



APPEAL: a toolkit for attracting people who inject drugs with hepatitis C to healthcare systems

Ricardo Baptista-Leite^{1,2} · Henrique Lopes¹ · Diogo Franco¹ · Timo Clemens² · Helmut Brand²

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Abstract

Aim The “APPEAL” toolkit was developed to address the challenges in diagnosing people who inject drugs (PWID) with hepatitis C (HCV) and engaging them with healthcare systems. It introduces an ecosystemic approach based on health and well-being literacy across awareness, prevention and diagnosis dimensions of the hepatitis C’s care cascade (CC) for PWID.

Subject and methods The framework incorporated a scoping review and thematic analysis of 54 studies, alongside contributions from 57 hepatitis C key opinion leaders across seven countries. The toolkit is structured around five main axes: problems, solutions, outputs, outcomes and feedback process, employing a holistic perspective that considers economic, legal and social contexts. Eighteen policy prescriptions (PP) are proposed and supported by selective references to ensure relevance and applicability.

Results The APPEAL toolkit facilitates a strategic workflow for policymakers, health authorities and patient advocacy organizations, guiding them through action flowcharts to evaluate and enhance their interventions within the hepatitis C’s CC for PWID. Notably, its implementation demonstrated potential in identifying and attracting PWID to hepatitis C treatment pathways, contributing to increased diagnostics, education on risk behaviours and raising overall disease awareness. The toolkit’s intelligent cycle system supports accountability, enabling continuous data-driven improvement and innovation in addressing hepatitis C.

Conclusion The APPEAL toolkit was developed to attract PWID living with HCV to healthcare systems in a proactive manner. By managing information and fostering education on HCV, it aims to amplify awareness, prevention and diagnosis. The toolkit’s design and functionality underscore the importance of continuous quality improvement and the potential for its use in internal or external quality audits of healthcare services related to hepatitis C.

Keywords Public health · People who inject drugs (PWID) · Hepatitis C · Vulnerable groups · Care cascade · Service quality improvement

Background

Hepatitis C is a silent disease because symptoms are often delayed for many years, sometimes decades. This epidemiological feature hinders the detection of the disease, being a

major challenge in finding and diagnosing individuals living with hepatitis C. People who inject drugs (PWID) are one of the populations that have higher reported HCV prevalence rates.¹ The lifestyle of PWID has also been identified as related to higher HCV transmission, such as drug injection and needle/syringe sharing.

Hepatitis C is recognized as a disease with a strong social impact on PWID, as it is common to find patients with a criminal record, and many are imprisoned due to strict drug-related legislation (Lafferty et al. 2021). Lifestyle factors greatly increase the probability of contracting hepatitis C,

✉ Ricardo Baptista-Leite
r.guerreirobaptistaleite@maastrichtuniversity.nl

¹ NOVA Center for Global Health, NOVA Information Management School (NOVA IMS), Universidade Nova de Lisboa, Lisbon, Portugal

² Department of International Health, Care and Public Health Research Institute - CAPHRI, Faculty of Health, Medicine and Life Sciences, Maastricht University, Maastricht, the Netherlands

¹ In this article, the PWID abbreviation refers to people with current or “active” injection drug use (IDU), which is generally defined as use in the past 6 months, and to former PWID who have active non-IDU.

and it can be aggravated when there are comorbidities (e.g. alcohol and drug addiction, mental disorders, HCV or HIV infections, etc.) (Abara et al. 2019; Molinaro et al. 2019; Amoako et al. 2021; Butt et al. 2021; EMCDDA 2021). Social problems such as unemployment, homelessness, unstable housing, social and family isolation, sex work or even criminal actions arise in this population, representing higher risk factors for poor health conditions (Larney et al. 2020; Arum et al. 2021; Butt et al. 2021; EMCDDA 2021). The conjugation of these conditions makes hepatitis C among PWID a serious global public health issue.

