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COVID-19 vaccine implementation at a syringe services program: experiences of frontline staff

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Abstract

Background While people with substance use disorders, including people who inject drugs (PWID), experience increased risk for COVID-19 infection and adverse outcomes, COVID-19 vaccination rates among PWID are consistently lower than those observed in the general population. Offering COVID-19 vaccines at syringe services programs (SSPs) has been proposed as a critical strategy to increase vaccine uptake among this population. We explored the experiences of frontline staff at an SSP in Miami, Florida implementing onsite COVID-19 vaccines.

Methods Between June and July 2022, we conducted in-depth semi-structured interviews with 17 staff members of an SSP in Miami, Florida. Data collection and codebook thematic analysis of transcribed interviews were guided by the Consolidated Framework for Implementation Research (CFIR).

Results Facilitators and barriers of COVID-19 vaccine implementation at the SSP aligned with all major CFIR domains. Key facilitators included the SSP's established partnership with the local health department for vaccine distribution, its existing funding sources which could be leveraged for vaccine-related expenses, consensus among staff about the need for new strategies to increase vaccine uptake among PWID, and PWID's trust in the SSP. Major—but largely modifiable—barriers included lack of participant compensation, limited internal collaboration and communication regarding the vaccine initiative beyond implementation leads and innovation deliverers due to competing priorities and segmented roles and responsibilities, and insufficient involvement of the most participant-facing staff (i.e., the SSP's peer navigators and outreach workers).

Conclusions Implementing onsite COVID-19 vaccines was perceived as feasible and acceptable by frontline staff at the SSP, however contextual factors impeded optimal implementation. Multilevel strategies, such as participant compensation for vaccine completion and internal educational meetings with staff to improve vaccine implementation and reach, are required. As a trusted source of preventative services for PWID, SSPs are an underutilized venue for increasing vaccine uptake among this population, and findings from this study could inform the expansion of low-barrier vaccine services at SSPs nationwide.

Keywords COVID-19, Vaccines, People who inject drugs, Syringe services programs

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Contributions to the literature

- People who inject drugs (PWID) are at increased risk of adverse outcomes due to COVID-19 yet have lower COVID-19 vaccination rates compared to the general population.
- Key facilitators for implementation of COVID-19 vaccines at a syringe services program (SSP) included the SSP's partnership with the local health department for vaccine distribution, existing funding sources, consensus about the need to increase vaccine uptake among PWID, and PWID's trust in the SSP.
- Key barriers included lack of participant compensation, limited internal staff collaboration and communication about the vaccine initiative, and insufficient involvement of the SSP's peer navigators and outreach workers.
- Analysis of front-line staff experiences will allow for evidence-based adaptations to address gaps in vaccine implementation, enhancing service availability and increasing awareness through knowledge-sharing from trusted staff members.

Background

As of December 2023, there have been more than 772 million confirmed cases and nearly 7 million deaths due to COVID-19 globally [1]. Despite their efficacy in preventing COVID-19 infection and decreasing the severity of symptoms, as of December 2023, only 66 per 100 people worldwide had received a complete primary series of the COVID-19 vaccine and only 31 per 100 people had received at least one booster dose [1]. In the United States, those figures are only slightly higher at 70 and 36 per 100 people, respectively [1].

Individuals with substance use disorders (SUD), including people who inject drugs (PWID), have increased risk for COVID-19 infection and adverse outcomes, partly due to their higher rates of comorbidities [2–4]. Despite these increased risks, research in a variety of contexts has identified lower COVID-19 vaccination rates among PWID than the general population, ranging from 10% in Oregon in mid-2021 to 49% in Australia in 2021 [3, 5–7]. Reasons for limited vaccine uptake in populations impacted by SUD include a range of individual and structural-level barriers. Studies have identified a "marked ambivalence" about COVID-19 in general and COVID-19 vaccines in particular [5, 8]; heightened concerns about potential side effects [8–10]; insufficient and/or inaccurate information; stigma and discrimination in healthcare settings; government mistrust; inadequate access to transportation and technology; and competing priorities of higher-order needs [5, 8, 11–16] as significant barriers to vaccine uptake.

