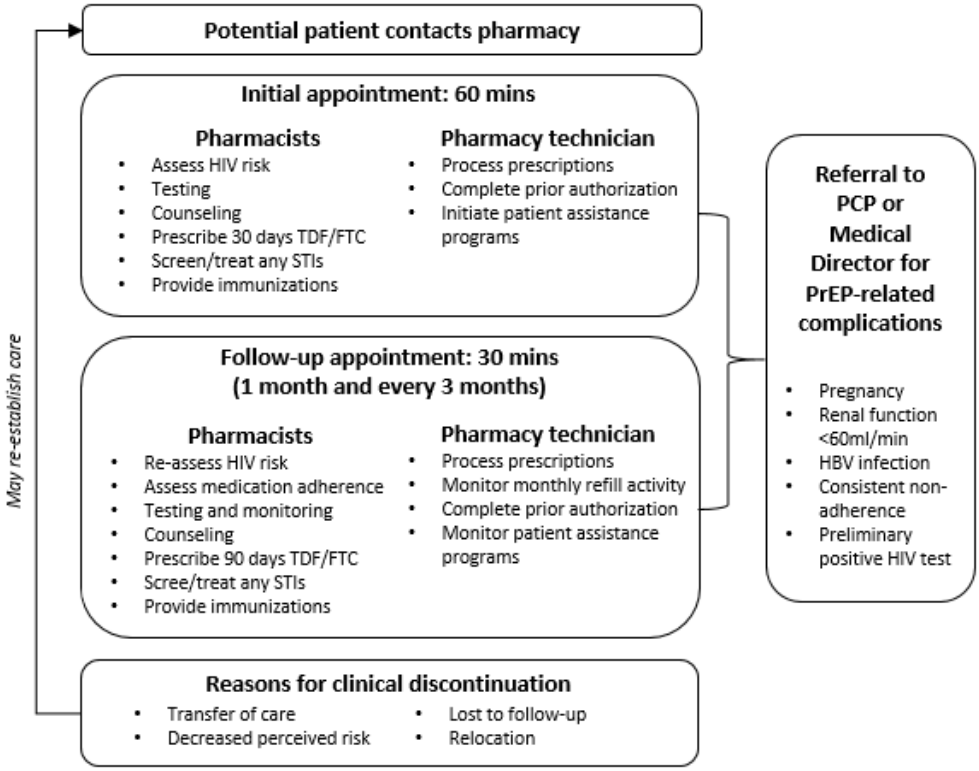

Fig. 1. Pharmacy-based PrEP care pathway, overseen by a remote physician, from Seattle *(adapted from (56))*

<u>The ongoing COVID-19 pandemic might affect the delivery and uptake of pharmacy-based PrEP</u>

We are currently in the midst of a global respiratory pandemic, coronavirus disease 2019 (COVID-19), which has dramatically changed the lives of individuals living in Kenya and other settings across the globe. Because COVID-19 is a newly emerging pandemic, the science on this new virus – including our understanding of transmission dynamics, treatment, and prevention – continues to evolve. What is

known, is that it COVID-19 is transmitted via respiratory droplets in the air or on surfaces, and that the risk of infection can be reduced with regular hand washing, social distancing, and wearing a face mask while in public settings. To help slow the risk of COVID-19 infection, Kenya (like many other countries) has implemented a number of measures including national curfews, road blocks, and stay at home orders.

This ongoing epidemic is likely to affect the care seeking and delivery behaviors of pharmacy clients and providers in ways that might impact the uptake of pharmacy-based PrEP delivery. For example, during COVID-19 pharmacy clients might decrease access of pharmacy care if they fear infection in a public setting, or they may increase access of pharmacy care if they fear visiting health facilities for regular services. Similarly, pharmacy providers might restrict pharmacy hours during COVID-19 to reduce risk of infection to staff and clients, or they may be increase pharmacy hours if there is greater demand for pharmacy services during this unique period (i.e., because individuals no longer feel comfortable visiting health facilities). The delivery of pharmacy-based PrEP delivery during COVID-19 may also have a number of unique challenges, including space constraints (e.g., availability of a well-ventilated private room for counseling and HIV testing or ensuring the appropriate space for social distancing among clients), limited protective gear for pharmacy workers, and limited pharmacy access for clients (due to curfews and fear or using public transport). We aim to understand the impact of COVID-19 on the delivery and uptake of pharmacy services, including PrEP, during this unique time so that we can understand the generalizability of our pilot findings in a post-COVID-19 era or during another future global pandemic.

Findings from the Partners Scale-Up Project and MPYA Study

PrEP delivery in HIV clinics is associated with stigma. A main delivery point for PrEP in Kenya currently is HIV clinics. We have learned from qualitative work conducted among clients and providers in our Partners Scale-up Project that many PrEP users consider HIV clinics as spaces for HIV infected people, and thus feel uncomfortable attending these clinics as HIV uninfected persons. Additionally, PrEP users face difficulties fitting in when waiting for services at the HIV clinics since most of the health discussions focus on illness, not prevention and health (**Table 1**).

Table 1. HIV uninfected persons' concerns with accessing PrEP at HIV Comprehensive Care Clinics (Partners Scale-up Project)

"I told you that experience is difficult, because we normally go to the CCC and the CCC clinic is for HIV+ people and therefore there is no difference between that person who is infected and the one who is not" **– PrEP user: Female**
"I used to fear because when people see me they would think I am sick" **– PrEP user: Male**
"There is still stigma with the negative patients coming to the CCC to take PrEP because they are associated with HIV+" **– Healthcare provider: Nurse**
"I know there are a lot of people who really wish to take PrEP, but when they learn that it is being given at the CCC they just disappear, so having another place to dispense PrEP will help" **– Healthcare provider: Counselor**

Diverse options for PrEP delivery are desired among individuals taking PrEP. Preliminary qualitative data from PrEP users and providers in the Partners Scale-up Project and community leaders in the MPYA study have demonstrated the desire for locations other than HIV clinics for PrEP prescribing and refilling. **Table 2** demonstrates how PrEP users would like PrEP delivery to be as easy as access to condoms and separate from HIV clinics for increased privacy. **Table 2** additionally demonstrates community leaders' interest in pharmacies as a potential location for PrEP delivery and refill as a result of their easy accessibility, availability of pharmacists/pharmaceutical technologists for PrEP prescribing/refilling, and long open hours.

Table 2. PrEP users', providers', and counselors' desires for diverse PrEP delivery options (Partners Scale-up Project and MPYA study)
"PrEP should be made available just like condoms are easily accessible and available in dispensers" **–PrEP user, Partners Scale-up**
"I feel that PrEP should be delivered separately from the CCC [HIV clinic] … yes it should be delivered at a different point because of stigma" – **PrEP user, Partners Scale-up**
"Sometime there are those people who do not want others to know about their thing, so there should be a way that one can be treated from wherever they are even without coming to the clinic" – **PrEP user, Partners Scale-up**
"Community pharmacies would work [for PrEP delivery] because they are easily accessible and the pharmacists are always available ... some of them work until late hours" – **NGO program officer, MPYA**
"For refill maybe we… observe how they are faring with the product [PrEP] then after 3 times … she can pick it at any given point like dispensaries and pharmacies around where they live because nowadays there are so many all over" **– Community-based organization leader, MPYA**

Pharmacy-based delivery of PrEP is of interest to communities. We recently conducted two anonymous, telephone-based, community surveys in Western Kenya (PrIYA study) with young women and men (<25 years) who had a phone and had agreed to be part of mSurvey – a national polling organization that connects to mobile phones in Kenya and pays a small amount for survey completion. In the June 2018 survey 515 individuals participated, and in the January 2019 survey 2274 individuals participated. None of these individuals were otherwise part of our ongoing research studies. In both surveys, PrEP knowledge was high: in the June 2018 survey, 83% of individuals had heard of PrEP and 43% knew someone on PrEP; in the January 2019 survey, 69% of individuals had heard of PrEP. The majority (58%) of individuals in the January 2019 survey said they would be willing to pay for PrEP and 35% visited a retail pharmacy ("drug shop") every 2-3 months. Interestingly, almost half of individuals who were familiar with PrEP in the June 2018 survey thought that people would most prefer to get PrEP from retail pharmacies compared to other locations (e.g., clinics) (**Fig. 2**).

Findings from formative research on pharmacy-based PrEP delivery

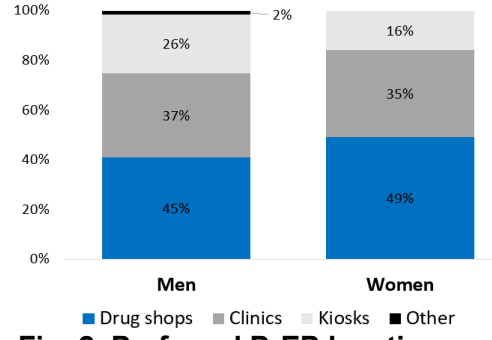

Fig. 2. Preferred PrEP locations
(mSurvey results)

As formative research for this project, in the second half of 2019 we conducted in-depth interviews with pharmacy clients (n=40) and pharmacy providers (n=12) to understand their health seeking behaviors (clients), interactions with clients and commonly provided services (providers), and attitudes towards pharmacy-based PrEP delivery (both). We interviewed client who currently purchase pharmacy products and services, self-reported being HIV negative, and were identified as at-risk for HIV using the Rapid Assessment and Screening Tool (RAST). We interviewed pharmacy providers who currently provide services at retail pharmacies. Study participants were recruited from four different areas of Thika and Kisumu: urban informal settlements, urban non-informal settlements, peri-urban areas, and rural areas. Exactly half of the pharmacy clients recruited were male, and half were under the age of 25. Participants were interviewed one-on-one by a trained Kenyan qualitative researcher. All interviews took place in a private room, were audio recorded, and subsequently transcribed verbatim. Major themes were identified inductively using

content analysis. Some of the main findings are summarized below.

Pharmacies are often clients' first resort for care-seeking; clients' preference for pharmacy-care is multifaceted. The majority (78%, 31/40) of clients reported that when they are ill, they first seek care at retail pharmacies and only seek care at healthcare facilities if their symptoms persist and/or worsen. Most (75%, 30/40) clients also reported seeking preventive care at retail pharmacies, most commonly through purchase of contraceptives. Clients identified six characteristics that underlie their preference for pharmacy care over facility-based care: 1) convenience (e.g., more locations, longer opening hours, faster service times); 2) privacy (e.g., less crowded, purpose of visit not obvious to on-lookers); 3) customer service (e.g., pharmacy providers are "friendly", "kind", and "not in a hurry"); 4) rapport (clients have ongoing, personal relationships with pharmacy providers who know their medical history); 5) flexibility (e.g., pharmacies work to provide services within clients' budget, some offer credit); and 6) autonomy (more client decision-making power in terms of timing and location of care, more negotiation power with pharmacy providers when deciding treatment plan, ability to seek care elsewhere if dissatisfied with services.)

Overall, pharmacy clients and providers strongly support the idea of pharmacy-based PrEP delivery, especially because the demand for PrEP is already there. Participants felt that the same six aforementioned advantages to general pharmacy care would also apply to pharmacy-based PrEP delivery, with many heavily emphasizing that pharmacy-based PrEP delivery would help circumvent HIV/PrEP stigma currently associated with HIV clinics, where PrEP is currently delivered. Providers reported that clients are already requesting PrEP at their pharmacies, and two providers said that they sell PrEP on demand. Clients similarly expressed interest in acquiring PrEP at retail pharmacies, with one client reporting that she had already purchased PrEP at a pharmacy previously. Overall, participants found pharmacy-based PrEP delivery highly acceptable, with 83% (10/12) of providers saying they would offer PrEP at their pharmacies and 95% (38/40) clients expressing support for this idea.

Clients' main recommendation for pharmacy-based PrEP delivery was to ensure client privacy and that providers are properly trained to deliver PrEP. When asked about undergoing HIV testing, counseling, and adherence and side effect assessments at a pharmacy, most clients reported that they would be comfortable so long as these activities occurred in a private consultation room and they felt sure that the provider would maintain their confidentiality. Clients also stressed that providers must have the proper training to conduct these activities. Other ideas for increasing client comfort with pharmacy-based PrEP included offering HIV self-testing and ensuring consistency of provider at follow-up visits.

Providers felt that delivering PrEP in pharmacies would be feasible so long as they have sufficient content knowledge of PrEP and staff to handle any additional workload. Providers supported the idea of pharmacy-based PrEP delivery being overseen by a remote clinician with PrEP expertise. In general, providers reported that they could deliver PrEP using the same practices they currently use to deliver other drugs (e.g., pill counts and phone calls to assess adherence, referrals of clients experiencing serious side effects). Half of providers also desired additional training on HIV testing and counseling to deliver PrEP. All providers (12/12) supported the idea of oversight by a remote PrEP clinician, with several calling for resources like a standardized checklist to ensure that clients meet eligibility criteria and clinical safety requirements to receive PrEP.