In most countries, the percentage of undiagnosed patients is estimated to be high (Mangia et al. 2021; WHO 2022), with data suggesting that around two-thirds of PWID are living with HCV infection (ECDC 2021). This rate is heterogeneous both within and between countries, with anti-HCV antibodies among PWID in North America estimated to be between 40 and 68% (Degenhardt et al. 2017; Grebely et al. 2019). In contrast, in Europe, it ranges between 18 and 80% (EMCDDA 2019; Stasi et al. 2020; ECDC 2021). Furthermore, it is estimated that approximately 9% of all HCV infections are related to recent drug injections among PWID (Grebely et al. 2019). It should be noted that epidemiological data can be underestimated for this population, mostly due to living on the health system's fringe, which poses a great challenge in attracting individuals to formal healthcare services.

The development of direct-acting antiviral (DAA) therapies has changed the hepatitis C treatment paradigm, potentially achieving a sustained virologic response of approximately 100% (Cornberg and Manns 2022). Also, the short time of the DAA therapy duration, taken orally and with little to no side effects, represents an appealing treatment opportunity for unprivileged populations (Ortiz-Paredes et al. 2022). However, to reach this care cascade (CC) stage, efforts in finding and diagnosing new HCV cases must be strengthened (EMCDDA 2021). Only by reinforcing the first steps of the CC for hepatitis C will it be possible to attain the WHO's elimination goal for the disease by 2030 (WHO 2016). This strategy is aligned with the micro-elimination approach for hepatitis C, in this case, directed to PWID, resorting to the active involvement of key stakeholders (Lazarus et al. 2018; Lanièce Delaunay et al. 2021). For this purpose, clinicians, government officials and policymakers with the expected input of the community, epidemiologists and public health experts have been developing intervention programmes to attract people living with HCV infection, such as PWID, to healthcare services. However, despite the scientific developments of DAAs, there have not been enough corresponding advances in public health policies (PHP) that attract target populations to diagnose and link them to treatment until the achievement of SVR_0 . Finding integrated public health solutions focussed on this

population is an opportunity to strengthen the bond between different healthcare services. For example, strengthening interventions to find and diagnose individuals living with the disease while integrating point-of-care and linkage-to-care process initiation in hepatitis C services (e.g. medical, psychological, social, etc.) for newly diagnosed HCV-positive infected individuals (EMCDDA 2021; Ortiz-Paredes et al. 2022; WHO 2022). With the growth of managed care plans responsible for specific populations, the healthcare system is becoming a more suitable vehicle for achieving public health goals. This is seen in clinical preventive services that find clinical and social solutions for patients, thus fostering PWID best practices. Therefore, knowing the fundamental role in finding and diagnosing PWID who may be living unaware of their hepatitis C condition towards achieving the HCV goal by 2030, public health solutions must be strengthened to control the disease in this population.

The high dropout rate of PWID between each hepatitis C's CC phase is also known (van Dijk et al. 2020). At INSHU 2018, the proposal of 90:90:90:90 was presented, which means that it should be sought to ensure that the dropout rates should not exceed 10% between phases of the hepatitis C's CC (Krekulova et al. 2022), as opposed to the current rates that reach approximately 50% (van Dijk et al. 2020). This article focusses on the first three steps (awareness, prevention and diagnosis), which, being among the initial ones in hepatitis C's CC, will partly determine the success of the remaining steps. Although no concrete values are known for the number of individuals in the early stages of the CC, field experience provides information regarding the difficulty in finding new PWID living with hepatitis C (Martínez et al. 2021).

COVID-19 added further complexity to the great efforts of countries towards achieving the WHO's hepatitis C elimination goal by 2030 (Smith 2022). As such, urgent action is required to prevent the loss of all the previous efforts and strengthen strategies in finding and diagnosing individuals living with hepatitis C, especially in vulnerable populations such as PWID. If this strategy is not adopted, new infections among PWIDs will not allow the disease's elimination goals and control in the community. Therefore, PHP tools must be developed to support the decision-making of politicians related to health, health authorities and organizations in the field, especially in the early steps of the hepatitis C's CC, for each target population, towards recovering delays in achieving the Sustainable Development Goals (SDG) established by the General Assembly of the United Nations.