Various implementation strategies have been proposed since the start of the COVID-19 pandemic to overcome these barriers, including creating vaccination points in places that PWID frequent and feel comfortable, such as syringe service programs (SSPs) [11]. Created primarily to provide sterile injection equipment to prevent and reduce harms associated with injection drug use, SSPs have expanded their services to address other needs of PWID, including overdose education and naloxone distribution, wound care, SUD treatment, and vaccine services. However, while a 2021 survey of 105 SSPs from 34 US states found that 87% of respondents believed it would be somewhat or very important to offer onsite COVID-19 vaccine services, only 44% of participating programs reported doing so, highlighting a significant gap in implementation [17]. Thus, as one of the only sources of culturally competent care for PWID, SSPs are an untapped venue for increasing COVID-19 vaccine uptake among PWID. Preliminary studies of the implementation of COVID-19 vaccines at SSPs have identified a handful of barriers, such as lack of appropriate facilities, lack of funding, lack of trained staff, and vaccine hesitancy among PWID, and facilitators, such as consistency of service delivery, respect for and close relationships with PWID, and monetary and non-monetary incentives [18–22].

These dynamics are playing out against a backdrop of more than 30 years of implementation of other vaccines, such as those for influenza and pneumococcus, at SSPs [20, 23, 24]. Much of this experience has focused on hepatitis B virus (HBV) vaccinations, with the percentage of SSPs in the United States implementing the HBV vaccine doubling from 16% in 2001 to 30% in 2021 [17, 25]. Numerous studies have demonstrated that offering HBV vaccines at SSPs is a feasible, effective, and cost-saving approach to increase uptake of the vaccine among PWID, and that additional adjunctive interventions, such as modest financial incentives and accelerated vaccination schedules, can increase vaccine series completion [26–33]. While lessons learned from this experience can be applied to COVID-19 vaccines, its newness and politicization warrant investigation to identify specific barriers and facilitators to implementation of COVID-19 vaccination at SSPs [22]. Thus, this study utilized qualitative thematic analysis informed by the Consolidated Framework for Implementation Research (CFIR) to explore the experiences of frontline staff at an SSP in Miami, Florida regarding facilitators and barriers to implementing onsite COVID-19 vaccines for PWID.

Methods

Setting

This study was conducted at the IDEA Miami SSP, which was established as the first legal SSP in Florida after 5 years of evidence-based advocacy in response to Miami-Dade's high rate of new HIV infections [34–36]. Since then, IDEA Miami has expanded beyond its core objective of syringe exchange to serve as a "one-stop-shop" for its participants, offering SUD treatment, if desired; HIV prevention, testing, and treatment; hepatitis C virus (HCV) testing and treatment; wound care; medication management; appointment reminders; and support to access social services such as housing and health insurance enrollment through its fixed site and mobile outreach [37–40]. At the time of this study, the SSP had been offering the Moderna COVID-19 vaccine for three months, emphasizing both first and booster doses. As of September 2024, the SSP had administered a total of 252 COVID-19 vaccines to 111 unique individuals. The SSP also offered influenza vaccines and was preparing to implement Hepatitis A and B vaccination. As of December 2023, IDEA Miami had enrolled over 2,300 PWID. Its participants are ethnically and racially diverse, with 38% identifying as Hispanic and 11% identifying as non-Hispanic Black. More than 70% of participants are male. At the time of enrollment, 9% of participants were living with HIV, and 40% were living with HCV [41].

Data collection

This study was approved by the University of Miami Institutional Review Board and follows the consolidated criteria for reporting qualitative research (COREQ) (Supplementary File 1). We conducted in-depth semi-structured interviews with all 17 staff members at the SSP who were not directly involved in this study (total $n=20$). Staff members were eligible for inclusion if they were 18 years old or older, worked at the SSP at the time of data collection (June-July 2022), and were able to provide consent to participate in the study in English. We approached all participants via email and they provided informed consent prior to any study activities.

Interviews took place in person in a private location or over Zoom and were conducted by one of the co-authors (MP) with previous training in qualitative methods and clinical experience at the SSP. The interview guide was structured according to the CFIR, an implementation determinant framework that guides the systematic assessment of barriers and facilitators of successful implementation (Supplementary File 2) [42]. The CFIR was selected over other determinant frameworks due to its wide application across diverse settings and topics, allowing for meaningful comparison with similar studies; additionally, its comprehensive and adaptable structure provides flexibility in identifying and analyzing multifaceted barriers and facilitators, making it ideal for capturing the complexity of real-world implementation challenges. Interviews lasted an average of 39 min and participants received USD 50 as compensation. The interviews were audio-recorded and transcribed verbatim in English by a third-party transcription service.