Findings from stakeholder meeting pharmacy-based PrEP delivery

In January of 2020, we convened 19 stakeholders from regulatory agencies and suppliers (e.g., National AIDS & STI Control Programme, Pharmacy & Poisons Board, Kenya Medical Laboratory Technology & Technicians Board, Kenya Medical Practitioners & Dentists Council, Kenya Medical

Supplies Agency), professional bodies (e.g., Kenya Pharmaceutical Association, Pharmaceutical Society of Kenya, Kenya Medical Association), PrEP implementing partners (JHPIEGO, Clinton Health Access Initiative), healthcare and pharmacy providers, Civil Society Organizations. The purpose of this meeting was to build consensus around a model for pharmacy-based PrEP initiations and pharmacy-based PrEP refills that could be pilot tested in Kenya. Following presentations on the role of PrEP in Kenya's national plan for HIV prevention, results from the formative research, and a mock care pathway for pharmacy-based PrEP delivery, participants were divided into small groups to brainstorm potential barriers and solutions—both for pilot testing and, if successful, for eventual scale-up—of pharmacy-based PrEP delivery. The outcomes from the stakeholder meeting are summarized below.

Stakeholders were supportive of the idea of pharmacy-based PREP delivery. There was overwhelming consensus that pilot work to better understand whether pharmacy-based PrEP initiation and refills could be done successfully. Importantly, no meeting attendee objected to trying pharmacy-based PrEP delivery. Stakeholders were in favor of a pilot test of pharmacy-based PrEP delivery and felt it would help identify matters requiring further clarification before further scale up.

Stakeholders identified potential challenges and solutions to pharmacy-based PrEP delivery for both the pilot study and, if successful, for larger scale up (Table 3). Anticipated challenges primarily centered on pharmacy provider knowledge and skills to deliver PrEP and lack of guidelines specifying, for example, what type of HIV test is permissible for initiation of PrEP at pharmacies, how pharmacies would procure and document PrEP, and reporting requirements. Stakeholders suggested numerous ways forward that could be incorporated into the pilot study. With respect to scaling up pharmacy-based PrEP delivery, stakeholders also suggested potential solutions, many of which would require the cooperation of local and national policymakers.

Table 3. Potential challenges and solutions to pharmacy-based PrEP delivery, according to stakeholder meeting attendees

Delivery component	Potential challenge	Potential solution: pilot	Potential solution: scale up
Promoting pharmacy-based PrEP	• Most pharmacies receive their promotional materials from suppliers. • Existing limitations on how pharmacies can advertise products/services. • CCCs may be reluctant to inform PrEP clients about pharmacy-based PrEP if trying to reach PrEP target numbers.	• Word-of-mouth promotion (e.g., PrEP providers at the affiliated CCC) • Ask customers seeking services indicating HIV risk-related sexual behaviors (e.g., condoms, emergency contraception) if they might be interested in PrEP. • Display posters within the confines of the pharmacy.	• NASCOP works with pharmacies to create PrEP materials for display. • NASCOP works with counties so PrEP promotional materials can be displayed without a county-level license. • MOH helps spread knowledge of pharmacy-based PrEP delivery through national awareness campaigns. • PPB revises advertisement restrictions for PrEP. • Pair pharmacies with CCCs so pharmacy-based PrEP users count toward CCC targets.
HIV testing	• No existing framework for pharmacies to do HIV rapid testing (e.g., Determine, First Response), although some already doing. • Only select pharmacies currently providing assisted HIV self-testing (blood- or oral-based). • No guidelines stating that PrEP can be initiated based on the results of an HIV self-test. • Concerns over counterfeit HIV self-tests.	• Select pilot pharmacies already certified to do assisted HIV self-testing. • Could consider a special approval from regulatory agencies to offer HIV rapid testing at pharmacies for the pilot.	• MOH develops guidelines so that pharmacies can conduct HIV rapid testing, which currently is provided in many pharmacies for ~one-fifth the price of HIV self-tests. • MOH could limit PrEP delivery to pharmacies that are certified to do assisted HIV self-testing and obtain their HIV self-testing kits through KEMSA. • PPB could reclassify the HIV self-testing so treated like any other HIV test.
Counseling	• Pharmacy providers not trained on PrEP counseling. • No privacy at some pharmacies for counseling. • Pharmacies have a business approach, gets	• Train pilot pharmacies on PrEP counseling, per NASCOP guidelines. • Pilot pharmacies should have a private counseling space to offer PrEP.	• MOH requires pharmacy providers to be trained on PrEP delivery in order to deliver PrEP. MOH customizes NASCOP training to fit the retail pharmacy setting.

	in the way of counseling. • Existing counseling prompted by clients, not pharmacy providers.		
Prescribing	• Pharmacy providers are not trained on how to prescribe PrEP (and not allowed to prescribe). • Who will bear the costs of prescription? (incentives for pharmacies if get drug for free)	• Train pharmacy providers on how to prescribe using a checklist and remote clinician oversight. • Charge small consulting fee that covers counseling and dispensing. • Allow pharmacies to charge for HIV testing (necessary for prescription).	• PPB reschedules PrEP so that it can be sold without a prescription. • Pharmacy providers purchase PrEP from a generic manufacturer. • Pair pharmacies with CCC clinics for co-signing and oversight. • Remote PrEP clinicians (MOH supported?) for remote oversight and co-signing.
Dispensing	• Retail pharmacies not registered in the Master Facility List (MFL) and thus lack codes necessary to: (1) acquire PrEP through KEMSA, and (2) report dispensing. • Current retail pharmacy records do not tend to track clients over time. • Some clients move between pharmacies. • Clients might not be able to afford 3-months PrEP at a time.	• Link pilot pharmacies with CCCs; have pharmacies use CCC MFL code to obtain PrEP; then CCC reports the drugs dispensed. • Set up unique tracking system for pilot. • Have clients pay only for testing & a consulting/dispensing fee; make PrEP drug free.	• Give pharmacies MFL codes. • Use system similar to diabetes for tracking prescriptions over time (e.g., "PrEP card"). • MOH provides PrEP to pharmacies for free. • MOH establishes minimum criteria that pharmacy providers must meet in order to deliver PrEP (e.g., completion of NASCOP PrEP training).
Oversight/Referrals	• Many retail pharmacies lack formal connections to PrEP facilities. • Clinicians busy, hard to reach when called. • Cost of oversight? Who pays? • Ethics – how do you know pharmacies will use when needed? • Who is the clinician?	• Link pharmacies with specific CCC. • Have study-staff clinician on call. • Monitor the frequency of calls and record the content.	• PrEP clinician hotline? • WhatsApp group for PrEP clinicians and pharmacy providers? • Include cost of oversight in the consultation/dispensing fee client pays to pharmacy.
Other/over-arching	• Some pharmacies only have one staff member working at a time. • Pharmacy providers may lack knowledge about PrEP and/or skills to conduct HIV	• Pharmacy providers selected for this pilot will be trained on PrEP delivery and provided with a standardized checklist to walk them through each	• MOH establishes minimum criteria (e.g., possession of a private consultation room, completion of NASCOP training) that pharmacy establishments and providers

	testing and counseling. Some pharmacy providers may discriminate against clients, especially marginalized key populations (e.g., MSM, commercial sex workers). • Currently, there are no regulations for pharmacy-based PrEP delivery.	step. • Pharmacy providers will also be connected to a remote PrEP clinician who can answer any questions they have and receive referrals of complex clients.	must meet to deliver PrEP. • MOH requires pharmacy-based PrEP providers to undergo a sensitization training on PrEP stigma/discrimination. • MOH establishes guidelines for pharmacy-based PrEP delivery, including any price regulation and accountability mechanisms (e.g., in cases of client mismanagement).

Stakeholders helped refine a care pathway to be pilot tested in Aim 1a and Aim 2a. The care pathway is illustrated in **Fig. 3** with the core components detailed in **Table 4**. The checklist pharmacy providers will use to assess PrEP eligibility (both at initiation and refills) is included in Appendix V.

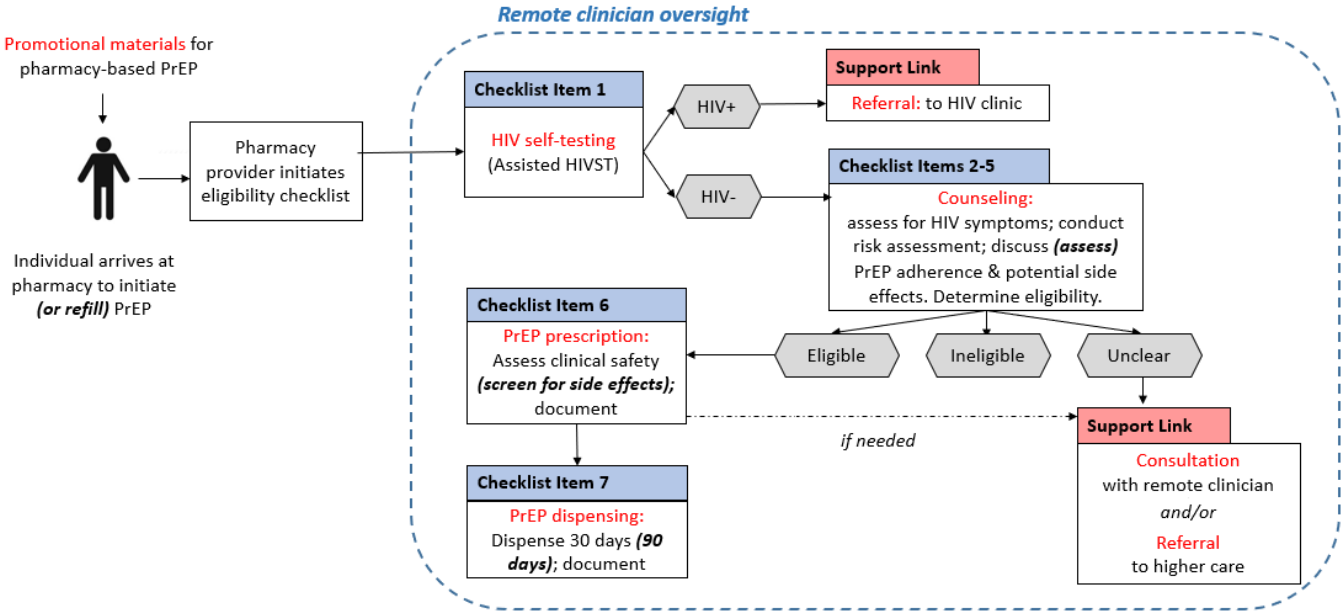

Fig. 3. Care pathway for pharmacy-based PrEP delivery

Table 4. Core components of pharmacy-based PrEP delivery		
Oversight With clinician input, we developed a checklist tool that walks pharmacy providers through each step required to initiate a client on PrEP and/or refill an existing PrEP prescription. All checklist items need to be completed in order for the client to receive PrEP. If at any point the pharmacy provider has questions, s/he can consult with a remote clinician and/or refer the client for care.	**Testing**	Assisted self-testing for HIV using rapid blood or oral fluid tests.
	Counseling	Includes risks and benefits associated with PrEP, PrEP adherence, recognizing symptoms of acute HIV infection, behavioral risk assessment (using Kenya's PrEP Rapid Screening Tool - RAST[62]), and side effects assessment.
	Prescribing	Prescribing of PrEP drugs for those initiating PrEP for the first time and continuation of prescriptions for clients coming in for refills.
	Dispensing/ Refilling	PrEP drugs dispensed/refilled by pharmacy provider; reliable drug supply required.

Preliminary findings from Aims 1a, 1b, and 2a and conversations with PrEP policy makers from the Kenya MOH, WHO, and PEPFAR. In Aim 1c, we propose refining the care pathway implemented in the Aim 1a and Aim 2a pilots to address (1) challenges reported by the clients and providers we interviewed and surveyed in Aim 1b and (2) evidence gaps identified by representatives from the Kenya Ministry of Health (MOH), WHO, and PEPFAR. The identified challenges and proposed refinements to how PrEP delivery is implemented (i.e., "implementation strategies") are summarized in table below:

Challenge Identified	Proposed Refinement to Model	Implementation Strategy Name[1]
Some clients cannot afford the fee study pharmacies are charging for PrEP (300 Kenyan schillings/~$2.75 USD per visit).	Eliminate the pharmacy fee.	"Free PrEP service"
Some clients felt uncomfortable completing the HIV risk assessment for PrEP (which includes highly sensitive questions about sexual behaviors) verbally with the pharmacy providers.	Give clients the option to self-administer this questionnaire, with review by pharmacy provider who can ask questions if needed.	"Optional Self-RAST" ("RAST" stands for "Risk Assessment Screening Tool")
Some prospective PrEP clients who do not know their HIV status are hesitant to undergo HIV testing at a pharmacy for fear for testing positive there.	Give prospective PrEP clients the option to complete an initial HIV self-test at home, and provide those who accept this offer an HIV self-test kit free of charge.	"Optional Initial Self-Test"
Some client populations with HIV risk—especially adolescent girls and young women—are not being reached by this model.	Incentivize PrEP clients to refer their peers to study pharmacies to learn about PrEP.	"Peer Referral"
The oral-fluid HIV self-tests being used in our pilots have a lower sensitivity than blood-based HIV self-tests.	Switch to using blood-based HIV self-tests (and continue to have pharmacy providers assist clients with conducting the test).	"Assisted Blood-Based HIV Self-Testing"
Some clients who undergo screening for PrEP are found to be post-exposure prophylaxis (PEP) candidates and have to be referred to public HIV clinics for PEP access (because pharmacies do not currently offer PEP).	Add PEP services to study pharmacies so that they can keep PEP clients engaged in care and offer them PrEP upon PEP completion.	"PEP-as-a-Bridge-to-PrEP"
Pharmacies receive a high volume of clients seeking testing and/or treatment for sexually transmitted infections (STIs) and currently have no way to formally test and diagnose these clients.	At a subset of 4 study pharmacies, offer clients seeking STI testing and/or treatment free STI testing and treatment with optional PrEP screening.	"STI Testing-as-a-Bridge-to-PrEP"

[1]For the extended pilot (Aim 1c), we define each of these implementation strategies prior to asking providers for their feedback on them in the baseline and follow-up questionnaires (Appendices XXII and XXIII).

