



Perceptions of Long-Acting Injectable Antiretroviral Therapy Among People Living with HIV Who Use Drugs and Service Providers: a Qualitative Analysis in Rhode Island

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Accepted: 12 June 2023 / Published online: 10 August 2023
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Abstract Long-acting injectable antiretroviral therapy (LAI-ART) is a novel method to deliver HIV treatment, and the first regimen was approved in the USA in 2021. LAI-ART may mitigate barriers to oral treatment adherence, but little is known about LAI-ART perceptions among people living with HIV (PLWH) who use drugs, despite these populations facing greater barriers to treatment retention and ART adherence. We assessed LAI-ART perceptions and implementation considerations among PLWH who use drugs and health and ancillary service providers in Rhode Island. Data was collected from November 2021 to September 2022, and include in-depth interviews with 15 PLWH

who use drugs and two focus groups with HIV clinical providers ($n=8$) and ancillary service providers ($n=5$) working with PLWH who use drugs. Data were analyzed thematically, with attention paid to how levels of structural vulnerability and social-structural environments shaped participants' LAI-ART perceptions and the HIV care continuum. Willingness to consider LAI-ART was impacted by HIV outcomes (e.g., viral suppression) and previous experiences with oral regimens, with those on stable regimens reluctant to consider alternative therapies. However, LAI-ART was seen as potentially improving HIV outcomes for PLWH who use drugs and enhancing people's quality of life by reducing stress related to daily pill-taking. Recommendations for optimal implementation of LAI-ART varied across participants and included decentralized approaches to delivery. HIV care delivery must consider the needs of PLWH who use drugs. Developing patient-centered and community-based delivery approaches to LAI-ART may address adherence challenges specific to PLWH who use drugs.

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Keywords HIV · Long-acting injectable
antiretroviral therapy · Substance use · Acceptability ·
Qualitative research · HIV treatment

Introduction

Advancements in antiretroviral therapy (ART) have significantly improved HIV management for

individuals with consistent access to treatment, thereby redefining HIV as a manageable, chronic condition [1, 2]. However, there are notable barriers to effective long-term HIV management, including daily oral ART adherence requirements and retention in care, which can be complicated by individual (e.g., pill burden, substance use), social (e.g., stigma, privacy concerns), and structural (e.g., medication costs, housing instability) factors [3–6]. Surveillance data has estimated only 66% of people living with HIV (PLWH) in the United States (US) have reached sustained viral suppression [7], underscoring a need to improve HIV treatment access and ART adherence. Given the factors impacting ART access and adherence, long-acting injectable (LAI) ART formulations have been developed to optimize treatment outcomes and reduce HIV-related morbidity, mortality, and viral transmission [8, 9].

In January 2021, injectable cabotegravir and rilpivirine was approved by the US FDA as a LAI treatment option for PLWH. This treatment is delivered as two intramuscular injections administered monthly or every other month. As such, LAI-ART holds promise for mitigating some barriers people face with daily oral ART adherence (e.g., pill burden, difficulty remembering to take pills) [10]. While clinical trials have shown non-inferiority of LAI-ART in achieving viral suppression [11], most LAI-ART research has focused on people with high levels of oral ART adherence [11–13]. Furthermore, individuals with current substance use disorders that study investigators felt could interfere with trial adherence were ineligible for LAI-ART clinical trials to date [14, 15]. As a result, little is known about the effectiveness of LAI-ART among populations who face barriers to ART, including PLWH who use illicit drugs.

PLWH who use drugs are often sub-optimally engaged in the HIV care continuum [16–18] and often experience treatment interruptions and lower levels of viral suppression [19–21]. In 2019, an estimated 75.4% of PLWH who use drugs were connected to care within the first month of diagnosis compared to 81.3% of PLWH who do not use drugs, and 57% were virally suppressed compared to 65.5% of the overall population of PLWH [7]. Research has documented that PLWH who use drugs are disproportionately impacted by social and structural barriers (e.g., housing vulnerability, insurance barriers) that impede HIV treatment access and retention in

care further affecting their health [20–22]. Although PLWH who use drugs have historically experienced challenges to ART adherence, no LAI-ART clinical trials have been published that focus specifically on this population. While recent research has shown promising early LAI-ART treatment outcomes among PLWH who have experienced adherence challenges, including people who use drugs [23], little is known about the acceptability or feasibility of LAI-ART among PLWH who use drugs. We sought to address this gap by examining LAI-ART perspectives among PLWH who use drugs and clinical and ancillary service providers who support these populations. We aimed to assess whether LAI-ART may mitigate barriers to HIV care among PLWH who use drugs and how location of LAI-ART roll-out may shape access to, and uptake of, this emerging treatment option.

