Potential interventions to support HCV treatment uptake among HIV co-infected people in Canada: Perceptions of patients and health care providers

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ABSTRACT

BACKGROUND: Increasing direct-acting antiviral (DAA) treatment uptake is key to eliminating HCV infection as a public health threat in Canada. People living with human immunodeficiency virus (HIV) and hepatitis C (HCV) co-infection face barriers to HCV treatment initiation. We sought to identify interventions that could support HCV treatment initiation based on patient and HCV care provider perspectives. METHODS: Eleven people living with HIV with a history of HCV infection and 12 HCV care providers were recruited for this qualitative descriptive study. Participants created ranked-ordered lists of potential interventions during nominal groups (n = 4) and individual interviews (n = 6). Following the nominal group technique, transcripts and intervention lists underwent thematic analysis and ranking scores were merged to create consolidated and prioritized lists from patient and provider perspectives. RESULTS: Patient participants identified a total of eight interventions. The highest-ranked interventions were multidisciplinary clinics, HCV awareness campaigns and patient education, nurse- or pharmacist-led care, peer involvement, and more and better-prepared health professionals. Provider participants identified 11 interventions. The highest-ranked were mobile outreach, DAA initiation at pharmacies, a simplified process of DAA prescription, integration of primary and specialist care, and patient-centred approaches. CONCLUSION: Participants proposed alternatives to hospital-based specialist HCV care, which require increasing capacity for nurses, pharmacists, primary care providers, and peers to have more direct roles in HCV treatment provision. They also identified the need for structural changes and educational initiatives. In addition to optimizing HCV care, these interventions might result in broader benefits for the health of HIV–HCV co-infected people.

KEYWORDS: direct-acting antivirals; hepatitis C; HIV infection; Indigenous peoples; men who have sex with men; people who inject drugs; treatment uptake; women

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INTRODUCTION

Direct-acting antivirals (DAAs) have revolutionized hepatitis C (HCV) management since they were first introduced in 2013. Previous interferon (IFN) based treatments were long and associated with multiple side effects and poor overall response rates. In contrast, DAAs are oral medications taken for 8 to 12 weeks with few to no side effects and cure rates of over 93% (1–3).

In 2016, the World Health Organization (WHO) released a global strategy aiming to eliminate HCV by 2030, defining it as a 90% reduction in new cases of HCV infection and a 65% reduction in mortality rates (4). To achieve this ambitious goal, Lazarus et al (5) introduced the concept of “micro-elimination,” which refers to targeting elimination efforts at specific high-prevalence sub-populations, among which tailored interventions can be developed and implemented.

Human immunodeficiency virus (HIV)-HCV co-infected populations are considered one such key population in which HCV could be microeliminated (5). People living with HIV (PLWH) are at increased risk of developing HCV infection; their odds of contracting HCV are six times higher than in HIV-negative populations (6). Among PLWH, people who inject drugs (PWID), men who have sex with men (MSM), Indigenous populations, and women are at the highest risk for co-infection (7).

DAA treatment uptake is a critical step in the HCV care cascade to eliminate HCV as a public health threat in Canada. According to recent data, Canada could eliminate HCV by 2030 if current treatment initiation rates are maintained over the next ten years (8). Despite being generally engaged in care for their HIV infection, HIV–HCV co-infected people continue to face difficulties with DAA uptake. This is evidenced by variable HCV treatment initiation rates across priority populations, ranging from 16% among PWID to 40% among MSM (9,10). Some of the barriers to DAA initiation that have been identified are substance abuse, poor mental health, homelessness, food insecurity, delays in care, providers’ competing administrative responsibilities, inadequate HCV literacy, and stigma (11–18). Tailored interventions to overcome these barriers and improve DAA uptake in Canada’s HIV–HCV populations are needed.

Objective

In this qualitative study, we sought to identify and prioritize interventions to increase HCV treatment uptake from the perspectives of HIV–HCV co-infected patients and HCV care providers to inform the choice and design of future tailored interventions.

METHODS

Methodology

We conducted a qualitative descriptive study (19,20) to produce a comprehensive representation of potential interventions to support DAA initiation among co-infected patients.

Research setting

This study was conducted within the Canadian Co-infection Cohort (CCC) (21). This prospective observational multicentre cohort study has recruited over 2,000 HIV–HCV co-infected patients from 18 urban and semi-urban centres across six Canadian provinces (Alberta, British Columbia, Nova Scotia, Ontario, Québec, and Saskatchewan) (www.cocostudy.ca).

Study population

Participants were identified using a convenience sampling strategy. Patient participants of the CCC who were ≥18 years of age, had HIV infection, and had a history of HCV infection were approached by research coordinators at CCC sites. Priority was given to those who had been treated with DAAs over those previously treated with IFN-based regimens. HCV care providers working at sites affiliated with the CCC were eligible to participate if they had at least one year of experience managing HIV–HCV co-infected patients. Patient participants were compensated with CDN$50 and provider participants with CDN$90.