The refined care pathway we propose implementing in an extended pilot study (Aim 1c) is illustrated in Fig. 4 with the new implementation strategies (refinements) highlighted in yellow.

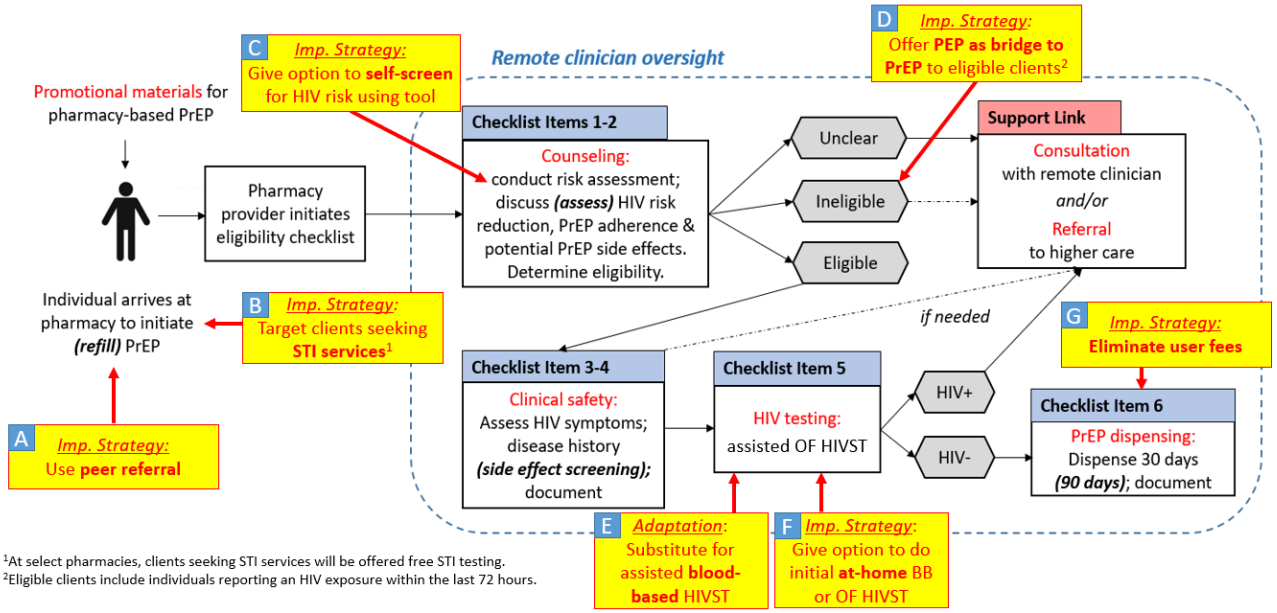

Fig. 4. Refined care pathway for pharmacy-based PrEP delivery for extended pilot study (Aim 1c)

METHODS

Taking PrEP to scale will require simplifying and diversifying models for delivery to achieve options that are affordable, accessible, and meet the needs of clients and health systems. We have assembled a multidisciplinary team to test pharmacy-based models as alternative strategies for PrEP delivery. **We hypothesize that pharmacy-based PrEP delivery will be feasible, acceptable, and preferred.**

Study Objectives

4. To test pathways for pharmacy-based PrEP delivery – both initiation and refill – through pilot studies (Aims 1a and 2a).

5. To identify weak points for pharmacy-based PrEP delivery, in domains relating to acceptability, fidelity, and costs (Aims 1b and 2b).

6. To understand the potential impact of the COVID-19 pandemic on the uptake and continuation of pharmacy-based PrEP delivery (Aim 1b only).

7. To test a refined pathway for pharmacy-based PrEP initiation and refills through an extended pilot study (Aim 1c)

Hypothesis. Individuals will be interested in pharmacy-based PrEP delivery and will successfully initiate and refill PrEP at pharmacies and be retained in care. Understanding the potential weak points for PrEP delivery in pharmacies will permit refinement of the care pathway, and this refined pathway will result in greater PrEP uptake and improve the acceptability and feasibility of the pharmacy-based PrEP delivery model among clients and providers. COVID-19 will impact how pharmacy clients and providers access and deliver care, including the provision of PrEP for HIV prevention.

Research Questions

- What is the uptake of pharmacy-based PrEP delivery among eligible pharmacy clients? (Aim 1a) Do model refinements result in greater uptake? (Aim 1c)

- What does PrEP retention and adherence look like among individuals who started PrEP at pharmacies? (Aim 1) Do model refinements result in increased PrEP retention and adherence? (Aim 1c)

- Could pharmacy-based PrEP refills increase PrEP retention and adherence compared to facility-based PrEP refills? (Aims 1a, 1c, & 2a)

- What is the preference for pharmacy-based versus facility-based PrEP refills among PrEP users? (Aim 2a and 2b)

- For clients who decide against obtaining PrEP refills at a pilot pharmacy, what factors influenced their decision-making? (Aim 2b)

- What is the fidelity of pharmacy-based PrEP delivery? (Aim 1b)

- What is the acceptability of pharmacy-based PrEP delivery among both pharmacy clients and providers? (Aim 1b) Do model refinements result in greater acceptability? (Aim 1c)

- What is the cost of pharmacy-based PrEP delivery and how much might pharmacy clients and providers be willing to pay for/provide PrEP at pharmacies? (Aim 1b)

- How has the COVID-19 pandemic affected the provision and uptake of pharmacy services in Kenya, including PrEP? (Aims 1 & 2)

Study Design

This study is a one-arm intervention trial, or pilot study. There is no comparison arm in this pilot study. The intervention we are testing was developed from extensive formative research, including analysis of data from in-depth qualitative interviews and a stakeholder meeting. We hope to use the information gained from this research to inform development of a larger randomized trial, which will include a comparison arm.

Setting

We will conduct the research for this study in Kiambu County led by a team of investigators based in Thika, Kenya (**Fig. 5**). Thika is an urban center, ~40 km outside of Nairobi in Central Kenya, which has a large peri-urban and rural surrounding population. HIV prevalence in Thika is 6%.[63] In Kiambu County, where Thika is located, there are 517 retail community, 15 wholesale, and 47 hospital pharmacies (all legal and registered).

Fig. 5. Study setting.

We selected Thika, Kenya to conduct this research because the research team implementing the project here has extensive experience with the provision of PrEP to diverse populations. They were involved in the Partners PrEP Study clinical trial,[4] then the open-label Partners Demonstration Project,[61] and are currently leading the Partners Scale-Up Project, MPYA study, POWER project, and other studies. The site has technical expertise related to PrEP, community engagement with diverse populations (with high recruitment and retention >90%), and collaborative experience working with health providers outside of their own research clinics – precisely the components necessary for this work.

Fig. 6. Retail pharmacy in Kenya
Source: www.howwemadeitinafrica.com

Thika is an appropriate place to conduct this research because in Thika there are numerous private, retail pharmacies that are high quality, well-stocked, and capable of implementing pharmacy-based PrEP delivery (example: **Fig. 6**). The Thika research team also has extensive experience with the development of PrEP delivery models in Kenya – members of our study teams were deeply involved in the Kenya PrEP guideline process, including guidelines for clinical delivery.[52] All work proposed will be done adhering to the minimal safety package defined in those guidelines – analogous to the pharmacy-based checklist model from the

US (**Fig. 1**).[55,57]

Pilot pharmacies

Pharmacy selection

For Aim 1a/2b, we will select two retail pharmacies of different sizes to conduct our pilot: 1) one medium-sized pharmacies (~100 customers/day), and 2) one large pharmacies (~500 customers/day). For Aim 1c (extended pilot), we will select four additional pharmacies, for a total of six pharmacies: four medium ones (~50 customers/day) and two large ones (~100 customers/day). The medium- and large-sized pharmacies will be equally distributed across aims and locations. In order for pharmacies to be eligible for study participation, they must: 1) be properly licensed with a fulltime licensed pharmacy provider, 2) have a private counseling space where HIV testing and PrEP counseling can occur, and 3) must be already certified to provide provider-assisted HIV self-testing. The majority of licensed retail pharmacies in Kenya have a private counseling room in the back that is regularly used to counsel clients on sensitive topics including, STI treatment, HIV self-testing, and family planning, amongst other things. Then, the lead provider at each pharmacy selected must agree to: 1) offer PrEP (with relevant providers undergoing project training), 2) allow a trained research assistant to collect client data (e.g., self-reported adherence, dried blood spot samples), and 3) allow one or more pharmacy staff members to participate in a confidential and voluntary in-depth interview about their experiences delivering PrEP (Aim 1a/2a only), a confidential survey about their experiences delivering PrEP (Aim 1c only), and a monitored WhatsApp group with the remote clinician providing PrEP oversight (Aim 1a/2a and Aim 1c). Pharmacies that participate in the extended pilot (Aim 1c) must agree to offer post-exposure prophylaxis or "PEP" (with relevant providers undergoing project training), and two of the four pharmacies that participate in the extended pilot (Aim 1c) must also agree to offer STI testing (again, with relevant providers undergoing project training).

Pharmacy provider training

The pharmacy providers who will deliver PrEP and/or PEP (Aim 1c only) in the pilot studies will undergo a training based on the Kenya MOH PrEP training (which our team helped develop) and Partners Scale-Up Project training (used at public clinics).[64] All individuals at the pilot pharmacies who plan on implementing pharmacy-based PrEP/PEP delivery must complete the training. The training will cover: 1) a review on how to perform assisted HIV self-testing, 2) how and where to refer individuals for HIV care if they test HIV-positive, 3) how to counsel individuals interested in initiating PrEP or PEP (Aim 1c only), including screening for PrEP/PEP eligibility using the standardized checklist, 4) how to refer individuals with complex medical backgrounds and/or side effects to the remote clinician, how to use and access the remote clinician, and 5) how to dispense drugs to individuals starting PrEP or PEP (Aim 1c only) for the first time (one-month drug supply) and individuals returning for PrEP refills (three-month drug supply), and 6) how to maintain proper safety precautions during the COVID-19 outbreak. Additionally, pharmacy providers participating in the pilot will complete training by members of the Thika research team on research ethics and the importance of confidentiality, as well as consistent protocols for PrEP/PEP record keeping, including instructions on how to complete and securely store the pharmacy-based PrEP/PEP delivery prescribing checklists (**Appendix IV. Prescribing checklist**), referral forms (**Appendix V. Referral form**), and the remote clinician contact forms (**Appendix VI. Remote clinician form**). All other research-related activities at the pharmacy (e.g., completion of informed consent documents and the quantitative questionnaires) will be completed by a full-time research assistant (trained by the Thika team on research methods and ethics) stationed full-time at the pilot pharmacies.

Participant eligibility & recruitment

For Aim 1a/2a, we aim to enroll up to 150 clients in total across the two Aim 1a pharmacies and up to 200 clients in total initiating PrEP at two public HIV clinic participating in our pilot (**Table 5**). We will stop enrolling participants in the pilots once we achieve the desired Aim 1a and Aim 2a sample sizes. For Aim 1c (extended pilot study), we aim to enroll up to 540 new clients, and to extend to Aim 1a/2a enrollees the option to continue refilling PrEP at pilot pharmacies so long as they still meet study and PrEP eligibility criteria and complete the Aim 1c informed consent process.

Table 5. Number of clients to be enrolled at pilot pharmacies

	Enrollment location	Study site	Pharmacy size	# Clients	Total Clients
Aim 1a	Pilot Pharmacies	Thika	N/A	N/A	Up to 150
Aim 2a	HIV CCC A	Thika	N/A	~100	Up to 200
	HIV CCC B	Thika		~100	
Aim 1c	Pilot Pharmacies	Thika	N/A	N/A	Up to 540

Our sample size calculation for Aim 1a/2a is detailed in **Table 6**. If we assume that 50% of Aim 2a participants will select pharmacy-based PrEP refills (at either of the 2 participating pilot pharmacies) over CCC-based PrEP refills, then this should give us sufficient power to measure a difference of 10% or more in retention between participants selecting pharmacy-based PrEP refills and participants selecting facility-based PrEP refills. For Aim 1a/2a, all participating pharmacies will provide PrEP to enrolled participants on a quarterly basis until December 2021 (**Figure 7**). The eligibility criteria and recruitment plan for the pilot and pilot evaluation activities are outlined for clients and providers in **Table 7** and **Table 8**, respectively.

