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A Mixed Methods Evaluation of Pharmacists' Readiness to Provide Long-Acting Injectable HIV Pre-exposure Prophylaxis in California

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Background: Pre-exposure prophylaxis (PrEP) uptake remains low among people who could benefit, some of whom may prefer alternatives to oral PrEP, such as long-acting injectable pre-exposure prophylaxis (LAI-PrEP). We evaluated the potential for LAI-PrEP provision in pharmacies through a mixed methods study of pharmacists in California, where Senate Bill 159 enables pharmacists to independently provide oral PrEP.

Methods: In 2022–2023, we conducted an online cross-sectional survey of California pharmacists and pharmacy students (n = 919) and in-depth interviews with pharmacists (n = 30), both of which included modules assessing attitudes about PrEP provision. Using log-binomial regression, we estimated prevalence ratios (PRs) comparing survey participants' willingness to provide LAI-PrEP by pharmacy- and individual-level characteristics. Qualitative interview data were analyzed using Rapid Qualitative Analysis to identify factors that may affect pharmacists' provision of LAI-PrEP.

Results: Half of the survey participants (53%) indicated that they would be willing to administer LAI-PrEP using gluteal injection in their pharmacy. Willingness was higher among participants who worked in pharmacies that provided vaccinations or other injections (56% vs. 46%; PR: 1.2; 95% confidence interval: 1.0–1.4) and/or oral PrEP under Senate Bill 159 (65% vs. 51%; PR: 1.3; 95% confidence interval: 1.1–1.5) than among participants whose pharmacies did not. Interviewed participants reported barriers to LAI-PrEP provision, including the need for increased training and staffing, a private room for gluteal injections, better medication access, and payment for services.

Conclusion: Pharmacies offer a promising setting for increased LAI-PrEP access. However, pharmacists may require additional training, resources, and policy changes to make implementation feasible.

Key Words: HIV prevention, pre-exposure prophylaxis, long-acting injectable PrEP, California, pharmacies

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INTRODUCTION

Over 30,000 people acquire HIV in the United States yearly, disproportionately impacting gay, bisexual, and other men who have sex with men (GBMSM), GBMSM of color, transgender people, young people, and people who inject drugs.[1] Although daily oral pre-exposure prophylaxis (PrEP) for HIV prevention has been available in the United States since 2012, its use among people who could benefit remains modest at best.[2,3] To bolster uptake, additional PrEP modalities are in development including long-acting injectables (long-acting injectable pre-exposure prophylaxis, LAI-PrEP), vaginal rings, implants, and transdermal patches.[4] Of these alternative delivery strategies, the first to reach the market is a long-acting injectable formulation of cabotegravir (CAB-LA), administered as an intramuscular injection in the ventrogluteal muscle (ie, buttocks region) every 2 months, which received Food and Drug Administration approval in 2021 and was found to be more effective than oral PrEP in preventing HIV in clinical trials.[5] Recent studies suggest that many GBMSM, transgender women, and people who inject drugs prefer LAI-PrEP to oral PrEP, in part because of reduced barriers to adherence.[6–13] Despite these biomedical innovations in HIV prevention, multifactorial barriers to uptake persist, such as limited healthcare provider knowledge and training; medical mistrust; HIV-associated stigma;

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concerns among potential users regarding medication affordability, side effects, and perceived efficacy; and poor structural and regulatory support for full PrEP implementation within public health systems.[3,12–19]

Policymakers and advocates alike are identifying new and alternative ways to deliver the expanding range of PrEP modalities.[3,20] In the United States, where 89% of people live within 5 miles of a pharmacy,[21] community pharmacists may be particularly suited to reduce accessibility barriers. Pharmacists are regularly connected to community members for their prescription and medical needs, and many already provide primary prevention services, such as immunizations and point-of-care testing (eg, HIV testing).[20,22] California has led the way for expanded pharmacy-based healthcare and was the first state in the United States to pass legislation giving licensed pharmacists authority to independently prescribe HIV post-exposure prophylaxis (PEP) and up to 60 days of PrEP with Senate Bill 159 (SB 159, 2019).[23] Other states have since passed similar legislation expanding pharmacists' role in HIV prevention.[24,25] Moreover, recent California legislation (SB 339, 2024) extends pharmacist provision of PrEP up to and beyond 90 days under certain conditions.[26] LAI-PrEP could be a viable complement to oral PrEP provision in pharmacies because pharmacists have historically provided both intramuscular and subcutaneous injectable medications, including more than half of COVID-19 vaccinations in the United States.[22,27]