Data collection

Two qualitative methods were employed to generate the data: nominal groups and individual semi-structured interviews. The nominal group
technique (NGT) is a method that allows group brainstorming and the identification of priorities in response to a given problem or situation in group discussions led by a trained facilitator (22). In this study, each nominal group began with an open discussion concerning potential interventions, which led to drafting an initial list of items. The facilitator then raised complementary interventions, and participants discussed whether these should be included in the list. Participants then refined the preliminary list leading to a final list of interventions. Finally, participants ranked items on each final list in order of priority (see Appendix 1 and Appendix 2 for the interview guides). These nominal groups were conducted by author DOP with the support of authors AA and DL. As providers had experience managing different profiles of patients, they ranked interventions for four specific populations: PWID, MSM, Indigenous people, and women.

Due to the COVID-19 pandemic and the social distancing recommendations, it was not possible to perform all nominal groups in person, and some were carried out online. Patient participants expressed not feeling comfortable using videoconferencing software. Therefore, we performed 1-hour individual interviews over the phone with them. Individual interviews followed the same approach just described for nominal groups, although the discussion and refinement of the preliminary list were done between participant and interviewer.

All nominal groups and phone interviews were audio-recorded and transcribed verbatim. HCV treatment providers had the opportunity to review the transcriptions if they wished to do so.

Data analysis

Data were analyzed following the approach proposed by Van Breda (23). This form of NGT analysis allows for a “holistic and multidimensional combination” of the qualitative data (transcripts) and quantitative data (ranking forms) gathered (23). The analysis involved the following steps:

1. Deductive thematic analysis: Each group/interview transcript was analyzed using their respective final list of statements as the coding framework.
2. Identifying top-ranked statements: Lists and rankings were entered into Microsoft Excel to calculate the average score for each final statement, and the highest-ranked were identified in each group/interview.
3. Merging nominal groups/interview lists: Final lists were synthesized by combining similar statements into categories. The development of categories was guided by the analysis performed in step 1 and was also reviewed by author AA.
4. Calculating combined ranks: The final score for each category was determined by the average score of the statements contained in each category, the number of top statements in each category, and the number of times participants raised each idea. This final score determined the rank position of each category, where 1 is the most important category.

Five analyses were carried out, one for patient-perceived interventions and four for provider-perceived interventions—one for each subpopulation ranked (ie, PWID, MSM, Indigenous people, and women).

Strategies to ensure trustworthiness

Data triangulation was achieved in this study by recruiting a heterogeneous sample of HIV-positive patients with previous HCV infection from various risk groups and diverse types of HCV treatment providers allowing perspectives to be compared. Honesty was fostered, as participants could withdraw from the study at any point without repercussion. Frequent debriefing meetings were held with co-authors. The use of qualitative software NVivo 12 for Mac (QSR International, Melbourne, Australia) to aid data analysis ensured a data-oriented audit trail. Thus, credibility, transferability, dependability, and confirmability were addressed in this study (24).

Ethics approval

Ethics approval for this study was obtained from the McGill University Health Centre Research Ethics Board in May 2019 (Reference number: MP-37-2019-4700). All participants consented to the use of their demographic data and de-identified quotations for the dissemination of results in scientific journals.

RESULTS

We recruited and consented 23 participants (11 patient participants; 12 HCV treatment providers). Table 1 presents participant characteristics. We carried out three provider-only nominal groups (one in-person, two online) with the 12 recruited
Table 1: Participant characteristics

| Variable                              | No. (%) |
|---------------------------------------|---------|
| Patients \(n = 11\)                   |         |
| Age, y, median (range)                | 53 (38–68) |
| Female                                | 4 (36) |
| Ethnicity                             |         |
| White                                 | 9 (82) |
| Black                                 | 1 (9) |
| Middle Eastern                        | 1 (9) |
| HCV risk group                        |         |
| PWID                                  | 8 (73) |
| MSM                                   | 3 (27) |
| Undetermined blood exposure           | 1 (9) |
| Currently taking ART                  | 11 (100) |
| Prior HCV treatment                   |         |
| IFN only                              | 2 (18) |
| IFN + DAA                             | 4 (36) |
| DAA only                              | 5 (46) |
| Providers \(n = 12\)                  |         |
| Female                                | 9 (75) |
| Professional profile                  |         |
| Infectious diseases specialist        | 1 (8) |
| Internal medicine specialist          | 1 (8) |
| Nurse                                 | 9 (75) |
| Pharmacist                            | 1 (8) |
| Years of experience                   |         |
| 1–3                                   | 1 (8) |
| 3–6                                   | 3 (25) |
| 6–10                                  | 3 (25) |
| >10                                   | 5 (42) |
| Province                              |         |
| Saskatchewan                          | 5 (42) |
| Québec                                | 4 (33) |
| Ontario                               | 2 (17) |
| British Columbia                      | 1 (8) |

