

# Barriers and Facilitators of HIV and Hepatitis C Care Among People Who Inject Drugs in Nairobi, Kenya: A Qualitative Study with Peer Educators

Natasha Ludwig-Barron (✉ [nludwigbarron@gmail.com](mailto:nludwigbarron@gmail.com))

University of Washington School of Public Health <https://orcid.org/0000-0002-0981-1550>

Brandon L Guthrie

University of Washington

Loice Mbogo

University of Washington Global Assistance Program - Kenya

David Bukusi

VCT and HIV Prevention, Kenyatta National Hospital

William Sinkele

Support for Addictions Prevention and Treatment in Africa (SAPTA)

Esther Gitau

Support for Addictions Prevention and Treatment in Africa (SAPTA)

Carey Farquhar

University of Washington

Aliza Monroe-Wise

University of Washington

---

## Research Article

**Keywords:** Kenya, peer educators, people who inject drugs (PWID), HIV care, Hepatitis C care, Modified Social Ecological Model (MSEM)

**Posted Date:** August 2nd, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-744969/v1>

**License:** © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

**Version of Record:** A version of this preprint was published at Harm Reduction Journal on December 1st, 2021. See the published version at <https://doi.org/10.1186/s12954-021-00580-7>.

1 **Title:** Barriers and facilitators of HIV and hepatitis C care among people who inject drugs in Nairobi,  
2 Kenya: A qualitative study with peer educators

3  
4 **Authors:**

5 Natasha T Ludwig-Barron, MPH<sup>a,b</sup>

6 Brandon L Guthrie, PhD, MPH<sup>a,b</sup>

7 Loice Mbogo, BS<sup>c</sup>

8 David Bukusi, MBChB, M.Med<sup>e</sup>

9 William Sinkele, D.Min<sup>f</sup>

10 Esther Gitau, BA<sup>f</sup>

11 Carey Farquhar, MD, MPH<sup>a,b,d</sup>

12 Aliza Monroe-Wise, MD, MSc<sup>b,d</sup>

13  
14  
15 <sup>a</sup>Department of Epidemiology, School of Public Health, University of Washington, UW Box # 351619,  
16 Seattle, WA, 98195, USA

17  
18 <sup>b</sup>Department of Global Health, School of Public Health and School of Medicine, University of  
19 Washington, UW Box #351620, Seattle, WA, 98195, USA

20  
21 <sup>c</sup>University of Washington Global Assistance Program-Kenya, Nairobi, Kenya

22  
23 <sup>d</sup>Department of Medicine, Division of Allergy and Infectious Diseases, University of Washington, Box  
24 356423, Seattle, WA, 98195, USA

25  
26 <sup>e</sup>VCT and HIV Prevention, Kenyatta National Hospital, Nairobi, Kenya

27  
28 <sup>f</sup>Support for Addictions Prevention and Treatment in Africa (SAPTA), Nairobi, Kenya

29  
30  
31 **Address correspondence and reprint requests to:**

32 Natasha Ludwig-Barron, MPH

33 University of Washington

34 School of Public Health

35 Department of Epidemiology

36 1959 NE Pacific Street

37 Health Sciences Bldg, F-262

38 Box 357236,

39 Seattle, WA 98195

40 Phone: +01 (909) 241 8274

41 Email: [nludwig@uw.edu](mailto:nludwig@uw.edu)

1 **TITLE:** Barriers and facilitators of HIV and hepatitis C care among people who inject drugs in Nairobi,  
2 Kenya: A qualitative study with peer educators

3

4 **ABSTRACT**

5 **Background:** In Kenya, people who inject drugs (PWID) are disproportionately affected by HIV and  
6 hepatitis C (HCV) epidemics, including HIV-HCV coinfections; however, few have assessed factors  
7 affecting their access to and engagement in care through the lens of harm reduction specialists. This  
8 qualitative study leverages the personal and professional experiences of peer educators to help identify  
9 HIV and HCV barriers and facilitators to care among PWID in Nairobi, including resource  
10 recommendations to improve service uptake. **Methods:** We recruited peer educators from two harm  
11 reduction facilities in Nairobi, Kenya, using random and purposive sampling techniques. Semi-structured  
12 interviews explored circumstances surrounding HIV and HCV service access, prevention education and  
13 resource recommendations. A thematic analysis was conducted using the Modified Social Ecological  
14 Model (MSEM) as an underlying framework, with illustrative quotes highlighting emergent themes.  
15 **Results:** Twenty peer educators participated, including six women, with 2 months to 6 years of harm  
16 reduction service. Barriers to HIV and HCV care were organized by (a) individual-level themes including  
17 competing needs of addiction and misinterpreted symptoms; (b) network-level themes including social  
18 isolation and drug pusher interactions; (c) community-level themes including transportation, mental and  
19 rural healthcare services, and limited HCV resources; and (d) policy-level themes including nonintegrated  
20 services, clinical administration, and law enforcement. Stigma, an overarching barrier, was highlighted  
21 throughout the MSEM. Facilitators to HIV and HCV care were comprised of (a) individual-level themes  
22 including concurrent care, personal reflections, and religious beliefs; (b) network-level themes including  
23 community recommendations, navigation services, family commitment, and employer support; (c)  
24 community-level themes including quality services, peer support, and outreach; and (d) policy-level  
25 themes including integrated services and medicalized approaches within law enforcement. Participant  
26 resource recommendations include (i) additional medical, social and ancillary support services, (ii)

1 national strategies to address stigma and violence and (iii) HCV prevention education. **Conclusions:** Peer  
2 educators provided intimate knowledge of PWID barriers and facilitators to HIV and HCV care that were  
3 described at each level of the MSEM, and should be given careful consideration when developing future  
4 initiatives. Recommendations emphasized policy and community-level interventions including  
5 educational campaigns and program suggestions to supplement existing HIV and HCV services.

6

7

8 **Keywords:** Kenya, peer educators, people who inject drugs (PWID), HIV care, Hepatitis C care,  
9 Modified Social Ecological Model (MSEM)

## 1 INTRODUCTION

2 In Kenya, people who inject drugs (PWID) are considered a key population that are  
3 disproportionately affected by the HIV and hepatitis C (HCV) epidemics, with prevalence estimates  
4 reaching upwards of 19-25% and 11-36%, respectively [1-6]. Within PWID communities HIV-HCV co-  
5 infection is common, prevalence estimates ranging 18-40%, due to the coinciding transmission risks  
6 including unsafe injection practices (e.g., syringe sharing, injecting blood or “flashblood”), sexual risks  
7 (e.g., unprotected sex, sexual violence, sex work), low HIV viral suppression (28-40%), and limited HCV  
8 prevention and care resources. [1,3,7]. Moreover, PWID living with HIV are more susceptible to  
9 acquiring HCV and experiencing HCV-related morbidity and mortality [8]. Kenya’s national HIV  
10 program scale-up for key populations has resulted in significant reductions in HIV incidence among  
11 PWID, but service gaps remain with 57%% of PWID unaware of their HIV status, 68% of PWID living  
12 with HIV are on antiretroviral treatment (ART), and 64% of those on ART are virally suppressed [4,9].  
13 With the release of direct acting antiretrovirals (DAAs), which are over 90% effective in treating HCV  
14 within other PWID settings, HCV elimination is achievable and has shown promising, cost effective  
15 results when incorporated in to existing harm reduction and HIV programs for PWID [9,10,11]. Within  
16 Kenya, DAA access has been largely cost-prohibitive and HCV prevention resources are limited, with  
17 little information on current PWID knowledge and perceptions of HCV, which can contribute to future  
18 HCV programs and services [1, 13]. As such, characterizing the circumstances surrounding PWID  
19 experiences of HIV and HCV care and access to prevention resources, will provide opportunities to  
20 improve services uptake.

21 Kenya’s Ministry of Health supports the collaboration of healthcare providers and harm reduction  
22 organizations that have established rapport with PWID communities in order to address the HIV and  
23 HCV epidemics [14-16]. Harm reduction programs are largely credited with reducing HIV and HCV  
24 incidence among PWID through needle syringes programs (NSPs), HIV counseling and testing services,  
25 social services (e.g., meals, shower facilities) and healthcare referrals [9, 17]. Common healthcare  
26 referrals include HIV and HCV care, wound care and opioid substitution therapy (OST), with several

1 OST clinics providing more comprehensive healthcare services by offering both methadone and HIV  
2 treatment to PWID [18]. Despite the success of harm reduction programs, NSP and OST service coverage  
3 remains low with approximately 54% of PWID accessing to NSPs and 4% accessing to OST [19]. In  
4 Nairobi, Support for Addictions Prevention and Treatment in Africa (SAPTA) is a non-profit organization  
5 that implements an evidence-based Peer Educator (PE) Program that trains former PWID to conduct  
6 outreach in PWID communities, offering grassroots harm reduction services that aim to reduce HIV and  
7 HCV incidence [20]. PEs serve as trusted community liaisons, often bridging the gap between PWID and  
8 healthcare providers, who largely serve the general public. Until recently, most studies have highlighted  
9 the experiences and perspectives of PWID, healthcare service providers and key stakeholders, but rarely  
10 consider the unique vantage-point of PEs, who offer both personal and professional perspectives on  
11 dynamics surrounding addiction, HIV and HCV care, and recommendations for improving service uptake  
12 [13, 21].