However, to date, there are no published studies examining pharmacists' views on providing LAI-PrEP medications, such as CAB-LA. In the present study, we used a mixed methods approach to assess the attitudes, preferences, and readiness of California pharmacists to provide LAI-PrEP to their patients.

METHODS

This study's design was informed by the Consolidated Framework for Implementation Research.[28] We also used the socioecological model to assess factors influential to pharmacists' implementation readiness at the individual, organizational, and system levels.[29]

Quantitative Survey Methods

We examined pharmacist readiness to provide LAI-PrEP quantitatively using cross-sectional survey data from the California Pharmacist Survey (methods previously described[30]). In brief, California pharmacists and pharmacy students were recruited to participate in an online survey from October to December 2022. The study was promoted through the email listservs and social media postings of 2 professional pharmacy organizations. Participants had the option to remain anonymous, but those who provided contact information could opt to receive a $20 gift card and/or entry in prize drawings as compensation.

After screening as eligible (ie, pharmacist or pharmacy student, 18 years and older, residing in California) and providing informed consent, participants completed a survey in Qualtrics[31] that included modules on participants' knowledge and attitudes around pharmacy-based PrEP/PEP provision and the characteristics of their current or most recent pharmacy workplace. Although the survey primarily focused on oral PrEP/PEP, we identified several questions relevant to LAI-PrEP including individual-level knowledge and attitudes and organizational-level characteristics that might serve as barriers to and facilitators of LAI-PrEP implementation.

We generated descriptive statistics excluding missing or "not applicable" responses from denominators. In exploratory analyses, we used log-binomial regression to estimate bivariate prevalence ratios (PRs), comparing participants' willingness to provide LAI-PrEP by other individual- and organizational-level characteristics. Analyses were conducted in R, version 4.3.1.[32]

Qualitative Interview Methods

Licensed California pharmacists (18 years and older) were eligible to participate in interviews. We used snowball sampling, allowing initial interview participants to assist in referring others to the study,[33] and recruited additional participants from a racially and ethnically diverse subsample of survey respondents. After obtaining informed consent, research team members conducted semistructured virtual interviews on Zoom[34] from October 2022 to July 2023. Participants were compensated with a $150 gift card.

A semistructured interview guide was developed and reviewed by members of the research team including pharmacists with clinical experience providing PrEP services. Interview questions focused on participants' knowledge and awareness of oral and LAI-PrEP; experience, comfort, and confidence in independently prescribing oral and LAI-PrEP; and challenges they may face when providing and administering oral and LAI-PrEP. Interviews, lasting approximately 60 minutes, were audio-recorded and transcribed verbatim.

Analyses were guided by the Rapid Qualitative Approach to Health Services Research,[35] which is a pragmatic and targeted method of qualitative data analysis intended to generate timely results to address implementation challenges. At the initial stage of analyses, 2 study team members reviewed the full transcripts and developed preliminary codes to identify underlying issues related to implementing pharmacy-based LAI-PrEP. Using the preliminary results, a matrix was developed to consolidate these larger themes into individual, organizational, and structural domains. Two pharmacists from the research team were then invited to review the final themes and related excerpts to ensure validity.

Ethical Approvals

The study was approved by the Office of the Human Research Protection Program at the University of California, Los Angeles with the University of California, Berkeley Committee for Protection of Human Subjects in reliance.

RESULTS

Table 1 presents sociodemographic characteristics of survey and interview participants.