The prevention of hepatitis C should follow the same procedures as in other diseases by implementing measures that promote literacy in all its forms (Lopes and McKay 2020). The absence of hepatitis C signs and symptoms in most people for many years contributes to individuals who live with hepatitis C often being unaware of the existence

of this disease and its transmission pathways (Solomon et al. 2015; Pimpin et al. 2018; Metwally et al. 2021). Furthermore, once the diagnosis is achieved, this may also promote less commitment from patients in addressing the disease, despite being associated with a major mortality cause among PWID due to liver disease (Yang and Muir 2021). This is aggravated by low literacy recurrence in this population, especially in closed communities (DeCuir et al. 2018; Metwally et al. 2021). The lack of knowledge about a disease, its associated risks and perceived lack of urgency in seeking care can lead to low adherence to interventional campaigns, screening tests and other preventive or control measures (Marshall et al. 2017; Walters et al. 2020; Amoako et al. 2021). Awareness through education is a key element in disease prevention, especially among high-risk populations, as knowledge dissemination allows capacitating individuals as active agents of their health by promoting the understanding of awareness as prevention (Schrauben et al. 2020) and healthier behaviours, addressing misconceptions and concerns while reducing risk behaviours and identifying risks related to the disease transmission (Scott et al. 2017; Lopes 2018; Buggisch et al. 2021; Metwally et al. 2021). In awareness and prevention actions, health, well-being and disease literacy and training are crucial for all the involved social actors in strategies focussed on hepatitis C, from PWID to social workers and health professionals (Amoako et al. 2021). Considering that nobody knows the PWID lifestyle (e.g. habits, avoidance strategies, etc.) as well as PWID themselves, the sharing of common language and experiences allows for peer evidence-based educational interventions to be a key measure in attracting and maintaining patients throughout the different CC phases (Deuba et al. 2020; Mabuie 2020; Schwarz et al. 2022).

Raising awareness about hepatitis C for policymakers is also important in guaranteeing adequate legislation and programmes for the disease, especially in developing strategies and resource allocation. Prevention must be achieved by optimizing information management processes and alerting target populations, those around them and all the people involved in this public health issue. To this end, it is important to proactively ensure access to social services and improve PWID's social, economic and political environment to maximize gains in public and individual health (Torrens et al. 2020). The aforementioned elements allow for a more adequate preparedness to interact with PWID since the first contact points are to foster action and preparedness concerning individuals from this population along the disease CC steps (Martínez et al. 2021). Point-of-care approaches may also take advantage of places with closer contact with the PWID population, such as harm reduction services, primary healthcare services and prisons.

A “cure as prevention of spreading” model can also be used with the new direct-acting antiviral (DAA) therapies

for hepatitis C due to a rate of individual viral elimination of approximately 100%. However, the link between general literacy and hepatitis C awareness is of such importance that we consider prevention measures before treatment efforts, reinforcing this reading based on the health literacy scientific literature. This approach is of the utmost importance to address PWID's potential concerns and misconceptions about the treatment and its side effects, namely those related to the Interferon treatment era (Amoako et al. 2021).

The greatest risk of HCV transmission is related to sharing needles, syringes and other paraphernalia (Curado et al. 2022), thus having a great need to be addressed. While needle and syringe programmes (NSP) are a primary source of clean injecting equipment, some PWID reported secondary distribution as a main source, considered a high-risk behaviour as they were more likely to share needles (Noroozi et al. 2017). The syringe exchange programmes aim to reduce the risk of HCV transmission by regularly providing enough syringes, complete injection kits to individuals with risk behaviours, advising on how to avoid those risks, linkage to maintenance therapy, among others (Miller et al. 2019; Palmateer et al. 2022). For example, the implementation of NSP in Europe was associated with a reduction in HCV transmission by over 70% (Palmateer et al. 2022).

A recent study supported these interventions, stating that high coverage of NSP among PWID could reduce HCV acquisition risk by half if more than one sterile needle and syringe were returned per reported injection (Ward et al. 2018). However, the effect of distributing syringes among PWID is not linear, in the sense that one cannot expect a direct and proportional effect based on the number of needles/syringes distributed. Some authors identified the need to micro-segment the patterns of syringe use (Jacka et al. 2020). While the exchange of used syringes for new ones will delay HCV spread among high-risk PWID patients, prevention in low-risk PWIDs can have a more determining effect. Therefore, the risk assessment normally based on incidence and prevalence rates could not be adjusted to PWID in reality.