Data analysis

We analyzed the transcripts using codebook thematic analysis, in which themes are determined in advance of analysis and are drawn from established frameworks or theories, existing knowledge of the topic, and/or the interview guide [43]. Using Dedoose (version 9.0.107, Sociocultural Research Consultants, Los Angeles, CA), five study members (RC, ET, GM, MP, SSS) reviewed two transcripts and reached consensus on a structured codebook. Minor modifications to the codebook were made during the analysis of additional transcripts. Six study members (RC, ET, GM, LF, MP, SSS) analyzed all remaining transcripts simultaneously, with at least two study members coding each transcript. Any differences in coding were negotiated until consensus was reached. Once all transcripts were coded, code application and co-occurrence were analyzed across transcripts. The codes were then condensed into barriers and facilitators corresponding with the CFIR.

Validation strategies included collaboration and member checking [44]. With regard to collaboration, two of the co-authors (MP and SSS) are staff members at the SSP, albeit not staff members who were interviewed as part of this study. With regard to member checking, the themes were presented to the SSP's staff, and their feedback was incorporated into the analysis.

Results

Sociodemographic characteristics of the participants are provided in Table 1. Most participants were 40 years old or younger (65%) and there was a roughly equal proportion of men (47%) and women (53%). The sample was racially diverse, with 47% identifying as White, 35% identifying as Black, and 18% identifying as another race. The majority identified as non-Hispanic (71%). Notably, 35% of participants had lived experience with injection drug use and 41% had more than 10 years of experience working with PWID. The leadership status of participants within the organization was categorized according to the CFIR construct definitions, with 18% of participants categorized as high-level leaders, defined as iIndividuals with a high level of authority, including key decision-makers, executive leaders, or directors," 29% categorized as mid-level leaders, or "individuals with a moderate level of authority, including leaders supervised by a high-level leader and who supervise others," and 53% were other cadres of employees [42]. Specific roles within the

Table 1 Sociodemographic characteristics of participants

Sociodemographic characteristic	*N* (%)
Age (years)	
21–30	3 (18)
31–40	8 (47)
> 40	6 (35)
Sex	
Male	8 (47)
Female	9 (53)
Race	
Black	6 (35)
White	8 (47)
Other	3 (18)
Ethnicity	
Hispanic	5 (29)
Non-Hispanic	12 (71)
Lived experience	6 (35)
Years working on issues affecting PWID	
≤ 10	10 (59)
> 10	7 (41)
Leadership level	
High-level leader	3 (18)
Mid-level leader	5 (29)
Other	9 (53)
Specific role in the SSP	
Clinician or phlebotomist	6 (35)
Administrator or researcher	5 (29)
Peer navigators and/or outreach workers	6 (35)

organization included peer navigators and/or outreach workers (35%), clinicians or phlebotomists (35%), and administrators or researchers (29%).

Facilitators and barriers to the implementation of COVID-19 vaccines at the SSP were identified in each of the five CFIR domains: Innovation, Outer Setting, Inner Setting, Individual Characteristics, and Implementation Process (Table 2).

Innovation

Facilitators

There was consensus among all staff members that the strong evidence supporting the innovation – i.e., COVID-19 vaccines – was an important facilitator for its implementation. As one staff member said, "The vaccine is effective for preventing severe illness and death from COVID. It's for definite outcomes that are relevant to our participants." Another staff member remarked that there were clear "advantages of being vaccinated as opposed to not being vaccinated."

Barriers

On the other hand, the complexity of the COVID-19 vaccines' storage and management created challenges for implementation. As one staff member explained, "There are considerations for the storage and the temperatures, and how long the vaccine can be reconstituted."

Outer setting

Facilitators

Staff members, especially high-level leaders, emphasized that existing relationships and collaborations between the SSP and external partners, especially the Department of Health (DOH), were crucial facilitators to the implementation of the COVID-19 vaccine at the SSP. As one staff member stated, "The public servants at the Department of Health have always been very supportive of the type of work that we do." Another staff member explained, "They're the ones supplying the COVID vaccines to us."

Staff members also described the importance of the SSP's existing funding sources that could be leveraged to cover COVID-19 vaccine-associated costs. Although the SSP could "order [the vaccine] for free from the Florida Department of Health," there were other upfront and ongoing costs, including purchasing new physical infrastructure for storage and hiring new personnel with the technical skills to administer them. Continued the same staff member, "We wrapped [the costs of COVID-19 vaccine services] in with our research and other contracts as we always do."

