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ORIGINAL RESEARCH

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Chronic hepatitis C elimination prison initiative: HCV-intensive test and treat, a whole prisoner population HCV test-and-treat program in England

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Abstract

Background and Aim: Prison residents are at high risk for hepatitis C virus (HCV) infection. HCV test-and-treat initiatives within prisons provide an opportunity to engage with prison residents and achieve HCV micro-elimination. The aim of the prison HCV-intensive test and treat initiative was to screen over 95% of all prison residents for HCV infection within a defined number of days determined by the size of the prison population and to initiate treatment within 7–14 days of a positive HCV RNA diagnosis.

Methods: An HCV-intensive test and treat toolkit was developed based on learnings from pilot HCV-intensive test and treat events. From January 2020 to September 2021, 13 HCV-intensive test and treat events took place at prisons in England selected based on high levels of reception blood-borne virus testing and good access to peers from The Hepatitis C Trust.

Results: Among a total of 8487 residents, 8139 (95.9%) underwent testing for HCV. Across the 13 prisons included, HCV antibody and RNA prevalence was 8.2% and 1.5%, respectively. The treatment initiation rate among HCV RNA-positive individuals (n = 124) was 79.0%.

Conclusion: The HCV-intensive test and treat initiative presented here provides a feasible and rapid test-and-treat process to achieve HCV elimination within individual prisons. The HCV-intensive test and treat toolkit can be adapted for rapid HCV testing and treatment events at other prisons in the United Kingdom and worldwide.

KEYWORDS

direct-acting antiviral, elimination, hepatitis C, prison, test-and-treat

1 | INTRODUCTION

Hepatitis C virus (HCV) is a blood-borne virus (BBV) that infects the liver. It is predominantly transmitted by parenteral exposure, specifically unsafe injection practices,[1] with almost 90% of transmission in England associated with injecting drug use (IDU).[2] HCV infection can either be acute or chronic.[1] Acute hepatitis C is asymptomatic and lasts less than 6 months.[1] Chronic HCV develops if the infection lasts longer than 6 months and is associated with the development of cirrhosis.[1] Chronic HCV infection is a major public health issue affecting approximately 58 million people globally,[1] including ~81,000 people in England across all settings.[2] The World Health Organization (WHO) has set a goal of eliminating viral hepatitis as a public health problem by 2030, aiming to achieve a 10% reduction in HCV-related deaths by 2020 and to reduce annual mortality to ≤2 per 100,000 globally.[3,4] National Health Service England (NHSE) plans to achieve these targets by 2025.[5]

Direct-acting antiviral (DAA) treatment provides an effective, well-tolerated, short-term oral treatment for chronic HCV infection.[6] In England, HCV treatment initiations have increased since all-oral DAA treatment became available in 2014. As of October 2019, over 40,000 HCV-infected individuals in England had been treated and up to 95% of those have been cured.[5] HCV prevalence in England reduced by 37% between 2015 and 2020, with HCV-related end-stage liver disease and hepatocellular carcinoma deaths between 2015 and 2020 reducing by 31%.[2] This exceeds the WHO target for HCV-related deaths.[3] However, despite these improvements, it has been estimated that by 2019 only 38% of individuals with HCV in the United Kingdom had been successfully treated.[7] In 2019, NHSE made a unique agreement with three pharmaceutical companies to address this issue.[8] They negotiated favorable prices for DAAs and collaborated to proactively identify undiagnosed individuals with HCV and ensure their effective referral to treatment.[8]