Methods

Qualitative data was collected in Rhode Island from November 2021 to September 2022. Data include semi-structured interviews with 15 PLWH who use drugs (see Table 1), and two focus groups with clinical providers (e.g., nurses, pharmacists, physicians; $n=8$) and ancillary service providers (e.g., harm reduction and housing outreach workers; $n=5$) who work with PLWH who use drugs. All study activities were approved by the Institutional Review Boards at Brown University and The Miriam Hospital. Participants provided written informed consent prior to their interview or focus group, and all study participants received \$40 (USD) honoraria.

Individual interviews were conducted with PLWH who use drugs to elicit in-depth individual-level perspectives [24] on their HIV treatment experiences and perceptions of LAI-ART. who were recruited from the Immunology Center of the Miriam Hospital—which serves the largest population of PLWH in Rhode Island—and community locations (e.g., drop-in centers, meal service programs). Participants were recruited through referrals by Immunology Center staff, study flyers, and by word-of-mouth. Interested individuals were provided with the study number where they could call and be screened. Eligible interview participants were 18 years of age or older, had a self-reported HIV diagnosis, and self-reported use of illicit stimulants (e.g., cocaine, crack,

Table 1 Participant demographics — PLWH who use drugs (*n* = 15)

Participant characteristic	<i>n</i> (%)
Age	
Mean	51 (range: 24–68)
Race and ethnicity¹	
Black	2 (13)
White	7 (47)
Indigenous	2 (13)
Hispanic	2 (13)
More than one race	3 (20)
Gender¹	
Woman (transgender-inclusive)	7 (47)
Man (transgender-inclusive)	8 (53)
Cisgender	12 (80)
Transgender	3 (20)
Housing status	
Housed	8 (53)
Unhoused ²	7 (47)
Length of time since HIV diagnosis	
0–5 years	3 (20)
6–10 years	2 (13)
11–20 years	4 (27)
20+ years	6 (40)
On ART at time of interview	
Yes	14 (93)
No	1 (7)
ART access	
Delivery	3 (20)
Pharmacy pick-up	7 (46)
Other (e.g., delivery and pick-up)	1 (7)
N/A	1 (7)
No response	3 (20)
Length of time on ART at time of interview	
< 1 year	—
1–5 years	6 (40)
6–10 years	2 (13)
11–15 years	—
16–20 years	4 (27)
> 20 years	2 (13)
N/A	1 (7)
HIV clinic visit frequency	
1 time per year	—
2–3 times per year	6 (40)
4–6 times per year	6 (40)
Monthly	1 (7)
Other (e.g., weekly, twice per month)	2 (13)
Frequency of substance use	
One or fewer times per week	2 (13)
3–4 times per week	4 (27)
Daily	9 (60)

crystal methamphetamine), illicit opioids (e.g., fentanyl, heroin), counterfeit prescription pills (defined

Table 1 (continued)

Participant characteristic	<i>n</i> (%)
Drug use (30 days prior to interview)¹	
Cocaine	7 (46)
Crack cocaine	11 (73)
Crystal methamphetamine	4 (26)
Fentanyl	5 (33)
Benzodiazepines	2 (13)
Alcohol	12 (80)
Other (e.g., synthetic marijuana, opioid pills)	2 (13)
Overdose in last year prior to interview	
None	11 (74)
One	2 (13)
Two	2 (13)
Income generation in last 30 days¹	
Part-time employment	6 (40)
Sex work	5 (34)
Drug selling	4 (27)
Social assistance/disability	9 (60)
Panhandling	2 (13)
Reselling goods	7 (47)

¹Responses are not mutually exclusive

²Includes couch-surfing, staying in hotels/motels, and residential treatment centers

as prescription pills obtained through the street-based drug market), or injection drugs and/or binge or chronic alcohol use (> 14 drinks per week) in the prior 30 days (see Table 1). Individuals who only reported marijuana use were not eligible. Although participants were eligible if they self-reported only binge or chronic alcohol use in the prior month, all participants enrolled reported using illicit substances. Furthermore, while current treatment with LAI-ART was not a study exclusion criterion, no participants were taking LAI-ART at the time of their interview.

