People in community corrections are a population with unmet need for viral hepatitis care

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Summary

To reach World Health Organization elimination targets for hepatitis C, different strategies are needed to reach people who have not yet been diagnosed and treated. In the context of declining treatment initiation rates, innovation in service design and delivery is necessary: testing and treatment needs to be offered to people in non-traditional settings. The community corrections (probation and parole) population is larger than the prison population, which has high prevalence of hepatitis C and—in some countries—established diagnosis and treatment programs. In this *Viewpoint* we identify a gap in hepatitis C care for people under community correctional supervision, a group who have either never been imprisoned or need continuity of healthcare provided in prison. We propose that offering hepatitis C screening and treatment would benefit this population, and accelerate progress to hepatitis C elimination.

Keywords: Hepatitis C virus; Models of care; Community corrections; Probation; Parole; Justice health; Elimination strategies

The correctional system: settings of poor health … and public health opportunity

People with criminal justice system involvement typically suffer poor health and reduced access to primary healthcare[1] due to poverty and social exclusion. Worldwide, carceral populations have high prevalence of infectious diseases including HIV, tuberculosis, viral hepatitis, and sexually transmitted infections and are identified as a special population for public health focus by the World Health Organization (WHO).[2] Despite carceral populations being at high risk for viral hepatitis infection[3] and improved evidence of the efficacy of prison-based viral hepatitis care,[4,5] community-based viral hepatitis care services typically struggle to engage people with criminal justice system involvement.[5–7]

The correctional system enables screening of large numbers of people at increased risk of viral hepatitis.[8] However, people supervised by non-custodial divisions of the criminal justice system have largely been overlooked by targeted viral hepatitis care initiatives, despite population overlaps and shared common risk factors with people in prison.[9] Community corrections supervise people serving a court-ordered sentence in the community. Community-based supervision of offenders can be ordered as an alternative to prison (probation), or as a condition of release from prison (parole). This *Viewpoint* argues that people involved in the community corrections (probation and parole) system are a key underserved population who could benefit greatly from accessible and streamlined hepatitis C testing and treatment services. Given they also typically represent a much larger population than those incarcerated, we further suggest that offering hepatitis C services in community corrections settings could accelerate progress towards reaching WHO hepatitis C elimination targets.[10]

Hepatitis C virus infection remains a significant global public health threat. There are an estimated 1.5 million new hepatitis C infections each year, 290,000 hepatitis C related deaths,[11] and less than a quarter of the estimated 57 million people infected worldwide are diagnosed.[12] One hundred and ninety four countries have committed to meeting WHO elimination targets, which include reducing new infections to 5 per 100,000, mortality to 2 per 100,000, diagnosing 90% of people living with hepatitis C and curing 80%, underpinned by the principle of 'leaving no-one behind'.[10]

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Among an estimated 10.7 million people incarcerated in prisons worldwide,[13] approximately 1.5 million (15%) are estimated to be living with hepatitis C infection.[3] However, few epidemiological studies have described hepatitis C prevalence among community corrections populations. Data from the US National Survey on Drug Use and Health shows adults in community corrections self-reported a 6.4% prevalence of hepatitis B or C on parole and 3.2% on probation between 2015 and 2018.[9] Lifetime injecting drug use was reported by almost a quarter of adults on parole (23.1%) and over one in 10 adults on probation (11.6%), with similar proportions reporting past year drug treatment. While global figures for the community corrections population are unavailable, country level data suggest that in high-income countries the number of people in community corrections comfortably exceeds those in prison. In 2020 in the USA, there were 1,691,600 people incarcerated in prisons and jails and 3,890,400 people serving supervised community-based orders.[14] In Australia in 2021 there were 43,073 people in prison at any one time, and 78,785 under community corrections supervision.[15] While in England and Wales, there were 80,659 people imprisoned and 243,127 people supervised under probation at the end of June 2022.[16]

Reaching elimination

Attaining the WHO elimination goals for hepatitis C is hindered by inequitable access to testing and DAA treatment, alongside inadequate coverage of drug use harm and demand reduction interventions. These inequities stem from a combination of poor policy development and program implementation, not prioritising hepatitis C within national and regional frameworks, and under-resourcing.[17] Eighty percent of high-income countries are not on track to achieve hepatitis C elimination by 2030, and over two-thirds are also unlikely to achieve elimination before 2050.[18] Even in countries that have well-resourced national strategies for hepatitis C and highly subsidised access to DAAs, it is estimated that only 20–30% of the viraemic population has received therapy.[12] Despite a strong initial uptake of DAAs among people previously diagnosed with hepatitis C infection in many high-income countries, gradual declines in testing and treatment have been observed,[18] with further declines reported due to the impact of the SARS-CoV-2 (COVID-19) pandemic.[19]

