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Convenience, rapport and skill: effective rural hepatitis C treatment, qualitative findings from a mobile harm reduction-informed tele-medicine intervention in Northern New England, 2022–2024

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Abstract

Background People who inject drugs (PWID) are at high risk for acquiring and transmitting the hepatitis C virus (HCV). Access to HCV testing and treatment remains limited in rural communities. Mobile healthcare interventions are promising models to reach underserved populations like rural PWID. Understanding the characteristics of effective interventions to engage rural PWID in HCV care can guide design strategies for HCV treatment and elimination in rural areas.

Methods The Drug Injection Surveillance and Care Enhancement for Rural Northern New England (DISCERNNE) study randomized 150 participants with chronic HCV to examine Mobile Tele-HCV Care (MTC) versus Enhanced Usual Care (EUC). On-the-spot qualitative interviews ($n=34$) were conducted with study participants, community providers, and study van staff to understand the context for protocol implementation. For this study, qualitative coding and thematic analyses identified the characteristics of successful HCV treatment engagement among PWID in rural areas.

Results This successful HCV treatment engagement intervention with out-of-treatment rural PWID had three essential characteristics: convenience, effective rapport, and skilled staff. Convenience factors included dependable and easily accessible locations with drop-in availability that made it easy to make HCV treatment a priority. Rapport with participants through a harm reduction approach engendered respect for autonomy and tailoring the protocol to accommodate the complexities of daily life that PWID face. Skilled staff were flexible across multiple roles including on-site phlebotomy, a notable barrier to rural PWID obtaining HCV treatment, and were competent in caring for PWID.

Conclusions We identified salient characteristics that contributed to high trust and treatment adherence among a marginalized population of rural PWIDs. Tailored, flexible approaches and specialized skills are required to engage and retain PWID in rural areas.

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Keywords Harm reduction, Tele-medicine, Hepatitis C virus, Rural health, Injection drug use

Background

People who inject drugs (PWID) are at high risk for acquiring and transmitting the hepatitis C virus (HCV) [1–3]. HCV is the most common chronic bloodborne infection in the United States, [4] and 80% of HCV infections are among PWID, with transmission often attributed to syringe and other injection equipment sharing [3]. HCV infections are especially common among young, rural PWID in the United States, [5] and HCV infections in this population increased rapidly between 2010 and 2020 [1]. Worldwide, over half of PWID carry HCV antibodies [1].

Access to HCV testing and treatment remains limited for PWID [6]. Rural areas face unique challenges, including a lack of economic stability and economic opportunities, as well as poor availability of HCV prevention programs and treatment providers [7, 8]. Our prior work in rural New England found that close to half of PWID lived over ten miles from the closest fixed-site syringe services program (SSPs) and had higher rates of HCV infection and injection equipment sharing than those who lived in closer proximity to an SSP [2].

Mobile healthcare interventions are promising models to reach underserved PWID living in rural communities [9–11]. Targeted interventions, in partnership with SSPs and other community organizations, better engage PWID in HCV care than traditional healthcare systems [2, 12, 13]. Interventions that incorporate harm reduction principles have also been shown to be effective in treating PWID [14, 15]. Harm reduction and HCV prevention and treatment programs rely on exceptional, caring, and nonjudgemental staff members for their success [16]. Prior research has demonstrated that utilizing harm reduction principles, such as humanism, pragmatism, individualism, and autonomy are essential to success in healthcare settings, especially when working with PWID and other marginalized populations [16, 17]. While harm reduction approaches to HCV prevention have demonstrated efficacy, we address the knowledge gap unique to HCV treatment uptake among rural PWID.

The aim of this study was to assess key characteristics of successful HCV treatment engagement among rural PWID. To identify key characteristics, we conducted on-the-spot (OTS) interviews with study participants, community partners, healthcare providers, and members of the study team directly engaged in the intervention implementation.

Methods

The qualitative study described in this paper was a component of a larger multi-methods study to examine the effectiveness of a mobile HCV intervention in rural New Hampshire and Vermont communities.