Interviews were conducted in field sites (e.g., hotels, apartments, Immunology Center) or in a private interview room at our university by a member of the research team (CM). Interviews were facilitated using an interview guide that included topics such as substance use patterns, experiences with HIV treatment, HIV-related stigma, perceptions of LAI-ART, and implementation considerations. Interviews were conducted when the oral ART lead-in was required based upon the FDA approval of LAI-ART. Interviews averaged 45 min in length.

Two focus groups were also conducted with clinical and ancillary service providers to assess

feasibility, acceptability, and implementation considerations for LAI-ART. Because we sought to understand providers' experiences working with PLWH who use drugs, including barriers and facilitators to care, we utilized focus groups which provide a group-level, collective understanding of study topics [24]. Focus groups were dichotomized by service provision type (i.e., clinical or ancillary services) to better facilitate inter-group discussions on interview topics and allow for group norms and processes to be identified [24]. By dividing focus groups by provider type, we also sought to minimize potential barriers to participants sharing perceived challenges of their clients/patients that may be related to clinical or ancillary service dynamics (e.g., healthcare stigma). Participants were recruited by email where they were invited to participate in a 1-h focus group. We aimed to recruit 8–10 participants per focus group to allow for two representatives from each organization type (e.g., AIDS service organization, harm reduction organization) or role (e.g., provider, nurse). Eight clinical providers were recruited for the first focus group, and five ancillary service providers were recruited for the second focus group. Focus groups were conducted in private rooms at two clinic locations, were co-facilitated (CM, AC), and averaged 60 min. Focus groups were facilitated using a guide that included topics such as barriers to ART adherence among PLWH who use drugs, gaps in services and supports, LAI-ART perceptions, and LAI-ART implementation suggestions.

Interviews and focus groups were audio recorded, transcribed verbatim by a transcription company, and reviewed for accuracy by a member of the research team. Data were imported into NVivo where they were coded and analyzed thematically [25]. Transcripts were independently read by two study team members. A preliminary coding framework was developed based on a priori categories from the topic guides, existing literature, and through line-by-line open coding of the first five interviews. The coding framework was revised as new categories emerged during analysis after which transcripts were re-coded once final categories were established [26]. All data and code summaries were reviewed by two members of the study team, and the larger team met bi-weekly throughout the analysis process to review emerging findings and resolve any discrepancies.

Results

Interview participants averaged 51 years of age (see Table 1). Most interview participants were cisgender (80%), and 47% were women (transgender-inclusive). Almost half of participants were white (47%), with the remainder of participants being multi-racial (20%), Black (13%), Indigenous (13%), and Hispanic (13%). At time of interview, 53% of participants were housed. Most participants had been diagnosed with HIV for over 20 years (40%), and most (40%) had been on oral ART for 1–5 years. All but one participant was on oral ART at time of interview. Of the 15 interview participants, 60% used alcohol and/or other drugs daily, while the remainder used drugs 3–4 times per week (27%) or one or fewer times per week (13%).

One-Size-Fits-All Approach: Characterizations of LAI-ART

All clinical provider participants knew of LAI-ART and/or had direct experience with LAI-ART administration, while only one ancillary service provider knew of this treatment prior to their focus group. Among interview participants, all but two had heard of LAI-ART prior to their interview, with participants having seen advertisements, and a few learning about LAI-ART from their healthcare provider or peers. Most participants' knowledge of LAI-ART was limited to frequency of injection administration, with side effects and logistical considerations (e.g., option for oral lead-in, monitoring) unknown. Given the limited information about LAI-ART, perceptions varied across participants.

Notably, some participants drew on what they characterized as a “*one-size-fits-all*” approach to highlight their concerns about LAI-ART. For these participants, having a single LAI-ART regimen (cabotegravir/rilpivirine combination) was viewed as a potential limitation to this treatment. One participant who had been on oral ART for more than 20 years explained:

Are they gonna, like customize that [the time between injections]? Or do you think it'll be a generic blanket? I mean, like, my system may be able to go 8 weeks. Somebody else's may only be able to go four. [Frank, 59-year-old white man]

For some participants, this hesitation was reflective of how they perceived LAI-ART to be at odds with existing ART regimens which participants described as requiring “*trial-and-error*” to find a treatment that worked. While most participants reported being on Biktarvy, participants readily described having cycled through several regimens before finding one suitable for them that did not lead to adverse side effects (e.g., night terrors, interference with methadone). Because “*some things [treatments] work for some and some work for others,*” several participants were apprehensive about transitioning to LAI-ART which had a singular formulation.