* Unless otherwise indicated

HCV = Hepatitis C virus; PWID = People who inject drugs; MSM = Men who have sex with men; ART = Antiretroviral therapy; IFN = Interferon; DAA = Direct-acting antivirals

In total, participants described 94 interventions (patients \(n = 60\); HCV treatment providers, \(n = 34\)), which were combined into 19 categories (patients \(n = 8\); HCV treatment providers = 11). These intervention categories fell into four classes: macro-level interventions that involve governmental funding for health services; care models that relate to alternatives to traditional hospital-based specialized HCV care; strategies to facilitate patient and provider health services utilization; and HCV education.

Patient-perceived interventions

Table 2 presents the rank-ordered list of interventions proposed by patients and some illustrative quotations. The interventions are explained here in order of decreasing importance.

1. Care model: Multidisciplinary clinics

The most important intervention from the patients’ stance was multidisciplinary teams. They described clinics employing these as HIV–HCV hubs, where patients can find all the services they need, including education and encouragement. In addition to physicians and nurses, social workers and psychologists were often mentioned as essential team members, without whom HCV care would not be holistic.

2. HCV education: HCV awareness campaigns and patient education

The second most important intervention, according to patients, was having better and more accessible information on HCV. Such a strategy would improve general awareness of HCV. This intervention included HCV awareness campaigns and patient education resources that could be provided at community organizations, safe injection centres, and hospitals, as well as via clubs, magazines, and social media.

3. Care model: Nurse- or pharmacist-led care

Patient participants expressed that nurses and pharmacists could have the capacity to follow up on patients and prescribe DAAs under the close supervision of a physician. They perceived that this intervention would decrease the waiting time between diagnosis and treatment initiation. However, some participants were against this intervention, as they believed a physician should be the only health professional to initiate HCV treatment.
### Table 2: Rank-ordered list of interventions to support HCV treatment uptake for HIV–HCV co-infected populations according to patients

| Rank | Intervention                                                                 | Examples of patients’ quotations                                                                                                                                                                                                                                                                                                                                 |
|------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | **Care models:** Multidisciplinary clinics                                   | A nice complex just for HIV and hepatitis. And then, at the same time it gives ... You know, you have everything, everything, everything: the regular people, nurses, doctors, everything would be there (…) psychologists, social workers, street workers, doctors, hepatologists. It would be important to have it there. But everything connected together like that, well nobody is judged because we are all the same. (Aged 56 years, PWID, MSM, IFN)   |
|      |                                                                             | Well, a nurse for sure, the doctor, the social worker, those are pretty much the 3 main things that should be in the first place right now [in the multidisciplinary clinic]. Maybe a psychologist as well. That’s very important. There are some who need to have psychological follow-up. (Aged 50 years, PWID, IFN+DAA regimen) |
| 2    | **HCV education:** HCV awareness campaigns and patient education            | More easy information, like information that [patients] can get, available to them, (…) or one area in a specific like [community clinic] or whatever that can explain everything to you in one setting. (Aged 68 years, PWID, DAA regimen)                                                                                                                                                                                                 |
|      |                                                                             | I would say, when it comes to awareness, I would say to probably post posters in certain areas, places where people hang out; bars, clubs wherever or even magazines. Even social media. It would just get the attention of people, “Ok, maybe I should get tested for hepatitis C?” (Aged 43 years, MSM, IFN+DAA regimen) |
| 3    | **Care models:** Nurse- or pharmacist-led care                              | Because pharmacists, my pharmacist has been following me for 10 years (…) It’s true that the pharmacist and the nurse who knows me well could prescribe for us ... Or could get us to start [HCV] treatment without seeing the doctor. That’s for sure it would be good. (Aged 43 years, PWID, DAA regimen)                                                                 |
|      |                                                                             | If the pharmacist has the same information as the medical team, I’m not against it. I think it would even be a good idea. Usually, the pharmacy is less far from the person’s home than the hospital. (Aged 64 years, PWID, IFN+DAA regimen)                                                                                                                                 |
|      |                                                                             | I think that I’m perfectly fine with them [nurses and pharmacists] being involved but not to initialize it [HCV treatment]. Not for them to say “okay you should be on this drug and I’m gonna initialize it and we are gonna start treatment.” That’s why I see a doctor, I don’t think that’s right. (Aged 54 years, PWID, DAA regimen) |
| 4    | **Health services utilization:** Peer involvement                           | I think that the sharing of experiences between individuals, while they are in treatment, is worth giving it a shot (…) and sharing that experiences, knowledge, it advances us. (Aged 59 years, MSM, IFN regimen)                                                                                                                                                                                                 |
|      |                                                                             | They [peer navigators] can open doors for you everywhere to improve treatment. (…) [and] people will suffer less during this treatment. (Aged 56 years, PWID, MSM, IFN)                                                                                                                                                                                                 |
|      |                                                                             | Social workers with people with experience in the streets to go and look for people who have no follow-up, who are left to their own. That would be a very good idea, I think. (…) I find it more humane, precisely, the social worker accompanied by a person who has lived through the experience. I think that would be the best idea. (Aged 50 years, PWID, IFN+DAA regimen) |
| 5    | **HCV education:** More and better-prepared providers                       | I think we need more family doctors that are aware of these diseases and are knowledgeable on the treatments of these diseases. (Aged 68 years, PWID, DAA regimen)                                                                                                                                                                                                                                                                 |
|      |                                                                             | I think doctors should take a refresher course every three years like nurses do; to update themselves on what’s out there in the field now. That’s not happening in the field right now. (Aged 59 years, MSM, IFN regimen)                                                                                                                                                                                                 |
|      |                                                                             | We’re too stringent on the needs for qualifications for other doctors. (…) if they only need only to do certain things, they can be done maybe in 6 months, and then they’re ready to join a team and that means more doctors. (Aged 68 years, PWID, DAA regimen)                                                                                                                                 |
| 6    | **Care models:** Mobile clinics                                             | If there was a mobile team with nurses going to your home to take your pressure, take blood samples, without you having to go out and get pricked. Because it’s tiring during the treatment, just walking a street corner is really exhausting. (Aged 56 years, PWID, MSM, IFN)                                                                 |
|      |                                                                             | [Providers] have to go directly to the field to see the people instead of the people coming to them. That would really be the most essential thing right now because they won’t come to them. They won’t come to the clinic directly. [Providers] really need to be the ones who go to [patients]. (…) After that, switching them to a clinic, multidisciplinary as they say. (Aged 50 years, PWID, IFN+DAA regimen) |
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4. Health services utilization: Peer involvement
This intervention consists of patients exchanging experiences with others going through a similar lived experience of HIV–HCV co-infection. Patient participants suggested that peers could be involved in support groups or peer navigation programs. Regarding the latter, a participant went beyond and suggested that peers and social workers jointly accompany patients. Not only would patients receive encouragement and guidance, but social workers and peers would learn from each other.