TABLE 1. Sociodemographic and Pharmacy Characteristics of Survey and Interview Participants, 2022–2023

	Survey (n = 919)	Interview (n = 30)
Age, mean ± SD	39.1 ± 12.9	44.9 ± 12.8
Gender		
Cisgender man	289 (35.5)	9 (36.0)
Cisgender woman	518 (63.6)	15 (60.0)
Nonbinary or transgender	7 (0.9)	1 (4.0)
Race and ethnicity		
American Indian or Alaska Native	4 (0.5)	0 (0.0)
Asian	497 (64.3)	7 (28.0)
Black or African American	15 (1.9)	6 (24.0)
Hispanic or Latino	36 (4.7)	0 (0.0)
Native Hawaiian or Pacific Islander	1 (0.1)	0 (0.0)
White	184 (23.8)	10 (40.0)
Multiracial	17 (2.2)	0 (0.0)
Other	19 (2.5)	2 (8.0)
Pharmacist category		
Currently practicing licensed pharmacist	769 (83.7)	30 (100.0)
Pharmacy student	83 (9.0)	0 (0.0)
Retired pharmacist	34 (3.7)	0 (0.0)
Other nonpracticing pharmacist	33 (3.6)	0 (0.0)
Pharmacy setting		
Community	393 (42.8)	22 (73.3)
Hospital	255 (27.7)	4 (13.3)
Clinic or ambulatory	143 (15.6)	2 (6.7)
Other	128 (13.9)	2 (6.7)
Pharmacists at pharmacy currently initiate HIV PrEP as authorized by Senate Bill 159		
Yes	96 (10.4)	4 (13.3)
No	623 (67.8)	25 (83.3)
Not sure/Don't know	168 (18.3)	1 (3.3)
NA—never worked in a pharmacy	32 (3.5)	0 (0.0)

n (column %) unless otherwise stated, excluding missing responses (survey: n = 76 age, n = 105 gender, n = 146 race/ethnicity; interview: n = 5 age, gender, race/ethnicity). NA, not applicable.

Quantitative Survey Results

Survey participants (n = 919) were primarily currently practicing licensed pharmacists (84%). Many worked in community (43%) or hospital (28%) settings. A small subset of participants (3%) who had never worked in a pharmacy were excluded from organizational-level analyses described below.

Most participants (68%) reported that their pharmacy provides vaccinations and/or other injections (see Table 1, Supplemental Digital Content, http://links.lww.com/QAI/C319). This was more common among participants in community settings than other settings (87% vs. 53%). Among participants whose pharmacy provides injections, the most performed types of injections were intramuscular (92%) and subcutaneous (74%). One in 9 (11%) participants reported that pharmacists at their pharmacy currently initiate (oral) PrEP under SB 159 (19% were unsure).

When asked about pharmacy spaces for private or semiprivate consultation or service provision, participants most often reported that their pharmacy had a private room (40%), private consultation window (28%), permanent semiprivate space such as a cubicle (17%), and/or temporary pop-up space with flexible walls (9%). Excluding spaces unlikely to be sufficiently private for gluteal injections (ie, private windows and permanent semiprivate spaces), 48% of participants reported that their pharmacy had a private room and/or temporary pop-up space.

At the individual level, most participants agreed that pharmacy-based PrEP/PEP provision was important (96%) and would be willing to prescribe PrEP (81%). Half (50%) were confident in their knowledge of PrEP, although only 1 in 4 (27%) had received training on pharmacy-based (oral) PrEP/PEP provision. Slightly more than half (53%) indicated that they would be willing to administer LAI-PrEP in their pharmacy if provided with training, compensation, and a private room; the other participants were unsure (23%) or unwilling (24%).

Several individual- and organizational-level characteristics were associated with participants' willingness to administer LAI-PrEP in the future (Table 2). Participants who had training on providing PrEP/PEP (69% vs. 47%, PR: 1.5, 95% confidence interval [CI]: 1.3–1.7) and/or confidence in their knowledge of PrEP (62% vs. 46%, PR: 1.4, 95% CI: 1.2 to 1.5) expressed higher willingness to administer LAI-

PrEP than those who did not. Willingness was also higher among participants who most recently worked at a pharmacy that provided vaccinations or other injections (56% vs. 46%, PR: 1.2, 95% CI: 1.0 to 1.4) and/or initiated PrEP under SB 159 (65% vs. 51%, PR: 1.3, 95% CI: 1.1 to 1.5) than among participants at pharmacies not offering these services. Participants in independent community pharmacies were more likely to report being willing to administer LAI-PrEP than those in chain community pharmacies (62% vs. 46%, PR: 1.4, 95% CI: 1.1 to 1.6).