In some countries, the decline in treatment numbers has corresponded with a decrease in hepatitis C population prevalence following universal access to DAAs,[12] however the strategies used to reach these early DAA initiates are unlikely to be effective for reaching those yet to be treated.[8,20] Health system adaptation and innovation have been called for,[21] and the recently updated WHO disease elimination strategies have emphasised the importance of streamlined diagnosis and treatment programs in priority settings, and better integrated and person-centred models of care.[10] In many countries, people most at risk of hepatitis C and those living with chronic infection are among the most socially disadvantaged, disproportionately experiencing homelessness, criminal justice system involvement, and drug dependency.[22,23] These factors often limit individuals' engagement in traditional models of healthcare. To reach and engage these people with hepatitis C care, services will need to be re-imagined, re-designed and located in clinical and other service environments likely to be attended by those living with hepatitis C. One possible setting for expansion is community corrections sites.

Hepatitis care in community corrections: a novel setting

There are few published evaluations of viral hepatitis services in community corrections settings. We searched PubMed and OVID Medline for studies published in English language using the search terms hepatitis C OR viral hepatitis AND probation OR parole OR community correction* and found four studies which evaluated viral hepatitis testing in community corrections and linkage to onsite (n = 1) or external (n = 3) assessment and treatment services (Table 1). Onsite assessment and treatment was evaluated by Cabezas and colleagues[24] who reported that among 548 people who received point-of-care finger-prick testing at a single community corrections site in Spain, 16 (3%) were hepatitis C RNA positive, of whom 13 (81%) commenced treatment. In Pawtucket, Rhode Island, Jacka et al.[25] offered onsite point-of-care hepatitis C antibody testing and participants were offered patient-navigator support to access confirmatory RNA testing, pre-treatment assessment, and treatment initiation elsewhere. Of 483 people tested, 85 (18%) were hepatitis C antibody positive but only 25 (29%) presented to community laboratories for confirmatory testing and 4 (5%) initiated treatment. High attrition was also observed in Denver, Colorado; among 52 participants testing hepatitis C antibody positive using onsite point of care tests with reflex to offsite RNA testing using the same blood sample, 34 (65%) had detectable hepatitis C RNA, of which 14 (27%) were linked to a treatment provider, and only four (8%) completed treatment.[26]

The results from these studies suggest feasibility and acceptability but suffered significant attrition from the hepatitis C care cascade when multiple visits were required at different locations. Simplified models of care that minimise visits or reduce the need for people to attend for care across different locations would encourage retention in the care cascade.[25] For typically marginalised and stigmatised populations such as people who inject drugs and people who interact with the criminal justice system, the current hepatitis C cascade

Author/ date	Model of care	Study site/s	Sociodemographic characteristics	HCV risk characteristics	# tested	# HCV AB + ve	# HCV RNA + ve	# initiated DAAs	# SVR12
Cabezas et al.,/ 2021[24]	*Onsite HCV AB and RNA fingerstick point-of-care testing and treatment assessment and initiation via telehealth.* HCV AB test incorporated into global health screen by existing onsite nurse/physician or study navigator. Positive HCV AB followed by finger-prick RNA test. If RNA + ve then telehealth consult and DAA prescription same day. Second visit (hospital): complete liver disease evaluation.	Santander-Cantabria, Spain	87% male Age median 38 years 49% unemployed	2% people who inject 48% drug dependent 8% severe mental disorder 22% previous imprisonment 43% tattoos	548	44	16	13	10
Jacka et al.,/ 2022[25]	*Onsite HCV AB fingerstick point-of-care test with offsite confirmatory testing and linkage to care.* Participants with a reactive rapid HCV AB test offered patient-navigator support to facilitate linkage to care for confirmatory laboratory-based HCV viral load testing and community-based DAA treatment.	Rhode Island, USA	79% male 42% white Age median 37 years 33% homeless 57% unemployed	79% ever used drugs 34% used drugs past 3 months 18% ever injected drugs 4% injected past 3 months	483	85	17	4	2
Kamis et al.,/ 2021[26]	*Onsite HCV AB point-of-care test using venous blood sample with offsite confirmatory testing and linkage to care.* Onsite HCV screening program utilizing point-of-care tests with linkage-to-care services. RNA testing at offsite lab. One venous sample for both OraQuick onsite AB and offsite pathology for RNA. A care navigator engaged with +ve participants, provided in-depth education on HCV treatment and linked to community care.	Denver, Colorado, USA	70% cisgender male Age median 39 years 32% Hispanic; 28% Black; 30% white 54% completed high school	44% 12-month drug use history	417	52	34	11	1
Zaller et al.,/ 2016[27]	*Onsite HCV AB fingerstick point-of-care test with offsite confirmatory testing and linkage to care.* Participants testing HCV AB + ve referred to hospital for confirmatory RNA testing. Appointment for communication of results and another for HCV assessment. Telephone contact attempted when failed to attend.	Rhode Island, USA	80% male 42% white; 17% African American; 26% Hispanic Age median 32 years 44% unemployed	60% not previously HCV tested (or don't know) 26% AOD treatment past 12 months 95% ≥ 1 previous convictions 13% ever injected drugs 5% injected past 3 months	130	12	2	0	0