13 The Modified Social Ecological Model (MSEM) is often applied to understand the multiple  
14 contributors to infectious disease risk within specific communities, but it has yet to be applied to PWID  
15 communities within Kenya [22]. The MSEM suggests that individual behaviors are not solely derived  
16 from individual decisions, but rather influenced by external factors outside of an individual's control [22,  
17 23]. Specifically, the MSEM explains the complex relationships between the stage of an epidemic,  
18 including HIV and HCV epidemics, and the surrounding risks that fall within political, community,  
19 network and individual domains [22, 23]. Policy-level risks include laws and policies that promote or  
20 prohibit access to care; whereas, community-level risks include organizational structures, social cohesion,  
21 and socio-cultural norms that may affect a PWID's ability to engage in HIV and HCV care [22]. At the  
22 network-level, risks may be influenced by family, friends, sexual and/or injecting partnerships, while  
23 individual-level risks include personal knowledge, attitudes, and behaviors that influence the health and  
24 wellbeing of PWID [22]. Describing risk through an ecological lens, applying the MSEM, will provide a  
25 holistic view of how the surrounding environment impacts PWID behaviors, particularly the uptake of  
26 HIV and HCV services.

1           Using the MSEM as an underlying framework, we aim to characterize barriers and facilitators of  
2 HIV and HCV care through the perspective of community-embedded PEs in Nairobi, Kenya. Until  
3 recently, several studies have highlighted the roles and perspectives of clinicians, policy makers and  
4 current PWID, but rarely seek input from PEs who offer intimate knowledge of PWID experiences. In  
5 addition, we ask PEs for suggestions on resources and services that may support current PWID and aide  
6 their work as harm reduction specialists in improving HIV and HCV care uptake, with the ultimate goal  
7 of achieving community-level HIV viral suppression and HCV viral clearance.

## 8 **METHODS**

### 9 *Setting*

10           Our qualitative study takes place within Nairobi’s urban core with two SAPTA facilities where  
11 PEs provide outreach and harm reduction services to surrounding PWID communities. The SAPTA  
12 service region caters to more than 21,000 PWID, most of which buy, sell and trade drugs within “dens”  
13 that are located in outdoor public spaces. To avoid contributing to community stigma, location names will  
14 not be provided. PEs are trained harm reduction specialists, who are former PWID. They undergo  
15 instructional and field training in order to provide a range of harm reduction services, including  
16 distributing injection kits; connecting PWID to HIV/HCV counseling and testing services; educating on  
17 HIV, HCV and overdose prevention; providing opioid-receptor agonist treatment (i.e., naloxone);  
18 promoting OST clinical referrals; providing medical navigation assistance (e.g., appointment setting and  
19 reminders, transportation); and social services offered through SAPTA facilities (e.g., meals, groceries,  
20 shower and laundry facilities, etc.) At the time of this study, HIV treatment and care was subsidized  
21 throughout Nairobi; however, HCV treatment was limited to interferon-based regimes, that were largely  
22 cost prohibitive and <50% ineffective [1]. Until recently, DAA treatment was limited to research studies  
23 and pilot programs, with a national HIV treatment rollout anticipated in 2021. Strategic planning around  
24 HCV services and DAA dissemination are expected to evolve in order to meet community needs.

### 25 *Sampling & Recruitment*

1 We established a sampling frame of PEs working at two SAPTA facilities in Nairobi, Kenya.  
2 Study eligibility included: 1) adults 18 years or older; 2) employed as a PE from November to December  
3 2017; 3) English or Swahili-speaking; and 4) willing and able to provide informed consent. All SAPTA  
4 PEs are former PWID, with established PWID relationships. Random and purposive sampling techniques  
5 were applied, whereby we randomly selected PEs from a SAPTA roster and oversampled female PEs in  
6 order to increase the robustness of participant experiences. A standard script was used to explain the study  
7 purpose and procedures, and in total, 20 participants were selected and agreed to participate.

### 8 *Data Collection & Management*

9 Prior to conducting in-depth interviews with PEs, key informant interviews were completed by the  
10 senior author (AMW), who met with SAPTA leadership, HIV and HCV clinicians, mental health experts  
11 and government officials. The interview guide was developed through an iterative process with key  
12 informants and translated into Swahili by the study coordinator (LM), which was later piloted with two  
13 PEs prior to the start of data collection.

14 Semi-structured, in-depth interviews were used to elicit PEs personal and professional  
15 experiences surrounding (1) job responsibilities; (2) PWID access and utilization of HIV, HCV and  
16 addiction care services; (3) treatment by law enforcement and medical providers; and (4) suggested  
17 resources for PWID and to aide PEs in providing harm reduction services. One female, bilingual  
18 (English/Swahili) interviewer, with graduate-level qualitative training and extensive experience working  
19 with local PWID communities, received training on study procedures and conducted all interviews.  
20 Interviews were audio recorded and ranged from 45-90 minutes, with the interviewer taking detailed field  
21 notes post-interview to summarize content and the physical and mental condition of each participant.  
22 Weekly study team discussions were used to (a) refine interview guides, (b) explore emergent topics (i.e.,  
23 reciprocation), and (c) initiate analysis discussions [24-26]. Through study discussions, research team  
24 members concluded conceptual saturation had been reached, whereby additional interviews would not  
25 elicit new information [24, 25]. All transcripts were transcribed verbatim, with all but four transcripts

1 undergoing translation from Swahili to English. ATLAS.ti, v8 (Berlin, Germany), was used to manage  
2 and analyze all transcripts, field notes, and memos into one integrated system.

### 3 *Data Analysis*

4 We conducted a thematic analysis using similar methods to those described by Braun and Clark  
5 (2006) [24]. Codebook development involved three study team members (NLB, AMW and LM)  
6 independently reading and open-coding select transcript experts in order to generate an initial list of codes  
7 based on *a priori* topics (i.e., deductive) and emergent themes (i.e., inductive) [24, 26]. Similar themes  
8 were merged together as common or recurring concepts, which were organized into typologies and later  
9 into classification schemes. Weekly coding schedules consisted of coding, reviewing field notes, and  
10 writing detailed memos, which was followed by team discussions of major themes and code definitions as  
11 an iterative process [26]. Isolated coding concerns were resolved through team discussions and further  
12 refinement of codebook parameters. Higher-level code classifications included (a) drug use and addiction,  
13 (b) social support systems, (c) politics and law enforcement, (d) infectious diseases, and (e) peer educator  
14 employment. Guided by the MSEM, PWID experiences of HIV/HCV barriers and facilitators to care, as  
15 described by PEs, are presented alongside representative quotes using pseudonyms to protect anonymity.

### 16 *Ethical approval*

17 All study procedures and materials were approved by the University of Washington Institutional  
18 Review Board (Seattle, WA, USA) and the Kenyatta National Hospital/University of Nairobi Ethical  
19 Review Committee (Nairobi, Kenya). Participants provided written informed consent in Swahili or  
20 English. Careful consideration was given to SAPTA employment contracts that outline grounds for  
21 probation or dismissal, whereby if a PE disclosed current substance use, particularly the combination of  
22 methadone and substance use, they were encouraged to speak with an addiction counsellor. To our  
23 knowledge, no PEs were engaging in poly-substance use at the time of their interview. PEs were  
24 reimbursed 400 Ksh (\$4 USD) for their time and transportation.

## 25 **RESULTS**

1 Twenty participants completed in-depth interviews, of which 30% were women. PE mean age  
 2 was 37 years, half completed their secondary education (55%), and more than half were married or had  
 3 partners (65%). Participant average years of service was 3 years (range: 2 months-6 years) (Table 1). PEs  
 4 referred to actively injecting PWID living with HIV/HCV as their “clients,” which is how they will be  
 5 referred to throughout.

6 **Table 1:** Study population characteristics

Characteristics	Peer Educators (n=20)
Sex	
Female	6 (30%)
Male	14 (70%)
Mean age (range)	37 years (25-50 years)
Level of Education	
Primary	9 (45%)
Secondary	10 (50%)
Some College	1 (5%)
Married or Partnered	13 (65%)
PE average years of service (range)	3 years (2 months – 6 years)

7  
 8 Themes relevant to HIV/HCV barriers and facilitators to care were adapted to the MSEM framework  
 9 including individual, network, community and policy-level risks that are centered around Kenya’s HIV  
 10 and HCV epidemics (Figure 1), with suggested service recommendations that included medical, social  
 11 and ancillary support services, provided at the end.