Qualitative Interview Results

All interview participants (n = 30) were currently practicing licensed pharmacists; most worked in community settings (73%). Analyses revealed potential challenges for LAI-PrEP implementation at the individual, organizational, and structural levels (Table 3).

Individual-Level Findings

Interviewed pharmacists expressed contradictory attitudes surrounding LAI-PrEP administration. Half (n = 15) of the pharmacists demonstrated little hesitancy in providing LAI-PrEP and further indicated that training was a key factor in their readiness. However, about one-quarter (n = 7) shared that they were not comfortable administering LAI-PrEP because of the gluteal injection site.

Training is Key

Many participants indicated willingness to provide LAI-PrEP and pointed to their previous training in administering immunizations, stating that potential future training would improve their comfort level in administering gluteal injections.

> *Pharmacists have been trained to give immunizations intramuscularly, and some pharmacists are then also trained to give deep intramuscular injections, so I wouldn't hesitate.* (Participant 27, independent community pharmacist)

Discomfort with LAI-PrEP Administration

Several participants indicated that they were hesitant to provide gluteal injections expressing that the injection site was "a bit more intimate" compared with an injection in the arm (Participant 13, hospital pharmacist).

> *Honestly, I've done injections before, but most of my injections are just like flu injections, so it's on the arm. It's different when it's a gluteal injection… I feel like there might be some discomfort there.* (Participant 16, clinic or ambulatory care pharmacist)

Two additional participants were concerned that asking patients to "pull down their pants" in the pharmacy could result in an uncomfortable patient interaction (Participants 15 and 24, hospital pharmacists). One expressed specific beliefs about persons who acquire HIV, stating that administering LAI-PrEP would mean having to "deal with a patient that… maybe they take part in risky business" (Participant 15).

TABLE 2. Pharmacy- and Individual-Level Characteristics Associated With Willingness to Administer Injectable PrEP in the California Pharmacist Survey (n = 919), 2022

	Would be Willing to Administer Injectable PrEP		
	Yes, n (Row %)	No/Don't Know, n (Row %)	PR (95% CI)
Overall	477 (52.9)	425 (47.1)	—
Pharmacy setting			
Community	200 (51.9)	185 (48.1)	Reference
Hospital	135 (53.8)	116 (46.2)	1.04 (0.89 to 1.20)
Clinic or ambulatory care	82 (58.2)	59 (41.8)	1.12 (0.94 to 1.33)
Other	60 (48.0)	65 (52.0)	0.92 (0.75 to 1.14)
Community pharmacy type*			
Chain	106 (45.9)	125 (54.1)	Reference
Independent	91 (62.3)	55 (37.7)	1.36 (1.12 to 1.64)
Pharmacy initiates HIV PrEP as authorized by Senate Bill 159			
Yes	62 (64.6)	34 (35.4)	1.26 (1.07 to 1.48)
No/Don't know	398 (51.4)	376 (48.6)	Reference
Pharmacy provides vaccinations or other injections			
Yes	333 (55.9)	263 (44.1)	1.21 (1.05 to 1.41)
No	127 (46.0)	149 (54.0)	Reference
Has training on providing PrEP/PEP			
Yes (completed or in progress)	167 (69.0)	75 (31.0)	1.47 (1.31 to 1.65)
No	310 (47.0)	350 (53.0)	Reference
Is confident in knowledge of PrEP			
Agree	262 (62.4)	158 (37.6)	1.36 (1.19 to 1.54)
Disagree	193 (46.0)	227 (54.0)	Reference

Missing and "not applicable" responses excluded from bivariate analyses: n = 17 willingness to administer injectable PrEP, n = 9 community pharmacy type, n = 32 initiates PrEP, n = 30 provides injections, n = 63 confidence in knowledge.
*Restricted to participants who most recently worked in a community pharmacy.
PR, prevalence ratio estimated using log-binomial regression.