NB: HCV AB = hepatitis C antibody; HCV AB + ve = positive [test for] hepatitis C antibodies; RNA = ribonucleic acid; AOD = alcohol and other drug; DAAs = direct-acting antivirals; SVR12 = sustained virologic response.

Table 1: **Description of models and retention in care in published studies evaluating the implementation of hepatitis C services in community corrections settings.**

of care in mainstream health services is onerous.[20] Attrition from the care cascade has already been extensively described in community studies of people who inject drugs and in prisons.[5,28,29]

Court- or parole board-ordered conditions of community supervision vary widely but almost always include requirements to report regularly to community correctional services (probation/parole officers). These reporting requirements are typically onerous for clients but also have the potential to be positively re-orientated and leveraged for healthcare engagement and retention.[30] In the case of hepatitis C, loss to follow-up between testing and treatment visits has been identified as a key factor undermining current hepatitis C elimination efforts.[12,31] System and capacity constraints also mean that people diagnosed with or at risk of hepatitis C sometimes miss out on opportunities to access treatment in prison. When leaving prison, linkage to community care is often challenging. Re-entry pathways from prison to community commonly involve community supervision. The existing infrastructure of community corrective services offers an avenue for providing continuity of care for people who did not access hepatitis C care in prison and expanded treatment coverage for those never previously imprisoned. Addressing co-occurring health need may also synergise with the goals of community corrections: improving health may reduce the risk of reoffending.[32]

Given the fundamental function of community corrections is to manage reoffending risk, we acknowledge that it is a challenging setting for the implementation of services to address competing healthcare need. Establishing clinical services within community corrections sites is made difficult by contrasting policy and systemic objectives of health versus corrections, a lack of infrastructure, systemic challenges of harnessing an administrative correctional system for healthcare purposes, and logistical barriers including reaching large numbers of people across a decentralised system. In the prison system a nurse-led health assessment is standard of care for prison reception in many countries and blood-borne virus screening is increasingly seen as integral to this health assessment. In contrast, the inclusion of a health assessment in the community corrections setting is not

Search strategy and selection criteria

We searched PubMed and OVID Medline for studies published in English language using the search terms hepatitis C OR viral hepatitis AND probation OR parole OR community correction*. We included studies in Table 1 which reported the results of offering hepatitis C testing and treatment in community correctional settings (probation and parole). The consolidated *Viewpoint* reference list included publications from the authors' personal files. The final reference list was based on relevance to the topic of this *Viewpoint*.

included as standard of care in many jurisdictions; therefore, inclusion of hepatitis C screening requires a new model of care.

Future directions

Offering simplified hepatitis C screening, assessment and treatment in non-healthcare settings attended by people at risk is made more feasible by recent technological advances in hepatitis C point-of-care diagnostic testing that allow same-day DAA prescription and efficient, rapid, and cost-effective pathways to treatment initiation.[31,33] Point-of-care hepatitis C testing has been found to be feasible and acceptable to people who inject drugs and people in prison.[34,35] Capillary blood sampling obtained by finger-prick for point-of-care testing is also more attractive to people who inject drugs than standard phlebotomy due to common venous access difficulties.