12 **Figure 1:** Summary of HIV/HCV care themes applied within the Modified Social Ecological Model  
 13 (MSEM)

14 [Insert Figure 1]

15 **Barriers to HIV and HCV Care**

16 *Individual-level themes*

17 Participants described two individual-level barriers: the competing needs of addiction and  
 18 misinterpreted HIV/HCV symptoms. PEs characterized periods of addiction, from both personal and  
 19 professional perspectives, as constantly having to “hustle” to earn an income to acquire drugs, food and  
 20 shelter, with main objective to avoid their withdrawal symptoms. As a consequence, HIV/HCV treatment

1 and care was often neglected. Kizito, a PE for over 2 years, described the effort he dedicates to escorting  
2 clients to HIV/HCV testing and treatment facilities, but struggles keep his clients engaged in care when  
3 clients anticipate their withdrawal symptoms in-transit or waiting in queue to see a provider at the clinic.  
4 He described one client with HCV complications, who voluntarily discharged against medical advice:

5 *“I lost one guy with Hepatitis C and the problem is that they [PWID clients] cannot be*  
6 *contained. They don’t stay in the hospital. If they are admitted, when they feel a little bit okay,*  
7 *they run away because of the craving.” Kizito, M, age 44 years, PE for 2 years*

8 Kizito’s day is often consumed by transporting clients to harm reduction facilities and medical  
9 appointments, or following-up with clients to ensure they adhere to treatment regimens. Kizito concluded  
10 that without PE follow-up, clients will delay their HIV/HCV medical care until they are extremely sick  
11 and treatment options are limited.

12 In other cases, PEs describe their clients’ hesitation in receiving an HIV/HCV test due to their  
13 misinterpretation of *rosto*, or withdrawal symptoms, which can be difficult to discern from symptoms of  
14 advanced HIV/HCV infection (e.g., headaches, body chills, stomach aches, diarrhea, etc.) Below Murwa,  
15 a newly trained PE, explains that some of his clients have mistaken HIV/HCV-related health issues as  
16 withdrawal symptoms, causing them to consume additional drugs rather than seek care:

17 *“You might find that someone has stayed with the HIV virus for almost one-year and they don’t*  
18 *know [their serostatus], and the body continues to wither down.. .they feel the stomach or*  
19 *somewhere else aching, and they will just say it is rosto [withdrawal symptoms].” Murwa, M, 37*  
20 *years, PE for 7 months*

21 Experiences of HIV/HCV-related health issues could be the result of high viral loads stemming from non-  
22 adherence to treatment. When paired with sharing injection equipment or unprotected sexual activities,  
23 PWID may continue to transmit HIV/HCV to sexual and injecting partners.

#### 24 *Network-level barriers*

25 PEs highlighted two network-level themes: social isolation and territorial drug dealers. For many  
26 clients, stealing from family and friends is a common occurrence, with all but two PE’s recalling personal

1 and professional accounts of theft that resulted in dissolved relationships. Otieno (M, 36 years), a PE who  
2 injected heroin for 15 years, recalled experiencing social isolation from family and friends that impacted  
3 his mental health. He relates to clients' poor mental health and fatalistic thoughts where, *"they don't see*  
4 *the meaning of life,"* which ultimately affects their willingness to engage in HIV/HCV care. In addition,  
5 PEs described limited family counselling services that are tailored to injecting communities and their  
6 families. More than half of the PEs described the benefits of addressing clients' mental health and  
7 supporting family reunification, which would increase client engagement in HIV/HCV services.

8 Territorial "drug lords" and "pushers," whose main objective of selling drugs, interfered with  
9 PEs' ability to provide harm reduction services in local dens, or outdoor areas where drugs are bought,  
10 sold and consumed. Moha describes acts of physical violence and threats from drug suppliers, who blame  
11 PEs for impinging on their revenue:

12 *"Sometimes you have to hide, so that you can talk with people [clients] at the den, or when*  
13 *distributing the [needle-syringe] kits, sometimes we hide because the drug lords see us as blocks*  
14 *to their business. . . . we [PEs] are people who have been marked. There was a time a peer*  
15 *educator from here, they were beaten."* Moha, M, 34 years, PE for 2 years

16 PEs provide essential harm reduction and HIV/HCV services, which is obstructed when drug suppliers  
17 threaten or carry out acts of violence. As a result, clients will avoid PEs, fearing retaliation by drug  
18 suppliers, which limits their access to harm reduction services.

### 19 *Community-level barriers*

20 Four community-level themes emerged during PE discussions including: (a) transportation, (b)  
21 limited care beyond city limits, (c) limited HCV resources, and (d) lack of mental health services. PEs  
22 described transportation cost as common barrier, especially when clients lived or spent time outside of  
23 city limits. Three PE's, including Wangai, described instances where they felt obligated to fund  
24 transportation costs to medical facilities when their client's health was at stake:

25 *"If the person is very sick, they will have to use transport and you find that we don't have money*  
26 *in the DIC [SAPTA drop-in centre] to support such things. We contribute money amongst*

1            *ourselves [between several PEs] and take him to the hospital.” Wangai, M, 42 years, PE for 5*  
2            *years*

3 Wangai and Muniu (M, age 39) explained that their personal experience with addiction motivates them to  
4 support clients who are *“still our brothers and sisters,”* regardless of the financial cost. On several  
5 occasions, PEs described selfless acts to overcome community-level barriers, which highlights their  
6 dedication to client’s healthcare needs goes beyond financial incentives.

7            In addition, PEs described several scenarios where clients with HIV/HCV-related complications  
8 returned to their home villages to receive family support. However, with limited medical facilities in the  
9 villages, family members will often transport clients back to Nairobi when a client health conditions are  
10 severe. To complicate matters, clients often do not disclose their HIV/HCV-status or substance use to  
11 family members, due to stigma and fear of discrimination. Rita and her sister moved into a Nairobi slum  
12 in search of work, where they both developed a heroin addiction. Rita received her HIV diagnosis shortly  
13 after her sister passed away, and although her sister was never tested, Rita assumes her death was related  
14 to HIV complications. Rita summarizes her sister’s final days alive:

15            *“She [Rita’s sister]got pneumonia. . . I took her home [to our village] when I saw things are bad*  
16            *and by that time she was really in a bad condition. My mother took her to the hospital, and the*  
17            *following day when my mother went to visit her, found that she had died. You know when you are*  
18            *at the base. . . you don’t think that this thing is serious.” Rita, F, 38 years, PE for 3 years*

19 Rita was one of two PEs that described returning home to their village for family support and finding  
20 limited medical resources. In addition, many clients underestimate the severity of their illness and re-  
21 engage in care when they are severely immunocompromised, which limits their treatment options and  
22 increases the risk of mortality.

23            Several PEs cited an abundance of HIV-related health education and awareness, but limited  
24 community awareness on HCV testing, treatment and care. Muniu (M, 39 years) a PE for more than 4  
25 years, describes his clients’ limited awareness of HCV prevention and requested national HCV  
26 educational campaigns to educate communities on transmission routes, affected sub-groups, and locations

1 for low-cost testing services. While harm reduction agencies provide consistent HIV prevention  
2 messaging and promote the use of clean injection equipment, clients often lack information on primary  
3 and secondary HCV prevention services.

4 Nearly all PEs described personal and/or professional experiences of poor mental health that  
5 impacted daily activities, drug use, and ultimately, HIV/HCV care. Descriptions of violence, trauma,  
6 stress, isolation and experiences of forced migration to major cities in order to support family members,  
7 all contributed to poor mental health. Seventeen PEs described experiences of trauma, stress, depression  
8 and anxiety after witnessing a peer overdose. Muniu (M, age 39 years) recalled a traumatic event where  
9 he and his peers attended a demonstration event that turned violent and his close friend was killed, citing,  
10 *“Nothing like that has ever happened to me. Losing someone that you were with five minutes ago, I think*  
11 *it took a toll on me.”* Following the event, Muniu’s addiction to heroin and benzodiazepines increased  
12 and he neglected his HIV care for more than a year. While PEs draw on personal experiences to counsel  
13 clients, they recognize their limitations in providing professional mental health services. Furthermore,  
14 PEs conveyed that most mental health services do not treat co-occurring disorders or severe mental health  
15 conditions (e.g., suicidal ideation, depression, psychosis), but highlighted the importance of mental health  
16 services and improved HIV/HCV care.

#### 17 *Policy-level barriers*

18 PEs described four policy-level themes: integrated and tailored services, clinical administration  
19 (e.g., long wait queues, ambiguous financial obligations), clinical infrastructure (e.g., confidentiality  
20 concerns), and poor treatment by law enforcement and community members. PEs consistently cited the  
21 lack of integrated, tailored services as challenges as reasons for discontinued HIV/HCV care among their  
22 clients. Many endorsed a *“one-stop”* facility where clients could access harm reduction, HIV/HCV care,  
23 OST, wound care, mental health and ancillary services from providers who understood the specific needs  
24 of their clients. Harm reduction sites are limited to basic first aid, HIV counseling and testing, peer  
25 support groups and social services, with all other medical services provided via referrals. As a result,  
26 clients that attend multiple clinics face additional time and financial burdens associated with lost income,

1 transportation costs and household obligations. Nearly all PEs advocated for integrated medical services  
2 provided within harm reduction facilities, which have established positive rapport with injecting  
3 communities.