The Drug Injection Surveillance and Care Enhancement for Rural Northern New England (DISCERNNE) study was a project of the Rural Opioid Initiative funded by the National Institutes of Health, Centers for Disease Control and Prevention, Substance Abuse Mental Health Services Administration (SAMHSA), and Appalachian Regional Commission (UH3DA044830). This randomized controlled trial (RCT), examined the effectiveness of a model of mobile telemedicine treatment for HCV integrated with harm reduction services (including syringe exchange and overdose prevention). Participants were recruited from three rural counties at elevated risk for HCV in New Hampshire (NH; 1 site) and Vermont (VT; 2 sites). The larger study examined HCV treatment initiation and cure, with the primary outcomes comparing those in a mobile tele-medicine intervention (MTC) to those in enhanced usual care (EUC) who (1) Initiated HCV treatment, (2) Achieved HCV clearance 12 weeks after end-of-treatment, and (3) Reported no syringe or injection sharing in the prior 30-days after viral clearance. The study recruited and enrolled 418 study participants from July 2022 to July 2024. Study participants with chronic HCV (n = 150) were randomized to MTC (n = 75) or EUC (n = 75). Participants in the MTC arm engaged with a prescriber via tele-health on the van to discuss HCV treatment. EUC participants were referred to local HCV treating community providers and received care coordination to support treatment initiation. Participants in both study arms were able to access harm reduction services from a mobile van for the duration of the study. The primary outcomes of the RCT revealed MTC participants were more likely to initate HCV treatament than EUC participants and achieve HCV viral clearance [9]. No difference in syringe sharing behaviors between MTC and EUC groups.

OTS Interviews: The DISCERNNE study incorporated implementation science approaches, including the on-the-spot (OTS) semi-structured qualitative interviews, to better understand intervention implementation and identify facilitators and barriers to treatment engagement. A total of 34 OTS interviews were conducted between July 2022 and November 2023 with representation from both study participants (n = 17) and community providers (n = 17).

Study participant OTS interviews: All 150 study participants were eligible to participate in semi-structured

interviews. Interviews were conducted in person at each of the three study sites, once every 3 months during the study period. Interview participants included those randomized to MTC and EUC in similar proportions to the intervention cohort size ($n = 8$ of 75 MTC participants, 10.7%; $n = 9$ of 75 EUC participants, 12%). One study participant interview was conducted over two separate occasions.

Community provider OTS interviews: The study team identified service providers who were frequently referring to the team or providing services to study participants and other PWID within their communities. Community provider OTS interviews included (1) community and harm reduction service providers (harm reduction partners) who offered services co-located at the three study sites ($n = 6$), (2) healthcare providers who facilitated treatment for HCV (physicians, nurse practitioners, pharmacists) ($n = 8$), and (3) study team members who worked on the van (study van team, $n = 4$) and were directly engaged in the implementation of the DISCERNNE intervention. Participants in one harm reduction partner interview requested their interview be conducted with another key informant, resulting in 18 community provider participants across the 17 interviews.

Interview Guide Development: The semi-structured interview guide was developed by the study team that included lived experience, medical, nursing, public health, and epidemiology expertise. The guide included questions to elicit (a) barriers, facilitators, successes, challenges and lessons-learned; (b) collaborations between HCV telehealth van team and the community providers (SSPs, supportive housing, recovery community organizations, HCV treatment providers); and (c) ideas for ongoing sustainability of the intervention.

Interview Data and Human Subjects Protections: Mean interview duration was 29 min (range 11–79 min), with community provider interviews (mean = 37 min) running longer than study participant interviews (mean = 20 min). OTS interviews were audio-recorded and transcribed verbatim. Identifying information was redacted to ensure participant confidentiality prior to analysis. Participants enrolled in the study received a $10 incentive for completing OTS interviews, while community partners did not receive compensation. All study procedures were reviewed and approved by the Baystate Health Institutional Review Board (#BH-19-166).

Qualitative data analysis

Qualitative data analysis: Qualitative analyses were conducted in a content analysis software platform (Dedoose version 9.2.012, Dedoose, Los Angeles, CA). Use of Dedoose v9, allowed for grouping of segments from all documents by code in a secure cloud-based system, ideal for cross-site coding and analysis. To protect confidentiality in the manuscript, only the interview ID and interviewee type are utilized to contextualize responses and demonstrate the range of respondents. Identifying locations, names, and gendered pronouns if potentially identifying were redacted. Quotes were edited minimally to remove utterances and for clarity.

A four-member coding team, with masters or doctoral degrees and expertise in public health, nursing, epidemiology, substance use, or harm reduction, utilized an established thematic coding strategy [18]. The team utilized an iterative process of code development through initial inductive open coding on five transcripts to develop the coding framework through iterative consensus. This resulting codebook had six parent codes associated with 18 sub-codes and 16 sub-sub codes. The number of open codes was refined and reduced by comparing and defining the boundaries of conceptual categories. This process continued iteratively until consensus on the codebook was achieved, and coding applications concurred. After consensus on the coding structure was achieved, eight additional transcripts were independently coded by two coders to test coding consistency. Once consistency was achieved with the eight double-coded manuscripts, the codebook was finalized and analysis team members independently coded the remaining 21 transcripts, meeting regularly to ensure concordance in code applications.