Prisons are high-risk sites for HCV infection and transmission.[9–11] The high prevalence of HCV infection in this population[9,12] is in part due to an overlap of HCV risk factors, including high incidence of mental health disorders, IDU, history of homelessness, and marginalization from society.[11,13,14] However, prisons can provide an opportunity to engage with individuals at high risk of HCV infection for testing and treatment.[15] European Association for the Study of the Liver and the European Policy guidelines have identified prison residents as a population that may benefit from a simplified, streamlined care pathway to improve treatment access.[10,16] Despite these recommendations, there has been significant variation in the planning of initiatives to identify and treat HCV-infected prisoners globally.[17] Of the 124 countries with national hepatitis plans, only 28 had proposed interventions for HCV testing of prison residents.[17] In the United States, HCV screening of prisoners varies by state with many prisons reporting risk-based HCV screening and only 35% reporting routine opt-out screening for all prisoners.[18] as recommended by the Federal Bureau of Prisons.[19] In Europe, among 25 countries surveyed for HCV screening and treatment provision within prisons, no specific HCV screening policy was reported in 16 and only five countries reported the availability of HCV treatment in all prisons.[20] This highlights the under-provision of initiatives to access this key population.

Several projects have implemented HCV testing and treatment pathways within prisons.[21–24] One approach is opt-out reception testing, which aims to identify all HCV-infected individuals entering prison and provide access to treatment and support. These approaches have been successful in prison micro-elimination strategies within a small number of prisons.[21–24] In England, opt-out BBV testing in prison at reception was agreed as policy in 2013 and has been in place in all adult prisons since 2018.[25] Despite this, in England between 2018 and 2019 only 32% of individuals were tested for HCV at prison reception and transfer.[5] Moreover, reception testing does not include residents who may not have had a BBV test at reception or whose BBV test at reception was a significant time ago.

2 | AIMS AND OBJECTIVES

The HCV-intensive test and treat (HITT) events were designed as one-off protocols to identify HCV-positive residents already in prison who were not screened at reception. The HITT initiative aimed to screen over 95% of all residents in prisons for HCV infection within a set number of days according to prison population size and to initiate treatment within 7–14 days of a positive HCV RNA diagnosis.

3 | METHODS

3.1 | Project oversight

The HITT initiative is part of an ongoing partnership between NHSE, Public Health England (PHE), Practice Plus Group (PPG), The Hepatitis C Trust, and Gilead Sciences UK as part of the 2019 NHSE HCV elimination initiative. As the HITT initiative was part of a service improvement, ethical approval was not required. Approval for individual HITT events was provided by the NHSE HCV elimination project oversight group, and the head of healthcare and the governor of each prison.

NHSE is the body that commissions healthcare in England at a national level. PHE is an executive agency sponsored by the UK Department of Health and Social Care to protect and improve health and well-being and reduce health inequalities. As of October 1, 2021, PHE was disbanded, and the UK Heath Security Agency (HSA) has taken over their role in this project. PPG is England's largest independent provider of NHS services, including healthcare for prisons. As of September 2021, PPG provided healthcare for 47 prisons in England. The Hepatitis C Trust is a UK charity that provides support and education for those affected by HCV and is a patient-led and -run organization active in all English prisons. The Hepatitis C Trust has significant experience in engaging with key stakeholders, including patients, and has had a peer network across all prisons since 2018. Gilead Sciences Ltd is a pharmaceutical company that provides

some of the DAA treatments used in England and whose Medical Scientists have significant knowledge and experience regarding the challenges of diagnosing and treating HCV patients, redesigning treatment pathways, and driving change through education. Gilead Medical Scientists participating in this project did not have any influence on DAA choice. In addition, the NHSE procurement tender structure ensures that any change in DAAs used in a setting is matched by reciprocal changes in another setting to ensure DAA use nationally aligns to the NHSE-specific market share arrangement in place with all HCV pharmaceutical industry partners.

3.2 | Development of HITT toolkit

Pilot HITT events were held at two prisons in July and October 2019. Neither HITT event achieved the testing levels required (over 95%) for HCV elimination based on NHSE criteria.[26,27] Based on key learnings obtained from the pilot HITT events, a toolkit was developed for HITT planning and delivery. The purpose of this toolkit was to provide a clear project structure, together with considerations and resources for staff working in prisons to enable them to prepare for and deliver a HITT event within their prison. The toolkit was not prescriptive and was designed as guidance for HITT events to be adapted for individual prisons. The HITT toolkit was divided into three stages: preparation, implementation, and post-event (Figure 1). The steering committee for each HITT event included members from NHSE, PHE, PPG, The Hepatitis C Trust, Gilead Sciences Ltd, and His Majesty's Prison and Probation Service (HMPPS). Engagement with HMPPS was essential to enable prisoner movement during HITT events.