4 Administrative barriers included crowded medical facilities, long wait-queues and ambiguity  
5 around the financial obligations for medical services. In several cases, PEs felt obligated to accompany  
6 their clients to medical visits in order to provide coping strategies for withdrawal symptoms and to assist  
7 in navigating complex administrative processes. In addition, ambiguous financial obligations leave PWID  
8 unsure about whether medical expenses are subsidized or unsubsidized, creating unnecessary barriers to  
9 HIV/HCV and ancillary health services. Kizito described accompanying his clients to medical  
10 appointments and being solicited for payment:

11 *“Once we take the client to the hospital, we take the client to the Social Department where they*  
12 *[apply for a subsidization] waiver. It is a challenge because if they [medical staff] refuse, you*  
13 *keep on telling them that they are street people and they are junkies and we usually have letters*  
14 *with our [SAPTA] letterhead, used for referrals. And then, at long last, they agree to waiver. That*  
15 *is why you have to follow up with them . . . because if you leave them [a client] there, they will just*  
16 *die.” Kizito, M, age 44 years, PE for 2 years*

17 While HIV medical services are subsidized, clinical administrators will often seek payment for ancillary  
18 medical services that can delay PWID from seeing a provider, which increases the possibility of  
19 withdrawal symptoms and creates undue stress. Like Kizito, many PEs feel obligated to assist clients in  
20 navigating through administrative and clinical barriers, fearing clients will become overwhelmed and  
21 neglect their medical care.

22 Several PEs highlighted concerns surrounding confidentiality breaches due to lack of privacy  
23 with the clinical infrastructure. Often small building spaces and the use of curtains as temporary walls  
24 impacted privacy, so that patients in the waiting areas could decipher patient-provider conversations.  
25 Kiplimo understands the advantages of providing ART within OST clinics, but described his clients  
26 confidentiality concerns:

1           *“You will be given your medicine [ART] and then you are given your methadone through the*  
2           *window and you know there is no curtain. . . . Or even there are two windows, and you open the*  
3           *other one and you find someone receiving the medicine and then that person will start talking.”*

4           *Kiplimo, M, 35 years, PE for 6 years*

5 Kiplimo and two other PEs described the benefits and convenience of integrating ART and methadone  
6 services; however, breaches in confidentiality have led to the unintended disclosure of clients’ HIV status,  
7 which later induced social discrimination. The fear surrounding confidentiality breaches causes clients to  
8 avoid OST clinics or to enroll in separate facilities. Notably, clients that attend separate medical facilities  
9 face both time and financial constraints, which can increase suboptimal care through miss appointments  
10 and treatment regimens.

11           Nineteen PEs described first- and second-hand accounts of poor treatment, harassment, and  
12 violent acts that were carried out by local businesses, police and community members. Fifteen PEs  
13 described experiences of physical violence perpetrated by community members, referred to as “mob  
14 justice,” with at least three instances resulting in mortality. Mob justice was described as a spontaneous  
15 assembly of community vigilantes delivering justice through physical beatings, typically following theft  
16 or the destruction of property; however, the notion that all community members are empowered to punish  
17 marginalized clients. In total, 13 PEs characterized scare tactics, threats and acts of physical violence  
18 carried out by law enforcement. Kizito (M, 44 years) described one law officer who consistently carried  
19 out lethal force within the dens, which resulted in more than a half-dozen deaths. According to Muniu (M,  
20 age 39 years), law enforcement agents arbitrarily apply physical violence towards injecting communities,  
21 explaining, “. . .*there [are] good days and bad days for a cop,*” which causes clients to avoid areas  
22 associated with law enforcement and government entities, including medical facilities that provide  
23 HIV/HCV services. Law enforcement mistrust was rooted in corruption, with three PEs describing  
24 personal bribe solicitations by officers in order to mitigate jail sentences. This was coupled with recent  
25 government sanctioned den raids carried out by law enforcement, where surrounding homes were  
26 demolished within hours and physical violence targeted known PWID. Raids caused displacement, stress,

1 and trauma amongst clients, with several PEs unable to locate clients for medical appointments.  
2 Considered together, displacement, corruption and violence perpetrated by law enforcement and  
3 supported by government officials, further marginalize PWID and limited their access to HIV/HCV  
4 healthcare services.

5 *Overarching barrier: Stigma*

6 Discussions around stigma-related barriers to HIV/HCV care were described at each level of the  
7 MSEM. PEs described intrapersonal stigma as clients' acceptance of discriminatory beliefs about  
8 themselves that were rooted in living with HIV/HCV, using drugs, and/or illegal income sources (e.g.,  
9 "hustling", stealing, sex work). At the network-level, PEs frequently described experiences of stigma,  
10 isolation and being outcasted from friends, family and community members based on one's addiction,  
11 illegal income sources, and/or HIV/HCV serostatus status. Cherono (F, 33 years) still faces the  
12 consequences of her heroin addiction, as her siblings are unwilling to communicate. As a PE, Cherono  
13 witnesses similar patterns of family isolation stating, "*They [family] count a junky as dead, they don't*  
14 *count them as a person anymore.*" At the community-level, PEs highlighted experiences of  
15 discrimination by uninformed medical providers and law enforcement, which further isolates PWID  
16 communities. Rita (F, 38 years) and two other female PEs explained that doctors that serve *raiya*, or the  
17 general public, "*look at you like you are not human,*" which further marginalizes injecting communities.  
18 Often PEs characterized societal beliefs associated with substance use and HIV/HCV as lapses in  
19 judgement or poor morality, which caused clients to avoid medical assistance. Experiences of clinical  
20 stigma and discrimination, caused several clients to go without screenings, care, and treatment.  
21 Particularly, six PEs described medical conditions (e.g., abscesses, broken bones and high fevers) that  
22 were left unattended and increased in severity, which complicated treatment options. At the policy-level,  
23 PEs discussed historically unsupported harm reduction programs from government officials that  
24 marginalized clients, which was compared with the current lack of government support for HCV services.  
25 In general, PEs perceived policy-makers, government officials, medical providers, and community  
26 members as being uninformed and intolerant towards their clients' needs.

## 1 **Facilitators to HIV and HCV Care**

### 2 *Individual-level facilitators*

3 PEs characterized three individual-level themes, including: concurrent engagement in OST,  
4 personal reflections and religious influences that motivated clients to remain engaged or re-engage in  
5 HIV/HCV medical care. Almost all PEs described improvements in physical and mental health outcomes  
6 when HIV, HCV and substance use disorders were addressed in parallel. Particularly, OST clinics provide  
7 daily directly-observed methadone and HIV treatment, with infrastructure to accommodate HCV testing  
8 and DAA distribution in the future. In addition, several PEs discussed personal reflections following  
9 severe health complications or the death of a peer, as a motivating factor for returning to HIV care, but  
10 left many unaware of HCV service options. The fear of death, particularly not wanting to abandon family  
11 or children, prompted several PEs to prioritize their health, re-engage in care and reduce their substance  
12 use. PEs credit their lived experiences and personal reflections as impactful tools in encouraging clients to  
13 engage in care. Furthermore, 10 PEs credited their faith and religious beliefs for improvements in  
14 treatment adherence and overall health, especially following extended periods of sub-optimal care.  
15 Cherono (F, age 33 years) described her disbelief of surviving a 9-year heroin addiction and being  
16 orphaned, surviving physical violence, and living in unsafe environments stating, “*I don’t have parents,*  
17 *no one else to take care of me, only God.*” Cherono shares with clients that her strength and survival is a  
18 combination of religious faith and following medical advice, which has allowed her to be a better mother.  
19 Several PEs described the benefits of faith-based organizations that provide social services (e.g., food,  
20 shelter, clothing) and host events to build community, which increases social inclusion and improves  
21 mental health. As such, PEs found it easier to motivate clients with religious beliefs to re-engage in care.

### 22 *Network-level facilitators*

23 Emergent network-level themes included trusted community recommendations, patient  
24 navigation services, commitment to family and children, and employer support. Trusted community  
25 recommendations and positive clinic reputations were seen as essential to promoting healthcare services  
26 to clients, including HIV, HCV and OST services. PEs characterized communication networks within

1 injecting communities that shared both positive and negative clinical experiences, which often impacted  
2 client engagement or re-engagement in care. When discussing HCV services, PEs stressed the importance  
3 of considering community perceptions and clinic reputations when developing HCV care delivery  
4 strategies.