Similar sentiments were echoed by several focus group participants who underscored the current barriers resulting from a single LAI-ART formulation. One provider explained:

The other thing that we also see is that our clients have a lot of resistance to the medication, right? And one of the main medications in this injectable is one of the first pills that they came out with...So they already try to get a lot of our people on those pills, because it was only one pill. But now a lot of them have built up a resistance to that pill and now can't get that injectable. [FG 2, Participant 4, ancillary service provider]

The limitations to the current LAI-ART formulation were further considered as an oversight of “*real-world application*” and how this resulted in gaps for PLWH who use drugs. One provider shared:

There's this disconnect between how drugs are being made and how drugs need to be used. And I think that's the nature of this being the first injectable therapy, is that they want the study population most likely to show benefit and safety. ...And that makes sense for a study design, but real-world application, you know, who would most benefit from it [aren't considered]. [FG 1, Participant 1, clinical provider]

While no participants described having resistance to particular ART regimens, the concerns related to potential for resistance due to missed LAI-ART appointments was stressed by providers as a significant limitation to roll-out among PLWH who use drugs.

Injectable Versus Oral Treatment

For participants who had prior experiences—and challenges—with finding a suitable oral regimen since their diagnosis, willingness to consider LAI-ART was intimately tied to their current treatment and viral suppression. Previous treatment challenges, including periods of treatment disruptions, resulted in numerous participants feeling like their oral ART were the best solution. One participant who previously experienced extended intervals in which they were off ART explained:

That's part of the reason why I'm afraid to go get the shot, cause it's too long of an interval. It's not the fact that I can't go get em [pills]...it was the fact that I ran out and I was stuck on the corner smokin' crack somewhere and I didn't leave the corner. [...] But I don't feel like takin' a shot every two months would be good for me cause I need the structure [of a pill]. Like, if I go two months without havin' it, I'm like gonna forget goin' to the hospital or something, unless I get a reminder like, but if you put it too far out, I forget. [“David,” 38-year-old white man]

Other participants, who had previous treatment interruptions, echoed the perceived barrier of not having their oral ART as a reminder. Here, the “*structure of the pill*” was described as important for some participants to maintain adherence.

However, most providers described LAI-ART as being particularly important for PLWH who use drugs given the extensive challenges this population faced in HIV care. Most providers characterized their clients' and patients' levels of structural vulnerability (e.g., housing instability, substance use patterns, sex work involvement) as significantly impacting their ability to regularly take oral ART, and LAI-ART was described as a critical solution to HIV care management and mental health. One provider explained how LAI-ART could reduce the burden their clients faced:

I know a lot of our clients like live with that fear [of dying]. Especially a lot of our clients who are in active drug use, who, you know, at one moment they might just start thinking about it and just spiral outta control and that leads to them showing up and being like, 'I wanna go to the emergency room. I think I

got AIDS, I think I'm dying.' You know what I mean? And I think it [LAI-ART] could really improve people's mental health. [FG 2, Participant 1, ancillary service provider]

Such sentiments were echoed by some participants who described LAI-ART as an option that would significantly reduce stress related to daily oral ART. "Trina," a 57-year-old white transwoman, explained:

It [LAI-ART] sounds amazing, I want to try that. ...So I don't have to worry about if I forget to take my meds...so I'm 100% convinced I want it. [...] I seen it on Facebook – it was an ad. I was like, 'Oh my God, that's what I need.' Because sometimes I wake up and when I'm out of the house and I'm already going to the [soup kitchen], I'm like, 'Damn, I forgot to take my meds.'

Participant narratives illustrate how their structural vulnerabilities can at times challenge their ability to regularly take oral ART as they seek to meet their basic needs.