3.3 | Implementation of the HITT initiative

Prisons were selected for participation in the HITT initiative based on high levels of reception BBV testing, good access to peers from The Hepatitis C Trust (HCT peers) to engage residents, and availability of operational delivery network (ODN) staff to facilitate treatment pathways to aid individual prisons to achieve the NHSE targets for HCV micro-elimination. All residents in the prison during the period of each HITT event were included. Before each HITT event, staff and residents were educated about HCV and information about the upcoming HITT event was communicated to residents and staff (Figure 1). HCT peers were already present in most prisons, but if not already present, training of two or three residents to become internal HCT peers was instigated during preparation. HCT peers provided an essential role during all HITT events to educate on HCV, promote testing to all residents, and support HCV RNA-positive residents through treatment. Implementation involved testing of all participating residents by ODN and PPG staff and initiating treatment of HCV RNA-positive residents. During the HITT initiative, HCV antibody testing changed from dry blood spot testing, which could take 2 weeks to obtain results, to a point-of-care test, which provided results within 15 min. This allowed rapid identification of individuals who required HCV PCR testing. Patient follow-up was an essential part of the post-HITT event process to engage with HCV RNA-positive residents who

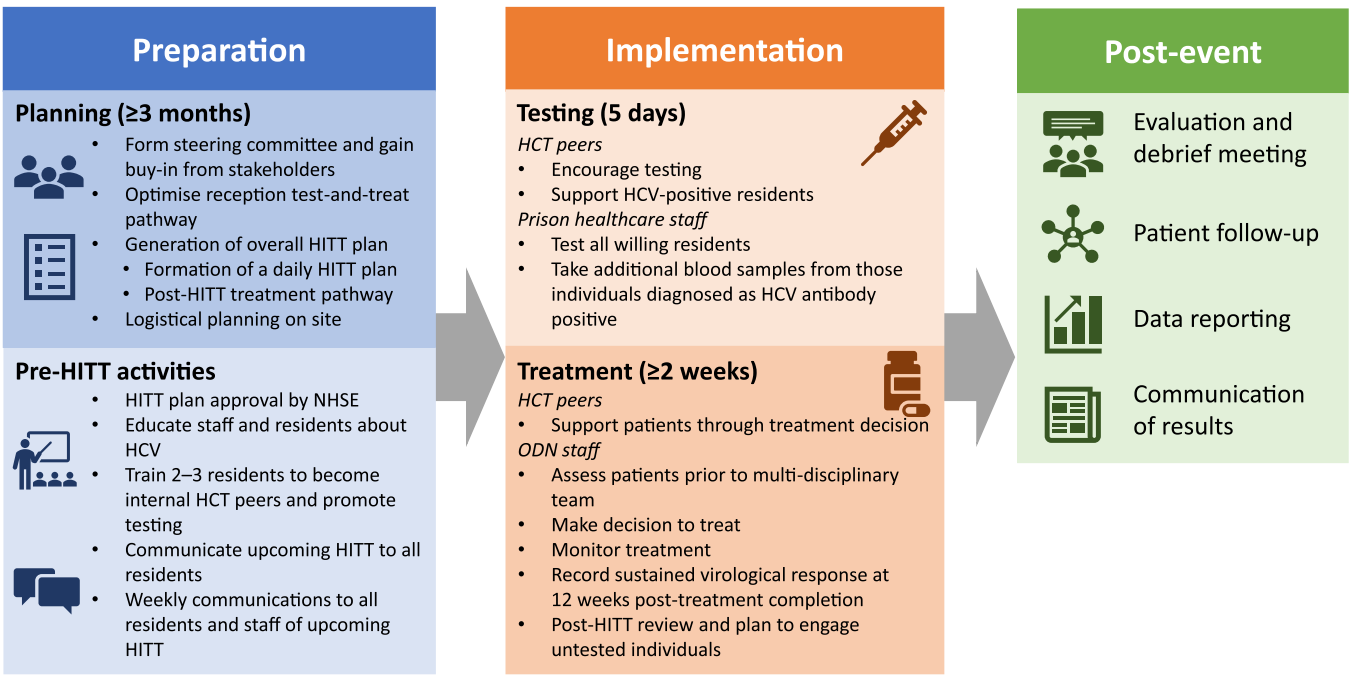

FIGURE 1 Overview of HITT toolkit. This diagram summarizes the three stages of the HITT toolkit: preparation, implementation, and post-event. HCT, The Hepatitis C Trust; HCV, hepatitis C virus; HITT, HCV-intensive test and treat; NHSE, National Health Service England; ODN, operational delivery network.

dropped out of the care pathway. If residents were released while on treatment, ODN staff and The Hepatitis C Trust were informed, and medication was given to residents to take with them. Throughout the initiative, resident screening and treatment data were recorded and accessed using the SystmOne patient records database. Paper records were also assessed where available.

4 | RESULTS

4.1 | Prisons