Barriers

Multiple staff members described the COVID-19 vaccines' storage and management policies as a barrier to implementation. Before the Department of Health dispersed vaccines to the site, the SSP had to demonstrate that it was "set up with [the capabilities]" to meet the requirements, which required procurement of new infrastructure (e.g., refrigeration systems) and creation of new operating procedures. Likewise, policies regarding vaccine administration credentials necessitated the hiring of new staff members. As one participant explained, "It's against the law for me to give vaccine...you have to be a medical assistant or a nurse or a doctor to administer the vaccines."

Additionally, a few staff members cited the political climate in Florida as another implementation barrier. Said one, "[Public officials] were at [the SSP] but we didn't mention our COVID vaccine partnership because of the non-belief in vaccines from the political appointees." On the other hand, the same staff member hypothesized that offering vaccines at the SSP could expand support for SSPs among those opposed to their core purpose of syringe exchange:

> *I think it's very important particularly in a conservative state like Florida to show that we are offering well beyond syringes for the injection of drugs. If we did more reporting surrounding the number of touch*

Table 2 Themes and exemplar quotes, by CFIR domain and construct

CFIR Domain	CFIR Construct	Theme		Exemplar Quote
Innovation	Evidence-base	Facilitators	Evidence of the COVID-19 vaccines' effectiveness	I think the vaccine is effective for preventing severe illness and death from COVID.
	Complexity	Barriers	Storage and management requirements of the COVID-19 vaccines	We need to make sure that the refrigerator is monitored, and the temperature doesn't go up or down too drastically.
Outer Setting	Partnerships and connections	Facilitators	Established partnership with the Department of Health	The public servants at the Department of Health have always been very supportive of the type of work that we do.
	Financing		Existing funding that could be leveraged to support COVID-19 vaccine-associated costs	We could order [the vaccine] for free from the Florida Department of Health.
	Local attitudes	Barriers	Politicization of the COVID-19 vaccines	[Specific public officials] were at [the SSP] but we didn't mention our COVID vaccination partnership because of the non-belief in vaccines from the political appointees.
	Policies and laws		Policies governing vaccine storage, management, and administration	You have to be a medical assistant or a nurse or a doctor to administer the vaccines…it's against the law for me to give vaccine.
Inner Setting	Recipient-centered culture	Facilitators	Established foundation of trust between the SSP and PWID	We meet them where they're at, regardless of what they're doing, how they're doing, with a level of love and care, which creates a trust factor.
	Mission alignment		Alignment with organizational goal of serving as a "one-stop-shop"	They can access everything. It's a one-stop shop here. I think that makes it easier for them.
	Compatibility		Existing services and research studies for alignment and/or integration	The COVID-19 vaccine could be offered alongside [syringe] exchange, at the weekly health clinic, or on the mobile unit.
	Tension for change		Consensus about the need for new approaches to reach PWID with the COVID-19 vaccines, and the relative advantage of doing so through the SSP	We tend to provide things to people in a setting that is as comfortable as possible for them… It doesn't look like a clinical setting with people looking down at them.
	Relative priority	Barriers	Competing organizational priorities	[The COVID-19 vaccine initiative] is not something as staff that is on the top of our agenda.
	Available resources		Personnel shortages	We need more people because one person can't be at 10 places.
	Relational connections		Segmentation of roles and responsibilities	Everyone has their tasks that they need to hit, so maybe sometimes that kinda gets in the way of being a little more, I guess, well-rounded.
	Communications		Limited internal staff communication across services/research studies	A lot of us don't know half of what's really going on, research studies or things being implemented.

Table 2 (continued)