There is growing evidence for the feasibility and efficacy of low threshold, co-located and streamlined hepatitis C services in community settings for people who inject drugs.[35,36] People on community corrections orders are a large and underserved at-risk population for hepatitis C which has received little attention to date. Adapted and novel models of care are needed to offer hepatitis C testing and treatment in these settings; these actions are critical in the quest for hepatitis C elimination.

Contributors

All authors contributed to the conceptualisation, drafting and re-drafting of this *Viewpoint*. RW undertook the literature search and wrote the first draft.

Declaration of interests

RW has received investigator-initiated funding from Gilead Sciences. YS is a co-investigator on investigator-initiated research grants from Gilead Sciences and AbbVie. MS has received investigator-initiated research grants from Abbvie and Gilead and consultancy from Gilead. AL has received investigator-initiated research grant support from Gilead Sciences and AbbVie. AJT has received consulting fees from Gilead, Abbvie, Roche Diagnostics, Assembly Biosciences, speaker fees from Gilead Sciences, Roche Diagnostics and investigator-initiated grants from Gilead Sciences. All other authors have no conflicts to declare.

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References

1 Fazel S, Baillargeon J. The health of prisoners. *Lancet*. 2011;377(9769):956–965.
2 World Health Organization. *Regional Office for Europe. Declaration on prison health as part of public health: adopted in Moscow on 24 October 2003*; 2003. Available from: https://iris.who.int/handle/10665/352130. Accessed December 28, 2023.
3 Dolan K, Wirtz A, Moazen B, et al. Global burden of HIV, viral hepatitis and tuberculosis among prisoners and detainees. *Lancet*. 2016;388:1089–1102.
4 Masarone M, Caruso R, Aglitti A, et al. Hepatitis C virus infection in jail: difficult-to-reach, not to-treat. Results of a point-of-care screening and treatment program. *Dig Liver Dis*. 2020;52(5):541–546.
5 Papaluca T, McDonald L, Craigie A, et al. Outcomes of treatment for hepatitis C in prisoners using a nurse-led, statewide model of care. *J Hepatol*. 2019;70(5):839–846.
6 Akiyama MJ, Columbus D, MacDonald R, et al. Linkage to hepatitis C care after incarceration in jail: a prospective, single arm clinical trial. *BMC Infect Dis*. 2019;19(1):703.
7 Papaluca T, Craigie A, McDonald L, et al. Care navigation increases initiation of hepatitis C treatment following release from prison in a prospective randomised controlled trial: the C-LINK Study. *Open Forum Infect Dis*. 2022. https://doi.org/10.1093/ofid/ofac350.
8 Bruggmann P, Litwin AH. Models of care for the management of hepatitis C virus among people who inject drugs: one size does not fit all. *Clin Infect Dis*. 2013;57 Suppl 2(Suppl 2):S56–S61.
9 Kilmer G, Hughes E. Hepatitis B and hepatitis C among adults on probation or parole in the United States: 2015-2018. *J Health Care Poor Underserved*. 2021;32(2):671–679.
10 World Health Organization. *Global health sector strategies on, respectively, HIV, viral hepatitis and sexually transmitted infections for the period 2022-2030*. Geneva: WHO; 2022. Licence: CC BY-NC-SA 3.0 IGO.
11 World Health Organization. *Global health sector strategy on viral hepatitis 2016-2021. Towards ending viral hepatitis*. Geneva: World Health Organization; 2016.
12 Blach S, Terrault NA, Tacke F, et al. Global change in hepatitis C virus prevalence and cascade of care between 2015 and 2020: a modelling study. *Lancet Gastroenterol Hepatol*. 2022;7(5):396–415.
13 Fair H, Walmsley R. *World prison population list*. 13th ed. London, UK: Institute for Criminal Policy Research, University of London; 2021.
14 Bureau of Justice Statistics. *Correctional populations in the United States, 2020 - statistical tables*. U.S. Department of Justice, Office of Justice Programs; 2022.
15 Australian Bureau of Statistics. *Corrective services, Australia, June Quarter 2021*. Canberra: ABS; 2021.
16 Ministry of Justice UK. *National statistics. Offender management statistics quarterly: April to June 2022*; 2022. Available from: https://www.gov.uk/government/statistics/offender-management-statistics-quarterly-april-to-june-2022/offender-management-statistics-quarterly-april-to-june-2022. Accessed September 5, 2023.
17 Smith S, Harmanci H, Hutin Y, et al. Global progress on the elimination of viral hepatitis as a major public health threat: an analysis of WHO Member State responses 2017. *JHEP Rep*. 2019;1(2):81–89.
18 Razavi H, Sanchez Gonzalez Y, Yuen C, et al. Global timing of hepatitis C virus elimination in high-income countries. *Liver Int*. 2020;40(3):522–529.
19 Blach S, Kondili LA, Aghemo A, et al. Impact of COVID-19 on global HCV elimination efforts. *J Hepatol*. 2021;74(1):31–36.
20 Scott N, Doyle JS, Wilson DP, et al. Reaching hepatitis C virus elimination targets requires health system interventions to enhance the care cascade. *Int J Drug Pol*. 2017;47:107–116.
21 Pedrana A, Munari S, Stoové M, et al. The phases of hepatitis C elimination: achieving WHO elimination targets. *Lancet Gastroenterol Hepatol*. 2021;6(1):6–8.
22 Socías ME, Ti L, Wood E, et al. Disparities in uptake of direct-acting antiviral therapy for hepatitis C among people who inject drugs in a Canadian setting. *Liver Int*. 2019;39(8):1400–1407.
23 Valerio H, Alavi M, Silk D, et al. Progress towards elimination of hepatitis C infection among people who inject drugs in Australia: the ETHOS Engage Study. *Clin Infect Dis*. 2021;73(1):e69–e78.
24 Cabezas J, Llerena S, Mateo M, et al. Hepatitis C micro-elimination beyond prison walls: navigator-assisted test-and-treat strategy for subjects serving non-custodial sentences. *Diagnostics*. 2021;11(5).