Thirteen prisons were included in the HITT initiative from January 2020 to September 2021 (Table 1). This included nine male prisons and four female prisons. Male prisons included five category B (remand) prisons, two category C (training) prisons, one category D (open) prison, and one young offender institute (YOI). Female prisons included three closed prisons and one open prison. The proportion of new receptions in the HITT month was lowest in open prisons (3.0% in Prison D and 6.7% in Prison G), and highest in category B (26.8%–43.7%) and female closed prisons (15.2%–30.9%).

4.2 | HCV testing and treatment initiation

Of the 8487 individuals in residence when the HITT events were performed, 95.9% ($n = 8139$) of residents underwent HCV testing (Table 2 and Figure 2). All prisons achieved an HCV testing rate of over 95% except for Prison L, which had an HCV testing rate of 87.3%. HCV antibody prevalence was 8.2% (669/8139) across all prisons. Of the 669 individuals who tested positive for HCV antibodies, 124 of these tested positive for HCV RNA (18.5%). HCV antibody prevalence was 17.8% in female prisons and 6.7% in male prisons. Thus HCV RNA prevalence was 1.5% (124/8139) across all prisons and 3.4% in female prisons and 1.2% in male prisons. HCV antibody prevalence was analyzed by prison category (Figure 3) and ranged from 18.9% in female closed prisons to 0.2% in the YOI. For HCV RNA prevalence, the highest rate was found in female closed prisons (3.7%), and no individuals had HCV RNA in category D prisons, female open prisons, and the YOI. It should be noted that one female closed prison (Prison C) had the highest HCV antibody and RNA prevalence (27.0% and 7.3%, respectively). The only YOI included in the HITT initiative had the lowest HCV antibody and RNA prevalence (0.2% and 0.0%, respectively).

Across all the prisons included in this study, the treatment initiation rate among HCV RNA-positive individuals was 79.0% (98/124; Table 2). The treatment initiation rate among HCV RNA-positive individuals was above 75% for all prisons except for Prison F (male training), where it was 38.9%. The treatment initiation rate was 91.9% in female prisons and 73.6% in male prisons. Five prisons had treatment initiation rates of 100.0%, and included Prisons C (male training), L and M (both male remand), and A and H (both female closed).

4.3 | Impact of COVID-19 pandemic on HITT events

During the HITT initiative, treatment initiation was delayed at three prisons during the first UK COVID-19 lockdown in March 2020

TABLE 1 Prisons included in the HITT initiative.