5 At the center of client care was the unanticipated theme of patient navigation services carried out  
6 by PEs providing the highest level of healthcare support and coordination, which often fall outside of the  
7 PE job description and without additional compensation. Specifically, PEs described (a) tracking and  
8 reminding clients of medical appointments, (2) absorbing clients' medical transportation costs, (3)  
9 navigating administrative processes, (4) mediating patient-provider discussions and (5) providing  
10 treatment adherence reminders. Hawi recalls neglecting her medical appointment at the height of her  
11 addiction, which motivates her persistent follow-up with clients:

12 *"I go with them to the hospital and when they have been given medication, I ensure they get them*  
13 *[medication], and if they are given a follow-up [appointment] I accompany them to the hospital*  
14 *again until they are done."* Hawi, F, Age 34 yrs, PE for 3 years

15 Ultimately, PEs described additional hours in providing ancillary services to clients that are integral to  
16 HIV/HCV care and achieving viral suppression; however, these services remain largely uncompensated  
17 and unrecognized by the medical community.

18 In addition, men and women discussed slightly different motivations for engaging or re-engaging  
19 in care. For women, commitment to family and children often motivates PEs and their female clients to  
20 follow medical recommendations. For men, influential community members like religious figures, PE  
21 colleagues and supportive employers provided motivation to remain or re-engage in HIV/HCV services.  
22 Moha (M, age 34 years) described the positive impact his former employer had on returning to care.  
23 Moha's employer permitted him to take time-off to attend medical appointments and encouraged him to  
24 take medical leave to address his substance use disorder, while maintaining job security. Both social  
25 networks (i.e., PWID, family, children, and employers) and patient navigation services provided by PEs  
26 were instrumental facilitating clients' engagement in care.

1 *Community-level facilitators*

2 High-quality service delivery, harm reduction services, and peer educator programs emerged as  
3 community-level themes and promoters of HIV/HCV care. All PEs credited access to harm reduction  
4 organizations, like SAPTA, for their improved physical and mental health. PEs relate to clients'  
5 skepticism of harm reduction agencies, but share their positive experiences with non-judgmental staff,  
6 access to social services (e.g., laundry, two meals per day, and shower facilities) and quality healthcare  
7 services within harm reduction facilities. Wairimu (F, age 27 years) described her initial motivation for  
8 visiting SAPTA in order to access social services, which created a level of trust and later transitioned into  
9 HIV, HCV and OST services. More often than not, PEs credited harm reduction facilities as mediators or  
10 “bridges” between clients and high-quality HIV/HCV care.

11 Harm reduction programs apply grassroots service delivery principles through the PE program,  
12 training PEs to, “*meet people where they are,*” and provide harm reduction services in dens where clients  
13 reside. These activities establish rapport between PEs and clients, with PEs drawing on their lived  
14 experiences and serving as positive role models. Eventually, PEs are able to broach the topic of HIV/HCV  
15 prevention, testing and care. Martin (M, age 50 years) explains that several of his clients “*feeling like it’s*  
16 *the end of the world. . . but when they look at people like us [PEs], they get hope.*” Employing PEs is a  
17 critical step in accessing and bridging the gap between PWID and medical communities, that ultimately,  
18 improve access to HIV, HCV and ancillary medical services.

19 *Policy-level facilitators*

20 PEs described two overarching policy-level themes, which included: supportive harm reduction  
21 and OST service policies and integrating medicalized approaches within law enforcement agencies. Three  
22 PEs provided historical context prior to the advent of harm reduction programs. Martin (M, age 50 years)  
23 shared injection equipment and engaged in “flashblood,” where he would inject another peer’s blood to  
24 avoid withdrawal symptoms, which is how he believes he contracted HIV and HCV. Following national  
25 support on harm reduction and OST programs, PEs noted the subsequent uptake of HIV/HCV prevention  
26 and care. Muniu (M, age 39 years) engaged in heroin and benzodiazepine use for more than 10-years and

1 posits when “*methadone came [to Kenya], life began.*” Until harm reduction and OST programs were  
2 nationally recognized public health strategies, PEs found it extremely difficult to assist clients in  
3 accessing HIV/HCV services.

4           Until recently, PEs noted that punitive punishments for drug possession were the standard  
5 practice; however, more recently harm reduction programs have partnered with law enforcement agencies  
6 to provide education around medicalized approaches to assist PWID. PEs described three accounts of law  
7 enforcement agents taking a medicalized approach by encouraging clients to pursue methadone when they  
8 were found in possession of opioids and/or drug equipment. In these instances, law enforcement agents  
9 provided clients with two options: jail or OST enrolment. While PEs felt medicalized approaches were  
10 inconsistently implemented by law enforcement agencies, they highlighted the promising effects of being  
11 a gateway to OST, HIV, HCV and harm reduction services.

## 12 **Recommended Services**

13           PEs recommended HIV/HCV resources and services, that would assist them in providing  
14 outreach and harm reduction services, which were categorized by: social, medical and ancillary services.  
15 Within the requested the social services, PEs advocated for occupational and vocational training programs  
16 for clients that provide pathways towards financial independence and stable housing options, which  
17 would allow them to prioritize their health. Vocational training spanned basket weaving, cosmetology,  
18 and typing classes. Four PEs suggested evaluating a client’s education and skill-level to offer  
19 opportunities for re-certification or occupational re-integration where appropriate. PEs noted clients with  
20 small businesses, mainly shoe-shining and car washing, and could benefit from small business loan  
21 programs to purchase supplies. Nearly all PEs advocated for occupational programs for clients to increase  
22 their financial independence and change their living conditions to be away from drug environments, so  
23 that their role of delivering harm reduction and assisting with HIV/HCV services would be more  
24 impactful.

25           Nearly all PEs requested integrated medical services, which included HIV, HCV, OST and  
26 ancillary services within established harm reduction organizations. PEs described the time, effort and cost

1 of escorting clients to multiple clinics that serve the general population, which produced lapses in care  
2 and less time spent conducting outreach. Two PEs suggested that providers and clinical frontline workers  
3 should be cross-trained on substance use disorders to reduce stigma and discrimination. PEs that have  
4 clients who frequently travel back to their villages, advocated for harm reduction mobile units that can  
5 provide HIV/HCV services in the villages. Additionally, six PEs requested training in first aid,  
6 resuscitation, and basic wound care that they can apply while conducting outreach. PEs are an integral  
7 part of the HIV/HCV care, yet their training is limited to outreach, harm reduction education and informal  
8 patient navigation services, with several PEs requesting additional responsibilities to better serve clients.

9       Recommendations for ancillary resources included mental health services, family counseling and  
10 re-unification services, national HCV educational campaigns, and non-traditional services like physical  
11 activity space to improve *kujithamini*, or self-esteem, and mental health. Twelve PEs stressed the  
12 importance of addressing clients' mental and physical health in parallel to increase the overall.  
13 Specifically, PEs recommended mental health and counseling services equipped to deal with co-occurring  
14 disorders (e.g., trauma, depression, schizophrenia), as well as, family counseling and reunification  
15 services. Nearly all PEs described their client's as having a basic understanding of HIV prevention, but  
16 lacked awareness around HCV prevention. PEs advocated for national HCV campaigns to educate  
17 community members and low literacy campaigns tailored towards PWID communities. Finally, two PEs  
18 suggested providing physical activity space and workout equipment in harm reduction facilities,  
19 explaining that improved physical appearance increases a client's confidence and ultimately keeps them  
20 engaged in HIV/HCV care. While non-traditional, ancillary programs are not widely promoted, they may  
21 offer unique solutions in addressing HIV/HCV care barriers.

## 22 **DISCUSSION**

23       This qualitative analysis applies the MSEM as an underlying framework to better understand  
24 HIV/HCV barriers and facilitators to care through the unique lens of PEs who offer both lived-  
25 experiences as former PWID, and professional experiences of providing outreach services to hidden  
26 PWID communities in Nairobi, Kenya. Barriers and facilitators to HIV/HCV care were identified within

1 each level of the MSEM, including individual, network, community and policy-levels, and were specific  
2 to Kenya's HIV and HCV epidemics among PWID, a group previously identified as a key population  
3 [14]. Notably, stigma was an overarching theme that touched all levels of the MSEM and greatly  
4 impacted HIV/HCV care. Additional resources and service recommendations to aid PEs, included  
5 additional medical, social and ancillary support services. Leveraging the unique perspectives of PEs  
6 through an ecological framework, posits intervention strategies that address one level of the MSEM may  
7 have limited effectiveness in improving HIV/HCV care. Moreover, HIV/HCV interventions should be  
8 developed by multiple stakeholders including current PWID, PEs, medical professionals, harm reduction  
9 specialists, law enforcement agents, and policy-makers.

10 Addressing policy-level barriers through a top-down approach, may address multiple HIV/HCV-  
11 related barriers at various levels of the MSEM with suggestions to (a) expand integrated services beyond  
12 the current OST, HIV, and HCV services; (b) increase OST capacity and treatment options; and (c)  
13 advocate for drug policies that emphasize medicalized, rather than punitive approaches. Several studies  
14 point to the benefits of patient-centered, integrated care models that provide HIV, HCV, OST and  
15 ancillary services within trusted harm reduction organizations and employ medical staff trained on the  
16 specific needs of PWID [27,28]. Globally, integrated approaches have effectively improved health  
17 outcomes among PWID, including reduced community viral suppression, and were cost-effective  
18 compared to decentralized care models [28-30]. However, PEs and PWID have expressed confidentiality  
19 concerns attributed to clinical infrastructure, in our study and elsewhere, which should be addressed [31].  
20 More recently, harm reduction facilities have incorporated additional medical services (e.g., ART,  
21 physical exams, tuberculous testing), which may provide a foundation for integrating HCV care in the  
22 near future. As such, integrated services within trusted harm reduction facilities offer a high level of  
23 patient-centered care and the potential to increase HIV/HCV service uptake among PWID.