Coding identified patterns and relationships across all cases in the data, where the unique experience of engaging with the study emerged as an axial theme and guided the team's further analysis. Subsequent analysis utilized codes that related to the unique characteristics of the intervention that enabled engagement with HCV treatment among PWID. The current analyses utilized axial and selective coding of the emergent themes described as enabling engagement including *community partnerships*, *lived experience*, *communication*, *team dynamics*, *cross training*, *engagement skills*, *staff roles*, *participant recruitment*, *harm reduction services*, and *barriers and facilitators to HCV treatment*.

Results

The sample of the 34 OTS interviews included 36 key informants including study participants from both RCT arms ($n = 17$, 27.2%), study van team ($n = 4$, 11.1%), community partners ($n = 7$, 19.4%), and healthcare providers ($n = 8$, 22.2%) from both the MTC and EUC groups. Key informants by type and demographics are summarized in Table 1.

Thematic analysis of the emergent codes identified convenience, effective rapport, and skilled staff as the primary themes important for successful engagement and HCV treatment among PWID in the study. Each was connected to *subthemes* that emerged as contributors to

Table 1 Characteristics of on-the-spot interview participants ($n=35$), rural Northern New England, 2022–2023

Characteristics of OTS Interview participants ($n=35$)	
Age, mean (SD)	42 years (11.5)
Female, n (%)	19 (54.3%)
White, Non-Hispanic, n (%)	34 (97.1%)
Type of Participant, n (%)	
MTC Study Participants	8 (22.9%)
EUC Study Participants	9 (25.7%)
Community and Harm Reduction Service Providers	6 (17.1%)
Healthcare Providers	8 (22.9%)
Study Van Team	4 (11.4%)

successful linkage to HCV care. Table 2 provides definitions of each subtheme with quote exemplars.

Of the nine identified subthemes, six were related to other identified subthemes. Figure 1 provides a conceptual Venn diagram depicting the related subthemes. For example, *community collaboration* was an identified subtheme of effective rapport and aligned with the *location near community partners* subtheme of convenience.

Convenience

The ability to walk in without a prior appointment, have assessments performed on the van, connect to telehealth for MTC participants, and receive support in navigating care were examples of convenience that facilitated treatment engagement. Specific subthemes related to convenience included *flexibility in communication*, *location near community partners*, and *provision of harm reduction services*.

Participants and community partners described convenience as being able to get multiple services that typically require multiple visits prior to HCV treatment initiation. Participants described this as one less thing to do and "a relief that I can do it in here instead of having to deal with the all the other stuff because it would have been more of a hassle [MTC, 3003]." This addressed some of the barriers often cited by both study participants and community

Table 2 Themes, subthemes, and quote exemplars

Theme	Subtheme (abbreviated)	Example quote
Convenience	Flexibility in Communication (Flexibility)	"(They) got both my social medias, both my telephone numbers. I stop in here and he'll pop out and see me at the picnic table and was like, hey, it's been a minute and I'm like, oh man, I forgot about you." [MTC, 1088]
	Location Near Community Partners (Location)	"(We) will say like, 'Hey, we have this. These people are amazing. They're right here, they're available. No, you don't have to go to the hospital.' And people have jumped onto that, so it's very low barrier." [Community partner, 9006]
	Provision of Harm Reduction Services (Harm Reduction Services)	"(T)hey definitely give you everything you need so you can stay clean rather than trying to transmit the infection further and further." [MTC, 2046]
Effective Rapport	Continued Engagement Facilitated by Genuine Commitment (Genuine Commitment)	"(I've liked) the fact that they are so welcoming. You know that's the biggest things. You know once you start feeling judged you don't want to be there. [EUC, 2002]
	Radical Acceptance	"They're freaking awesome, amazing. I've never had like I feel like they're friends and family like they've known, because that's how my family is too. Like the aunts and the uncles like they didn't judge me, like they knew what was going on. My cousins were like I know you were in juvie, like it was just great and then it just reminds me of home of when we all used to get along. [EUC, 1013]
	Community Collaboration	"I am getting an apartment Wednesday. I just did not have anywhere to go and they [study team] helped me actually get into [transitional housing]. . So, amazing. They have helped me more than just with the Hep C treatment for sure and just been constant, if you need anything call us, whatever." [MTC, 1076]
Skilled Staff	Expert Phlebotomy	"I think really the thing that we have that has made this successful is {staff name}, is having an experienced compassionate phlebotomist. Because we hear time and time again from people who are at these hospitals and every time they go to the hospital they need the ultrasound and they need the fourth person to try to get their blood and they can't get the blood so they put it in their neck." [Van staff, 9004]
	Clinical Communication	"It's been really great working with the study, with their care navigators because, they can pass on our information to the patient. So they can reach us, easily on our work cell phone…I've received plenty of texts, like I know you tried to reach me x amount of months ago and, I have…a working phone or talk time minutes [available] or maybe they just weren't feeling ready to engage in that time but they feel ready then. [Healthcare provider, 9016]
	Compassion, Empathy, and Respect (Respect)	"Everyone I've met has been extremely wonderful. . It's nice to know that there are people out there that do think that us users are not just a waste of space." [EUC Participant, 2007]