	Category	Region in England	HITT date	Total prison population in HITT month	New receptions in HITT month	Proportion of new receptions in HITT month (%)
Prison A	Female closed	Derbyshire	January 2020	327	101	30.9
Prison B	YOI	Staffordshire	February 2020	573	31	5.4
Prison C	Female closed	Yorkshire	February 2020	391	115	29.4
Prison D	Female open	Yorkshire	February 2020	101	3	3.0
Prison E	B (remand)	Oxfordshire	February 2020	1101	326	29.6
Prison F	C (training)	Devon	March 2020	697	78	11.2
Prison G	D (open)	Yorkshire	March 2020	357	24	6.7
Prison H	Female closed	Staffordshire	March 2020	277	42	15.2
Prison I	C (training)	Rutland	October 2020	1009	62	6.1
Prison J	B (remand)	Devon	May 2021	378	165	43.7
Prison K	B (remand)	Yorkshire	May 2021	1091	292	26.8
Prison L	B (remand)	London	July 2021	1155	388	33.6
Prison M	B (remand)	Worcestershire	September 2021	914	254	27.8

Abbreviations: HCV, hepatitis C virus; HITT, HCV-intensive test and treat; YOI, young offender institute.

TABLE 2 Summary of HCV testing results and treatment initiation.

	Category	Individuals available for testing[a]	Number tested	Proportion tested (%)	Number HCV Ab positive	HCV Ab prevalence (%)	Number HCV RNA positive[b]	HCV RNA prevalence (%)	Number of treatment initiations	Treatment initiation rate (%)
Prison A	Female closed	317	314	99.1	33	10.5	5	1.6	5	100
Prison B	YOI	564	564	100	1	0.2	0	0.0	0	n/a
Prison C	Female closed	381	371	97.4	100	27.0	27	7.3	24	88.9
Prison D	Female open	99	96	97.0	6	6.3	0	0.0	0	n/a
Prison E	B (remand)	1094	1060	96.9	112	10.6	27	2.5	21	77.8
Prison F	C (training)	709	680	95.9	65	9.6	18	2.6	7	38.9
Prison G	D (open)	354	341	96.3	6	1.8	0	0.0	0	n/a
Prison H	Female closed	318	315	99.1	56	17.8	5	1.6	5	100
Prison I	C (training)	1022	983	96.2	43	4.4	3	0.3	3	100
Prison J	B (remand)	425	417	98.1	37	8.9	6	1.4	5	83.3
Prison K	B (remand)	1100	1085	98.6	102	9.4	21	1.9	16	76.2
Prison L	B (remand)	1189	1038	87.3	41	3.9	5	0.5	5	100
Prison M	B (remand)	915	875	95.6	67	7.7	7	0.8	7	100
All prisons		8487	8139	95.9%	669	8.2	124	1.5	98	79.0

Abbreviations: Ab, antibody; HCV, hepatitis C virus; HITT, HCV-intensive test and treat; n/a, not applicable; YOI, young offender institute.

[a]This includes all residents of the prison during the HITT testing phase (usually 1 week). This number can be higher than the prison capacity as it includes both new arrivals and leavers during that week.

[b]Patients already on treatment were not tested for HCV RNA outside of their ongoing management.

(Prisons F, G, and H) and the HITT event in one prison was postponed (Prison I). Prison healthcare teams worked with their respective ODN staff to ensure that individuals diagnosed in HITT events before the lockdown could access treatment remotely. It should be noted that the HITT event at Prison F, which had the lowest treatment initiation rate of 38.9%, took place 2 weeks before the first COVID-19 national lockdown in England. HITT events recommenced from October 2020 and were adapted to include new COVID-19 working practices.