CFIR Domain	CFIR Construct	Theme		Exemplar Quote
Individual Characteristics	High-level leaders	Facilitators	Influential decision-makers	Have you heard the Ariana Grande song? 'I want it, I got it.' I want it, so… [laughter].
	Implementation leads, Motivation		A clear champion	It took the self-efficacy of one person [to get] everything done.
	Other implementation support	Barriers	Lack of ownership among staff members not directly involved in delivery of the vaccines	Personally, I don't feel, like, very responsible, or…that involved in, like, making it a success.
	Innovation deliverers, Capability		Limited personnel with the technical skills to manage and administer the vaccines	Since there's only one person that can do it, if he's not here, then that means…they can't get it. That happens pretty frequently.
	Innovation recipients, Opportunity		Higher order needs	The biggest thing is just the competing survival, mental health, and the substance use disorder. Our participants, as soon as there's a barrier it feels unsurmountable.
	Innovation recipients, Motivation		Limited perceived susceptibility to COVID-19	Many PWID don't believe that COVID-19 could cause them any damage, because of where they're at in their own lives.
			Misinformation about COVID-19 and the COVID-19 vaccines	Most people have a conspiracy theory idea behind COVID. They're tryin' to microchip us, or…that they're tryin' to wipe all the HIV positive people out.
Implementation Process	Doing	Facilitators	Adaptive and flexible approach to implementation	At [our SSP], we're always making changes and always adapting. I think like every week it's something new or something different.
	Engaging innovation recipients		Transparent and consistent communication about the COVID-19 vaccines with PWID	We don't force it. We tell them whatever they're more comfortable with and remind them that we'll always have vaccines available on site if they choose, later on.
	Engaging innovation deliverers	Barriers	Limited internal staff communication about the COVID-19 vaccines	I haven't gotten any updates about whether or not it's progressing or whether or not they needed to find more people. That coordination piece, I have not seen.
	Teaming		Limited involvement of the peer navigators and/or outreach workers and the mobile unit	Definitely [the peer navigators and/or outreach workers], they could communicate. Since they handle a lot of participant's medications, that's also a sense of trust there that they develop with the participants.
	Adapting		Tension between increasing vaccine uptake and reducing waste	Before when it started, we would…schedule around maybe six until those six would come. Now if only one comes or two show up, we'll administer that to just that one or two, rather than wait for those six. We'll just discard the rest.
	Assessing needs of innovation recipients		Lack of compensation	Pay them for their time…That takes away the competing priority. They don't have to hustle for that half hour. They can follow through on what they want to for their health.

points that we have providing people medications for opioid use disorder, HIV meds, COVID vaccination. If that's the way they want harm reduction packaged.

They've seen us the whole way through. They saw us when we were fighting for needle exchange. They saw us win. They saw us implement, and they saw it grow. Then they saw us make it legal in the whole state. They trust us. They trust that we have their best interest.

Inner setting

Facilitators

Staff members described four characteristics of the SSP's inner setting as favorable to the implementation of the COVID-19 vaccines. First and foremost is the established foundation of trust that the SSP has with PWID. As one staff member explained:

They emphasized that this trust was especially important with the COVID-19 vaccine, given their misinformation and politicization. Said one, "If anybody's gonna change [PWID's distrust of the COVID-19 vaccine], it is us." Said another, "They understand that…[we] would never… inject them with something that I would not inject myself

with…What we do at [the SSP] is…held to a standard of what we would do for our own family." A third expanded:

> *We meet them where they're at, regardless of what they're doing, how they're doing, with a level of love and care, which creates a trust factor with them to where they may be able to say, "This is why I don't want to be vaccinated"…I think because of who we are…[we can] shift their thinking about whether or not this is good for them.*

Second, staff members described that the SSP's non-judgmental and non-stigmatizing setting and its culture of meeting PWID's evolving needs with love and respect gave it an indisputable relative advantage compared to other healthcare settings. "To be honest, our participants hate every other place" said one staff member; explained another, "they have a hard time even going into Walgreens without being stared at." In contrast, "We tend to provide things to people in a setting that is as comfortable as possible for them… It doesn't look like a clinical setting with people looking down at them." Another expanded, "The doctors down to the people who are the security guard at the front…have a level of cultural competence for people who inject drugs that really they don't get anywhere else in Miami."

Third, offering COVID-19 vaccines at the SSP aligned with the organization's mission and its staff's motivation to serve as a "one-stop-shop" for its clients. "They can pick up their medication. They can do an exchange. They can access everything. It's a one-stop shop here." Said another, "Since they're already here, I think that's definitely an advantage…they don't have to go out of their way or go to visit or wait anywhere. You know, they just really don't have that kind of time."

Finally, implementation of the COVID-19 vaccine was compatible with the existing services and research studies at the SSP. Staff mentioned that the COVID-19 vaccine could be offered alongside syringe exchange, at the weekly health clinic, or on the mobile unit for clients who don't come to the fixed site. One staff member mentioned that it could be integrated into an ongoing study regarding the influenza vaccine. Another noted that vaccination records could be "connected to their [SSP enrollment] number" in the SSP's database, reported in the team's weekly email, and discussed at the team's weekly meeting to facilitate monitoring and evaluation.

Barriers

There was a sense among staff members that the COVID-19 vaccine initiative had lower relative priority within the organization as compared to other services. They explained, the COVID-19 vaccine initiative "is not something as staff that is on the top of our agenda" partly because staff members are "probably too busy [with their existing responsibilities] to be involved." This barrier was exacerbated by personnel shortages: said one, "We're short-staffed. People work on multiple different studies;" said another, "We need more people because one person can't be at 10 places."