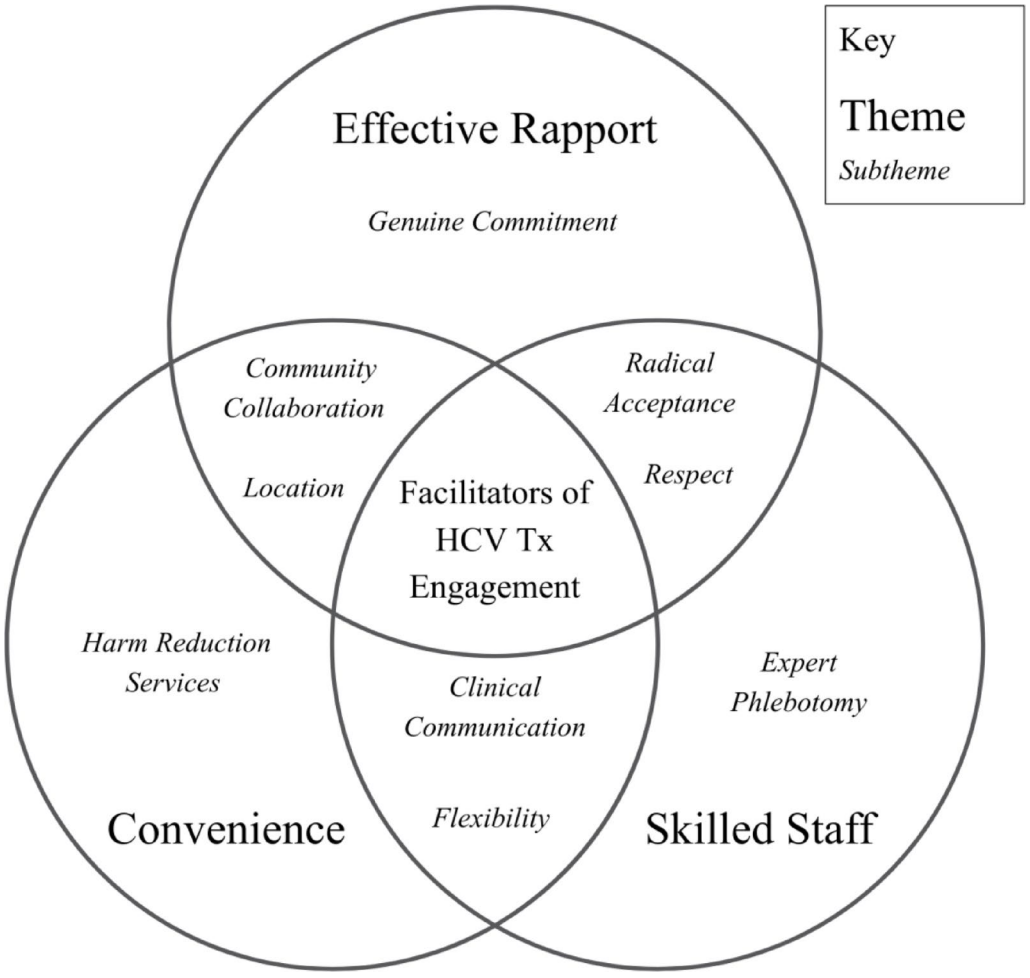

Fig. 1 Venn diagram of facilitators of HCV treatment (Tx) engagement themes and related subthemes

partners such as the need for transportation, the lack of treatment resources, and the changing of available resources in this rural area:

> *„health care is so dried up here. There's just such a limited amount of resources for patients to access. So, maybe some patients feel like, oh, if I have to drive all this way, what's the point really? And then they might not seek care because of that very reason. [Healthcare Provider, 9015]*

The ease of telehealth on the van was another example of convenience, however it was only availae to MTC participants. Although many MTC participants had not previously used tele-health, they described it as easy and non-burdensome- "it was fine, it was quick [MTC, 1007]." As the majority of study participants had experienced multiple barriers to HCV treatment, telemedicine simplified the process of connecting to treatment and facilitated their ongoing engagement. For example, while participants randomized to the comparison EUC condition were not offered telehealth on the van, healthcare providers [9011] noted "virtually everybody [referred from the study]… opted for… telemedicine." When telemedicine was offered by referring providers, EUC participants were required to connect through their own device and location to the provider. This preference was contrasted with traditional referral pathways that required community partners to "spend every day trying to get people to go to the doctors at the hospital, and it's pulling teeth [9006]."