Other participants who had experienced ART disruptions further stressed the benefits of LAI-ART at helping them maintain their HIV care. "Mark," a 52-year-old white man who recently restarted oral ART after a disruption explained:

I'm back on my meds. But my last visit...that's when I found out about this shot once a month. Man, I want that. I don't want to be remembering to take a pill every single day. ...I know I'm not the only one out there that gets sick and tired of taking pills or forgets. [...] [With LAI-ART] a lot of people, they'll live longer, they'll be undetectable, and I think they'd be a little happier. I know I would. I wouldn't have to worry, 'Oh did I take my med? Oh my god—oh wait a minute, I got this. I'm good for two months.'

Here, "Mark" stressed what he saw as the potential for LAI-ART to improve people's quality of life by addressing the overall stress and pill burden.

However, several participants juxtaposed how they felt LAI-ART was characterized as an easier option—"this can free your life"—with the clinic demands it required. "Jess," a 42-year-old bi-racial transwoman,

explained how increased clinic visits would be challenging:

The only reason why I haven't really fired [up] about it [LAI-ART] is because it's such a demanding thing where you have to go in and like you have to go there every month and you have to monitor it and you have to check it. And it's just a lot of going into the office and doing all that stuff. Where I'd rather just take my one pill - one pill a day.

For some participants, oral ART was not described as constrictive, but rather characterized as providing structure which they felt was necessary to maintaining ART adherence and managing their HIV.

Perceived Risks of LAI-ART

While almost all participants thought LAI-ART was safe, many underscored the potential risks of switching treatments. For participants who expressed some concerns, most focused on how LAI-ART might impact their viral suppression. "Sean," a 57-year-old Black man, described his concerns about the oral lead-in period which was required at time of interview:

For the four weeks [lead in] am I being monitored? And how does that happen? I mean, am I coming for a blood test once a week or - I don't wanna be not taking my HIV meds for a long period of time and being gone unchecked.

Like "Sean," other participants underscored a fear of experiencing adverse HIV outcomes if they transitioned from oral ART to LAI-ART: "I don't know—if it's not broke, don't fix it. And I would be scared. I'd be afraid in case my levels drop low and I get sick—just nah. ...Especially since it just got approved" ("Nancy," 58-year-old white woman). Importantly, most participants who raised concerns about viral load impact had been on oral ART for at least 5 years and described the importance of their current regimen at maintaining their overall health.

Although some participants' concerns were related to the effectiveness of LAI-ART, others stressed how missing LAI-ART clinic appointments would create increased risk of adverse HIV outcomes. "Monique," a 51-year-old Black woman, explained: "Maybe it is good though [but] when you have to miss an

appointment, you're fucking up your medicine." The importance of the clinic appointment in relation to LAI-ART was echoed by participants who simultaneously underscored competing priorities and barriers (e.g., transportation, work schedules, substance use patterns) that at times impacted their clinic attendance. For these participants, committing to monthly or bi-monthly clinic visits for injections was considered a potential barrier.

Moreover, some participants described how concerns of potential LAI-ART side effects (e.g., viral load disruptions, allergic reaction) made them hesitant. Participants drew on negative experiences and complications they had experienced with prior ART regimens and wanted to avoid similar issues. One participant shared:

What happens if my thyroid starts actin up, you give me the shot, and we don't realize anything. And then I'm not gettin tested because I've been undetectable and I'm on the shot and next thing you know, the shot's not even workin cause my thyroids fucked up. Next thing you know I go do somethin with somebody and then I'm sittin in jail for attempted murder [i.e., HIV transmission] because I thought I was clean [undetectable]. ["David," 38-year-old white man]

For "David," uncertainty about the interaction of LAI-ART with their co-occurring health conditions and the potential for this to impact their viral suppression led to significant hesitation. Despite such concerns, most participants stressed the importance of clarity and transparency about LAI-ART side effects and how this information would impact their decision.

For many participants, LAI-ART's "newness" was a catalyst for hesitancy. However, some participants described potentially being interested in LAI-ART after it had been available for a while, so the longer-term impacts of the treatment were known. One participant explained:

Once the trial is over I'll check it out again... I'll see what's going on. I would be more apt to try it. But right now, I'm just going to continue with my pills until I can see what happens with others. ...Is the injection going to do the same to your body that the pill would do on your kidneys? I am worried about you know either kidney failure, kidney issues. And, I mean, if it has

less side effects than my pill, I'm willing to try it. ["Jess," 42-year-old biracial transwoman]

LAI-ART Implementation Considerations

Target Populations

Most participants stressed the importance of offering LAI-ART to all PLWH and allowing individuals to make the best decision for their health. One participant shared:

I think that people need options. You know, 'There's this and there's this and this and this.' You know? Like I said, for me personally, the pill right now is the most important thing. ["Antonio," 68-year-old Hispanic man]

Here, participants underscored the need for equitable roll-out rather than prioritizing certain populations. In doing so, participants stressed the diversity of PLWH and how a range of treatment options could better support peoples' needs:

I think it would be very effective for everybody. Because you figure you've got people that work overnights that don't want to deal with having to take a pill when they got out of work...People who have drug addiction. People with mental health issues. People that have mobility issues. ["Dominic," 50-year-old multi-racial man]

Although most participants felt LAI-ART should be offered to all PLWH, some described the need to prioritize PLWH who use drugs or who were unstably housed given the additional barriers to clinic and treatment adherence they often faced. One participant who used drugs daily explained how people who use drugs should have priority LAI-ART access:

We procrastinate. We put shit off. ...People don't – I don't listen. It's the dope or the antiviral; I'm gonna do the dope. But if it's one shot, I can do that just I think it'd be manageable. ["Angela," 49-year-old Indigenous woman]

Providers underscored similar barriers to care among people who use drugs, stressing the disconnect between populations that should be offered LAI-ART and those that had been included in clinical trials. One provider explained:

[There are] caveats that go with it [LAI-ART]. The ideal population that we wanted injection ART for was those that can't adhere to the daily medicine. For those that, you know, are unable to become undetectable. And that's not how this one was studied, unfortunately. So we're really waiting for that treatment option for people. [FG 1, Participant 5, clinical provider]

Other providers underscored the utility of LAI-ART for case managers who often helped their clients manage their HIV care:

I think it's a great option especially for people who have trouble taking their meds, holding on to their meds. ...I feel like it's more reasonable for a lot of folks and it's more manageable from a case manager perspective. Like if I know my client has this once-a-month appointment and I know the day in advance I can really plan around it, I'm gonna get them to that appointment. As opposed to the unexpected, 'I lost my meds last night. I need to get them as soon as possible' which then throws you into having to do a lot of work. [FG 2, Participant 3, ancillary service provider]

Dispensing Locations and Accessibility

Recommended approaches to LAI-ART delivery varied across participants. Providers described the utility of decentralized LAI-ART roll-out, including community-based delivery (e.g., mobile medical units) and co-location with substance use treatment programs and harm reduction services. One provider explained the potential benefit of offering LAI-ART at a drop-in center where outreach workers could administer it: *"My personal thing is because we do HIV and Hep C...I think if we were trained they would trust us. Our people. I think they would"* (FG 2, Participant 2, ancillary service provider). Other ancillary service providers echoed these sentiments drawing attention to the more medicalized supports outreach workers provide to clients, including supporting clients administer hormone replacement therapy and responding to overdoses. Given these experiences, several ancillary service providers felt confident they could administer LAI-ART with training: *"Like, not*

for nothing, but we've all Narcaned a bunch of people, you know what I mean? Like just give us the right vial of medication – we got this" [FG2, Participant 2, ancillary service provider].

In addition to co-locating LAI-ART in drop-in centers, providers described the need to *"meet people where they're at"* through mobile delivery approaches. One provider explained:

I don't know how logistically feasible it is, but if it were something that could be administered in an outreach setting for the folks who aren't even gonna come like walk into facilities, that would be great too. Cause we do have docs...that could come out with us, you know what I mean? [FG2, Participant 5, ancillary service provider]

Increasing availability of LAI-ART across settings was described by providers as important for improving access to, and retention in HIV care.

While providers promoted decentralized roll-out, many participants described wanting to access LAI-ART from their clinic rather than a community location. Here, the clinic was positioned as a space that offered privacy and discreetness about one's HIV status that was variable in community settings (e.g., pharmacy, drop-in center). One participant explained: *"I'd rather get it from my clinic. I don't want [drop-in center] and stuff in my business. It's more privacy if you do it at your doctor's office"* ('Trina,' 57-year-old white transwoman). For others, the clinic was seen as a more appropriate option, so their HIV care was only managed by *"professionals"*:

I wouldn't do it at like a Walgreens or anything like that because they're not truly professionals. They're pharmacists. Pharmacists just deal with pharmaceuticals. You don't deal with individuals on a regular basis. ["Troy," 59-year-old Indigenous man]

In these instances, participants illuminated how critical trust was for their HIV care. Notably, almost all participants described having positive relationships with their providers and clinic staff, which contributed to the clinic being a safe space. One participant who had described extensive privacy issues with their status when accessing a drop-in center explained: *"[I'd prefer it] at my doctor's*

cause he know more about me than everybody else” (‘Monique,’ 51-year-old Black woman).