Despite difficulties being identified in all the hepatitis C's CC steps for the PWID population, the main challenge for HCV's adequate management is to diagnose the entire population of HCV infected individuals (Amoako et al. 2021). Globally, HCV testing and diagnosis are inadequate, showing a great need to intensify the effectiveness of diagnosis strategies (EMCDDA 2021; WHO 2022). This might be partly explained by individuals' anxiety, stigma and fears towards screening actions for hepatitis C (EMCDDA 2021). Such reactions underline the need for additional counselling support to facilitate testing and referral of chronically infected individuals, with a need for improvements across the general practice for patients to be retained in care (Baptista-Leite et al. 2024). The integration

of health services will also greatly contribute to adequate linkage-to-care after a first hepatitis C diagnosis by making the referral process simpler and more agile. Globally, it was estimated that 90% of patients chronically infected with HCV reside in resource-limited settings (Mohd Hanafiah et al. 2013; Solomon et al. 2015), with all that is implied in terms of access equity for health care and aggravated conditions. However, in these contexts even a great isolated clinical solution is insufficient. In countries where HCV prevalence is poorly documented, it is of the utmost importance to have national programmes (planned, financed, politically supported and implemented) that address awareness, screening, interventions and treatment strategies. Recruitment and follow-up of PWID in the community are not easily achieved due to the aforementioned factors, such as people not being willing to be diagnosed, selecting the best tools to collect samples, not having suitable veins and other factors (Chevaliez et al. 2020; EMCDDA 2021).

An important strategy in finding and diagnosing PWID living with HCV infection is to implement point-of-care screening and diagnosing tests for HCV in places frequented by PWID, such as harm-reduction services (Saludes et al. 2019; Chevaliez et al. 2020; WHO 2022). For this approach, the dried blood spot (DBS) test has been identified in the literature as easy to collect due to the use of an auto-retracting disposable sterile lancet, used for voluntary HCV testing with similar specificity and sensibility to HCV-RNA (Saludes et al. 2019; Chevaliez et al. 2020). The utility of using DBS samples as a monitoring test is described in the literature as feasible, with specificity and sensitivity rates of approximately 100% for HCV (Saludes et al. 2019; Chevaliez et al. 2020). It has been suggested that DBS has the potential to measure key epidemiological features among community-recruited PWID samples and allows differentiation between individuals with cleared infections, ongoing infections and those recently infected.

A more efficient strategy should include outreach hospital care, point-of-care and linkage-to-care, only using necessary tests (HCV-RNA), for example, at the end of therapy and the three subsequent months. Performing tests that enable virus characterization at genotype and nucleotide levels may greatly enhance PWID populations' public health surveillance. Moreover, fingerstick tests, including viral load assessment and non-invasive assessment of liver fibrosis (APRI, FIB-4, mobile FibroScan®, mobile ultrasound), street doctors and nurses, social technicians and peers' coaching should be available to this population. All the aforementioned measures are examples of evidence models of care for drug services (EMCDDA 2019) and are aligned with the updated recommendations on hepatitis C care from the WHO (WHO 2022) and EMCDDA (EMCDDA 2021). It is fundamental that these approaches are accompanied by strong surveillance systems that allow for evaluating and

tailoring adequate strategies for different contexts (Lazarus et al. 2021; Mirzazadeh et al. 2021).

Interventions² are among the most efficient field approaches to identifying new HCV cases (and other diseases), fostering higher test uptakes and diagnosis rates while sensitizing target populations about the pathology, good hygiene and prevention practices (Scott et al. 2021; Ortiz-Paredes et al. 2022; Palmateer et al. 2022). Knowing that HCV is a silent disease with often late-onset symptoms, people living with HCV infection can be unaware of their condition, making interventions an important procedure in diagnosing new hepatitis C cases.

Considering the above, the present paper aims to create a toolkit – APPEAL³ – to strengthen the awareness, prevention and diagnosis steps of the disease's CC towards controlling hepatitis C in PWID by supporting organizations to reflect on their practices, identify possible issues and find adequate solutions for their specific ecosystems.

Methods

A scoping review was conducted to understand the main challenges and possible solutions to attract PWID living with hepatitis C to healthcare services.