5. HCV education: More and better-prepared providers
Patient participants suggested increasing the quantity of HCV care providers. However, they indicated that it is not sufficient to simply increase the number of providers; these professionals must also be well trained in HCV. To achieve this, some suggested continuing professional development and facilitating the qualification process for international medical graduates.

6. Care models: Mobile clinics
This intervention referred to teams of health providers that go directly to distant communities and patients facing mobility barriers. These mobile teams could offer services, such as HCV testing, vital signs, education, and treatment initiation. These teams would work as a bridge between difficult-to-reach communities and central multidisciplinary treatment clinics.

7. Macro level: Funding for HCV health services and research
Patient participants perceived that more resources from public and private stakeholders were needed to improve HCV health services and research. They perceived that such funds would positively impact treatment access, particularly for patients who are otherwise not eligible for DAA coverage.

8. Health services utilization: Technology to support HCV care
Some patients suggested technology interventions to improve HCV care provision; for instance, telemedicine for people in remote areas, a hotline for inquiries, or creating a blog facilitated by providers for patients to exchange experiences confidentially. Patients recognized that these interventions might have limited impact, as many may not have access to the Internet or to devices such as computers. Therefore, they stressed that this intervention should not replace in-person care but rather complement it. Some patients were even uncomfortable with involving technology in patient care.

Provider-perceived interventions
Table 3 presents how provider participants ranked their proposed interventions for each

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Table 3: Rank-ordered list of interventions to support HCV treatment uptake for HIV–HCV co-infected populations according to HCV care providers