Organizational-Level Findings

Most interviewed pharmacists (n = 20) described issues surrounding LAI-PrEP implementation at the organizational level. Three themes emerged related to the delivery of LAI-PrEP within the pharmacy setting: financial considerations (n = 6), workflow and staffing issues (n = 7), and the need to protect patient privacy (n = 13).

Financial Considerations

Participants expressed financial considerations as a factor in implementing LAI-PrEP, especially given their uncertainty regarding the amount of reimbursement offered by third-party payers.

> *It's a $150 loss on the cost of the medication, so I can't spend, you know, $3700 on the drug, and have [the specialty pharmacy] pay me $3550 and lose $150 on him every time he walks in the door to get a shot. It's not financially viable. And if I*

TABLE 3. Themes Related to Challenges in Injectable PrEP Implementation from In-Depth Interviews with California Pharmacists (n = 30), 2022–2023

Level	Themes	Description
Individual	Training is key	Willing to be trained or have sufficient experience to administer LAI-PrEP
	Discomfort with LAI-PrEP administration	Expressed reasons for hesitancy in administering gluteal injections in pharmacies
Organizational	Financial considerations	Uncertainty regarding reimbursement for cost of LAI-PrEP, payment by health insurance plans for the HIV services provided, and/or patient demand for services
	Workflow and staffing issues	Concerns about competing tasks and priorities; increased duties, additional safety precautions, protocols, and the need for investment of time by pharmacists
	Privacy concerns	Private rooms, spaces, and/or barriers must be built within the pharmacy to administer LAI-PrEP
Structural	Regulatory barriers	Key governing entities provide rules, guidelines, and requirements that make it more difficult for pharmacists to provide LAI-PrEP

> *got a dozen patients on that, I mean it would literally put us out of business to do that. And then on top of that we need to provide them with the injection, and that takes time and the consultation, and I can't lose money on it.* (Participant 2, independent community pharmacist)

Considerations for "carrying the cost of these products" included whether the pharmacy has capacity and authority to "buy and bill" (Participant 3, independent community pharmacist), a process that allows healthcare providers to acquire medications and directly bill medical plans, and whether their patients would routinely access the medication, making it more "commonly dispensed" (Participant 26, independent community pharmacist). Similarly, several participants raised the issue of receiving payment for the time it takes to provide LAI-PrEP–related services, from patient consultation to HIV testing to the actual administration of LAI-PrEP injections.

Workflow and Staffing Issues

Interviewed pharmacists questioned how LAI-PrEP provision would fit into their current workflow and availability of staff. Participants shared their concerns about asking pharmacy staff to do too much in the context of competing tasks or priorities and the potential need to rely on appointment-based services to minimize disruption to the current workflow.

> *But for pharmacists by himself, by herself, one person at the same time, pharmacists have to counsel and to answer the phone and do this and do that. It's just asking for too much. It's not fair.* (Participant 15, hospital pharmacist)

With a potential increase in duties for pharmacists seeking to implement LAI-PrEP, some participants indicated that further safety precautions may be needed, including security protocols, infection control, and plans to address medical emergencies.

Privacy

Concern for patient privacy was the most common theme with over a third of participants agreeing that private rooms, spaces, and/or barriers are needed to administer LAI-PrEP using gluteal injection. Several participants mentioned not having access to such facilities, whereas others stated that they had already constructed private areas in their pharmacy.

Structural-Level Findings

Interviewed pharmacists (n = 4) identified regulatory restrictions from varying state, local, and professional organizations in California as a structural-level barrier that has limited their ability to implement LAI-PrEP.

Regulatory Barriers

Several participants stated that key entities, such as the California State Board of Pharmacy, the California Department of Public Health, and public and private health coverage providers, maintain multiple, and at times contradictory, procedural rules and requirements for implementing LAI-PrEP.