Additionally, staff members noted that while some "people have sort of fluid roles," collaboration on the COVID-19 vaccine initiative was limited by the segmentation of staff roles and responsibilities based on existing services and research studies. One staff member explained, "I might not be aware that we're involved. I don't know. I'm always in the van. I don't know what's told at [the peer navigators/outreach workers' team meeting]…there's not a lotta time for dialog." Said another:

> *Everyone has their tasks that they need to hit, so maybe sometimes that kinda gets in the way of being a little more, I guess, well-rounded with the information. You may focus on what you need to get done rather than maybe, oh, this person actually does qualify for a list of things.*

Finally, some staff members expressed a need for improved communication at the SSP, in general. They explained, "There's so much going on here" and "a lot of us don't know half of [the] research studies or things being implemented. It would be good to have…something that we could go look at," such as a "schematic [describing] 'Here's this study. It hasn't started. Here's the person in charge of it.'".

Individual characteristics

Facilitators

Staff members noted that the high-level leaders of the SSP serve as the organization's primary decision-makers, which facilitated prompt implementation of the COVID-19 vaccines at the SSP once they became available. One high-level leader acknowledged the scope of their influence, stating jokingly "Have you heard the Ariana Grande song? 'I want it, I got it.' I want it, so… [laughter]." While such decision-making structures can have disadvantages, there was consensus among staff members that the high-level leaders had the capability and expertise to exercise this influence, as well as a clear motivation "to make sure [PWID] are protected."

Additionally, staff members identified an implementation lead whose capabilities and motivation were critical to the success of the COVID-19 vaccine initiative. This individual had sufficient experience at the SSP to understand its operational dynamics and had the relevant capabilities – graduate education in science, "great communicator," "great at interacting with our participants" – to carry out her roles and responsibilities. As one staff

member explained, "If we wanted to effect change on the COVID vaccination, we would ask [her], and [she] would execute. She would get it done."

Barriers

Though the high levels of self-efficacy and motivation among the high-level leaders and the implementation lead were important facilitators, staff members described a lack of other implementation support in the organization. Individuals whose roles were not directly involved with the COVID-19 vaccines expressed a lack of perceived responsibility. As one staff member said, "Personally, I don't feel, like, very responsible, or, like…I'm that involved in, like, making it a success."

While personnel shortages were noted as an overarching barrier in the SSP's inner setting, implementation of the COVID-19 vaccines posed particular staffing challenges given the requirements for innovation deliverers, i.e., those administering the vaccines. As one staff member explained, "We had [to get] a medical assistant who could administer vaccines." Even after the medical assistant was hired, multiple staff members cited the need for additional personnel to ensure sufficient availability of the vaccine: said one, "Since there's only one person that can do it, if he's not here, then that means whoever was scheduled for that day, they can't get it. That happens pretty frequently."

Meanwhile, with regard to characteristics of innovation recipients (i.e., PWID), staff members described limited motivation to get the vaccine as a major barrier to its success. Two reasons were hypothesized for this lack of motivation. First, staff observed widespread misinformation among PWID regarding COVID-19 and the COVID-19 vaccines. "Most people have a conspiracy theory idea behind COVID," for example, that "they're tryin' to microchip us, or…that they're tryin' to wipe all the HIV positive people out." Another described, "There's a lot of different speculation, or just not really believing that it would work or that it may be a government thing." Staff members attributed this misinformation, in part, to the communication platforms utilized by PWID. Given that "many of our participants are using informal networks to get information, both social media and just word of mouth," staff noted that "rumors can spread very fast. It can be a problem." Second, staff described a lack of perceived susceptibility among PWID to COVID-19. Many PWID don't believe that COVID-19 "could cause them any damage, because of where they're at in their own lives." Another said, "I don't think they see…being protected against COVID as an immediate benefit." Even among PWID who "are immunocompromised, it's still difficult for them to say okay, maybe I should [get vaccinated]." However, one staff member recounted that this was not universally true for all PWID: "I definitely remember speaking with some participants who…see the benefit of it."

Finally, nearly all staff members described how PWID's prioritization of higher-order needs limited their opportunity to get the COVID-19 vaccine. As one stated, COVID-19 is "one of the last things that they're concerned about." Explained another:

> *The biggest thing is just the competing survival, mental health, and the substance use disorder. Our participants, as soon as there's a barrier it feels unsurmountable. They will often not be able to follow through on what—something that they might want to do.*

Implementation process

Facilitators

Staff members described the SSP's adaptive, flexible, and "organic" culture as a facilitator to the implementation of the COVID-19 vaccines. One high-level leader reflected that the SSP "[improvises] as things come in front of us… Often, we figure it out as we go." Explained another staff member, "At [the SSP], we're always making changes and always adapting. I think like every week it's something new or something different."