Table 6. Sample size calculation for Aim 1a/2a.

Assume: 50% pharmacy refill \ selection, 10% non-inferiority limit, 80% power, 5% alpha, 1-sided CI.
Calculate: Minimum size per group:

% retention: pharm ▶ clinic ▼	*65%*	70%	75%	80%
60%	129	70	43	28
70%	n/a	n/a	110	58

For Aim 1c (extended pilot), our primary focus is on evaluating the model refinements (**Fig. 4**) and whether clients and providers find these refinements acceptable and feasible to use/implement. As such, there is not a minimum size per group required for the Aim 1c primary analysis. Participating pharmacies will provide PrEP to enrolled participants through July 2022.

Table 7. Client eligibility, recruitment, and evaluation

	Pilot		Pilot Evaluation Component	
	Eligibility	**Recruitment**	**Quantitative Survey & DBS**	**In-depth Interviews**
Aim 1a and Aim 1c (n=2 pharmacies for Aim 1c and n=6 pharmacies for Aim 1c)	• ≥18 years • Interested in initiating PrEP at a pilot pharmacy (Aim 1a) or interested in initiating PrEP or PEP or undergoing STI testing at a pilot pharmacy (Aim 1c) • Meets all criteria (e.g., tests HIV-negative) for PrEP initiation on the checklist (Aim 1a) or for PrEP, PEP and/or STI testing (Aim 1c) • Able & willing to provide written informed consent[1]	• Display posters that encourage customers to ask their pharmacy provider about PrEP • Have pharmacy providers ask customers buying HIV self-tests, emergency contraception, or STI treatment if they are interested in initiating PrEP at the time of check-out • Other strategies developed from the formative research and stakeholder meeting	At each study visit, research assistants (RAs) stationed at the pharmacy will conduct the quantitative survey with and collect the DBS samples from participants.	**Aim 1b**: Study staff will identify a sample of enrollees to invite to participate in an in-depth interview.[3] RAs will approach these individuals to see if they are interested in participating. *At each pharmacy that participated in Aim 1a (n=2), up to 10 clients who initiate PrEP and 10 clients who also refill PrEP will be interviewed (n=40 client interviews total).*
Aim 2a (n=2 HIV CCC)	• ≥18 years • Initiated or refilled PrEP at project-affiliated CCCs • Meets all criteria (e.g., tests HIV-negative) for PrEP refill on the checklist • Able & willing to provide written informed consent[2]	• PrEP providers at affiliated CCCs will inform clients newly initiating PrEP and those refilling PrEP of the option to refill their PrEP at pilot pharmacies for a consulting fee. • We will also hang posters about PrEP's availability at pilot pharmacies and in affiliated CCCs. *Up to 200 clients from the Aim 2a HIV CCC will be enrolled in total.*	At all study visits that occur at an HIV CCC, RAs stationed at the participating HIV CCCs will conduct the quantitative survey with and collect the DBS samples from participants. For all study visits that occur at a study pharmacy, RAs stationed at the pharmacy will conduct the aforementioned activities.	**Aim 2b**: Study staff will identify a sample of participants (n=30) who were referred from CCCs for PrEP refills in the pharmacies and who refilled PrEP at least once during the study but did not refill at a pilot pharmacy to invite to participate in an in-depth interview. [3]RAs will approach these individuals to see if they are interested in participating.

[1]By signing the consent form (Appendices I-III), Aim 1a participants agree to 1) receive PrEP services (e.g., HIV testing); 2) complete a quantitative survey; and 3) give a DBS sample. Participants from Aim 1a pharmacies and Aim 2b (CCCs) additionally consent to being invited to participate in an in-depth interview about their PrEP care experiences. By signing the consent form for the extended pilot (Appendices XIII and XIV), Aim 1c participants agree to 1) receive PrEP, PEP, or STI testing services; 2) complete a quantitative survey; and 3) give a DBS sample. All participants must provide written or electronic consent to participate in study activities. [2]Because the original consent form for Aim 2a client participants did not cover voluntary participation in an in-depth interview, we have created an additional consent form that select Aim 2b participants will complete prior to participating in an interview. [3]We will purposely sample clients of different ages, sex, and duration of PrEP use to reflect a range of experiences and perspectives on pharmacy-based PrEP delivery.

Table 8. Provider eligibility and recruitment plan

		Pilot Evaluation Component	
	Eligibility	**In-depth Interview**	**WhatsApp Group**
Pharmacy providers from Aim 1a, Aim 1c, & Aim 2a pharmacies	• ≥18 years • Provides PrEP at a pilot pharmacy (Aim 1a/2a) or provides PrEP, PEP, and/or STI testing at a pilot pharmacy (Aim 1c) • Able & willing to provide consent[1]	Prior to agreeing to be part of the Aim 1a/2a pilot study, Aim 1a providers will be informed that they will be invited at a later time to participate in a confidential in-depth interview. Prior to agreeing to be part of the extended pilot (Aim 1c), providers will be informed that they will be invited to participate in monthly confidential surveys. **Aim <u>1b only:</u>** Study staff will identify a sample of providers to invite to participate in an in-depth interview. RAs will approach these individuals to see if they are interested in participating. *At each Aim 1a pharmacy, we will interview 2 pharmacy providers and 1-2 clinicians providing remote oversight (n=8 provider interviews total).*	Prior to agreeing to be part of the Aim 1a/2a and Aim 1c pilot studies, providers will be informed that, if they desire, they may contact each other via a WhatsApp group created and accessible to study staff for the purposes of understanding the kinds of support pharmacy providers request in initiating clients on PrEP and/or refilling PrEP prescriptions. Providers are not obligated to use this WhatsApp group but may instead opt to contact each other through other means (e.g., phone calls), the content of which will not be known to study staff during Aim 1a/2a. For Aim 1c, providers will consent to having study-related phone consultations audio recorded for subsequent transcription. *The total number of providers participating in the WhatsApp group will depend on the number of pharmacy providers who are trained at each pilot Aim 1a pilot pharmacy to deliver PrEP (likely 1-2 individuals) and the number of clinicians providing remote oversight to these pharmacies (likely 1-2). We therefore anticipate that approximately 8 providers will participate in the WhatsApp group.*
Remote oversight clinicians for Aim 1a, Aim 1c, & Aim 2a pharmacies	• ≥18 years • PrEP clinician at a project-affiliated CCC who provides remote oversight to pilot pharmacies • Able & willing to provide consent[1]		

[1]Eligibilty criteria for participating in an in-depth interview and/or the study WhatsApp Group. All participants must provide written electronic consent (Appendix II) to participate in study activities. To participate in the extended pilot (Aim 1c), all pharmacy providers and remote clinicians, including those who previously participated in Aim 1a/2a, must provide written electronic or physical consent (Appendices XV and XVI).

Pilot procedures

We have chosen single-arm trials for this study (i.e., no comparison pharmacies or CCCs) because this study is focused on testing the feasibility of pharmacy-based PrEP delivery and refining care pathways for this delivery model; ongoing PrEP delivery work in HIV care centers can serve as a general comparison in terms of demographics, retention, and adherence.

Study visits

Aim 1a pilot:
All Aim 1a pilot participants will be followed for 6 months and complete a maximum of four study visits: at months 0, 1, 4, and 7 (**Fig. 7**). All Aim 1a participants will initiate PrEP at a pilot pharmacy and be instructed to return to the pharmacy one month later (the Kenya standard); thereafter, they will return quarterly to test for HIV and refill their PrEP drugs.

Aim 1a pilot:
All Aim 2a participants will initiate PrEP at a project-affiliated public CCC and enroll in the study either at the time of PrEP initiation or during a scheduled clinic-based PrEP refill appointment. Then, these participants will have the option to refill PrEP at one of two participating pilot pharmacies or at the CCC over the next 6 months (at months 1, 4, and 7 for participants initiating PrEP at the clinic and at months 3 and 6 for participants refilling PrEP at the clinic).

Aim 1c pilot:
Aim 1c participants include the following two populations:

- Client Population A - Individuals who did not participate in the Aim 1a or Aim 2a pilot: These participants will initiate PEP, PrEP, and/or undergo STI testing at a pilot pharmacy and be followed for up to 6 months. They will complete a maximum of four study visits: an initiation visit and follow-up visits at 1, 4, and 7 months post-initiation (**Fig. 5**).
- Client Population B – Individuals who participated in the Aim 1a or Aim 2a pilots: At their last study visit for the Aim 1a or Aim 2a pilot, these individuals will be informed that they can opt to continue receiving PrEP refills at the pilot pharmacy during the extended pilot study but that, to participate in the extended pilot study, they will need to complete a new informed consent form. During the extended pilot study, participants will be followed for a maximum of 6 months and complete up to 2 study visits (in addition to the ones they had during Aim 1a or Aim 2a). **Figure 8** illustrates the study visit schedule and maximum number of study visits participants will have depending on what month they enrolled in the Aim 1a, Aim 2a, or Aim 1c pilot. Individuals who, after completing their M7 visit in Aim 1a or Aim 2a pilot, continued taking PrEP at a clinic will be notified by study staff about the option to obtain PrEP refills at a pilot pharmacy during the extended study. If any such individual stopped taking PrEP since their M7 study visit for Aim 1a or Aim 2a pilot, but is interested in re-initiating PrEP at a pilot pharmacy during the extended pilot, s/he will be invited to return to the pharmacy to undergo PrEP screening and, if eligible, will be enrolled in the extended pilot and follow the study visit schedule for new initiators (i.e., starting with a M0 visit).

All pilots (Aims 1a, 1c, and 2a):
At all study visits that occur at a pharmacy, the pharmacy provider will use the PrEP prescribing/refilling checklist (with remote clinician oversight) when delivering PrEP services (**Table 9, Appendix IV. Prescribing checklist**). At their last study visit, participants will refill PrEP at the pharmacy (receiving a 3-month supply or a 1-month supply, depending on whether their last visit is a M1 visit or a quarterly follow-up visit), complete endline assessments, and be referred to public CCCs for PrEP continuation. Throughout the study, the CCC will be a referral point for the pilot pharmacy providers should they have

any concerns or questions about PrEP clients.

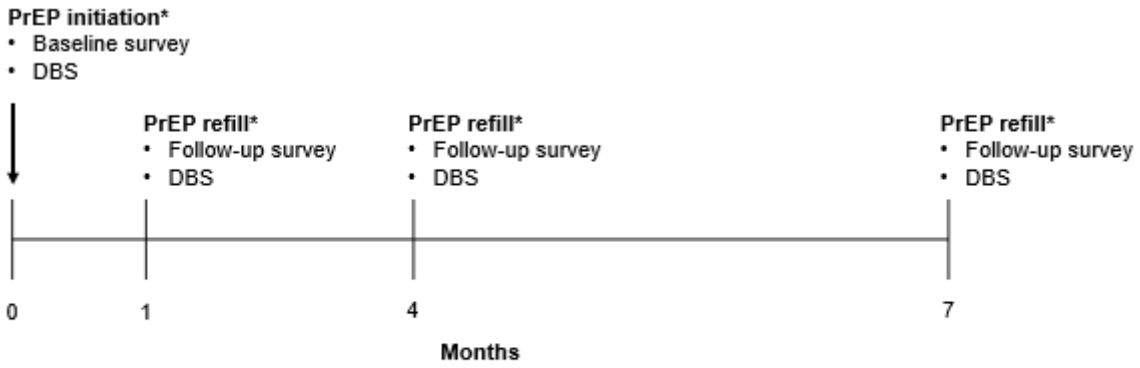

Fig. 7. Timeline of participant enrollment and follow-up for Aims 1a and 2b

Note: For Aim 2a participants that enroll in the pilot during a clinic-based PrEP refill visit, they will be eligible for 6 months of pharmacy PrEP refills (i.e., at months 3 and 6)

	Original pilot studies (Aim 1a & Aim 2a)													Extended pilot study (Aim 1c)							
Study month → Enrollment month ↓	Nov '20	Dec '20	Jan '21	Feb '21	Mar '21	Apr '21	May '21	Jun '21	Jul '21	Aug '21	Sept '21	Oct '21	Nov '21	Dec '21	Jan '22	Feb '22	Mar '22	Apr '22	May '22	Jun '22	Jul '22	Max # of study visits
Nov '20	M0	M1			M4			M7[a]			M10[b]			M13[b]			M16[c,d]			M19[d,e]		6
Dec '20		M0	M1			M4			M7[a]			M10[b]			M13[c,d]			M16[d]			M19[d,e]	7
Jan '21			M0	M1			M4			M7[a]			M10[b]			M13[c,d]			M16[d,e]			6
Feb '21				M0	M1			M4			M7[a]			M10[b]			M13[c,d]			M16[d,e]		6
Mar '21					M0	M1			M4			M7[a]			M10[c]			M13			M16[d,e]	7
Apr '21						M0	M1			M4			M7[a]			M10[c]			M13[e]			6
May '21							M0	M1			M4			M7[a]			M10[c]			M13[e]		6
Jun '21								M0	M1			M4			M7[c]			M10			M13[e]	5
Jul '21									M0	M1			M4			M7[c]			M10[e]			5
Aug '21										M0	M1			M4			M7[c]			M10[e]		5
Sept '21											M0	M1			M4[c]			M7			M10[e]	5
Oct '21												M0	M1			M4[c]			M7[e]			4
Nov '21													M0	M1			M4[c]			M7[e]		4
Dec '21														M0	M1[c]			M4			M7[e]	4
Jan '22															M0	M1			M4[e]			3
Feb '22																M0	M1			M4[e]		3
Mar '22																	M0	M1			M4[e]	3
Apr '22																		M0	M1[e]			2
May '22																			M0	M1[e]		2
Jun '22																				M0	M1[e]	2
Jul '22																					M0[f]	1