25 Jacka BP, Bazerman LB, Dickerson C, et al. Feasibility of hepatitis C virus testing and linkage in community supervision offices: great potential but persistent challenges. *Int J Drug Pol*. 2022;103:103668.

26 Kamis KF, Wyles DL, Minturn MS, et al. Hepatitis C testing and linkage to care among adults on probation in a large US city. *Open Forum Infect Dis*. 2022;9(2):ofab636.

27 Zaller ND, Patry EJ, Bazerman LB, et al. A pilot study of rapid hepatitis C testing in probation and parole populations in Rhode Island. *J Health Care Poor Underserved*. 2016;27(2a):214–223.

28 Iversen J, Grebely J, Catlett B, et al. Estimating the cascade of hepatitis C testing, care and treatment among people who inject drugs in Australia. *Int J Drug Pol*. 2017;47:77–85.

29 Sheehan Y, Cunningham EB, Cochrane A, et al. A 'one-stop-shop' point-of-care hepatitis C RNA testing intervention to enhance treatment uptake in a reception prison: the PIVOT study. *J Hepatol*. 2023. https://doi.org/10.1016/j.jhep.2023.04.019.

30 Winter R, Young J, Stoové M, et al. Resumption of injecting drug use following release from prison in Australia. *Drug Alcohol Depend*. 2016;168:104–111.

31 Trickey A, Fajardo E, Alemu D, et al. Impact of hepatitis C virus point-of-care RNA viral load testing compared with laboratory-based testing on uptake of RNA testing and treatment, and turnaround times: a systematic review and meta-analysis. *Lancet Gastroenterol Hepatol*. 2023;8(3):253–270.

32 Thomas EG, Spittal MJ, Taxman FS, et al. Health-related factors predict return to custody in a large cohort of ex-prisoners: new approaches to predicting re-incarceration. *Health Justice*. 2015;3(1):1–13.

33 Shih STF, Cheng Q, Carson J, et al. Optimizing point-of-care testing strategies for diagnosis and treatment of hepatitis C virus infection in Australia: a model-based cost-effectiveness analysis. *Lancet Reg Health West Pac*. 2023. https://doi.org/10.1016/j.lanwpc.2023.100750.

34 Lafferty L, Cochrane A, Sheehan Y, et al. "That was quick, simple, and easy": patient perceptions of acceptability of point-of-care hepatitis C RNA testing at a reception prison. *Int J Drug Pol*. 2022;99:103456.

35 Williams B, Howell J, Doyle J, et al. Point-of-care hepatitis C testing from needle and syringe programs: an Australian feasibility study. *Int J Drug Pol*. 2019;72:91–98.

36 Eckhardt B, Mateu-Gelabert P, Aponte-Melendez Y, et al. Accessible hepatitis C care for people who inject drugs: a randomized clinical trial. *JAMA Intern Med*. 2022;182(5):494–502.