5 | DISCUSSION

Opt-out BBV reception testing has been implemented in all prisons in England since 2018. Although prison staff are also encouraged to offer testing to existing residents,[25] this approach does not systematically identify HCV-infected individuals already in prisons. NHSE HCV elimination criteria specify that over 95% of residents in a prison should be tested within any 12-month period.[27] The HITT initiative was designed to rapidly screen all residents within a prison for HCV infection and initiate DAA treatment within 7 days of a positive HCV RNA diagnosis. The results presented here showed that the HITT initiative satisfied the NHSE HCV elimination criteria, with over 95% of residents being tested for HCV infection and over 75% of HCV RNA-positive residents within 13 prisons in England initiating DAA treatment between January 2020 and September 2021. The screening and treatment initiation rates achieved during the current initiative compare favorably with those achieved with similar initiatives in Europe. Other HCV micro-elimination projects have successfully implemented test-and-treat strategies within small numbers of prisons,[21–24,28] with some in Europe reporting screening rates of 47%–100% and initiation of treatment in 21%–80% of patients with chronic HCV infection.[21,22,28] Taken together, the data presented here and from other studies show that the HITT initiative is a feasible protocol that could aid HCV micro-elimination in prisons worldwide which is a vital step in eliminating HCV as a public health threat. In the United States, whilst DAA therapy has been shown to be effective in prison populations,[29] less than 1% of prison residents with chronic HCV in 49 of the 50 State Departments of Correction were receiving treatment in 2015,[18] highlighting the need for effective test and treatment strategies. HCV treatment has subsequently been recommended for patients with the greatest risk of disease complications in these settings.[30] The HITT initiative was developed as part of the 2019 NHSE HCV elimination plan managed by a unique partnership between NHSE, PHE, PPG, The Hepatitis C Trust, and Gilead Sciences Ltd, and provides the opportunity for HCV micro-elimination within individual prisons.

The COVID-19 pandemic had an impact on the HITT initiative because prison HCV elimination programs were paused during the early stages of the pandemic as all prisons in England were put into lockdown in March 2020.[7,31] This resulted in exclusion of all but essential staff from prisons, confinement of residents to their cells for over 22 h a day, and a reduced number of staff due to self-isolation

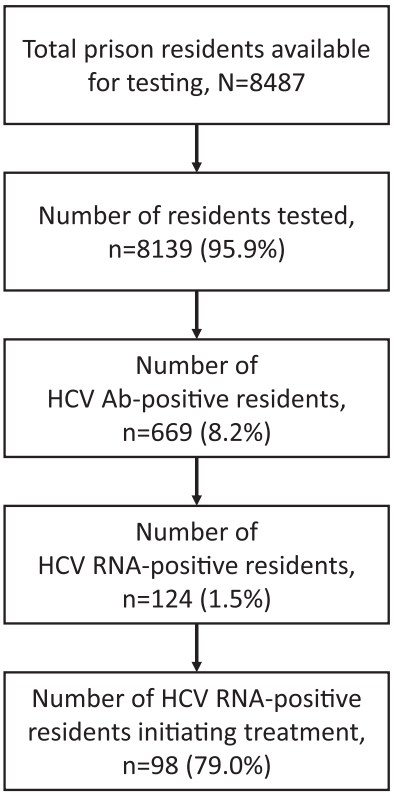

FIGURE 2 Flowchart of population included in HITT events, HCV testing results, and treatment initiations. This flowchart summarizes the total prison population included in the 13 HITT events, those who participated in HCV testing, HCV antibody and RNA testing results, and treatment initiations. Ab, antibody; HCV, hepatitis C virus; HITT, HCV-intensive test and treat.

and shielding because of health conditions. Treatment initiation for HCV RNA-positive residents was delayed during the HITT events at three prisons due to lockdown. Multiple factors were involved in this treatment delay, including delay in receiving PCR test results due to laboratories prioritizing COVID-19, and specialist hepatology nurses and HCT peers not being able to enter prisons to assess or meet with patients. Only 38.9% of HCV RNA-positive residents identified in the HITT event at Prison F initiated antiviral treatment. This and the lower screening rate compared with similar initiatives in Europe,[21–24,28] was likely due to the COVID-19 lockdown. The HITT event at Prison F was completed less than 2 weeks before the lockdown in March 2020 and HCV RNA test results were not available until after lockdown commenced due to delays in testing, which may explain the low treatment initiation rates. As only 8.4% of the total prison population in this study were residents in Prison F the public health limitations are likely to be minimal and excluding Prison F, the treatment initiation rate was 85.8% across the other 12 prisons. To our knowledge, no other studies have been published that describe a similar initiative to the one presented here in English prisons. Data from PHE showed that from January to April 2020, the number of HCV tests declined by 80% and treatment initiations declined by 68%. However, these numbers have been recovering since.[7] HITT events recommenced in October 2020 with no observed differences in rates of testing or treatment initiation compared with rates before lockdown.