Flexibility in communication

Study participants, community partners, and the study van team all described *flexibility in communication* as a facilitator of HCV treatment engagement. Communication being available beyond traditional office hours and methods was consistently appreciated and described as a factor of convenience. This feature included tailoring education and explanations as observed by a study participant, "they're full of information and if I don't understand it, they're always working together [EUC, 1013]."

The team requested permission to utilize multiple methods to get in touch with clients, which facilitated access to care that might not have otherwise happened:

> *{staff name} called me and I had a doctor… that had been trying to get a hold of me. They've only been able to get a hold of me through my mom's phone, I haven't been around here in the last two weeks. So, {she/he} was able to relay a message to me and bring me in and I was able to call {her/him} and talk… yesterday and set up an appointment, so I could get started. [EUC, 3008]*

Flexible and responsive methods of communication were critical to successful care navigation. Texting, email, and social media messaging facilitated convenience for those with only intermittent access to cell phone service or wifi in our rural study area.

Healthcare providers reported communication as a major barrier in traditional care that the van team was able to bridge for both MTC and EUC participants. As a healthcare provider (9016) explained, "one of the biggest barriers is the initial communication… we can't reach the patient and the referring provider can't reach the patient, it's a hard stop… their {the study's} medical care navigators… pass on our information to the patient. So they can reach us."

Location near community partners

The study van had a consistent presence and was situated in close proximity to community service providers which facilitated ongoing relationships. Study participants felt the location was great, noting the proximity to service providers, which were unique to each town including homelessness service providers, food pantries, harm reduction programs, or shelters. The relationship was reciprocal as study participation also engaged more participants in these community services. One community partner [9001B] described, "we're reaching more people through your connection with them… we're able to partner with you, because we do see so much HCV prevalence within people who inject drugs and…here's a potential option that could happen for people who are living with HCV, which has been a nice way for us to be able to say well there may be some options here." This community provider had previously attempted referrals to care that were rarely successful due to barriers faced by their participants.

The study van team and their engagement with community partners enabled participants to be connected to other local and co-located services, embodying the harm reduction approach: meeting people where they were, both physically and figuratively, to address emerging needs beyond HCV treatment alone.

Provision of harm reduction services

A key component of convenience for study participants was the availability of *harm reduction services* (including sterile injecting supplies in partnership with local harm reduction providers), which all enrolled participants had access to throughout the study. For participants, the onsite, easy access to sterile supplies reduced fear of spreading HCV: "I had to keep moving with fresh needles, and other works, and one less thing I have to worry about, getting needles and sharing shit now [EUC, 2004]." Prevention of reinfection and decreasing the spread of infection were echoed as priorities, with reports of intentions to change syringe sharing behavior: "I definitely will never share a syringe ever again in my life [MTC, 2001]."

Effective rapport

When prompted about engaging with the study and seeking HCV treatment, the rapport built with the study van staff was a key facilitator of participants' follow-through. Specifically, staff always made them feel welcome and comfortable by treating them with respect, without judgment, and with empathy and compassion for their current situation, which was also recognized and appreciated by community partners and healthcare providers. Specific subthemes tied to effective rapport included *continued engagement facilitated by genuine commitment*, *radical acceptance*, *and community collaboration*.

Continued engagement facilitated by genuine commitment

Participants reported that the study staff have been "more than helpful… go above and beyond normal duties [MTC, 2046]" which influenced their commitment to subsequent study activities. One participant was initially motivated to complete screening because of the monetary incentive but then felt,

> *It's like it's more of an incentive and like at first I'm not going to lie, I looked at it like that. But then I realized these people are actually here to try to help us like whatever way they can. And that's awesome. People that go out of their ways–I don't even know somebody and they want to help. So that's just awesome people and awesome programs. [MTC, 2001]*

Outreach to participants occurred throughout the community, which was viewed as genuinely caring about their follow up, completion of treatment, and support for other needs that may arise.