> *[These entities] are disparate in how they work, each of them has their own ecosystem, their guidelines, their rules, right. And the manufacturer has their rules. The Office of AIDS has their rules, and then the California State Board has their own rules on what pharmacists can do… they are in their own separate bubbles, and they rarely intersect. Like there's a few points where they intersect… but it's not enough and that's why I feel like it's an uphill battle.* (Participant 3, independent community pharmacist)

These rules were often related to medication reimbursement, payment for services, training and certification requirements, and safety protocols and procedures. Some participants viewed patients covered by commercial health plans as being at a disadvantage because LAI-PrEP may not be covered in their prescription drug coverage plans, whereas patients insured through Medi-Cal (state Medicaid) were expected to have coverage for LAI-PrEP.

> *There's no like standardized method of coverage. So if a patient has Medi-Cal it's like a gift because it's covered and it's easy to deal with. If they have private insurance, commercial insurance, it's pretty much a nightmare.* (Participant 5, clinic or ambulatory care pharmacist)

Another significant issue raised by participants was drug manufacturers' control of their products because LAI-PrEP is considered a specialty drug and, therefore, can only be accessed by select specialty pharmacies. Participants described serving as a "middle person" in facilitating patients' access and shared specific steps of shipping LAI-PrEP first to an eligible facility, such as a doctor's office or another pharmacy, to receive the medication for their patients.

DISCUSSION

Our mixed methods study found that many California pharmacists have supportive attitudes around HIV prevention and, specifically, PrEP provision. Pharmacists' existing role in administering injections and their willingness to provide LAI-PrEP suggests that pharmacies may be a promising community-based channel through which to expand equitable access to this highly effective HIV prevention modality. However, we also identified individual, organizational, and structural factors that are likely to influence whether PrEP delivery in pharmacies could be expanded to include LAI-PrEP.

At the individual level, training and experience emerged as important aspects of pharmacists' willingness to provide LAI-PrEP in both the survey and interview data. For example, interviewed pharmacists pointed to their past training and current practice of administering intramuscular and subcutaneous injections as reasons for their confidence and comfort with potentially providing LAI-PrEP in the pharmacy. There was also significantly higher willingness to provide LAI-PrEP among survey participants who were confident in their knowledge of PrEP, had training on PrEP/PEP provision, and/or worked in pharmacies that initiated PrEP under SB 159, suggesting that oral PrEP provision may be a gateway to additionally providing LAI-PrEP. Indeed, previous studies have found that HIV- and PrEP-related training and experience improve pharmacists' knowledge and attitudes about the provision of HIV services, thereby increasing their willingness to offer these services.[36–39] In addition, our results suggest that some pharmacists may hold stigmatizing attitudes toward potential PrEP users. For example, 1 interviewed pharmacist indicated that providing PrEP would mean working with patients who may be taking part in "risky business." Past studies have also reported discomfort among pharmacy students on being in close contact with people living with HIV and negative experiences among people living with HIV with pharmacists who provided their HIV care.[40,41] Provider stigma is an important barrier to PrEP uptake and continuation that warrants additional training for pharmacists to ensure holistic and culturally competent HIV prevention care.[15,17,19,42]

Although some pharmacists may be well positioned to smoothly integrate LAI-PrEP into their services (ie, because of their current scope of practice and existing pharmacy infrastructure), the gluteal injection required to administer CAB-LA, the currently approved LAI-PrEP option, may pose unique implementation challenges at the organizational level. Most survey participants worked in pharmacies that already offered injectable medications, and these participants reported significantly higher willingness to provide LAI-PrEP compared with those whose pharmacies did not offer injections. Still, our quantitative and qualitative findings suggest that many pharmacists do not currently have access to sufficiently private spaces in which to administer ventrogluteal injections, as required for CAB-LA provision. Even before CAB-LA's Food and Drug Administration approval, proponents of pharmacy-based LAI-PrEP provision noted that the lack of privacy in pharmacies would be a significant hindrance to implementation.[43,44] Although this barrier may require significant investment from pharmacy owners, there are new forms of LAI-PrEP in the pipeline, including subcutaneous thigh injections, that may integrate more easily into current pharmacy infrastructure and scope of practice should they achieve regulatory approval.[4]