This approach comprised a literature search, following a thematic content analysis for the concepts under study, with data being retrieved from the databases “Pubmed” and “Scopus”, and “Google Scholar” as an additional source. The scoping review focussed on the early CC steps for hepatitis C in the PWID population, namely disease awareness, prevention and diagnosis.

For this study, database searches were conducted using the keywords “hepatitis C”, “drug users” and “PWID” (Table 1). These searches were systematically expanded to encompass the management of hepatitis C among these groups within primary healthcare settings, resulting in four distinct search queries. The initial database search returned 10,320 records. An additional three records were sourced from discussions and interviews with 57 experts across seven countries, organized in National Advisory Boards (NAB). After duplicate removal and the exclusion of records based on criteria such as legibility, accessibility and relevance, the abstract screening process narrowed the selection to 401 articles. Subsequent evaluation based on specific inclusion and exclusion criteria further

² In this article, interventions refer to actions aiming to approach individuals, particularly in community or healthcare settings, to raise awareness about a disease with the ultimate goal of improving one's global health status.

³ APPEAL—retAin PwId hePatitis hEALthcare.

Table 1 Inclusion and exclusion criteria for the scoping review**Inclusion criteria:**

- Participants of the studies must be current users or had a past history of usage of injectable drugs or drugs in general;
- Publication and information collection performed after DAAs introduction in the market, after 2014
- The aim of the study must be about awareness, prevention and diagnosis
- Keywords: “hepatitis C”, “drug users” and “PWID”

Exclusion criteria:

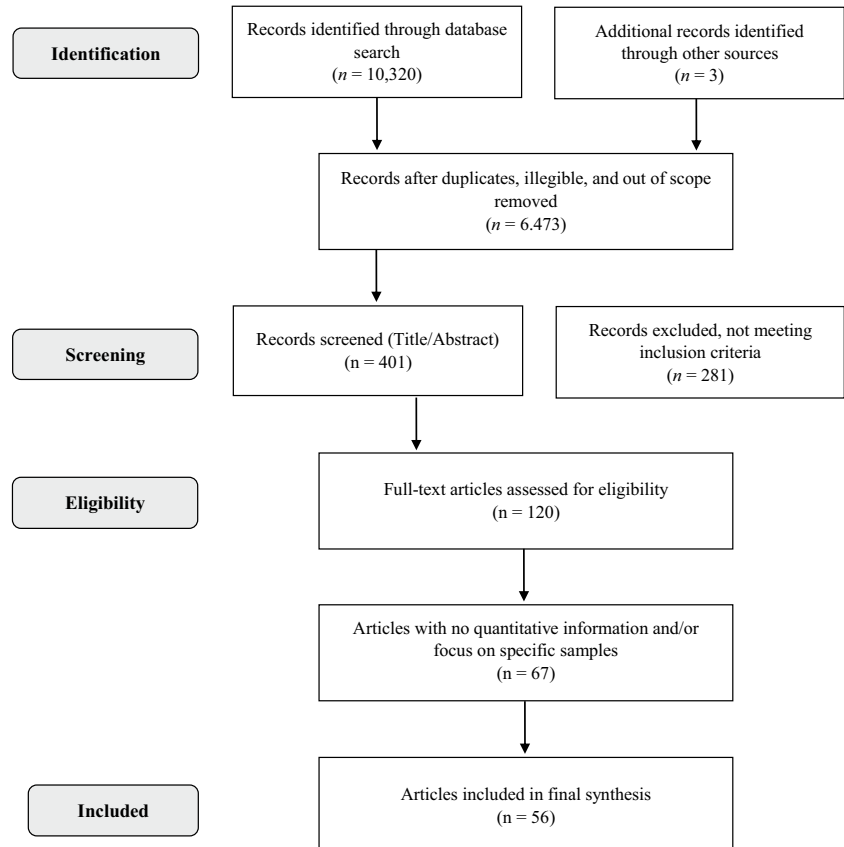
- Publications or data from the publication before 2014, except for Fibroscan matters
- Articles not written in English

reduced this to 120 articles for full-text assessment. Of these, 67 articles were excluded for lacking quantitative data or relevance, leaving 57 articles for inclusion in the study (Fig. 1).