24 To address logistical and financial barriers, including mobility to and from villages, OST services  
25 should expand to include more convenient treatment options like take-home buprenorphine, which has  
26 been associated with improved HIV/HCV care outcomes [32,33]. Currently, methadone is Kenya's

1 standard of care for OST; however, service coverage is limited and requires patients to attend daily clinic  
2 appointments which presents time, financial and logistic barriers for PWID [17,19]. Early concerns  
3 pointed to the effectiveness, misuse and increased overdose risks associated with take-home  
4 buprenorphine treatment; however, new evidence highlights the multiple benefits, including increased  
5 HIV/HCV treatment initiation and adherence, negative opioid urinalysis, HIV viral suppression and HCV  
6 viral clearance among PWID [32-34]. Currently, Kenya's Essential Medicines List (2019) includes  
7 methadone and buprenorphine as approved OST; however, funding constraints limit methadone service  
8 access and buprenorphine access is scarce [35]. Thus, efforts to prioritize OST options and increase  
9 availability may address opioid use disorders and multiple HIV/HCV barriers.

10           Outside of healthcare services, punitive drug laws and harm reduction policies further  
11 marginalize PWID communities and often disrupted HIV, HCV and OST care. Recent OST service  
12 modifications include less punitive, and more strengths-based approaches following a positive urinalysis  
13 for opioids (e.g., counselling, goal setting) to meet PWID where they are in their addiction [14,36].  
14 Following study enrolment, SAPTA and other harm reduction facilities partnered with local law  
15 enforcement agencies to provide education on medicalized approaches when working with PWID.  
16 Currently, a few local police jurisdictions offer PWID the option of drug treatment or a jail sentence upon  
17 being arrested; however, constraints exist on OST capacity and law enforcement agents that physically  
18 harm on PWID, with the perception that substance use is affiliated with moral choice, rather than mental  
19 health. Global funding agencies and policy makers should prioritize (a) integrating OST, HIV, and HCV  
20 services within trusted harm reduction facilities, (b) increasing capacity and disseminating OST options,  
21 including buprenorphine, and (c) advocating for local and national policies that adapt medicalized  
22 approaches when working with PWID.

23           With the release of DAAs in 2021, HCV prevention, testing and care services were not well  
24 understood by the general public or PWID communities, supporting the need for educational campaigns.  
25 Until recently, HCV treatment in Kenya was limited to interferon-based options, which are cost  
26 prohibitive, produced multiple side effects and were largely ineffective (<50% viral clearance) [1].

1 According to the WHO, DAAs are the standard of care for HCV due to their shorter treatment duration,  
2 limited side effects, fewer clinic visits and increased effectiveness (>90% viral clearance), eliminating  
3 several financial and logistic barriers [37,38]. Thus, targeted HCV educational campaigns for medical  
4 providers, harm reduction specialists and PWID are fundamental to HCV elimination, which is largely  
5 achievable in the DAA era.

6 Finally, addressing the mutually reinforcing effects of intra- and interpersonal stigma (e.g.,  
7 network, community and policy level) at multiple levels of the MSEM, can greatly improve the physical  
8 and mental wellbeing of PWID communities. Policy-level recommendations include broad  
9 communication efforts enforcing Kenya’s National AIDS and STI Control Programme Guidelines that  
10 condemn community and network-level violence as a form of retaliation and moral cleansing, paired with  
11 healthcare provider trainings emphasizing harm reduction approaches [39]. Alternatively, political  
12 ambivalence towards community violence, will continue to reinforce issues of stigma towards PWID. At  
13 the network-level, cognitive behavioral interventions coupled with family and couple counselling have  
14 noted promising results in reducing stigma [40]. Intrapersonal interventions are personalized counseling  
15 sessions on “coping” with experienced stigma or changing personal environments, which when well-  
16 timed and supported by sufficient resources have been effective [41]. Stigma against injection drug use  
17 carries important implications for PWID health, and currently, there are limited evidence-based  
18 interventions that reduce HIV/HCV and/or substance use-related stigma in Kenya, highlighting  
19 opportunities to adapt, develop and evaluate strategies in the future [41, 42].

#### 20 *Limitations*

21 These findings reflect the personal and professional experiences of PEs from two harm reduction  
22 facilities in Nairobi, Kenya, and may not be representative of all PE or actively injecting PWID  
23 experiences. Additional insight may be gained through the experiences of providers, local policy makers,  
24 and persons who are actively injecting drugs at the time of the interview. Second, the interview setting  
25 included PEs’ place of employment, which may have induced socially desirable bias. However, this was  
26 felt to be minimal as several PEs were comfortable discussing sensitive topics like illegal activities,

1 instances of relapse, and negative employment experiences, including low salaries, having to take  
2 multiple jobs, low transportation reimbursement, and having use personal cell phones. Thirdly, this study  
3 took place prior to the release of DAAs, with the anticipation that information gained from this work  
4 could inform HCV program planning.

## 5 **CONCLUSION**

6           Applying the MSEM as a guiding framework and drawing upon the experiences of PEs to discuss  
7 personal and professional HIV/HCV barriers and facilitators to care within Nairobi, Kenya, offers a  
8 grassroots perspective to improving HIV/HCV care among PWID that should be considered when  
9 designing future initiatives. Moreover, addressing barriers and supporting existing facilitators at multiple  
10 levels of the MSEM, may offer more effective approaches to increasing HIV/HCV care uptake.  
11 Recommendations largely focused on policy and community-level interventions to supplement existing  
12 services and provided awareness around issues that affect PWID, with the ultimate goal of achieving  
13 community HIV viral suppression and HCV viral clearance among PWID in Kenya.

## 1 **ABBREVIATIONS**

2	AIDS	Acquired immunodeficiency syndrome
3	ART	Antiretroviral treatment (HIV treatment)
4	DAA	Direct acting antivirals (Hepatitis C treatment)
5	HIV	Human immunodeficiency virus
6	HCV	Hepatitis C virus
7	MSEM	Modified Social Ecological Model
8	NSP	Needle/syringe programs
9	PE	Peer educator
10	PWID	People who inject drugs
11	OST	Opioid substitution therapy
12	SAPTA	Support for Addictions Prevention and Treatment in Africa (harm reduction organization)
13	STI	Sexually transmitted infection
14	WHO	World Health Organization

1 **STUDY DECLARATIONS**

2 I. Ethical approval and consent to participate

3 All study procedures and materials were approved by the University of Washington Institutional Review  
4 Board (Seattle, WA, USA) and the Kenyatta National Hospital/University of Nairobi Ethical Review  
5 Committee (Nairobi, Kenya).

6 II. Consent for publication

7 Participants in study provided written informed consent for publication of the data, without the use of  
8 identifying information.

9 III. Availability of data and materials

10 Study materials and data that support the findings of this study are available from the corresponding  
11 author (NLB) on reasonable request. The data are not publicly available due them containing information  
12 that could compromise research participant privacy/consent.

13 IV. Competing interests

14 The authors declare that they have no competing interests.

15 V. Funding

16 This research was supported through the Fogarty International Center of the National Institutes of Health  
17 (R25 TW009345), which was awarded to the Northern Pacific Global Health Fellows Program (PI:  
18 Monroe-Wise). NLB received support through an administrative diversity supplement from the National  
19 Institute of Drug Abuse (NIDA; R01 DA043409-S1), and collaborating authors are supported through the  
20 SHARP Study a NIDA funded study (R01 DA043409; co-PIs: Farquhar & Herbeck). The content of this  
21 manuscript is solely the responsibility of the authors and does not necessarily represent the official views  
22 of the National Institutes of Health.

23 VI. Author's contributions

24 NLB managed the data analysis team, drafted the concept sheet and manuscript, and approved the final  
25 manuscript for submission. AMW and BG collaborated on the study conceptualization and funding  
26 acquisition. Study materials were developed by a binational team of researchers and community partners

1 including AMW, LM, DB, WS, EG, BG and CF. All interviews were transcribed and translated by LM.  
2 The qualitative data analysis team consisted of NLB, LM, and AMW. All authors read and approved the  
3 final manuscript.

#### 4 VII. Acknowledgements

5 We wish to acknowledge all the participating agencies and staff, especially the peer educators that  
6 provided their personal experiences with HIV, HCV, addiction and their professional expertise working  
7 with PWID communities. We would also like to thank staff members from the Support for Addictions  
8 Prevention and Treatment in Africa (SAPTA), who assisted with recruitment, data collection, and  
9 triangulation of findings.