Additionally, staff members highlighted how the SSP's harm reduction approach to substance use influenced the implementation of COVID-19 vaccines. Staff members explained that, on the one hand, "[We're] shooting down all of the stuff that they talk about online, showing the advantages as opposed to the disadvantages to having it." At the same time, though, "We let them choose. We don't force it. We tell them whatever they're more comfortable with and remind them that we'll always have vaccines available on site if they choose, later on, to be administrated."

Barriers

Staff members described four barriers in the COVID-19 vaccines' implementation process. First, they underscored the need for improved internal staff communication about the COVID-19 vaccines. Specifically, they requested evidence-based information about COVID-19 and the COVID-19 vaccines to guide their conversations with PWID. Additionally, they requested periodic updates about the status of the COVID-19 vaccine initiative to improve their understanding of its strengths and weaknesses. One staff member lamented, "I haven't gotten any updates about whether or not it's progressing or whether or not they needed to find more people."

Second, staff members described the need for improved collaboration with PWID-facing staff, such as the SSP's outreach workers and peer navigators i.e., people with

similar lived experience as the SSP's clients. They "see these things in the algorithm that we don't see," one of the high-level leaders reflected. They also "come directly in contact with the participants more so than anybody else" and thus "they have the relationship." Likewise, they suggested utilizing the SSP's mobile unit to increase the availability of the vaccine for PWID who don't come to the SSP's fixed site and to "get the word out more on the street."

Third, staff members described the struggle to balance maximizing availability of the vaccines with reducing waste. Because of the vaccines' technical requirements, once a vial was opened the SSP "only [had] a certain amount of time to use it before it has to be wasted." Thus, at the beginning, the SSP attempted to schedule vaccine appointments so that multiple PWID would receive the vaccine on certain days. However, staff members agreed that these scheduled appointments limited vaccine uptake and were in conflict with the SSP's general drop-in approach to service provision. They explained, "[We have to] make it flexible." "When you have them, and you have their attention, you really need to try to work within that time to do as much as you can do to help them. Because they are just trying to survive."

Finally, all staff members agreed that the lack of compensation was a primary barrier to increasing uptake of the COVID-19 vaccine. Said one staff member, "the participants that are willing to get vaccinated have already been vaccinated." The rest "don't see the necessity [of it], so if we're not compensating them, they don't think they need it." Further, staff members felt that compensation would be fair to offset the opportunity cost for PWID. As one argued, "Pay them for their time…That takes away the competing priority. They don't have to hustle for that half hour. They can follow through on what they want to for their health."

Discussion

Guided by the CFIR, our findings provide important insights into implementation determinants for the provision of onsite COVID-19 vaccines at SSPs for PWID. Key facilitators included the SSP's established partnership with the local Department of Health for vaccine distribution, its existing funding sources that could be leveraged for vaccine-related expenses, consensus among staff about the need for new strategies to increase vaccine uptake among PWID and the relative advantage of doing so through the SSP, and PWID's trust in the SSP. The latter was noted as an especially important facilitator given the high degree of politicization of and misinformation about the COVID-19 vaccines. Meanwhile, key challenges to implementation included lack of participant compensation, limited internal staff communication about the vaccine initiative, and insufficient involvement of the SSP's most participant-facing staff, specifically its peer navigators and/or outreach workers. Encouragingly, staff members expressed optimism that these barriers were modifiable and could be overcome through relatively minor organizational adjustments moving forward, including offering compensation for vaccine completion, utilizing strategic internal communication, and increasing engagement of the peer navigators and outreach workers, especially those on the mobile unit, in vaccine-related communication and vaccine delivery. Together, these findings suggest that while SSPs have the potential to increase uptake of the COVID-19 vaccines among PWID, numerous characteristics, processes, and structures must exist to ensure adequate support for implementation. As the pandemic progresses and public concern about COVID-19 wanes, the lessons learned from this study can be applied to other vaccines, such as Hepatitis A and B which are particularly relevant to PWID, and can support the SSP's readiness to address future challenges.