| Rank | PWID | MSM | Indigenous Women | Intervention Examples of providers' quotations |
|------|------|-----|------------------|-----------------------------------------------|
| 1    | 3    | 2   | 1                | Care models: Outreach and going where the patients are We want to go to where the patients are at. (Pharmacist, 3–6 years in practice) Mobile outreach is extremely important at least for us. And with that not only goes you know, we as providers, nurses, physicians, pharmacists, visiting the communities, but it also requires on-the-grown local expertise and/or support whether that is peer so an outreach worker. (Nurse, >10 years in practice) I think to add on outreach is providing education in outreach. I mean we can educate people that there is treatment; that there is a cure; finding out how can we treat in groups of people so testing, treating; and getting the word out to these people that there is a cure. (Nurse, 3–6 years in practice) |
| 2    | 8    | 5   | 7                | Health services utilization: DAA initiation at pharmacies So if you can provide their hep C medication at the pharmacy (...) that's much more successful than, you know, trying to split things up or having [patients] going in different directions (...) medication linkage I think is definitely very successful for us. (ID specialist, 6–10 years in practice) If people can interface with the pharmacist, who they probably see more than their own – any of their health care team. Then, it would be very simple for them to just show up [at the pharmacy] the following week or 2 weeks and have their medication dispensed at the same time. (Nurse, >10 years in practice) |
| 3    | 4    | 3   | 5                | Health services utilization: Simplifying the DAA prescription process I think that the minimal output that individuals have to make. (Nurse, >10 years in practice) That’s what it looks like to me, but I put “limit pre-treatment exams as much as possible.” It can be... it’s like not doing ultrasound or FibroScan on everyone. (Nurse, >10 years in practice) Not to have requirements for specific statuses, e.g., PWIDs requiring them to stop consuming or ... judging [eligibility] criteria. (...) Not to judge or require cessation of active use to be eligible for hepatitis C treatment. (Nurse, 6–10 years in practice) It may seem simple, but let’s make it simple to cover drugs through the Non-Insured Health Benefits insurance program, which is like the equivalent for the RAMQ, but for First Nations. (Pharmacist, 6–10 years in practice) |
| 4    | 11   | 6   | 2                | Care models: Integration of primary care and specialist care We have to generate more interest in primary care and provide training for primary care providers. I really think when you’re dealing with marginalized folks, their trust is most important, and when you have the ability to treat hep C in the primary care setting where you already have that trusting relationship, I think it’s really important. (Nurse, >10 years in practice) There needs to be two pathways that still exists; there’s a role for primary care physicians expanding, I’m totally all for that, but I still think that there is also the need for us to continue and emphasize that there will be complexities in certain patients that will necessitate the need for specialists to be seeing these patients. (IM specialist, >10 years in practice) |

(Continued)
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| Rank | PWID | MSM | Indigenous | Women | Intervention | Examples of providers’ quotations |
|------|------|-----|------------|-------|--------------|-----------------------------------|
| 5    | 7    | 9   | 4          |       | Care models: Multidisciplinary teams | Nurse- and pharmacist-led care and a supervision of a physician. So this is based out an OST [opioid substitution therapy] setting where the physician actually doesn’t need to see the patient, but the assessment can be– the testing and treatment assessment [can] be completed by a nurse, supervised by the physician, and then treatment monitoring can be done by a pharmacist. (Nurse, 3–6 years in practice) Address patients' needs (...). It can be addiction treatment, mental health treatment, and all other psychosocial needs such as housing. It could include many, many, many things. That way, you can help them more, you can hook them up so they have more access to treatment. (Nurse, 3–6 years in practice) |
| 6    | 1    | 1   | 3          |       | Health services utilization: Peer-based interventions | Have a standing hepatitis C sort of group, you know, week by week to which people come in and out (…) an opportunity for people to sort of hear other people’s experiences and realize what peers have gone through with hepatitis C treatment. (ID specialist, 6–10 years in practice) I had considered peer support during the course of treatment. (...) Really people who have been through hepatitis C treatment and come from their community. Pair them up. (Nurse, 6–10 years in practice) |
| 7    | 5    | 4   | 8          |       | HCV education: More and better-prepared prescribers | So, I would say that would literally be the easiest step... Would be to allow pharmacists to have prescribing certification for that. Especially is there is barriers to, you know, not having enough physicians prescribing, being able to reach remote locations. (Pharmacist, 6–10 years in practice) We always talk about people doing outreach or going out but maybe we have to have more people that are on that prescriber list, actually going to where the people are (…) but if we had an expanded list we could have more people actually writing the prescriptions. (Nurse, >10 years in practice) |
| 8    | 6    | 7   | 9          |       | Macro level: HCV prioritized at a governmental level | Try to determine an agreement between the objectives of the WHO and different levels of government in terms of priorities for intervention. (…) When you have a recognition of priorities, the government will allocate the budgets accordingly which will make us, there will be a recognition of caregivers, there will be incentives for training, etc. (Nurse, 6–10 years in practice) Compensation for caregivers (…) Let them [government] recognize that they [priorities] are changing. (…) Basically, the government doesn’t recognize the work and compensation for [HCV] caregivers. (Nurse, 3–6 years in practice) |
| 9    | 2    | 8   | 6          |       | Care models: Patient-centred approaches | Client-specific clinics to prevent stigmatization. (Nurse, 6–10 years in practice) An adapted clinic, as an example, for Indigenous people so that they can be served in their mother tongue where they have access to an Elder and give them a choice because there may be some who wouldn’t want to go there either. (Nurse, >10 years in practice) Let the patient choose their treatment if possible. Me, my patients, I show them the 8-week and 12-week treatments, and I show them the size of the pills and then it's three [pills] a day, so I tell them “would you rather take three [pills] a day for 8 weeks that are big or would you rather take one pill” (…) They have a decisional weight. (Nurse, >10 years in practice) |

(Continued)
subpopulation. Shaded cells represent the top 3 interventions, along with their illustrative quotations. The interventions are explained in this section.