However, several participants who regularly experienced barriers to attending clinic appointments highlighted how restricting LAI-ART roll-out to their HIV clinic was a potential barrier. For these participants, offering LAI-ART in alternative locations (e.g., pharmacies, community health clinics) or through at-home self-administration was described as important for increasing accessibility. One participant explained:

Sometimes I’ll forget to take my pills or I just don’t want to. And I think I would be willing to at least consider it a bit—talk about it more with [provider] about just getting it. But see, I don’t know if I could get here once a month. You know what I mean? Cause I’m working. You know, I don’t wanna take time off work just to get a shot. If they could come to your house or something like that I would be more, you know, [interested]. [“Sean,” 57-year-old Black man]

The utility of home-based LAI-ART administration was echoed by other participants, including those who were already self-administering hormones. One participant described:

If I could take the injection home, maybe I could do one injection. Boom. ...Yeah, if I could take a little vial home, I mean, take an injection once a month. And I already do injections now intramuscularly [for estrogen]. [“Jess,” 42-year-old bi-racial transwoman]

Similarly, providers stressed how self-administration would be critical for their patients who use drugs. One provider explained:

It’s not perfect [LAI-ART]. I mean, it’s the first of the options that we have available for this. So hopefully as more and more [formulations] come out, we’ll have a more perfect option. Like for one, patients can’t self-administer so that’s a barrier especially in this patient population. To have to come into the office every one to two months? ...Being able to self-administer is key. [FG 1, Participant 3, healthcare provider]

Discussion

This study explored LAI-ART perceptions among PLWH who use drugs and health and ancillary service providers. Our findings demonstrate how LAI-ART willingness to was shaped by existing HIV outcomes (e.g., viral suppression) and experiences with oral ART, with participants who were on stable regimens reluctant to switch therapies. However, LAI-ART was positioned as a treatment option that could improve HIV outcomes for PLWH who use drugs and enhance people’s quality of life. Our findings also highlight variations in implementation considerations for LAI-ART including community-delivery and at-home delivery to mitigate barriers to access.

As LAI-ART becomes more available in the US, our findings demonstrate a need to consider the perspectives and experiences of PLWH who use drugs in the implementation and accessibility of this treatment. This study underscores the significance of previous ART experiences on LAI-ART perceptions. Research has documented a preference for LAI-ART over daily oral treatments [27–29]. While providers in our study perceived LAI-ART to be useful for mitigating barriers to daily oral ART for PLWH who use drugs, this sentiment was not echoed by all participants. Rather, our findings suggest that participants who had consistently been on ART for several years were hesitant to switch treatments compared to participants who continued to experience disruptions in care more frequently or had a more recent disruption. Future research should continue to assess how previous ART experiences may impact willingness to consider LAI-ART and how this may vary across sub-populations. Furthermore, offering a range of treatment options to PLWH who use drugs, including LAI-ART, is critical for meeting people’s diverse needs.

While LAI-ART is well-positioned to mitigate many barriers related to oral ART adherence, new challenges have been documented (e.g., storage infrastructure, insurance coverage of treatment, provider readiness) [30]. Our findings echoed some of these barriers, underscoring how the need for increased clinic visits could limit LAI-ART uptake among PLWH who use drugs. Participants described how existing barriers to clinic visits (e.g., transportation barriers, lack of phones) would continue to pose challenges for monthly LAI-ART appointments.

Bimonthly visits may improve acceptability of LAI-ART, as well as future LAI-ART iterations which may have less frequent injections. Importantly, drug use was rarely discussed as a barrier to HIV treatment among interview participants, despite most using drugs daily. Rather, barriers to care were framed around levels of structural vulnerability, including housing instability and socio-economic marginalization. While a substantial body of research has underscored drug use as one of the most common predictors of adverse HIV-related health outcomes—including ART adherence [19, 31–33]—our findings point to the role of structural barriers at reinforcing health inequities among this population. This distinction by participants is important as it underscores the need for more comprehensive supports addressing the structural vulnerabilities experienced by PLWH who use drugs (e.g., financial supports, increased access to affordable and stable housing, job security) which were described as undermining participants' abilities to effectively manage HIV. Mitigating structural barriers is thus imperative for improving access to, and retention in, HIV care and supporting PLWH who use drugs at HIV management.