The analysis of the collected information, either through the bibliography or through the hearing of the experts, was carried out qualitatively, taking into account the experts’ choice of PHP, established within the LEHC project (Baptista-Leite et al. 2023). This work was organized within a decision-making flowchart (Fig. 2) using process procedures represented by arrows that interconnect the condition boxes, aiming to construct the APPEAL toolkit.

Construction of the APPEAL toolkit

Upon reviewing the literature and recognizing the primary obstacles in diagnosing and attracting individuals who inject drugs (PWID) with hepatitis C into healthcare systems, we propose a toolkit designed as a response to this particular challenge. It comes as a complement to the “ADHERE” toolkit, which was created to tackle the challenges in the retention of PWID in healthcare systems. The “APPEAL” toolkit (Fig. 2) brings an ecosystemic approach with a basis on health and well-being literacy developed for the awareness, prevention and diagnosis dimensions of the hepatitis C’s CC for PWID.

Fig. 1 Flow diagram of the study selection aggregated over the topic areas reviewed

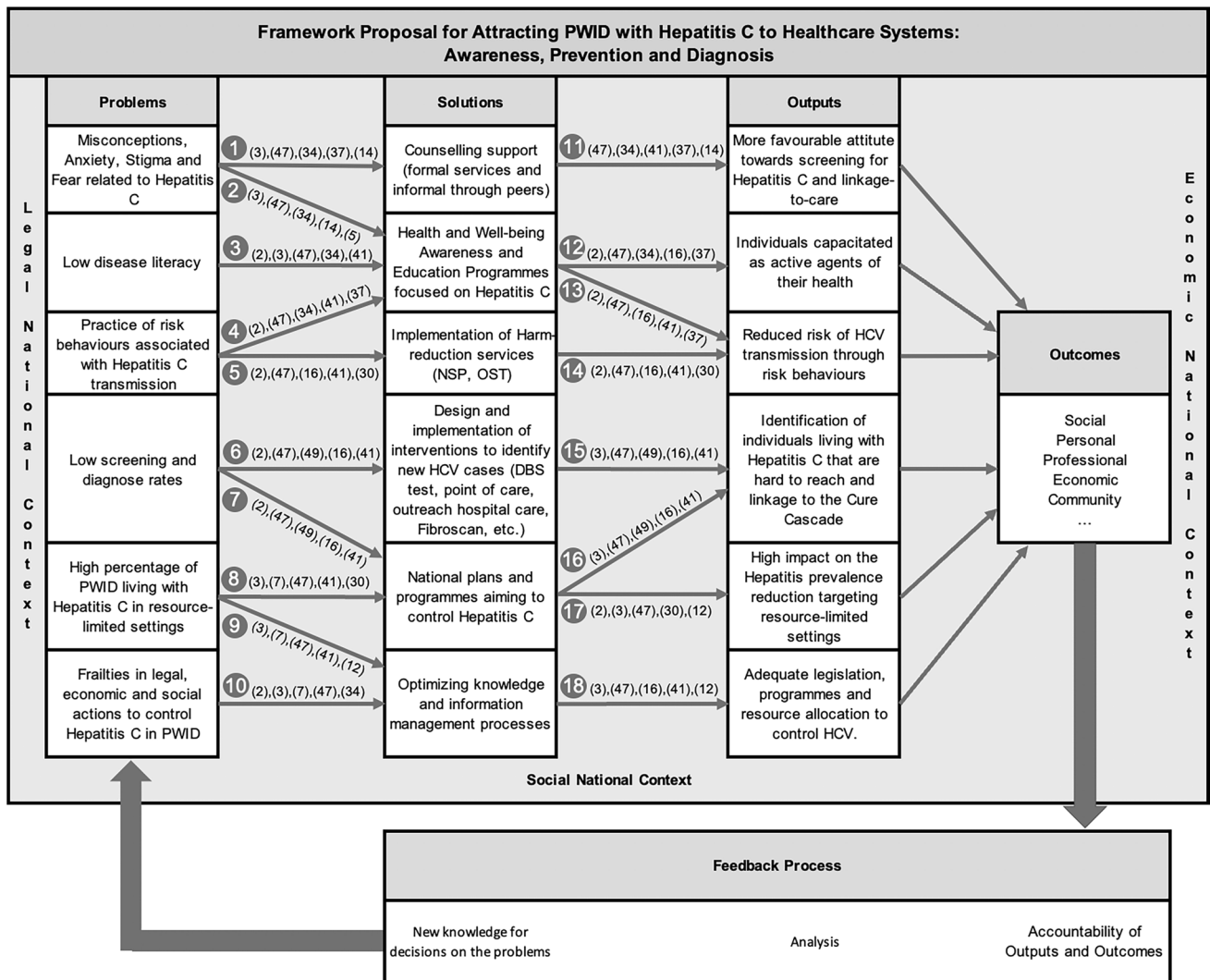


Fig. 2 Proposed toolkit for attracting PWID with hepatitis C to healthcare systems – APPEAL

The toolkit comprises five main axes: problems, solutions, outputs, outcomes and feedback process. To provide an all-encompassing solution, the toolkit employs a holistic ecosystem perspective that takes into account the countries’ realities, namely those regarding economic, legal and social systems. Within each category, we have included key elements that we, along with the NAB, deem most relevant to ensuring success. Our proposed 18 policy prescriptions (PP) are supported by references cited in Fig. 2. Although several sources support some PP, only five will be mentioned if multiple sources support them simultaneously.

This toolkit aims to systematically identify problems related to PHP implementation and, through its analysis, trigger cycles of improvement, which can be supported by quantitative elements, thus allowing new goals to be established for each point of the model. It is, therefore, a work that is never completed, as improvements introduced in a

cycle will lead to the identification of new areas of potential improvement, which constitute a new cycle.

The toolkit was designed through an approach that allowed the user (politician, health authority or patient advocacy organization acting in the field) to navigate an action flowchart, verifying through internal discussion (quality circles, continuous quality improvement groups, quality improvement of services or other systems, EFQM/CAF, etc.) their performance in each of the toolkit’s nodes, how they can improve their performance and the quality of services provided to users/customers. In its genesis, the hypothesis was worked for external entities to also use the toolkit in comparison and evaluation matters, such as benchmarking, auditing or other processes.