### Care model: Mobile outreach
Mobile outreach was described as mobilizing personnel to the communities to provide them with a wide variety of services based on trusting relationships and partnerships with local stakeholders. Examples of the services provided in outreach were offering DAA treatment to individuals and their social networks, and education. This was the most important intervention identified by providers, and it was the only highly ranked one across all subpopulations (see Table 3).

### Health services utilization: DAA initiation at pharmacies
This intervention consists of offering DAA initiation at pharmacies and ensuring that these medications are permanently available at these settings. For providers, this intervention could minimize the delay between HCV diagnosis and treatment initiation while taking advantage of the relationship that patients have with pharmacists, whom they see more often than other health care providers. This intervention was regarded as essential for the PWID group in the ranking process (see Table 3).

### Health services utilization: Simplifying the DAA prescription process
According to providers, there is a need to minimize the steps that patients and providers must go through prior to initiating DAAs. This could be achieved, for instance, with more straightforward eligibility criteria for HCV treatment, elimination of sobriety requirements, fewer pre-treatment tests, and having a simpler reimbursement system inspired by the Non-Insured Health Benefits (NIHB) program. Providers saw these strategies as another way to reduce the time between HCV diagnosis and treatment initiation. These types of interventions were highly ranked for PWID and Indigenous groups (see Table 3).
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Care model: Integration of primary care and specialist care
On the one hand, this intervention was described as an efficient primary care system with providers capable of establishing trusting relationships with co-infected patients. On the other hand, providers stressed that this type of care should be integrated with specialized care as a parallel path so that primary care providers can refer complex HCV cases. Education is needed to foster the interest of primary care providers in getting involved in providing HCV treatment and to drive cultural change for them, so that they understand that full adherence to HIV treatment and abstinence from drugs is not needed to start HCV treatment.

Care model: Multidisciplinary teams
Providers argued for nurse- or pharmacist-led multidisciplinary teams under physician supervision, which could be based at addiction care facilities. Such teams would include other professionals such as psychologists and social workers to offer a wide variety of services to manage patients’ competing needs.

Health services utilization: Peer-based interventions
This intervention comprises peer navigation and support groups, which were regarded as appropriate strategies to improve HCV care. Provider participants recognized that peers have high credibility among HIV–HCV co-infected patients, particularly Indigenous and MSM groups (see Table 3).

HCV education: More and better-prepared prescribers
Providers proposed assigning prescribing authority to other health care professionals, such as nurses, pharmacists, and addiction care physicians. For them, this intervention should be paired with the necessary training for professionals wanting to prescribe DAAs, and remuneration for such activities. Having an expanded pool of prescribers would translate into reaching more key populations.

Macro level: HCV prioritized at a governmental level
Another intervention raised by providers was the implementation of policies that prioritize HCV care at a governmental level. It was described as the harmonization of the WHO targets for HCV elimination with how policy makers allocate health care budgets. For instance, this could translate into better compensation for HCV care nurses, whose HCV-related activities are not compensated.

Care model: Patient-centred approaches
Provider participants agreed that a “one size fits all” approach does not work for HIV–HCV co-infected populations. For instance, they recommended population-specific clinics, which were particularly relevant for Indigenous patients (see Table 3). At an individual level, some providers expressed the importance of involving patients in treatment decisions to offer them tailored treatment management.

HCV education: HCV awareness campaigns and patient education
To address the barrier of stigma, providers recommended conducting awareness and education campaigns and increasing HCV-related publicity. Similarly, they voiced the need for education aimed at health professionals, particularly regarding the interpretation of HCV test results.

Health services utilization: Technology to support HCV care
This intervention involves using technology to offer care and facilitate access to medications for communities that live far from services. Telemedicine, phone appointments, and even machines dispensing DAAs and delivery of medications using drones were ideas mentioned by providers to achieve this intervention.

DISCUSSION
Recent evidence suggests that if DAA initiation rates fall, Canada will not be able to eliminate HCV infection as a public health threat by 2030 (8). The present qualitative descriptive study identified several potential interventions to improve HCV treatment uptake. Given frequently shared barriers, the identified interventions should not only strengthen HCV care provision for HIV–HCV co-infected populations but could also facilitate DAA uptake for many HCV monoinfected people. Patient and provider participants converged in many ways in their perceptions (see Figure 1).