Regardless of privacy requirements, incorporating new clinical services may disrupt an already busy pharmacy workflow. Interviewed pharmacists reported that insufficient staffing and financial support were barriers to LAI-PrEP implementation and were concerned about receiving payment for performing the services required to prescribe and administer LAI-PrEP. Although this is the first study to focus on barriers of and facilitators to LAI-PrEP in pharmacies, other studies assessing pharmacists' expanding scope of practice in California have noted similar challenges.[45,46] Despite the state's increasingly favorable policy climate toward pharmacist-delivered PrEP, practical barriers to policy implementation persist including staffing shortages and often unreliable and disproportionate payment of HIV services by varied health insurance plans.[30,45] For example, we previously found that participants from chain community pharmacies were almost 3 times as likely to report that insufficient staff and/or time was the main barrier to oral PrEP provision under SB 159 compared with those at independent community pharmacies.[30] Staffing and reimbursement concerns may in part explain why we observed higher willingness to provide LAI-PrEP among community pharmacists at independently owned pharmacies compared with chain pharmacies.

Finally, we found evidence of possible structural barriers to LAI-PrEP implementation within pharmacies. Interviewed pharmacists reported facing regulatory hurdles from key governmental and organizational entities that they perceived as having specific and, at times, contradictory demands regarding LAI-PrEP implementation. In other studies, pharmacists involved in the delivery of HIV prevention services have expressed similar confusion and frustration about the lack of uniform guidelines and protocol in providing new clinical services in their pharmacies.[45,46] These regulatory hurdles may also differentially impact chain and independent community pharmacies. For example, several studies have found that chain pharmacies were more likely to provide new products/services (eg, PrEP, naloxone) than independently owned pharmacies, which may point to efforts made by corporate pharmacies to implement practices that adhere to new state regulations.[30,47] It is plausible that pharmacists at independent pharmacies require more time to ensure that their businesses are compliant with new regulations, whereas chain pharmacists may only need to follow corporate mandates within their pharmacies.

Our study is strengthened by its rigorous mixed methods approach and a large sample of participants from diverse pharmacy settings, surveyed and interviewed at a key point in the implementation of pharmacy-based oral PrEP provision. Although recruited as a convenience sample, the demographics of survey participants are similar to those of California pharmacists and pharmacy students.[30] Interview participants were purposively selected to encompass a broad range of perspectives, including those in rural areas and of racial/ethnic identities that are underrepresented in pharmacy practice. However, there remain several limitations. Questions in the survey about pharmacy infrastructure and services were not specific to gluteal injections, limiting our ability to clarify pharmacists' willingness to administer LAI-PrEP based on their current service provision and availability of private spaces in quantitative analyses. Additionally, the cross-sectional survey design does not enable us to determine the directionality of associations. For example, it is possible that PrEP-related training increases pharmacists' willingness to provide LAI-PrEP and/or that those with higher willingness are more likely to seek out training. Thus, the associations found in exploratory analyses should be interpreted as hypothesis-generating. Although these survey data were richly contextualized by the qualitative interviews, we did not conduct on-site pharmacy observations that could offer a more robust picture of the issues that interviewed pharmacists faced in implementing LAI-PrEP. Finally, all analyses focused on provider-side perspectives. Further research is necessary to understand the perspectives of people who may seek LAI-PrEP in pharmacies, including potential experiences of stigma during encounters with pharmacists and other staff, and to evaluate pharmacy-based provision models that meet both supply- and demand-side needs and preferences through implementation science studies.

In conclusion, our study offers strong preliminary evidence that pharmacist-prescribed and pharmacist-administered LAI-PrEP may be feasible in California pharmacies. However, individual, organization, and structural barriers remain that are likely to limit implementation of this service. Results from this study can inform policy directions and implementation considerations amidst a rapidly changing PrEP provision landscape.

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