[a]Participant's last study visit as part of Aim 1a/Aim 2 pilot. At this visit, participant receive a 3-month supply of PrEP and is instructed to go to a public clinic for their next follow-up visit if they wish to continue taking PrEP.
[b]If participant continued PrEP, these visits would have occurred at a clinic. They are shown here only to explain how the participant's PrEP schedule might continue under the extended pilot study (Aim 1c).
[c]To receive PrEP at this visit, participant will need to be re-consented using the extended pilot consent forms.
[d]Assumes participant continued talking PrEP at a clinic following their M7 visit. If client stopped taking PrEP after their M7 visit and/or does not return to a pilot pharmacy to participate in the extended pilot, then this and all subsequent visits will not occur. If client stopped taking PrEP after their M7 visit but wishes to re-initiate PrEP in the extended pilot, participant will be re-enrolled in the study (Aim 1c) and follow the study visit schedule for new initiators (i.e., starting with a M0 visit).
[e]Participant's last study visit. At this visit, participant will receive a 3-month supply of PrEP and be instructed to go to a public clinic for their next follow-up visit if they wish to continue taking PrEP.
[f]Participant's first (and only) study visit. At this visit, participant will receive a 1-month supply of PrEP and be instructed to go to a public clinic for their M1 follow-up visit if they wish to continue taking PrEP.

Figure 8. Participant study visits based on enrollment month

PrEP checklist

In order for pharmacy providers to prescribe PrEP (both at initiation and follow-up visits), they must ensure the individual seeking PrEP meets the criteria on a checklist, summarized in **Table 9** (also found in **Appendix III. Prescribing checklist**), which we developed in collaboration with Kenyan stakeholders (including clinicians, pharmacy providers, etc.) at the stakeholder meeting and updated for the extended pilot (Aim 1c) to reflect the Kenya national guidelines for PrEP, which allow pregnant and breastfeeding women to initiate PrEP, and the guidelines for PEP.

Table 9. Checklist for pharmacy PrEP and PEP prescribing and refilling. Month (M)

• **HIV risk**: at risk *(determined using the Kenya Rapid Assessment and Screening Tool, RAST)*
• **Recent HIV exposure:** if yes, screen for PEP instead
• **Counseling**: completed *(e.g., risk reduction, PrEP/PEP adherence, etc.)*
• **HIV status**: negative *(confirmed with assisted HIV self-testing at pharmacy)*
• **HIV symptoms**: none
• **Clinical safety & side effect assessment:** confirmed *(e.g., no known kidney disease)*
• **Records:** completed *(for prescribing and dispensing)*

Interventions

During Aim 1c, we will incorporate the following interventions to increase demand for PrEP:

- Peer Referral (**Aim 1c only**) – Participants coming for a refill visit will be given the option to engage in a peer referral program. Those who choose to participate will receive up to 5 referral slips (**Appendix XXIV**) at each follow-up visit to distribute to their peers and receive a small incentive for each of their peers that presents their referral slip at a pilot pharmacy and inquires about PrEP. The incentive will be paid even if the referred peer does not ultimately initiate PrEP.
- PEP (**Aim 1c only**): Pharmacy providers will be trained to deliver post-exposure prophylaxis (PEP) to individuals seeking PEP and/or reporting a recent HIV exposure and encourage such clients to return for PrEP.
- STI Testing (**Aim 1c only**) – We will select a subset of 4 pharmacies (2 in Kisumu and 2 in Thika) at which pharmacy customers seeking STI diagnosis or treatment services will be offered free STI testing plus PrEP screening. Participants will have the option to complete STI testing (for C. trachomatis and N. gonorrhoeae). Participants that accept STI testing with PrEP delivery will self-collect a urine sample in a private pharmacy room. All pharmacy providers will be trained on how to explain urine sample self-collection and contact courier service for sample delivery. Couriers will then deliver samples to the PHRD Thika study clinic for STI testing (both C. trachomatis and N. gonorrhoeae). Only participants who test positive for an STI will receive a call from study clinician, who will confirm their identity, screen for potential drug allergies/interactions, and write a STI treatment prescription that will be sent electronically to the participant's choice pilot pharmacy for dispensing of free treatment.

During Aim 1a, Aim 2a, and Aim 1c, at each study visit, participants will receive the core components of pharmacy-based PrEP delivery identified in the stakeholder engagement meeting (**Table 4**) and incorporated into the care pathway for pharmacy-based PrEP delivery (**Fig. 3 and Fig. 4**).

- Counseling – on PrEP or PEP adherence and HIV risk reduction. Specifically, counseling will

include PrEP/PEP side effect profiles, how to take PrEP/PEP, what to do if PrEP/PEP side effects are experienced, and the importance of not sharing PrEP/PEP to optimize potential efficacy and to reduce the chances of developing resistance through suboptimal HIV suppression. Depending on the study visit, this will be provided by a pharmacy provider or a clinician at the CCC. All individuals who administer this counseling will have completed PrEP and PEP training, per NASCOP guidelines.

- Assisted HIV self-testing – will be provided at each study visit to clients wishing to initiate PrEP or PEP and/or refill PrEP by a pharmacy provider trained on HIV self-testing. During the Aim 1a and Aim 2a pilots, clients will receive either assisted blood-based or assisted oral-fluid HIV self-testing. During Aim 1c, only assisted blood-based HIV self-testing will be used. With assisted HIV self-testing, pharmacy clients (including study participants) test for HIV in the presence of and with the support of a pharmacy provider using a self-testing kit purchased at the pharmacy (during Aim 1a) or provided free of cost at the pharmacy (during Aim 1c). Provider-assisted HIV self-testing (using both blood-based and oral-fluid kits) is already ongoing in Kenya, and thus pharmacies included in the pilot must already be certified to conduct this assisted self-testing. We are using assisted HIV self-testing in these pilots because technically only laboratory technologists are allowed to conduct rapid HIV testing in Kenya according to national guidelines (as determined at our stakeholder meeting). In Aim 1c, we are switching to blood-based HIV self-testing to assuage ongoing concerns about the sensitivity of oral fluid-based HIV self-testing among key decision-makers, such as the Kenya MOH and WHO.
- Optional initial at-home HIV self-testing (**Aim 1c only**) – Clients interested in initiating PrEP at a pilot pharmacy during Aim 1c will have the option to take home an HIV self-testing kit (blood-based or oral-fluid) and complete the self-test at home before undergoing assisted HIV self-testing with a pharmacy provider as required for PrEP initiation. Findings from several PrEP implementation studies in Kenya, including the formative research conducted for this study and preliminary findings from Aim 1b, suggest that some clients are uncomfortable testing for HIV at a pharmacy without knowing their HIV status. Giving clients the option to learn of their HIV status in the privacy of their homes may help lower this barrier to PrEP initiation. Clients who opt to complete an initial HIV self-test at home will receive the kit free of charge.
- PrEP/PEP prescribing – including determination of clinical safety (for PrEP initiation in Aim 1a and for PrEP and/or PEP initiation in Aim 1c) and screening for potential PrEP/PEP side effects (for PrEP refills in Aims 1a, 1c & 2a or PEP follow-up visits in Aim 1c). To prescribe PrEP/PEP at initiation and follow-up visits, pharmacy providers must complete the checklist for PrEP/PEP prescribing (**Table 9, Appendix IV. Prescribing checklist**) and keep record of the prescription.
- PrEP/PEP dispensing – once the checklist for PrEP/PEP prescribing (**Table 9**, **Appendix IV. Prescribing checklist**) has been completed, pharmacy providers can dispense PrEP or PEP. At PrEP initiation visits, pharmacy providers (in Aims 1a and 1c) and CCC clinicians (in Aim 2a) will only dispense a 1-month supply of PrEP, per Kenya MOH guidelines. At all follow-up visits, pharmacy providers will dispense a 3-month supply of PrEP. At PEP initiation visits, pharmacy providers (in Aim 1c) will dispense a 1-month supply of PEP, per Kenya MOH guidelines.
- Oversight/referral – A Kenyan study clinician with experience in PrEP and PEP prescribing will be available 24/7 for consultation throughout the pharmacy PrEP delivery pilot (Aim 1a, Aim 2a, and Aim 1c). Pharmacy providers with any questions about PrEP or PEP eligibility or side effects can call the remote clinician for free using a number provided, or can consult with the PrEP clinician via a study-created WhatsApp group. All pharmacy providers will be trained on when consultation with the remote clinician is appropriate and how to share questions or concerns via the WhatsApp group without identifying patient information. Pharmacy providers will be trained to record the

content of their discussions with the remote clinician using a specific study form (**Appendix VI. Remote clinician form**). Pharmacy providers will also be given referral forms for nearby CCCs, which they can use to refer participants should they test HIV-positive or should they experience any PrEP/PEP side effects. Again, pharmacy providers will be trained to record any referrals to CCC using specific study forms (**Appendix V. Referral form**).

- DBS samples – Trained research assistants will collect dried blood spot (DBS) samples.

To remind participants to refill their PrEP drugs at pharmacies or the CCC (Aim 2a) or to return for follow-up after being dispensed PEP, we will use retention methods used in Kenyan PrEP clinics (e.g., telephone reminders for missed appointments). At the final follow-up visit before the end of the extended pilot study, we will do active tracing to have final data on all participants. Participants that are contacted via active tracing will still complete quantitative questionnaires (including DBS sample collection) so that we can understand the reasons why they might not have returned to the pharmacy for PrEP refills or following PEP dispensing; these participants that we actively trace, however, will not count towards our PrEP retention measurement.

Individuals interested in initiating PrEP or PEP and/or refilling PrEP at pharmacies, but not interested in participating in study-related activities (including quantitative surveys or DBS collection) will be referred to a nearby CCC for free PrEP or PEP care. The total number of such individuals will be tracked over time, but no other information will be collected from them.

Although the PrEP and PEP medications and potentially HIV self-tests for this pilot study will be provided by NASCOP via the Kenya Medical Supplies Agency (KEMSA), a consulting fee will be associated with pharmacy-based PrEP delivery in our initial pilot study (Aim 1a and Aim 2a, as is the case with other pharmacy-based services) to reflect the real-world sustainability of the delivery model. This fee will be agreed upon in a meeting with participating pharmacy providers and may vary by pharmacy depending on the clientele of that pharmacy (i.e., urban, high-income pharmacies may charge more for pharmacies in informal settlements). During Aim 1c, to assess the impact of removing client fees on PrEP initiation and continuation, the study will cover this consulting fee and participants will not pay any out-of-pocket expenses to receive PrEP, PEP, or STI testing and treatment.

If this pilot study is ongoing during the COVID-19 pandemic, participants may be screened at the pharmacy entrance for symptoms of COVID-19 (including temperature) and may be asked to wear a face mask to reduce the risk of COVID-19 infection to pharmacy providers and other pharmacy clients.

Condoms will be available for purchase at all participating pilot pharmacies, but not included in the package of PrEP services provided in this study.

The interventions that participants receive at each study visit are summarized in **Table 10** below**.**

Table 10. Interventions received at each study visit. Month (M)

Study intervention	Study visit*			
	M0	M1	M4	M7
Counseling: on PrEP use and side effects, PrEP adherence, HIV risk reduction	X	X	X	X
Testing: for HIV, STIs (if available), and hepatitis B (if available)	X	X	X	X
Safety oversight: ensuring that PrEP is not contraindicated (e.g., history of renal disease, diabetes)	X	X	X	X
PrEP prescribing: if all checklist items completed.	X			
PrEP dispensing: 30-day supply at initiation; 90-day supply at follow-up visits	X	X	X	X
Consultation with remote clinician and/or referral to CCC: for complex PrEP cases	X	X	X	X
Dried blood spot sampling: for measurement of PrEP adherence	X	X*	X*	X

Social harm: reports of physical, sexual, or verbal violence	X	X	X	X

*All Aim 2 participants will initiate PrEP at a clinic and will only complete two follow-up visits at 3 and 6 months. Aim 1a and Aim 2a participants who opt to participate in the extended pilot (Aim 1c) will continue to receive the M7 study interventions on a quarterly basis until the study's end.