> *Their workers don't intrude, but they know the hangout spots and where everybody is and what the thing is they're really respectable about coming into what we're doing and I think they're really respectable and they don't go and they're really like they don't say it*

in front of people. So they're very, very respectable about that. But honestly they do above and beyond what they really should. [EUC Study Participant, 2007]

Radical acceptance

Van staff facilitated effective rapport with participants through radical acceptance, consistent with a harm reduction philosophy. This approach fostered close relationships and trust, allowing participants to feel accepted without judgment. These types of connections also helped participants feel comfortable being more upfront and honest with the staff when they were struggling with returning to substance use during their study involvement.

I feel like I have people I can trust with that information and I'm not being judged at all and I was like, wow, that sucks. But like, what are we going to do now? How do we make this safe?... are you okay?... Do you need like, connections with people?... And like he just accepted where I was at and, didn't judge me for it. He never talked down to me because of it. Not like, oh man, you fucked up after treatment, it's just a regular everyday conversation.... The people that work the van just are so kindhearted, and they are just like non-biased, non-judgmental, yeah, I've never felt more accepted by a treatment program. [MTC, 1088]

These experiences were often described as distinctive in comparison to prior experiences where care was difficult to navigate or even refused, as one study participant experienced when seeking treatment for HCV along with her partner,

One {treatment provider} that said you had to be clean... it's like {they} didn't think it was severe enough possibly to get the medicine... {They} said, 'I'm done, I'm not doing this and you can find someone else.' We had the one slip-up and it was weird on why {they} wouldn't help us. {They} was hesitant to help us, but I couldn't even tell you why exactly. {They} did call back and said, "We'll do blood work or something." {My partner was} like, "No I don't want your help. [2011]

These difficult experiences, echoed by both study participants and community providers, were described as more impactful in the local area because of the rurality, as often there was only a single provider in the area treating HCV and another provider was an hour or more away, presenting numerous additional barriers.

Community collaboration

Community partners, who provided services to the unhoused community and PWID, recognized that the approach taken by the van staff was well aligned with their approach to serving vulnerable individuals and unlike their clients' experiences with healthcare locally. This approach not only helped participants stay committed to study visits and HCV treatment but led to further referrals from community partners, as one [9001 A] described:

They're just such caring people and just very sweet and I really like them a lot...I think that from what I've heard from the participants that I know that are part of the program have said good things about them as well. So that's important to me if I'm referring to a place I want to know that they're being taken care of. Well, that's the intimacy thing that I feel like I - the people that we serve, I want to make sure that they're...treated right.

Community partners consistently remarked on the positive impact of the study on the population that they also served. They appreciated that van staff provided a level of care and service far superior to what participants typically received in traditional health care settings: "I'm really pleased with what your program is, because it's about as low barrier as I can imagine… I've taken countless people through our normal hospital system of care throughout years…and it's been difficult and I don't know of any one successful case that has been treated [community partner, 9006]."

Skilled staff

Van staff served multiple roles including recruiters, triage specialists, patient navigators, and phlebotomists. Consistently, interviews described the skill the study team had with the population. As one healthcare provider [9008] described,

There's a certain comfort you have to have, being in that situation that they obviously have. They build trust and they are just seen as part of this community that hangs out in this van and helps out, whereas a lot of times with medical interventions, it can come off as a very academic thing. Like some guy... goes out there with a bow tie and I just don't fit in. And I think they're definitely there because they want to be, they just happen to be part of a study.

The study van staff connected with clients in the community and their approach was seen as supportive and respectful. The subthemes of skilled staff included *phlebotomy*, *clinical communication*, and *compassion*,

empathy, *and respect*, described as specific attributes of staff that facilitated study activities and HCV treatment support.

Phlebotomy

A compassionate, skilled phlebotomist was the most frequent recommendation for success of HCV treatment programs for PWIDs across all interviews. Many study participants reported fear of phlebotomy often related to prior negative experiences. A common barrier experienced by study participants during prior attempts to receive HCV treatment was difficulty in having blood drawn for confirmatory laboratory testing. Having a compassionate and skilled phlebotomist with extensive experience with PWIDs was paramount, as one participant described:

> *{Staff phlebotomist} was awesome and{he/she}was like take off your socks… like, don't worry about it, stick it right on me and I stuck my leg right up on{their}freaking lap there and… {they were}like, we're gonna get you and {they} did, {he/she} ended up getting blood out of my ankle… [MTC, 2001].*

The study participants and community partners often described being shocked the study phlebotomists were able to obtain the needed samples, which often established great respect for the skilled staff. As one van staff member (9004) described the trust established with study participants related to phlebotomy,

> *It's just like having that experience, having that compassion. I think that's step number one honestly. . . .Part of why{staff name}is as effective in {their} role… is because {staff} is nonjudgmental and listens to people about, like, "Where should I stay away from?" I hate using buzzwords, but it's cultural competence.*

The study van staff recognized each other and their unique roles that enabled effective rapport with participants.