Research has demonstrated that structurally vulnerable participants may prefer to access LAI-ART from community settings [24]. In our study, participants were divided on preferred location of LAI-ART roll-out with trust, privacy, and accessibility deemed the most critical to implementation. Notably, providers underscored how decentralized LAI-ART implementation could improve accessibility and retention in HIV care among PLWH who use drugs. However, many participants described how community and non-clinic spaces (e.g., drop-in centers, pharmacies) lacked the level of privacy afforded by their HIV clinic and were thus not preferred for integrating HIV care. Despite this, some participants who were experiencing transportation barriers or were receiving at-home treatments (e.g., hormone injections) described how alternative locations to LAI-ART access would increase accessibility. Notably, these variations in LAI-ART delivery—and HIV care access more broadly—underscore the need for patient-centered care delivery that is tailored to the diverse needs of populations. Research should examine the feasibility and roll-out of LAI-ART across non-clinic settings, including co-locating with existing services for people who use drugs (e.g., opioid treatment programs,

syringe service programs), and mechanisms for enhancing HIV-related privacy and promoting trust in these locations. Additionally, pilot testing LAI-ART home administration and improving clinic transportation services may also be important for ensuring PLWH who use drugs have numerous options for HIV care to utilize.

Despite the clinical effectiveness of LAI-ART [11–13], our study documented several areas of consideration for implementation. First, equitable roll-out was stressed across participants, elucidating the disconnect from clinical trial approaches and real-world implementation. Increasing the agency of PLWH to make choices about the best care for themselves was seen as critical to LAI-ART effectiveness. Moreover, participants emphasized how increased transparency about LAI-ART and its side effects was needed to help patients choose treatment options. While oral ART regimens vary among PLWH who use drugs, developing additional LAI-ART regimens that include alternative medications may also be important for increasing accessibility among individuals who have existing resistance to the current formulation. Importantly, there is a critical need to address social-structural inequities faced by PLWH who use drugs, including housing instability, transportation barriers, and stigma, to better support access to care and treatment retention. Examining how tailored, participant-driven approaches to LAI-ART impact access across specific populations is needed.

There are several limitations to note. Most participants were recruited through an HIV clinic, and thus, the perspectives of PLWH who were not engaged in care are underrepresented. Future research should focus on LAI-ART perceptions and uptake among this population as they may benefit from long-acting treatments. While we reached thematic saturation, transgender and gender diverse participants were underrepresented, and additional research is needed to examine their perceptions of LAI-ART. Our study also captures perspectives from a single geographic site, and multi-sited research could be beneficial at exploring variations and implementation considerations, particularly as it relates to rural communities. Furthermore, the oral ART lead-in period was removed during this study and may have impacted some participants' perspectives of LAI-ART.

This work underscores the need for HIV care delivery that is more attuned to the barriers faced by

PLWH who use drugs. Developing patient-centered and community-based delivery approaches to HIV treatment, and specifically LAI-ART, may mitigate challenges specific to PLWH who use drugs.

Acknowledgements The authors thank the study participants for their contribution to this research, as well as research staff for their administrative and research support. We also thank the community organizations who participated in this project. This study was conducted on the traditional and ancestral lands of the Narragansett peoples. This study was funded by the Boston/ Providence Center for AIDS Research (P30AI042853). ABC is partially supported by NIGMS (P20GM125507).

Author Contribution ABC and CB designed the study and secured funding for the study. ABC, CM, and CB implemented the study. CM conducted data collection, and RJ supported participant recruitment. ABC and CM developed the analysis plan and codebook. ABC and CM coded and analyzed the data with interpretation support from KL and CB. ABC wrote the first draft of the manuscript. All authors (CM, KL, RJ, AT, CD, CB) provided written feedback on the initial draft of the manuscript. ABC revised the manuscript according to comments received. All authors read and approved the final version of the manuscript. ABC and CB secured the funding.

Data Availability Due to the nature of questions asked in this study, participants were assured raw data would remain confidential and would not be shared.

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