Given the proposed toolkit (Fig. 2), it is recommended that each organization generates a tailored written procedure for each of the 18 PP (as represented by the arrows) to

effectively execute the framework. These procedures should encompass the following aspects: 1. The implementation of the procedure within the organization's ecosystem and compliance with the prevailing legal framework; 2. Coordination through the hierarchical structure and associated responsibilities delineated in the organizational chart; 3. The development of a quantification system for each activity with appropriate metrics and information collection methods; 4. The inclusion of an audit system, either as part of a quality seal or as an independent component, which identifies and assesses deviations, specifies their magnitude and outlines the required corrective measures.

Discussion and conclusions

As a great portion of the population living with HCV remains undiagnosed, efforts must be strengthened towards improving their diagnosis. One of the greatest challenges in reducing the HCV prevalence in PWID is for the health services to reach this population, thus comprising a serious public health issue. To overcome this difficulty in combating HCV, it is important to manage information and knowledge adequately.

We propose the APPEAL toolkit to reinforce finding individuals living with HCV so that it is possible to convey programmes that aim to reduce risk behaviours while increasing testing and diagnosis. This can be achieved by fostering the education of target populations such as PWID, their literacy, knowledge of the disease and risk behaviours. It is also important to raise the awareness of policymakers, PWID, health professionals and the general public.

Point-of-care actions such as in harm reduction services, primary healthcare and prisons have a crucial role in enhancing strategies such as HCV assessment and treatment in this group, especially with the growing dissemination of treatments using DAA, which have close to 100% cure rates. Successfully implementing the above-mentioned actions will greatly diminish HCV prevalence.

The APPEAL toolkit allows for decisive contributions in attracting PWIDs living with hepatitis C to the disease treatment courses and thus improve the processes of reducing the loss of patients along the CC. Therefore, the availability of the toolkit is fundamental to enhance continuous quality improvement and serve as internal or external quality audit processes of entities providing healthcare in hepatitis C or agencies that follow up and monitor the PWID population.

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Consent to participate Not applicable.

Consent for publication Not applicable.

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Conflict of interest The research center has ongoing projects that are financed by the pharmaceutical industry.

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