Interestingly, our findings also highlighted multiple examples of tension between implementation facilitators and barriers. For example, staff suggested that the decision to implement COVID-19 vaccines onsite was made by the organization's high-level leaders with little internal consultation. While staff supported the decision, felt comfortable with their leadership exercising such authority, and indicated this likely expedited the process, their reflections suggest it may also have hindered the involvement and self-efficacy of staff members whose awareness and engagement is critical to the initiative's success. Likewise, staff members described the tension between maximizing availability of the vaccines and reducing waste. Finally, while staff members noted that the integration of COVID-19 vaccine services ran the risk of alienating public officials opposed to the vaccines given their high degree of politicization, they also noted that it could increase support among those who supported the vaccines but were opposed to the harm reduction philosophy of SSPs.

This study aligns with other findings, in that staff believed low vaccination rates among PWID may reflect a combination of misinformation regarding their need for vaccines and the safety and efficacy of such vaccines, reluctance to engage with healthcare institutions in which they are often stigmatized and denigrated, and a variety of structural barriers that impede their access to services [12, 45]. For example, other studies found that distrust in medical staff functioned as a barrier to vaccine uptake [46] and noted that misinformation and exposure to social media had a negative impact on PWID's perceived susceptibility to COVID-19 [47]. At the same time, this study also affirms other findings, in that staff perceived that SSPs have a relative advantage in increasing

vaccine uptake among PWID as compared to other vaccine sources [17, 20, 22], and that the established trust that SSP staff have with PWID is a primary driver of that relative advantage, especially given the politicization and misinformation surrounding the COVID-19 vaccines [18]. Our study also highlights how the harm reduction approach that SSP staff apply to injection drug use extends into their approach to the COVID-19 vaccines, and that this could be further emphasized through participant compensation for vaccine uptake. However, as SSP staff roles continue to expand in pursuit of a "one-stop-shop" [40], we call for organizations to ensure that SSP staff are adequately compensated for their time and labor and supported in response to the unique demands that this work requires.

This study exhibits notable strengths, particularly its use of the CFIR to inform data collection and analysis, yielding structured and comparable insights that can be aligned with other efforts in implementation science. Moreover, the rigorous qualitative approach employed in this study illuminated important details that can be acted upon to refine implementation efforts at the SSP and inform efforts elsewhere. In particular, its use of multiple validation strategies encourages confidence that its findings are well-founded and credible. The study also has limitations. First, it was conducted at a single site with a relatively small sample size. Thus, the generalizability of its findings may be limited by the particularities of the single SSP from which we recruited staff, for example, its strong relationship with the local Department of Health and its highly medicalized model. Second, it does not include the perspective of PWID; a study was conducted in parallel to explore their perspectives and will be reported separately. Despite the unique characteristics of the IDEA Miami SSP, we draw confidence from the consistency of our findings with the existing, albeit limited, literature. Future research could focus on evaluating implementation strategies to address the barriers identified in this study, exploring PWID's preferences for vaccine service delivery, and determining whether facilitators and barriers differ between COVID-19 vaccines and other, less politicized vaccines.

Conclusion

The findings of this study add to a growing body of literature that suggests implementation of COVID-19 vaccines at SSPs is feasible and has a strong relative advantage for PWID compared to other vaccination access points, but that such efforts require prioritization and multilevel strategic implementation. Leveraging the fundamental trust PWID have in SSPs for implementation of comprehensive preventative health services, SSPs are uniquely positioned to offer a variety of indicated vaccines to this community. The lessons learned from this analysis can inform the expansion of COVID-19 and other vaccine services at SSPs nationwide.

Abbreviations

CFIR	Consolidated Framework for Implementation Research
COREQ	Consolidated criteria for reporting qualitative research
COVID-19	Coronavirus disease 2019
HBV	Hepatitis B virus
HCV	Hepatitis C virus
PWID	People who inject drugs
SSP	Syringe services program
SUD	Substance use disorder

Supplementary Information

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Supplementary Material 1.

Supplementary Material 2.

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Authors' contributions

TSB, HET, and MP designed the study. TSB, HET, and MP designed and led study recruitment. MP conducted the qualitative interviews and MP, SSS, RC, GM, LF, and ET analyzed the transcripts and drafted the manuscript. TSB, HET, and ARB reviewed drafts of the manuscript and provided substantial feedback. All authors have read and approved the final manuscript.

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Availability of data and materials

Data and materials are available upon request to the corresponding author.

Declarations

Ethics approval and consent to participate

This study was approved by the Institutional Review Board of the University of Miami (IRB # 20220452) and was performed in line with the principles of the Declaration of Helsinki. Informed consent was obtained from all participants included in this study.

Consent for publication

Not applicable.

Competing interests

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: TSB and HET receive research funding from Gilead Sciences.

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