PrEP medication

Tenofovir disoproxil fumarate (or TDF, 9-[(R)-2-[[bis [[(isopropoxycarbonyl) oxy] methoxy] phosphinyl] methoxy] propyl] adenine fumarate), emtricitabine (or FTC, 5-fluoro-1-(2R,5S)-[2-(hydroxymethyl)-1,3-oxatholan-5-yl]cytosine), and lamivudine (or 3TC, 2',3'-dideoxy-3'-thiacytidine 4-Amino- 1-[(2R,5S)- 2-(hydroxymethyl)- 1,3-oxathiolan-5-yl]- 1,2-dihydropyrimidin- 2-one) are reverse transcriptase inhibitors that have been approved for the treatment of HIV infection in humans in Kenya and the United States. A fixed-dose, oral co-formulation of FTC/TDF (Truvada®) has also been approved for HIV prevention in Kenya and the United States. The World Health Organization recommends TDF-containing medications as PrEP, which includes TDF combined with FTC as well as potentially TDF alone and TDF combined with lamivudine (or 3TC, a medication closely related to FTC). Any TDF-containing medications that align with WHO and Kenya national guidelines for PrEP will be used in this study. PrEP will be prescribed for once-daily use. Study medication will be provided by the Kenya Ministry of Health and stored in accordance with the drug manufacturer's recommendations.

PrEP discontinuation

PrEP continuation will be according to Kenya PrEP guidelines. Use of PrEP may be interrupted by the site investigators, trained pharmacy providers, or remote clinician due to safety concerns for the participant or use of concomitant medications that could interfere with PrEP or present a safety concern. All treatment interruptions will be documented.

Referral to continued PrEP care

For participants that continue to return to the pilot pharmacies for PrEP refills, at their final pharmacy PrEP refill visit before the study's end, pharmacy providers will dispense another 3-month PrEP supply (assuming the individual meets the criteria on the prescribing checklist, **Appendix IV. Prescribing checklist**) and then will refer participants to a nearby public CCC for free continued PrEP care (**Appendix V. Referral form**). This procedure will apply to all enrolled participants, regardless of whether they initiated PrEP at the pilot pharmacy or clinic.

PEP medication

Tenofovir disoproxil fumarate (or TDF, 9-[(R)-2-[[bis [[(isopropoxycarbonyl) oxy] methoxy] phosphinyl] methoxy] propyl] adenine fumarate) and dolutegravir (or DTG, 1,2-bis(2-methylphenyl)guanidine) are reverse transcriptase inhibitors that, in combination with lamivudine (or 3TC, 2',3'-dideoxy-3'-thiacytidine 4-Amino- 1-[(2R,5S)- 2-(hydroxymethyl)- 1,3-oxathiolan-5-yl]- 1,2-dihydropyrimidin- 2-one)—an integrase strand transfer inhibitor—have been approved for use as HIV post-exposure prophylaxis in Kenya among individuals age 15 or older or weighing 35 kg or more. For women and adolescent girls of childbearing potential, the Kenyan guidelines recommend a regimen that substitutes 3TC for atazanavir/ritonavir (or ATV/r, 3,12-bis(1,1-dimethylethyl)-8-hydroxy-4,11-dioxo-9-(phenylmethyl)-6-((4-(2-pyridinyl)phenyl)methyl)-2,5,6,10,13-pentaazatetradecanedioic acid dimethyl ester). PEP will be prescribed for once-daily use, and participants found eligible for PEP will be dispensed a one-month supply, as per Kenya national guidelines. Study medication will be provided by the Kenya Ministry of Health and stored in accordance with the drug manufacturer's recommendations.

Referral for continued PEP care

During the extended pilot (Aim 1c), any individual who is found eligible for PEP but who declines to initiate PEP at a pilot pharmacy will be referred to an HIV comprehensive care clinic. Any participant who is dispensed PEP at less than 1 month before study endline will be instructed to go to an HIV comprehensive care clinic for PEP follow-up care and given a referral form (Appendix VII. Referral form).

Data Collection Quantitative client surveys & DBS (Aims 1a, 1c, and 2a)

Trained research assistants (RAs) stationed at pilot pharmacies and project-affiliated CCCs will approach eligible individuals and invite them to participate in the study. They will review the informed consent form (**Appendix I & Appendix III for Aim 1a and Aim 2a, and Appendices XIII and XIV for Aim 1c**) with these individuals and answer any questions they may have regarding participation. Once written informed consent is obtained, RAs will conduct a structured quantitative survey with the participant (**Appendix VII. Questionnaire: Baseline for Aim 1a and Aim 2a, and Appendix XX for Aim 1c**). (The timing of the survey for each pilot is outlined above in **Fig. 7**.) **Table 11** outlines the information we will collect in these surveys, including information to be collected in the follow-up questionnaire (**Appendix VIII. Questionnaire: Follow-up**). All quantitative data will be collected on a tablet using CommCare (Dimagi, Cambridge, USA), an electronic data collection platform.

At each study visit, RAs will also collect a DBS sample from participants. PrEP adherence will be assessed using self-reported drug adherence in quantitative surveys and batched drug levels at PrEP initiation and follow-up visits. Dried blood spots from batched drug levels will be shipped to the University of Washington (USA) for processing and analysis for tenofovir drug levels because currently the only laboratories that have the capacity to do that testing are located there.

Table 11. Information collected in the quantitative surveys. Month (M)

	Study visit*			
Information collected	**M0**	**M1**	**M4**	**M7**
Socio-demographic: gender, age, education, employment	X			
Alcohol use: # days in past week, alc. problem screen (RAPS4-Q4)	X	X	X	X
Depression: PHQ-9 depression screening tool, often used in SSA	X	X	X	X
Relationship: partner status, social support, partner violence	X	X	X	X
Sexual behaviors: sex frequency, condom use, sexual power	X	X	X	X
Fertility intentions: # children (& goal #), pregnancy history, current contraception	X	X	X	X
HIV stigma: scale + disclosure to fam./friends & adverse effects	X	X	X	X
COVID-19 assessment: prevention measures, risk, impact on health seeking	X	X	X	X
PrEP adherence: pills missed (past week)		X	X	X
Clinical safety: pregnancy, history of kidney disease, etc.	X	X	X	X
Potential drug side effects: nausea, vomit, dizziness, headache		X	X	X
Social harm: reports of physical, sexual, or verbal violence		X	X	X
Costs: $ spent at last pharmacy/clinic visit, willingness to pay (see **Table 10**)	X	X	X	X
Implementation strategies: acceptability and feasibility (Aim 1c only)	X	X	X	X

*Aim 2a participants who enrolled at a CCC during a PrEP refill visit will only complete two follow-up visits at 3 and 6 months. For Aim 1a and Aim 2a participants who opt to participate in the extended pilot (Aim 1c), we will continue to collect the same information as shown for M7 above on a quarterly basis until the study's end.

Costs (Aims 1a, 1c, and 2a)

To measure costs and cost preferences associated with pharmacy-based PrEP deliver, we have included questions related to participants' expenditures on health goods/services (at clinics or pharmacies) and their willingness to pay for pharmacy-based PrEP delivery in the quantitative surveys (**Table 11, Appendix VII. Questionnaire: Baseline, Appendix VIII. Questionnaire: Follow-up; Appendix XX: Baseline questionnaire for Aim 1c participants, Appendix XXI: Follow-up questionnaire for Aim 1c participants**). Additionally, we will conduct two quantitative surveys with the lead staff member of each Aim 1a pilot pharmacy (n=4): 1) shortly after the pharmacy training on pilot procedures and before the first participant is enrolled, and 2) at study completion, seven months after the last participant has been enrolled. **Table 12** details the costs we will measure in surveys for providers and clients. All surveys will be conducted by trained research assistants on tablets using CommCare, an electronic data collection platform.

Table 12. Pharmacy-based PrEP delivery costs measured

Client costs	Provider costs
● Service(s)/item(s) purchased at most recent pharmacy (clinic) visit, & amount spent on each	● Service(s)/item(s) provided by the pharmacy, & the cost of these services
● Travel time, time away from work, child care, & other costs associated with pharmacy PrEP visit	● Overhead costs (including salaries and space) of running a pharmacy
● Perceptions on price at which pharmacy-based PrEP was provided in the pilot	● Perceptions on price at which pharmacy-based PrEP was provided in the pilot
● Price willing to pay for pharmacy-based PrEP	● Price willing to provide pharmacy-based PrEP
	● Time spent recruiting PrEP clients and with each PrEP client for PrEP initiation (including counseling) and refills

Standardized patient actors (Aim 1a only)

To measure fidelity of the Aim 1a pharmacy-based PrEP delivery intervention (i.e., counseling, HIV testing, safety assessment), we will use unannounced standardized patient actors. Standardized patient actors have been shown to accurately measure care and assess provider performance in a variety of settings, including PrEP research in Kenya.[65–71] The use of standardized patient actors is advantageous in this study because it enables us to identify weak points in our pharmacy-based PrEP delivery care pathway for individuals and scenarios that are of particular interest (e.g., pregnant women, or individuals who test HIV positive). While pharmacy providers will not know that the standardized patient actor is an actor at the time of that individual's study visit, providers will be informed of and agree to this study procedure when they agree to participate in the pilot study.

Case scripts

In consultation with Kenyan medical PrEP providers, we have developed case scripts informed by previously conducted formative research. We developed scripts for four distinct participant populations hypothesized to benefit most from pharmacy-based services:

(5) Young woman, seeking emergency contraception
(6) Man who has sex with other men, presenting for STI treatment
(7) Young man, seeking sexual performance enhancing drugs (e.g., Viagra)
(8) Young woman, has trouble doing HIV test

We have developed unique scripts for each actor and each pharmacy visit (i.e., the first visit for PrEP initiation, and the second visit for PrEP refills). The scripts include pseudo names for the actors to use,

as well as detailed personal information about these fictional individuals – including date of birth, relationship status, medical and sexual history, tobacco and alcohol use, occupation and education, and current living arrangement.

Actors

We will train 4-6 study staff (not participating in research related to this project) as standardized patient actors. These staff will participate in a standardized patient actor training (conducted by a trainer with years of experience) on case scripts that detail key elements of pharmacy-based PrEP delivery, including general PrEP inquires, eligibility requirements, symptoms of PrEP side effects, and PrEP non-adherence. The study staff that volunteer to be standardized actors have to not be living with HIV and must agree to HIV testing at the pilot pharmacies; we will take every precaution to ensure their HIV status remains confidential should one of these individuals test HIV positive at a pilot pharmacies. The number of actors (N=4) and visits (2 visits/actor, =8 visits in total) we are proposing for this assessment visits is consistent with similar evaluations conducted in other settings.[65]

Unannounced visits

The patient actors will visit the Aim 1a pilot pharmacies in Thika two times: 1) once to initiate PrEP, and 2) a second time to refill their PrEP drug supply. The patient actors will complete all steps in the pharmacy-based PrEP delivery care pathway that would be completed by any other PrEP client. They will not reveal to the pharmacy provider that they are a patient actor.

Right after completion of the unannounced visits, the patient actor will meet with a staff researcher to complete the standardized patient checklist, where we measure the fidelity of their pharmacy-based PrEP delivery visit (see details below). When the patient actor meets with the research staff, they will hand over any PrEP drugs they received at their pharmacy visit. When the patient actor returns for their follow-up visit, they will not bring any partially completed PrEP bottles with them and, if asked, tell the pharmacy provider that they left their remaining PrEP drugs at home.

Standardized patient checklist

At the end of each unannounced visit, the standardized patient actors will complete debriefing visits with a research assistant collecting data for the pilot study. These debriefing visit will occur on the same day of the actors' unannounced visits, in a private setting outside the pilot pharmacy. At this debriefing visit (which will be audio recorded), the standardized patient actor will complete two checklists with the research assistant: 1) a technical checklist that identifies what services they were offered and how much they paid, and 2) a checklist that assess the quality of care, including duration of the visit and the actors' perceptions of how they were treated by the pharmacy PrEP provider (summarized in **Table 13**, **Appendix XII. Standardized Patient Actor Checklist**). The technical checklists will vary slightly for PrEP initiation (enrollment) and PrEP refill (follow-up) to account for the different services associated with these visits. All checklist data will be collected electronically on a tablet or phone using CommCare, an electronic data platform. The audio recordings from the debriefing visit with be transcribed so that can be later used to supplement the checklist data.