A unique and essential part of the HITT initiative was the peer-to-peer support provided by The Hepatitis C Trust. Engagement between residents and HCT peers with their lived experience of HCV infection was critical to successfully engaging with residents who had

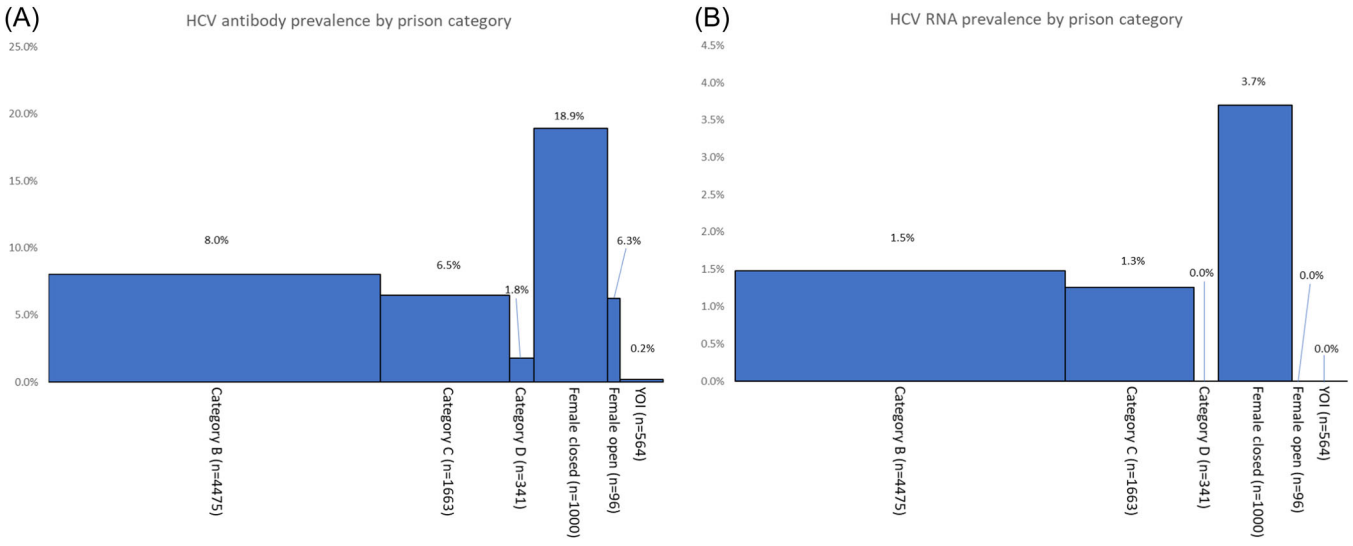

FIGURE 3 HCV antibody and RNA prevalence by prison category. Mean HCV antibody (A) and RNA (B) prevalence are shown by prison categories. Resident numbers available for testing for each prison category are shown below the bars. Five category B prisons, two category C prisons, one category D prison, three female closed prisons, one female open prison, and one YOI were included. Category B: male remand prisons; Category C: male training prisons; Category D: male open prisons. The width of each bar represents the number of prisoners tested in each category of prison as a proportion of the total number tested in the HITT events. HCV, hepatitis C virus; HITT, HCV-intensive test and treat; YOI, young offender institute.

previously refused testing. Another key advantage of the HITT initiative was the short timeframe between testing and treatment initiation (maximum 14 days), providing less chance for patient loss due to transfer. Providing DAA treatment to prison residents can be challenging due to inter-prison transfers or prisoner release in the case of short prison sentences.[32] A previous test-and-treat initiative performed in a prison in Cantabria, Spain only offered DAA treatment to HCV RNA-positive residents who were anticipated to remain in prison for longer than 30 days.[21] However, during the HITT events performed in the current initiative, DAA treatment was offered to all HCV RNA-positive residents regardless of anticipated stay. Upon prison transfer or release, plans were in place to ensure treatment continuation and HCT peers played an essential role. While the prison healthcare system was responsible for continuation of antiviral treatment upon transfer of HCV RNA-positive residents between prisons, The Hepatitis C Trust established a "Follow Me" program where HCT peers from both the initial and new prison connected so that continuous support was provided. HCT peers were also available to provide support for HCV RNA-positive residents leaving prison and link them to healthcare support within the community.