Clinical communication

Education of study participants, from initial recruitment, through screening, randomization, data collection, and care navigation, was seen as essential. Patient education by van staff paved the way for effective treatment navigation, allowing infectious disease clinicians, nurse practitioners, and specialty pharmacists to perform at 'the top of their license' (i.e., performing tasks that are unique to their specialty rather than tasks that don't require special training). One healthcare provider [9015] who received referrals for EUC participants compared the experience to coordinating care for other, non-study patients:

> *It's almost like they can predict what you need before you even start to ask, because everything is there. They're like, 'Oh, we're waiting on a genotype. It will be there in about a few days or so,' because then we know. But in other cases, we have to like reach out to the medical records…or for another health institution and it makes it a little bit more harder for us to get records. But with the study participants, everything is just lined up and just hand-delivered to us.*

Effective, consistent communication of next steps in treatment ensured that the patient was well-informed and understood what was expected. Communication was also key between van staff, clinical providers, and specialty pharmacists, ensuring quick responses and clear transfer of information, thus avoiding lags that often delay treatment in key moments. A frequent barrier addressed by the van team's was patient-pharmacist communication to facilitate dispensing of the additional course(s) of medication. One healthcare provider [9010] described that, for patients who had already initatiated treatment, the van staff would,

> *give us updates every once in a while… nobody wants medication to be wasted. That's for sure… I can't find them but I don't want their PA to run out and then I don't want them to miss doses if they do show up… [usually] I wouldn't dispense it because we don't dispense medication to people who we can't talk to… So I mean it's been fun [the van staff's close contact with patients].*

Communication that was proactive facilitated treatment initiation and completion. Participants greatly appreciated being 'kept in the loop' by study team members and community providers. Participants recognized the updates on clinical information as unique, and described them as key to helping them learn about the testing and treatment process. This approach was recognized as different from their prior healthcare experiences, in which they received few if any updates. "They always seem to communicate well," a participant explained, "so that we knew what was coming next." [EUC, 2012].

Compassion, empathy, and respect

Often study participants reported prior healthcare experiences that were traumatic, leading to hesitancy in seeking treatment. Study participants were pleasantly surprised and relieved by the respect, empathy, and compassion shown by the team. Study van staff were described as accommodating as they navigated challenges like childcare or transportation. This patient-centered approach allowed participants to stay committed

to their HCV treatment, as one participant [MTC, 1088] described,

> *Well, {staff name}'s amazing… literally brought my medication to my apartment because it was like, in the first two weeks that I was single mommying it, and I was like, I cannot walk there with three kids and they were like, 'oh, I'll drop it off after, I'll figure it out'… they're like on your level, not like, somebody with a super intense medical degree, who's talking above my head… Like, it's, "Where are you in life? How can we help you? And like, what's the best way for us to help you?*

Feeling understood, respected, and not judged by the van staff was consistently described as the reason people completed their follow-up visits or referred friends to the study. As a study participant described,

> *It's just digging down-to-earth and good people. It's nice to have that, because in this type of life being an addict, you get a lot of judgment, you get a lot of people looking at you wrong and it's tough to have people look at you as a person, and when you get that it's nice. [EUC, 2011]*

The staff skills related to compassion, empathy, and respect for the study population of people who inject drugs was a critical factor in study engagement and successes of the project. As one study van staff [9004] reflected: "The fact that we really do care about the people that we're working with, and we really do see them as people, and we really do value them and their stories and their time—that's what keeps those people without phones coming back to the van."

Discussion

Through our qualitative OTS interviews with patients, providers, community partners, and staff at our rural HCV treatment and harm reduction sites in rural VT and NH, we obtained a wide range of contextual information that can inform rural HCV interventions for PWIDs. Prior research mirrors some elements identified in our study including the benefits of the co-location of services, [19] emotional and informational support to patients during the HCV treatment process, [20] and care that recognizes the socio-economic challenges often experienced by PWIDs [21]. Similarly, the most salient emerging themes related to the successful engagement of study participants were convenience, effective rapport, and skilled staff. A range of subthemes also emerged from the data, including flexibility in communication, radical acceptance, and phlebotomy, which may guide future interventions as essential features that ensure successful HCV treatment initiation and completion.