Table 13. Standardized fidelity checklists items (PrEP initiation, Aim 1a only)

Technical assessment	*Quality of care assessment*
● Asked if they were interested in initiating PrEP	● Greeted when entered pharmacy
● Tested for HIV	● Pharmacist made eye contact and smiled
● Counseled on importance of PrEP adherence	● Pharmacist explained why providing services
● Counseled on potential side effects of PrEP	● Pharmacist did not use judging or stigmatizing language

● Screening for pre-existing health conditions, including COVID-19 symptoms	● Patient felt that privacy was maintained throughout their visit
● Received 1-month (initiation) or 3-month (refill) PrEP supply	● Interactions with the pharmacists were not rushed
	● Measures were in place for COVID-19 protection

In-depth Interviews (Aims 1b and 2b)

We will conduct in-depth qualitative interviews with clients and providers (both pharmacy providers and clinicians providing remote oversight) who participated in the Aim 1a pilot to explore their experiences with this new PrEP delivery model and understand the acceptability of pharmacy-based PrEP. In client interviews (**Appendix IX. In-Depth Interview Guide: Clients**), we will assess perceptions of quality of care, attitudes towards paying for pharmacy-based PrEP delivery, and their interest in continuing to receive PrEP at pharmacies. In provider interviews (**Appendix X. In-Depth Interview Guide: Providers, Appendix XI. In-Depth Interview Guide: Clinicians**), we will assess pharmacy providers' attitudes toward providing PrEP and interest in continuing to provide PrEP at pharmacies or remote oversight. The topics to be discussed during these interviews are summarized in **Table 14**. All pharmacy providers that participate in these in-depth interviews will sign documents of informed consent (**Appendix II**); consent for the in-depth qualitative interviews was included in the consent for participation in the pilot study for pharmacy clients (**Appendix I**). For Aim 2b, we will conduct in-depth qualitative interviews with Aim 2a participants (n=30) who refilled PrEP at least once during the Aim 2a pilot study but did not ever refill PrEP at a pilot pharmacy. The purpose of these interviews is to understand why these participants decided against refilling PrEP at a pharmacy and to identify potential ways to improve this model's acceptability. The interview guide is available in **Appendix XVIII**. All client participants that participate in these in-depth interviews will sign a document of informed consent (**Appendix XVII**).

All qualitative interviews will be conducted in the participant's preferred language (English, Kikuyu, or Kiswahili) by trained research assistants using pre-piloted, semi-structured guides. Each interview will be audio recorded, transcribed, and translated into English by study team members who will also routinely complete debriefing reports[72] to accelerate real-time learning. Dr. Ngure, an experienced behavioral scientist who has led our qualitative research in Thika for the past decade, will supervise these interviews.

Table 14. Topics to be discussed during qualitative interviews (Aim 1b)

Services received	• Description of client services received at pharmacy (e.g., greeting, counseling, screening, dispensing, etc.)
Likes/dislikes of pharmacy-based PrEP delivery	• Discussion of client and provider preferences related to pharmacy-based PrEP delivery – what worked, what did not work, elements of services that were or were not appreciated or convenient.
Quality of services	• Discussion of how clients were treated by pharmacists, including participants' attitudes on how comfortable and confident pharmacists seemed providing PrEP services.
Cost of pharmacy-based PrEP	• Discussion of the costs associated with pharmacy-based PrEP delivery – did clients find them reasonable? Would provider be willing to continue to provide PrEP at these costs? How might the costs be adjusted?
Future interest in pharmacy-based PrEP	• Discussion of where clients might want to access PrEP in the future: standard of care clinic-based delivery or preference for the new model of pharmacy-based PrEP delivery?
COVID-19 impact	• Discussion of how the COVID-19 outbreak affected healthcare seeking behaviors, including participants' ability to access PrEP at pilot pharmacies.

WhatsApp Group (Aims 1a, 1c, and 2a) & phone consultation transcripts (Aim 1c only)

Prior to agreeing to be part of this pilot study, providers will be informed that, if they desire, they may contact each other via a WhatsApp group created and accessible to study staff for the purposes of understanding the kinds of support pharmacy providers request in initiating clients on PrEP and/or refilling PrEP prescriptions. Providers are not obligated to use this WhatsApp group but may instead opt to contact each other through other means (e.g., phone calls). By signing the consent form for Aim 1c, pharmacy providers and remote study clinicians consent to having any study-related phone consultation recorded and subsequently transcribed for analysis. Study staff will export any conversation threads (hereafter, "transcripts") from the study-created WhatsApp group for analysis. All pharmacy provider and remote clinicians that participate in this WhatsApp Group will sign documents of informed consent (**Appendix II**).

Quantitative provider surveys (Aim 1c only)

For Aim 1c, we will conduct baseline and monthly follow-up surveys (Appendices XXVII and XXVIII) with pharmacy providers who are involved in the delivery of PrEP, PEP, and/or STI testing at a pilot pharmacy (n=up to 2 providers surveyed per pilot pharmacy, or 24 survey participants total). These surveys will collect basic demographic information about the providers, their assessments of acceptability and feasibility of the care pathway refinements (peer referral, PEP-as-a-bridge-to-PrEP, STI testing-as-a-bridge-to-PrEP, optional client self-administration of the HIV risk assessment tool, optional initial HIV self-test at home, provider assisted blood-based HIV self-testing), and their willingness to charge for pharmacy-based PrEP services. All surveys will be conducted by trained research assistants on tablets using CommCare, an electronic data collection platform. For the handful of survey questions that are open-ended, the research assistant will audio record the participant's response. These audio recordings will be subsequently transcribed, translated to English (if necessary), and stored securely.

Data Analysis & Outcomes

Quantitative client surveys & DBS (Aims 1a, 1c, and 2a)

Table 15 shows the study outcomes that will be obtained from the quantitative surveys (**Appendix VII. Questionnaire: Baseline, Appendix VIII. Questionnaire: Follow-up for Aim 1a/2a and Appendices XX and XXI for Aim 1c**) and DBS data. For Aims 1a and 1c, we will calculate the number of participants who initiated PrEP at pilot pharmacies, and the proportion of these who: returned for PrEP refills, were adherent to PrEP, and experienced any PrEP side effects or study-related social harms.

For Aim 2a, we will also calculate the number of participants who initiated or refilled PrEP at a CCC but choose to refill PrEP at a pilot pharmacy, and the proportion of these who: returned for PrEP refills, were adherent to PrEP, and experienced any PrEP side effects or study-related social harms (comparing outcomes with those who remained in PrEP care at the CCC).

- PrEP initiation. We will report the socio-demographic characteristics of participants who initiate PrEP at pharmacies (Aim 1a) and compare those with the sociodemographic characteristics of participants from our other studies who have initiated PrEP at healthcare facilities.

- PrEP refills. We will report the socio-demographic characteristics of participants who refilled PrEP at a pharmacy and compare those with the sociodemographic characteristics of participants from our other studies who have refilled PrEP at healthcare facilities (and the sociodemographic characteristics of participants who do not choose to refill PrEP at pharmacies in Aim 2a).

- PrEP discontinuation. For individuals who are in known HIV serodiscordant relationships, if a participant discontinues PrEP use because their HIV infected partner has initiated and sustained ART for >6 months (the Kenya standard for discontinuing PrEP), this participant will be considered PrEP-adherent. Similarly, if PrEP is discontinued for safety reasons (but not adherence reasons) as determined by the pharmacy providers and confirmed by the remote clinician, follow-up thereafter will be censored, since the subject will not be able to be assessed for adherence to PrEP.

Adjusted analyses will be done as needed, controlling for potential confounders based on our prior work assessing correlates of PrEP use: demographics (e.g., age, educational level), sexual behaviors (e.g., condom use, MSM, number of partners), medical status (e.g., depression), and beliefs (e.g., risk perception, PrEP efficacy). We will assess specifically for gender as a key variable. Stata or R will be used for all analyses.

DBS samples will be measured from all participants in at each PrEP pharmacy or clinic (Aim 2a) visit. We will take a random sample of 10% of the DBS samples and measure concentrations of tenofovir diphosphate (TFV-DP) and emtricitabine triphosphate (FTC-TP) using validated liquid chromatography tandem mass spectrometry (LC-MS/MS), which has become the gold standard for research evaluations of PrEP adherence.[10,11] Any concentrations of TFV-DP in a DBS punch >700 fmol will be considered PrEP adherent.[10] All DBS samples that we collect from study participants will initially be stored in a secure freezer at the Thika study site. However, the DBS samples that are randomly selected for TFV-DP and FTC-TP drug concentration testing will be shipped to the USA because currently the only laboratories that have the capacity to do this testing are located there.

Table 15. Outcomes from quantitative survey and DBS samples (Aims 1a, 1c, and 2a)

	Aim(s)	Definition	Data Source(s)	Timing
PrEP initiation	Aim 1a & 1c	# of participants that initiated PrEP at pilot pharmacies	• Quant survey • Pharm records	M0
PrEP retention	Aims 1a, 1c, & 2	% of participants who return to the pilot pharmacies (or CCC) for PrEP refills	• Quant survey • Pharm records	M1, M4*, M7*
PrEP adherence	Aims 1a, 1c, & 2	• % of participants that missed no pills in previous week • % of participants that refill drugs at pharmacy • % of DBS samples with drug concentrations indicating adherence	• Quant survey • Pharm records • DBS	M1, M4*, M7*
Selection of pharmacy-based PrEP	Aim 2a	• % of participants who initiated or refilled PrEP at CCC and selected pharmacy-based PrEP refills	• Quant survey • Pharm records	M0
PEP initiation	Aim 1c	# of participants that initiated PEP at enrollment at a pilot pharmacy	• Quant survey	M0
PrEP initiation following PEP	Aim 1c	# of participants that initiated PrEP at a pilot pharmacy and, at a later study visit, initiated PrEP	• Quant survey	M0, M1, M4, M7
STI testing	Aim 1c	# of participants that underwent STI testing at enrollment at a pilot pharmacy	• Quant survey	M0
Concurrent STI testing and PrEP initiation	Aim 1c	# of participants that underwent STI testing at enrollment at a pilot pharmacy and initiated PrEP at that same visit	• Quant survey	M0

PrEP initiation following STI testing	Aim 1c	# of participants that underwent STI testing at a pilot pharmacy and, at a later study visit, initiated PrEP	• Quant survey	M0, M1, M4, M7
Acceptability & feasibility of implementation strategies used in the refined care pathway	Aim 1c	Median rating of each implementation strategy (i.e., care pathway refinement shown in Figure 4)	• Quant survey	M0, M1, M4, M7

** All Aim 2a participants will initiate PrEP at a clinic and will only complete two follow-up visits at 3 and 6 months. Aim 1a and Aim 2a participants who opt to participate in the extended pilot (Aim 1c) will continue to contribute data at quarterly follow-up visits until the study's end.*

Costs (Aims 1a, 1c, and 2a)

We will use descriptive statistics to summarize the various aspects of pharmacy-based PrEP delivery costs (**Table 12**). We will use multivariable regression models to determine the socio-demographic characteristics of PrEP clients (collected in the baseline quantitative survey) that might be associated with cost-related outcomes (e.g., willingness to pay).

Standardized patient actors (Aim 1a only)

For each pharmacy, we will calculate the percentage of actors who received the items on the technical and quality-of-care checklists (**Appendix XII. Standardized Patient Actor Checklist**). We will pre-determine what items on the checklist are essential for pharmacy-based PrEP delivery and calculate the percentage of actors who received all of these services. We will also supplement the findings from the checklist with insights (i.e., quotes) shared during the debriefing meeting and captured in the audio recordings/transcripts of these meetings. Additionally, we will identify key areas of our care pathway that will require additional training, modification, or reinforcement during implementation.

In-depth interviews (Aims 1b and 2b), WhatsApp group (Aims 1a, 1c, and 2a), and phone consultation transcripts (Aim 1c only)

Interview transcripts, WhatsApp transcripts, and phone consultation transcripts will be reviewed separately by two qualitative researchers, who will ensure completeness. These researchers will immerse themselves in the data through repeated readings of the transcripts and create a preliminary codebook of inductive[73,74] and deductive[75–77] codes to capture client and provider experiences of pharmacy-based PrEP delivery, including barriers and facilitators. A sample of transcripts will be double-coded independently by two or more researchers, with coding discrepancies identified and resolved via consensus. During this process, the codebook will be refined, with existing codes combined, separated, or eliminated and new codes added as needed to capture emerging themes.[78,79] Thereafter, remaining transcripts will be coded in Dedoose (Los Angeles, California, USA) and Atlas.ti (Berlin, Germany). We have extensive experience analyzing qualitative data to inform intervention development.[24,80–101]

Quantitative provider surveys (Aim 1c only)

We will calculate median provider ratings for each survey item assessing acceptability and/or feasibility of the model refinements. We will also assess change in providers' ratings over time, and we will calculate median willingness to charge for pharmacy-based PrEP services. Excel, Stata, or R will be used for all quantitative analyses. We will qualitatively analyze the transcriptions of provider responses to open-ended questions using content analysis.

Participant retention and withdrawal

The Thika site will develop retention methods tailored to and most efficient for the local study settings. Retention activities may include explanation of the study visit schedule and procedural requirements during the informed consent process and re-emphasis at each study visit, collection and updating of locator information, and use of appropriate and timely visit reminder mechanisms (including phone calls and text messages). To provide complete information at the end of the study, efforts will be made to have a final follow-up visit for each participant.

Participants may voluntarily withdraw from the study for any reason at any time. The site Investigators also may withdraw participants from the study in order to protect their safety and/or if they are unwilling or unable to comply with required study procedures. Reasons for withdrawal will be recorded.