The rankings give an idea of the strategies that could potentially be more pertinent. Alternative models of care were highly ranked, which means that patients and health care providers identified
the need for different approaches to traditional hospital-based specialized HCV care. Patient participants highly ranked nurse-/pharmacist-led multidisciplinary care (see Table 2), while provider participants considered more mobile outreach and primary care models as of greater value (see Table 3). In the literature, outreach has been described as mobile clinics (25) and the co-location of HCV services within community centres for drug dependence, homelessness, and needle exchange (26–31). The implementation of multidisciplinary clinics and outreach activities would likely be facilitated if nurses and pharmacists prescribed DAAs. Several nurse-led multidisciplinary teams have been described elsewhere (28,29,32). However, the impact of allowing nurses to prescribe DAAs on initiation rates has not been evaluated in previous research. Our findings indicate that some patients might not feel comfortable when HCV treatment is prescribed by a professional other than a physician. Patient education could be needed to facilitate the implementation of this intervention.

In terms of the interventions to support the utilization of health services, four core interventions were identified by patients and providers in this study: the involvement of peers, DAA initiation at pharmacies, a simpler prescription process, and the use of technology. These strategies could complement other interventions by reducing the interval between HCV diagnosis and treatment initiation. Although peer support has been studied in many forms, such as identifying local champions to promote HCV treatment (33,34), the proposed close collaboration between peers and social workers in the accompaniment of patients has not been studied. Regarding technology-supported HCV care, limited access to computers and the Internet and a distrust of technology-related interventions might hamper the implementation of telemedicine for HIV–HCV co-infected populations. For instance, previous research has shown that one third of Canadian elderly Indigenous people do not use the Internet regularly (35). However, participants raised other technological interventions to support HCV treatment access, such as DAA distribution using drones or dispensing machines, which could be considered for remote communities.

Both patient and provider participants raised the subject of HCV education. This intervention referred to awareness campaigns targeted toward patients or health care professionals, which could help decrease HCV-related stigma. When directed toward health care professionals, education was considered a key component of other interventions, such as multidisciplinary teams, mobile

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**Figure 1: Interventions to improve HCV treatment uptake**

HCV = Hepatitis C virus; DAA = Direct-acting antiviral
outreach, and primary care services. Many publications have discussed the use of education to support HCV care, and it is commonly described in conjunction with other interventions. Provider education has been described as directed to primary care physicians (36), pharmacists (28), and other staff members (27,29). When directed to patients, education is presented as concerning general HCV knowledge, drug use, and prevention of HCV reinfection (30,31,37). While patient education was not in the top 5 among provider participants (see Table 3), it was the second most important intervention, according to patients (see Table 2). This indicates that co-infected patients perceive current educational campaigns are not sufficient and are not meeting their needs. Accessibility of information was a key concern among the interviewed patients.

Both groups of participants recognized the importance of implementing macro-level interventions to support all the aforementioned interventions. The most significant policy-level intervention in HCV care to date has been unrestricted access to DAAs regardless of fibrosis stage. In Canada, it has been implemented in three provinces (ie, Québec, Ontario, and British Columbia (38). While this intervention improved DAA initiation rates over time, they were not maintained (38). Participants identified complementary macro-level strategies, such as better compensation for health professionals and more governmental support for HCV-specific care activities. However, none of these was highly ranked (see Table 2 and Table 3).

**LIMITATIONS AND STRENGTHS**

The main limitation of this qualitative study is its restricted transferability. Female and immigrant patients are underrepresented in our sample, and we could not recruit Indigenous participants and other ethnic groups. This was primarily due to the impact of COVID-19 restrictions during the recruitment period. Thus, our findings might be more applicable to PWID and MSM groups. Specific risk groups, such as immigrants and Indigenous people, may face additional challenges in accessing HCV care that may require tailored interventions (eg, culturally appropriate education or language translation) that were not revealed in our study. In addition, there was an over-representation of nurses in the HCV treatment provider group. While nurses are well-positioned to provide a broad view and propose possible interventions, they may not have highlighted interventions that are more pertinent to physicians (eg, hepatologists, family physicians, addiction care physicians) or other care providers. Finally, the interventions identified were solely related to improving treatment uptake. It will be important to consider pairing these strategies with interventions focused on other steps of the care cascade, such as the expansion of screening programs and adherence support. This would optimize HCV care and keep Canada on track to eliminate HCV as a public health threat in the next decade.

In addition to the steps taken to ensure the trustworthiness of the present study, we consider the nominal group technique we employed to be an essential strength. This method allowed a meaningful combination of the qualitative transcript data with the quantitative rankings data to produce a cohesive set of interventions in order of importance, which may be of great value to all stakeholders.