## REFERENCES

1. Akiyama MJ, Cleland CM, Lizcano JA, Cherutich P, Kurth AE. Prevalence, estimated incidence, risk behaviours, and genotypic distribution of hepatitis C virus among people who inject drugs accessing harm-reduction services in Kenya: a retrospective cohort study. *Lancet Infect Dis.* 2019 Nov 1;19(11):1255-63.
2. Degenhardt L, Peacock A, Colledge S, Leung J, Grebely J, Vickerman P, Stone J, Cunningham EB, Trickey A, Dumchev K, Lynskey M. Global prevalence of injecting drug use and sociodemographic characteristics and prevalence of HIV, HBV, and HCV in people who inject drugs: a multistage systematic review. *Lancet Glob Health.* 2017 Dec 1;5(12):e1192-207.
3. Kurth AE, Cleland CM, Des Jarlais DC, Musyoki H, Lizcano JA, Chhun N, Cherutich P. HIV prevalence, estimated incidence, and risk behaviors among people who inject drugs in Kenya. *J Acquir Immune Defic Syndr.* 2015 Dec 1;70(4):420.
4. National AIDS and STI Control Programme (NASCOP). 2010-2011 Integrated biological and behavioural surveillance survey among key populations in Nairobi and Kisumu, Kenya. Nairobi: Government of Kenya, Ministry of Public Health and Sanitation; 2014 Nov. Cited 2021 July 10. Available from: [https://globalhealthsciences.ucsf.edu/sites/globalhealthsciences.ucsf.edu/files/pub/final\\_report\\_keypops\\_ibbs\\_nov\\_24\\_2014\\_print.pdf](https://globalhealthsciences.ucsf.edu/sites/globalhealthsciences.ucsf.edu/files/pub/final_report_keypops_ibbs_nov_24_2014_print.pdf)
- 5 National AIDS Control Council (NACC), Kenya Ministry of Health. Kenya HIV estimates report 2018. Nairobi, Kenya, 2018 Oct. Cited 2021 July 10. Available from <https://nacc.or.ke/wp-content/uploads/2018/11/HIV-estimates-report-Kenya-20182.pdf>

- 1 6. Tun W, Sheehy M, Broz D, Okal J, Muraguri N, Raymond HF, Musyoki H, Kim AA, Muthui M,  
2 Geibel S. HIV and STI prevalence and injection behaviors among people who inject drugs in Nairobi:  
3 results from a 2011 bio-behavioral study using respondent-driven sampling. *AIDS Behav.* 2015  
4 Feb;19(1):24-35.
- 5 7. Muriuki BM, Gicheru MM, Wachira D, Nyamache AK, Khamadi SA. Prevalence of hepatitis B and C  
6 viral co-infections among HIV-1 infected individuals in Nairobi, Kenya. *BMC Res Notes.* 2013  
7 Dec;6(1):1-6.
- 8 8. Operskalski EA, Kovacs A. HIV/HCV co-infection: pathogenesis, clinical complications, treatment,  
9 and new therapeutic technologies. *Curr HIV-AIDS Rep.* 2011 Mar;8(1):12-22.
- 10 9. Musyoki H, Bhattacharjee P, Sabin K, Ngoksin E, Wheeler T, Dallabetta G. A decade and beyond:  
11 learnings from HIV programming with underserved and marginalized key populations in Kenya. *J Int*  
12 *AIDS Soc.* 2021 Jul;24:e25729.
- 13 10. Smith-Palmer J, Cerri K, Valentine W. Achieving sustained virologic response in hepatitis C: a  
14 systematic review of the clinical, economic and quality of life benefits. *BMC Infect Dis.* 2015  
15 Dec;15(1):1-9.
- 16 11. Rich KM, Bia J, Altice FL, Feinberg J. Integrated models of care for individuals with opioid use  
17 disorder: how do we prevent HIV and HCV? *Curr HIV/AIDS Rep.* 2018 Jun;15(3):266-75.
- 18 12. Morgan JR, Servidone M, Easterbrook P, Linas BP. Economic evaluation of HCV testing approaches  
19 in low and middle income countries. *BMC Infect Dis.* 2017 Nov;17(1):117-27.
- 20 13. Akiyama MJ, Muller A, Huang O, Lizcano J, Nyakowa M, Riback L, Ross J, Bundi H, Kulabi ES,  
21 Mwangi AM, Musyoki H. Hepatitis C-related knowledge, attitudes and perceived risk behaviours among  
22 people who inject drugs in Kenya: A qualitative study. *Glob Pub Health.* 2021 Mar 9:1-3.

- 1 14. Abdool R. Policy change towards implementing harm reduction in Sub-Saharan Africa. *Int J Drug*  
2 *Policy*. 2016 Apr 1;30:140-2.
- 3 16. National AIDS and STI Control Programme (NASCOP), Kenya Ministry of Health. The national  
4 guidelines for HIV/STI programming with key populations. Nairobi, Kenya, 2014 October. Cited 2021  
5 July 10. Available from [https://www .icop.or .ke/wp-content/uploads/2016/10/KP-National-Guidelines-](https://www.nascop.or.ke/wp-content/uploads/2016/10/KP-National-Guidelines-2014-NASCOP.pdf)  
6 [2014-NASCOP .pdf](https://www.nascop.or.ke/wp-content/uploads/2016/10/KP-National-Guidelines-2014-NASCOP.pdf)
- 7 17. Stone J, Fraser H, Walker JG, Mafirakureva N, Mundia B, Cleland C, Kigen B, Musyoki H, Waruiru  
8 W, Ragi A, Bhattacharjee P. Modelling the Impact of Prevention and Treatment Interventions on HIV and  
9 Hepatitis C Virus Transmission Among People Who Inject Drugs in Kenya. *medRxiv*. 2021 Jan 1.
- 10 18. Kenya Ministry of Health. The national protocol for treatment of substance use disorders in Kenya.  
11 Mental Health & Substance Abuse Management Unit, Nairobi, Kenya, 2017. Cited 2021 July 10.  
12 Available from: [https://www.afro.who.int/sites/default/files/2017-](https://www.afro.who.int/sites/default/files/2017-09/The%20National%20Protocol%20for%20treatments%2014%2007%202017.pdf)  
13 [09/The%20National%20Protocol%20for%20treatments%2014%2007%202017.pdf](https://www.afro.who.int/sites/default/files/2017-09/The%20National%20Protocol%20for%20treatments%2014%2007%202017.pdf)
- 14 19. Larney S, Peacock A, Leung J, Colledge S, Hickman M, Vickerman P, Grebely J, Dumchev KV,  
15 Griffiths P, Hines L, Cunningham EB. Global, regional, and country-level coverage of interventions to  
16 prevent and manage HIV and hepatitis C among people who inject drugs: a systematic review. *Lancet*  
17 *Glob Health*. 2017 Dec 1;5(12):e1208-20.
- 18 20. National AIDS and STI Control Programme (NASCOP), Kenya Ministry of Health. Manual for  
19 training peer educators for programs with people who inject drugs. Nairobi, Kenya, 2017 June. Cited on  
20 2021 July 10. Available from: [https://hivpreventioncoalition.unaids.org/wp-](https://hivpreventioncoalition.unaids.org/wp-content/uploads/2019/01/NASCOP2017_Manual-for-Training-Peer-Educators-for-Programs-with-Female-Sex-Workers-Participants-Handbook_Kenya.pdf)  
21 [content/uploads/2019/01/NASCOP2017\\_Manual-for-Training-Peer-Educators-for-Programs-with-](https://hivpreventioncoalition.unaids.org/wp-content/uploads/2019/01/NASCOP2017_Manual-for-Training-Peer-Educators-for-Programs-with-Female-Sex-Workers-Participants-Handbook_Kenya.pdf)  
22 [Female-Sex-Workers-Participants-Handbook\\_Kenya.pdf](https://hivpreventioncoalition.unaids.org/wp-content/uploads/2019/01/NASCOP2017_Manual-for-Training-Peer-Educators-for-Programs-with-Female-Sex-Workers-Participants-Handbook_Kenya.pdf)