Limitations

These pilot studies have some potential limitations that are important to note. First, the pharmacies and pharmacy providers selected to participate in these pilot studies will be selected on specific criteria and may not be generalizable to all private pharmacies and pharmacy providers throughout Kenya. For example, all pharmacies participating in these pilots must be registered with the different Kenyan pharmaceutical boards, thus the findings from this study cannot extend to non-registered pharmacies or drug kiosks – which will unlikely to be able to legally deliver PrEP in a real-world setting without registration anyways.

Additionally, the remote PrEP clinicians that will oversee any questions pharmacy providers may have about pharmacy-based PrEP delivery will be PrEP experts within the Kenya PrEP delivery setting and might not be representative of all remote clinicians available for consultation if pharmacy-based PrEP delivery is to be scaled throughout Kenya. However, since these PrEP clinicians just have to be available remotely and not in person, it should be feasible to have a rotation of PrEP experts available for consultation if this model is to be scaled-up in Kenya.

Finally, in these pilot studies, the PrEP drugs and HIV self-tests are being provided by the Kenya Ministry of Health, and thus the price pilot participants pay for pharmacy-based PrEP delivery in Aim 1a/2a is just a mark-up that covers the overhead of pharmacy PrEP storage and providers' time. This model, where the Ministry of Health provides PrEP and HIV self-test kits to private pharmacies for distribution, might not be feasible if pharmacy-based PrEP delivery is to be scaled nationally in Kenya. Thus, the future price of pharmacy-based PrEP may differ from that in this pilot study (i.e., it will likely increase), which may influence (i.e., decrease) PrEP uptake and retention among individuals who access PrEP at pharmacies.

SAFETY

PrEP

Multinational studies demonstrated that PrEP (including FTC/TDF) was safe for use in heterosexual men and women from Kenya and Uganda. There were no statistically significant differences in the frequency of deaths, serious adverse events, adverse events overall, or key laboratory adverse events (specifically, creatinine elevation and phosphorus decrease) for those receiving PrEP compared to those receiving placebo in the Partners PrEP study.

For the purposes of this study, only serious adverse events (SAEs) will be documented. SAEs felt to be related to PrEP will result in temporary hold of PrEP. In the case of temporary holds, the hold will continue until the event is stabilized or resolved. If the event resolves, PrEP may be reinitiated at the discretion of the Data Monitoring Committee (see "Study oversight" below), resuming safety monitoring. The severity of clinical symptoms will be scored using the DAIDS Table (July 2017 Version) for Grading the Severity of Adult and Pediatric AEs. Reporting on adverse events to relevant IRBs will be according to relevant regulations.

Pregnancy

Animal and human data, including from the Partners PrEP Study and Partners Demonstration Project, suggest safety of FTC/TDF when used by HIV infected women during pregnancy and breastfeeding. Other studies are exploring detailed safety of PrEP use in pregnancy. In the pilot evaluations described in Aims 1a (pharmacy-based PrEP initiations and refills) and Aim 2a (pharmacy-based PrEP refills only), we excluded pregnant and breastfeeding women because it was felt, at the time, that assessing the PrEP eligibility of pregnant women was outside of the scope of care of pharmacy providers in Kenya. However, through consultation with members of the Kenya Ministry of Health and other PrEP stakeholders, we have come to the realization that excluding pregnant women from those pilot studies was unnecessary for two reasons. First, Kenya's current national PrEP guidelines allow pregnant women to be initiated on PrEP, in line with WHO recommendations. In fact, the guidelines explicitly state, "Pregnancy and breastfeeding are not contraindications to provision of PrEP. Pregnant or breastfeeding women whose sexual partners are HIV positive or are at high risk of HIV infection may benefit from PrEP as part of combination prevention of HIV infection", and throughout Kenya, PrEP is regularly prescribed to pregnant and breastfeeding women, for example, at family planning and antenatal care clinics. Second, within the Kenya national PrEP guidelines, the criteria that individuals must meet to qualify for PrEP do not vary based on the prospective client's pregnancy status. As such, pharmacy providers in this pilot study would not need any additional training beyond that which we provided in Aim 1a in order to safely initiate pregnant and breastfeeding women on PrEP. Lastly, excluding pregnant and breastfeeding women from our extended pilot study (Aim 1c) who otherwise meet both study and PrEP eligibility criteria (i.e., who test negative for HIV, are determined to be at high risk of HIV using the Kenya Risk Assessment Screening Tool, and who have no other PrEP contraindications) may represent a greater risk to them than including them in the study would, as it would constitute denying them access to PrEP—a drug that has been found to reduce the risk of getting HIV by sex by about 99% (CDC, 2021). For these reasons, we propose allowing pregnant and breastfeeding women to participate in our extended pilot study (Aim 1c).

Social harm considerations

We have extensively considered the risk of social harm related to both PrEP use and the delivery and prescribing of PrEP at pharmacies, including risks of depression/anxiety and disclosure and stigma.

Our extensive experience with longitudinal follow-up of heterosexual HIV serodiscordant couples and women at risk mitigates some of this risk, and we found very little risk of social harms or anxiety related to HIV self-testing in our pilot evaluation, among couples. Analyses of social harm related to pharmacy-based PrEP delivery will be done overall, by sex and by relationship status, given the potential for differential gendered and relationship risks. In the event of a clinical need (e.g., side effects, symptoms of a sexually transmitted infection), participants will be referred to nearby HIV clinics for care.

HUMAN SUBJECTS CONSIDERATIONS

The protocol, informed consent forms (for pilot participation and for interviews of participants and providers), and patient education and recruitment materials will be reviewed and approved by the institutional review boards at the University of Washington and at KEMRI. All participants will provide written informed consent before participation in the pilot and quantitative/qualitative interviews. Participants will be informed the purpose of the study, the procedures to be followed and the risks and benefits of participation. The consents forms will be translated into Kiswahili. Specifically, the participants will be informed that this novel study will answer critical questions on acceptability, feasibility, and costs of pharmacy-based PrEP delivery in Kenya.

Study oversight

This study will be subject to oversight by an independent data monitoring committee that will periodically review data from the study, including study execution, adherence, HIV incidence, PrEP/PEP side effects, serious adverse events and social harms by study arm. We have had a Data Monitoring Committee for many of our other ongoing studies. The independent data monitoring committee will provide recommendations to the study team as part of periodic reviews. Reports from all reviews will be provided for submission to overseeing IRBs/ECs.

Risks

Participants may become embarrassed, worried, or anxious when completing their HIV risk assessment and/or receiving HIV counseling at pharmacies. They also may become worried or anxious while waiting for their HIV test results at the pharmacy. Individual counseling and discussions of study participation may raise issues in individuals. Participants who learn that they have HIV may experience anxiety or depression related to their test results. At all study sites, individual and couples-based HIV counseling will be provided by pharmacists who have been trained in specific issues related to HIV risk, HIV acquisition, and care of HIV serodiscordant couples, including stigma, blame, methods to avoid transmission, and available support services.

Although study sites will make every effort to protect participant privacy and confidentiality, it is possible that participants' involvement in the study could become known to others, particularly as this project will be conducted at community-based settings. There is a possibility that social harms may result (i.e., because participants could become known as participating in a pilot involving HIV prevention). For example, participants could be treated unfairly or discriminated against, or could have problems being accepted by their families and/or communities. Understanding the risk/benefit balance for confidential delivery of PrEP services in community settings is an explicit goal of this project. Moreover, we have extensive experience with the strategies to minimize the potential for social harms in populations participating in HIV prevention studies.

Risks and side effects related to PrEP include gastrointestinal intolerance and rarely more serious side effects; these are detailed on the package insert and this project is not testing PrEP itself but its delivery. The medical risks of HIV testing using blood collection are small.

Protection against risk

The study team has extensive experience with counseling about HIV risk, PrEP, and strategies for HIV prevention in general. Study procedures will include qualitative interviews and prospective follow-up,

HIV testing, blood collection, assessment of uptake and adherence to PrEP for HIV prevention. PrEP will be provided by the study site and will follow Kenya clinical guidelines. Counseling about antiretroviral-based HIV prevention will include messaging describing the benefits of all strategies, based on evolving available data and national policies / national roll-out of antiretrovirals (including earlier treatment and PrEP) for HIV prevention.

For data collection, standardized questionnaires will be used that will include questions on sensitive topics, including sexual behavior, depression, alcohol use, and stigma. We have extensive experience with these questionnaires from our prior studies and the expertise and counseling resources required to attend to study participants (e.g., those with depression). We have published on very low rates of social harm and intimate partner violence in our prospective studies of HIV serodiscordant couples, which likely reflects the counseling available to couples; for women at risk, we have extensive experience with management of potential social harms, through our prevention studies (detailed in Preliminary Results and also experience in clinical trials such as ASPIRE, the MTN study of the dapivirine vaginal ring for HIV prevention).

The risks from the anticipated activities will be no greater than in our previous studies; in fact, given the proven prevention benefits of PrEP and now national roll-out in Kenya, risks are anticipated to be less than in some of our prior studies. We feel the risks associated with the study are small. The benefits are consistent with clinical care benefits and cultural expectations and they follow the established standard with IRB approval in our other studies. We therefore believe the balance of benefit and risk is appropriate.

Benefits

All pilot participants will benefit by having novel access to PrEP during the study period. HIV prevention practices, according to national guidelines, will be provided to all participants enrolled in this study. This will include risk reduction counseling, addressing sexually transmitted infections (STIs), and access to condoms. There are also possible benefits from ongoing access to HIV risk reduction counseling and other prevention services at the pilot pharmacies. In addition, participants and others also may benefit in the future from information learned from this study. There may be no other direct benefits to participants in this study.

Care for persons identified as HIV infected

This study will identify persons who are infected with HIV, either as part of the study screening process or during follow-up of enrolled participants. Study staff will provide participants with their HIV test results in the context of post-test counseling. Persons identified as HIV infected during the study screening process, but who do not meet eligibility criteria or who do not wish to enroll in the study, will be referred to nearby clinics where they can receive free HIV care and treatment services. For participants who are HIV infected and who also become pregnant during follow-up, every effort will be made to facilitate access to programs for preventing mother-to-child HIV transmission for appropriate antiretroviral treatment to reduce the probability of HIV transmission from mother to child.

Benefits to the community

An important goal of this study is to achieve the study objectives in a way that provides benefits to the community that endure beyond the proposed study lifetime regardless of the specific outcome of the study. Some of these community benefits include development of optimized approaches to HIV prevention care and community awareness of comprehensive HIV prevention.

Importance of the knowledge to be gained

Knowledge gained from the studies proposed in this application will include information about optimal delivery of PrEP for HIV prevention, which may have substantial impact on the global burden of HIV.

Treatment for injury

Participants will be asked to inform the clinic staff if they feel they have been injured because of taking part in the study. Injuries may also be identified during laboratory testing, medical histories, and physical examinations. Treatment for adverse events related to study participation will be provided by the treatment clinic. If treatment is required that is beyond the capacity of the clinic, the clinic staff will refer the participant to appropriate services or organizations that can provide care for the injury.

Study records

Implementation investigators will maintain, and store in a secure manner, complete, accurate, and current study records throughout the study. Study records include administrative documentation and regulatory documentation as well as documentation related to each participant enrolled in the cohort, including informed consent forms, data forms, notations of all contacts with the participant, and all other source documents.

Confidentiality

Every effort will be made to protect participant privacy and confidentiality to the extent possible. Personal identifying information will be retained at the local study sites and not forwarded to the University of Washington Coordinating Center. The sites will use their standard operating procedure for confidentiality protection that reflects the input of study staff and community representatives to identify potential confidentiality issues and strategies to address them.

All study-related information will be stored securely at the study sites. All participant information will be stored in areas with limited access. Data collection, administrative forms, laboratory specimens, and other reports will be identified only by a coded number to maintain participant confidentiality. All records that contain names or other personal identifiers, such as locator forms and informed consent forms, will be stored separately from study records identified by code number. All local databases will be secured with password-protected access systems. Forms, lists, logbooks, appointment books, and any other listings that link participant ID numbers to other identifying information will be stored in a separate, locked file in an area with limited access.

Dissemination Plan

The study team for this award is committed to public dissemination of results of pilot studies, to participants, local stakeholders in Kenya, the global scientific community, and US, Kenyan, and global policymakers. Dissemination of pilot results will follow principles of good participatory practice. Results will be published in conference abstracts and peer-reviewed journals. Study results will be disseminated through presentations to local stakeholders and policymakers in Kenya, including the Ministry of Health.

TIMELINE

Table 16. Timeline of activities	Year 1 (2021)				Year 2 (2022)			
Data collection activity	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
AIMS 1a & 2a: Pilots								
Train pharmacists on pharmacy-based PrEP delivery								
Pilot of pharmacy-based PrEP delivery								
AIM 1b: Identify pilot weak points								
Acceptability: Qualitative interviews with consumer								
Fidelity: Use of standardized patient actors and checklists								
Costs: Use of quantitative surveys at baseline and follow-up								
Model Refinement								
Aim 2b: Identify weak points of pharmacy-based refills-only model								
Acceptability: Qualitative interviews with consumer								
Aim 1c: Extended pilot								
Train pharmacists on pharmacy-based PrEP/PEP delivery								
Pilot of refined pharmacy-based PrEP delivery model								

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