**CONCLUSION**

Both patients and providers identified the pertinence of integrated care strategies that offer alternatives to hospital-based specialist HCV care. Implementing these models of care requires increasing capacity for nurses, pharmacists, primary care providers, and peers to have more direct roles in HCV treatment provision while maintaining strong support from specialists. This could be achieved through structural changes and education initiatives. In addition to optimizing HCV care, this approach might result in broader benefits for the health of HIV–HCV co-infected people as well as HCV monoinfected individuals who share similar challenges.

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APPENDIX 1: INTERVIEW GUIDE FOR PATIENT PARTICIPANTS

Part 1. Individual list creation
1. In your opinion, what could be done to promote HCV treatment initiation among people living with both HIV and HCV?
   a. Prompt: what type of support and resources do you think can help people living with HIV and HCV start treatment? (Each one makes a list individually)

Part 2. Creation of a master list
2. Each participant states aloud one intervention/strategy of their individual list one by one and jointly create a master list
3. Some ideas have been proposed to improve DAAs’ initiation; for example:
| Idea                        | What it is                                                                                                                                                                                                 |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nurse-/pharmacist-led care | Nurses or pharmacists would be able to initiate HCV treatment without you having to see a physician. For instance, during drug dependence treatment.                                                           |
| Peer navigators             | Someone with a lived experience of HIV and HCV who has gone through the same processes in the past, helps you to find your way through the health care system                                                  |
| Peer support programs       | A safe space where you find people like you and share your experiences                                                                                                                                 |
| Directly observed therapy   | You meet with a health care worker, who will watch you while you take your medication.                                                                                                                   |
| Patient education           | Easy to understand information about hepatitis C and its treatment provided by a health care worker                                                                                                       |
| Multidisciplinary community clinics | A clinic where physicians, nurses, pharmacists, therapist, and other health care professionals work together to offer you thorough care                                                                 |
| Group treatment             | A group of patients that gathers to initiate and continue treatment together. They can also exchange experiences                                                                                         |
| Telemedicine                | The delivery of health services using technology. For example, having your medical appointment via Skype                                                                                                 |
| Mobile clinics              | Clinics on wheels that reach isolated communities                                                                                                                                                        |
| Incentives for patients     | Offer patients cash or other incentives to start and/or complete Hepatitis C treatment                                                                                                                  |
| Holistic care               | Care that considers not only your physical health, but also your emotional, social, economic and spiritual needs                                                                                         |

Would any of them (if not mentioned already) apply to people living with HIV and HCV and should be added to the list? 
[Participants discuss if any of them should be added to the list]

4. Are there other ideas to make it easier for people living with HIV and HCV to start HCV treatment? 
[Participants finalize the master list]

**Part 3. Discussion and list refinement**
5. Should any intervention be further explained?  
6. Should wording be changed?  
7. Should an intervention be removed from the list?  
8. Could we combine interventions into categories?  
[Participants create a final list with 10 to 15 elements]

**Part 4. List ranking**
9. Organize the interventions according to priority (where 1 is the most important and X is the least important).  
[Each participant ranks the final list individually]

**APPENDIX 2: INTERVIEW GUIDE FOR PROVIDER PARTICIPANTS**

**Part 1. Individual list creation**
1. In Canada, what are some of the current interventions/strategies to promote DAAs’ access and uptake?  
[Each makes a list individually]

2. In your opinion, what interventions/strategies to promote DAAs’ access and uptake may be more specific to:  
   a. People who inject drugs?  
   b. Men who have sex with men?  
   c. Indigenous communities?  
   d. Women?  
[Each complement their list individually]

**Part 2. Creation of a master list**
3. Each participant states aloud one intervention,strategy of their individual list one by one and jointly create a master list  
4. In research, some interventions/strategies to promote DAAs’ access and uptake are:

| Nurse-/pharmacist-led care | Trauma-informed care | Mobile outreach clinics  |
|-----------------------------|----------------------|-------------------------|
| Peer navigators             | Provider education   | Incentives for patients |
| Peer support programs       | Multidisciplinary community clinics | Incentives for providers |
| Direct-observed therapy     | Group treatment      | Holistic care            |
| Patient education           | Telemedicine         | Counselling              |

[Participants discuss if any of them should be added to the master list]
Would any of them (if not mentioned already) apply to the Canadian context and should be added to the list?  
[Participants discuss if any of them should be added to the master list]

5. Are there other interventions/strategies to promote DAAs’ access and uptake?  
[Participants finalize the master list]

Part 3. Discussion and list refinement
6. Should any intervention be further explained?  
7. Should wording be changed?

8. Should an intervention be stricken from the list?  
9. Could we combine interventions into categories?  
[Participants create a final list with 10 to 15 elements]

Part 4. List ranking
10. Organize the interventions according to priority (where 1 is the most important and X is the least important)  
[Each participant ranks the final list individually]