Convenience

- Be flexible with communication including use of texting
- Co-locate with supportive community resources
- Provide harm reduction supplies and connect to other services as needed

Effective Rapport

- Engage a team of people who truly care about the health of people who use drugs
- Train staff in harm reduction strategies and engagement
- Recognize positive interactions as a critical component of engagement

Skilled Staff

- Provide regular education on HCV
- Provide prevention pointers and proactive updates to clients about next steps
- Ensure access to skilled phlebotomy with experience with people who inject drugs
- Engage and train a team in compassionate approaches like trauma informed care

Fig. 2 Recommendations for effective engagement of rural populations in HCV treatment

In rural communities, convenience appeared to be particularly prominent in our study of HCV treatment, similar to a multitude of barriers often identified in clinical care of PWID, whether for substance use treatment initiation [22] and continuity [21] or infectious disease treatment [23]. The willingness and ability of van staff to meet participants where they were geographically—arriving at their hangouts and homes when needed—and figuratively—in an ever-present non-judgmental and supportive manner—were essential to rapport and trust building, facilitating long term interactions and follow-up. Prior advances in HCV and HIV treatment among PWID have primarily focused on urban communities, but there is a growing recognition of the importance of development of infrastructure and community resources to meet the needs for HCV and HIV treatment in rural communities [24]. Our findings point to the importance of more convenient interactions that facilitate linkage to and retention in care.

We highlight recommended characteristics of a successful rural mobile HCV treatment program based on our findings in Fig. 2. Recommendations are derived from the subthemes identified through our analyses. A unifying factor across all domains was harm-reduction

informed service provision tailored to meet the needs of the rural population with HCV; for example, both having a fixed and dependable location and being flexible to go to the homes of those without transportation.

Effective rapport is essential to working relationships with participants and patients in all manners of harm reduction, prevention, and clinical care. The tenets of harm reduction point to the importance of meeting people where they are at and recognizing the impacts of poverty, class, and other social inequities [25]. Our team's embodiment of harm reduction principles and strengths extended to supportively describing all steps in the research and HCV treatment process succinctly and simply so that participants felt prepared, informed, and included in decision-making. This approach was notably described by participants in both study arms describing rapport as facilitating their engagement with treatment. Our van staff helped build rapport, not only between participants and staff, but also between community and healthcare providers with whom they coordinated services.

Skilled staff, who provided regular HCV prevention education and treatment pointers, were paramount to the success of provider-patient interactions in our study. These skills included sympathetic trauma informed care, access to skilled phlebotomists with experience with PWID, and proactive updates on next steps in treatment and research procedures (Fig. 2). This aspect was emphasized by participants in both study arms and providers.

Within our study, staff on the ground facilitated and coordinated tele-health visits. Future studies may examine visits coordinated by the community partners already engaging a rural population with HCV; service providers (e.g., harm reduction, unhoused services) with existing relationships with rural PWID are best positioned to perform the ongoing intensive outreach. Eliminating the barriers these organizations face to facilitate follow-ups with participants is crucial for maintaining the patient-care team communication necessary for successful treatment engagement, initiation, and completion.

Limitations/strengths

The strategies we employed were funded within the research study, which should be examined in a fee-for-service module based on volume.

Our comparison, EUC group, relied upon patient navigation and referrals to specialists providing HCV treatment (i.e., gastroenterologists and infectious disease clinicians) serving these rural communities. Although HCV treatment in primary care is effective and more common [26], there were no primary care providers identified in the study area treating HCV. Future studies should also explore differences in HCV treatment approaches through primary care and specialist treatment.

The OTS interviews were conducted to examine implementation of the intervention including facilitators of HCV treatment initiation and completion. While the objective of the interviews was shared with participants, there may still be response bias from study participants, who were receiving services as part of the study, and from van staff, who were invited to participate in interviews.

Conclusion

We identified salient characteristics of our rural, van-based treatment intervention (and most importantly of our van staff) that contributed to high treatment adherence and trust among a traditionally marginalized population of rural PWID. Tailored approaches and specialized skills are required to engage and retain PWID in rural areas, enhancing convenience in treatment and research procedures, facilitating patient and provider rapport building. We provide recommended attributes for staff working to enhance HCV treatment and harm reduction in rural communities, that could help pave the way to success in future studies and treatment models.

Author contributions

L.DTM., R.H., and P.D.F. directed all aspects of the project including data acquisition and storage. T.J.S., K.N., and L.DTM. conducted interviews. K.N., T.J.S, S.T., and L.DTM. conducted qualitative coding and analysis. K.N., E.B., & T.J.S. wrote the main manuscript text. P.D.F. and R.H. substantially revised the manuscript. All authors reviewed the manuscript.

Data availability

No datasets were generated or analysed during the current study.

Declarations

Competing interests

The authors declare no competing interests.

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