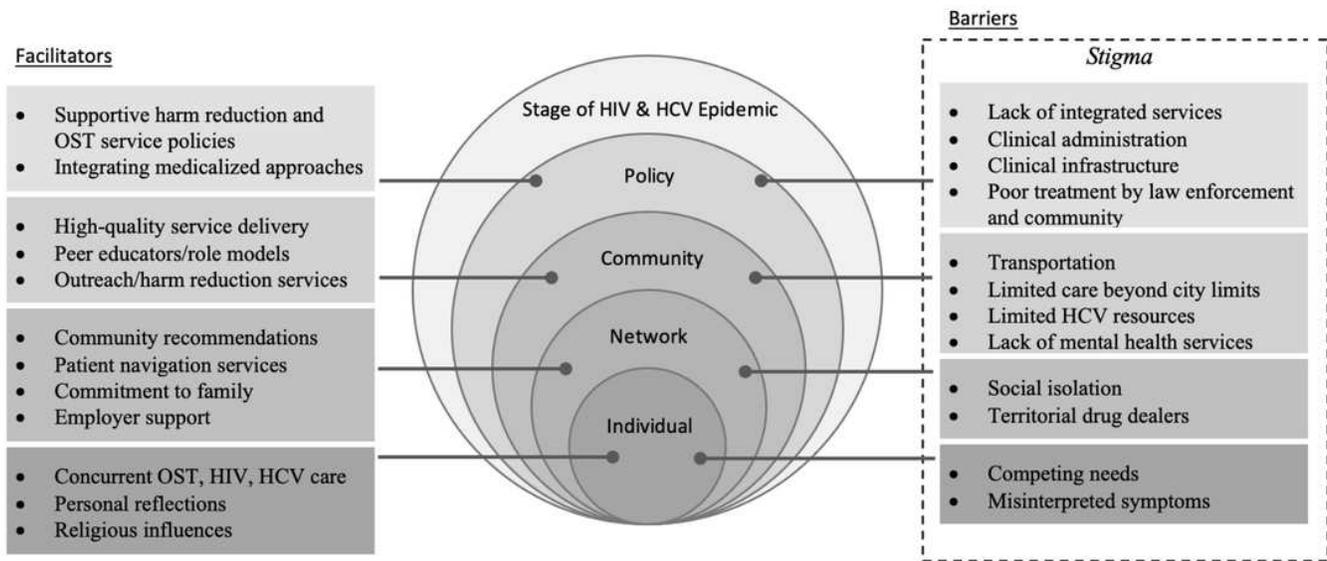
- 1 21. Guise A, Rhodes T, Ndimbii J, Ayon S, Nnaji O. Access to HIV treatment and care for people who  
2 inject drugs in Kenya: a short report. *AIDS care*. 2016 Dec 1;28(12):1595-9.
- 3 22. Baral S, Logie CH, Grosso A, Wirtz AL, Beyrer C. Modified social ecological model: a tool to guide  
4 the assessment of the risks and risk contexts of HIV epidemics. *BMC Pub Health*. 2013 Dec;13(1):1-8.23.
- 5 23. Larios SE, Lozada R, Strathdee SA, Semple SJ, Roesch S, Staines H, Orozovich P, Fraga M, Amaro  
6 H, de la Torre A, Magis-Rodriguez C. An exploration of contextual factors that influence HIV risk in  
7 female sex workers in Mexico: The Social Ecological Model applied to HIV risk behaviors. *AIDS care*.  
8 2009 Oct 1;21(10):1335-42.
- 9 24. Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative research in psychology*. 2006  
10 Jan 1;3(2):77-101.
- 11 25. Patton MQ. *Qualitative research & evaluation methods: Integrating theory and practice*. Sage  
12 publications; 2014 Oct 29.
- 13 26. Fereday J, Muir-Cochrane E. Demonstrating rigor using thematic analysis: A hybrid approach of  
14 inductive and deductive coding and theme development. *Int J Qual Methods*. 2006 Mar;5(1):80-92.
- 15 27. Belani H, Chorba T, Fletcher F, Hennessey K, Kroeger K, Lansky A, Leichliter J, Lentine D, Mital S,  
16 Needle R, O'Connor K. Integrated prevention services for HIV infection, viral hepatitis, sexually  
17 transmitted diseases, and tuberculosis for persons who use drugs illicitly: summary guidance from CDC  
18 and the US Department of Health and Human Services. *MMWR*. 2012 Nov 9;61(5):1-43.
- 19 28. Haldane V, Cervero-Liceras F, Chuah FL, Ong SE, Murphy G, Sigfrid L, Watt N, Balabanova D,  
20 Hogarth S, Maimaris W, Buse K. Integrating HIV and substance use services: a systematic review. *J Int  
21 AIDS Soc*. 2017;20(1):21585.

- 1 29. Bachireddy C, Soule MC, Izenberg JM, Dvoryak S, Dumchev K, Altice FL. Integration of health  
2 services improves multiple healthcare outcomes among HIV-infected people who inject drugs in Ukraine.  
3 *Drug Alcohol Depend.* 2014 Jan 1;134:106-14.
- 4 30. Tran OC, Bruce RD, Masao F, Ubuguyu O, Sabuni N, Mbwambo J, Lambdin BH. Implementation  
5 and operational research: linkage to care among methadone clients living with HIV in Dar es Salaam,  
6 Tanzania. *J Acquir Immune Defic Syndr.* 2015 Jun 1;69(2):e43.
- 7 31. Guise A, Ndimbii J, Igonya EK, Owiti F, Strathdee SA, Rhodes T. Integrated and differentiated  
8 methadone and HIV care for people who use drugs: a qualitative study in Kenya with implications for  
9 implementation science. *Health Policy Plan.* 2019 Mar 1;34(2):110-9.
- 10 32. Norton BL, Beitin A, Glenn M, DeLuca J, Litwin AH, Cunningham CO. Retention in buprenorphine  
11 treatment is associated with improved HCV care outcomes. *J Subst Abuse Treat.* 2017 Apr 1;75:38-42.
- 12 33. Springer SA, Qiu J, Saber-Tehrani AS, Altice FL. Retention on buprenorphine is associated with high  
13 levels of maximal viral suppression among HIV-infected opioid dependent released prisoners. *PloS one.*  
14 2012 May 31;7(5):e38335.
- 15 34. Altice FL, Bruce RD, Lucas GM, Lum PJ, Korthuis PT, Flanigan TP, Cunningham CO, Sullivan LE,  
16 Vergara-Rodriguez P, Fiellin DA, Cajina A. HIV treatment outcomes among HIV-infected, opioid-  
17 dependent patients receiving buprenorphine/naloxone treatment within HIV clinical care settings: results  
18 from a multisite study. *J Acquir Immune Defic Syndr.* 2011 Mar;56(Suppl 1):S22.
- 19 35. Kenya Ministry of Health. Kenya essential medicines list 2019. Nairobi, Kenya, 2019 November.  
20 Cited on 2021 July 10. Available from: [https://www.health.go.ke/wp-content/uploads/2020/03/Kenya-](https://www.health.go.ke/wp-content/uploads/2020/03/Kenya-Essential-Medicines-List-2019.pdf)  
21 [Essential-Medicines-List- 2019.pdf](https://www.health.go.ke/wp-content/uploads/2020/03/Kenya-Essential-Medicines-List-2019.pdf)

- 1 36. Craw JA, Gardner LI, Marks G, Rapp RC, Bosshart J, Duffus WA, Rossman A, Coughlin SL, Gruber  
2 D, Safford LA, Overton J. Brief strengths-based case management promotes entry into HIV medical care:  
3 results of the antiretroviral treatment access study-II. *J Acquir Immune Defic Syndr*. 2008 Apr  
4 15;47(5):597-606.
- 5 37. Boglione L, Mornese Pinna S, De Nicolo A, Cusato J, Cariti G, Di Perri G, D'Avolio A. Treatment  
6 with direct-acting antiviral agents of hepatitis C virus infection in injecting drug users: A prospective  
7 study. *J Viral Hepat*. 2017 Oct;24(10):850-7.
- 8 38. World Health Organization (WHO). Guidelines for the care and treatment of persons diagnosed with  
9 chronic hepatitis C virus infection. Geneva, Switzerland, 2018 July. Cited on 2021 May 10. Available  
10 from: <http://apps.who.int/iris/bitstream/handle/10665/273174/9789241550345-eng.pdf>
- 11 39. National AIDS and STI Control Programme (NASCOP). National key populations communication  
12 strategy 2014-2017: Communication strategy for sex workers, people who inject drugs and men who have  
13 sex with men. Nairobi, Kenya, 2014 November. Cited on 2021 July 20. [http://icop.or.ke/wp-](http://icop.or.ke/wp-content/uploads/2016/10/KP-Communication-Strategy-2014_2017.pdf)  
14 [content/uploads/2016/10/KP-Communication-Strategy-2014\\_2017.pdf](http://icop.or.ke/wp-content/uploads/2016/10/KP-Communication-Strategy-2014_2017.pdf)
- 15 40. McHugh RK, Hearon BA, Otto MW. Cognitive behavioral therapy for substance use disorders.  
16 *Psychiatric Clinics*. 2010 Sep 1;33(3):511-25.
- 17 41. Cook JE, Purdie-Vaughns V, Meyer IH, Busch JT. Intervening within and across levels: A multilevel  
18 approach to stigma and public health. *Soc Sci Med*. 2014 Feb 1;103:101-9.
- 19 42. Sengupta S, Banks B, Jonas D, Miles MS, Smith GC. HIV interventions to reduce HIV/AIDS stigma:  
20 a systematic review. *AIDS Behav*. 2011 Aug;15(6):1075-87.

# Figures

**Figure 1: Summary of HIV/HCV care themes applied within the Modified Social Ecological Model (MSEM)**



**Figure 1**

See image above for figure legend