HCV antibody prevalence in the HITT initiative (8.2%) was lower than reported in a previous study of prisons in England in 2016 (18.0%).[9] Previously reported estimates of HCV antibody prevalence in English prisons were based on targeted testing rather than testing the majority of residents, indicating that targeted testing does successfully identify the highest risk groups, though it doesn't result in the diagnosis of all patients with current, or a history of, HCV infection. The antibody prevalence in this initiative was also lower than the estimated prevalence in prisons on different continents. A meta-analysis showed that the HCV antibody prevalence in prisons in Asia, America, Europe, Africa, and Australia and Oceania were 21.4%, 10.7%, 25.1%, 11.7%, and 28.4%, respectively.[33] This represents an HCV prevalence of 17.7% in prisons worldwide.[33] HCV RNA prevalence was also lower than anticipated, likely reflecting the fact that many HCV RNA-positive residents have been identified and treated through the effective reception-based screening in place in these prisons. In the HITT events, most individuals identified as HCV antibody positive were already known to prison healthcare and ODN staff, with many previously treated, currently on treatment, or having spontaneously cleared the virus. However, the HCV antibody prevalence data obtained during the HITT initiative provide accurate information for the prisons included that could be extrapolated to give a projection of numbers of HCV-infected individuals across prisons in England.

PWID are the main group infected with HCV in England and prisons have high numbers of PWID.[5,11] IDU is also associated with HCV reinfection,[34,35] which provides an additional challenge with respect to HCV elimination. HCV antibody prevalence was higher in female prisons (17.8%) compared with male prisons (6.7%) in the HITT initiative. According to data from analysis of the National Drug Treatment Monitoring System, 75% of female residents in prisons and secure settings receiving alcohol and drug treatment reported using opiates compared with 49% of male residents.[36] These data suggest that HCV prevalence in English prisons may be linked to the proportion of residents who inject drugs. Correspondingly, only 21% of YOI residents in alcohol and drug treatment reported using opiates,[36] which is reflected in the low HCV antibody prevalence (0.2%) reported in the HITT initiative. Further investigation of this potential link is warranted to determine if enhanced engagement with PWID in prisons could provide opportunity for both drug treatment, and identification and antiviral treatment of HCV-positive residents. Prison residents are often in a chaotic phase of their lives when incarcerated and prison may provide an opportunity to engage with medical care.[37] Engaging with residents has the potential to reduce HCV prevalence both in prisons and the wider community.[15]

There were some limitations to the HITT initiative, including the challenge in reaching all HCV-infected residents for antiviral treatment. Anecdotal reports provided during the HITT events stated that some resident cohorts did not engage with the HITT initiative. Resident characteristics were not recorded as part of this initiative so further information on which residents were reluctant to engage with the HITT initiative is not available. However, this issue highlights a key learning point of the importance of HCT peer diversity as some residents may not identify with an individual peer despite a similar history of incarceration. This could potentially highlight health inequalities within the prison system and provide information about which residents may need a more focused approach to facilitate engagement with HCV test-and-treat pathways. Another drawback to the HITT initiative was that these were "one-off" events. Consequently, to effectively eliminate HCV infection within individual prisons, the HITT initiative should be combined with reception testing to identify all HCV-infected individuals entering prisons. The cost of the HITT initiative was challenging to determine as no definite costs were associated with each event. To our knowledge, no cost–benefit analyses of similar initiatives have been performed in the United Kingdom, however an analysis in a remand prison in London found that improving HCV screening and linkage to care was cost-effective in this setting.[38] A cost-effectiveness analysis of the HITT initiative presented here is currently being performed and will be published separately. Business cases were approved by the NHSE HCV project oversight group before any of the HITT events. The partnership between NHSE, PHE/UK HSA, PPG, The Hepatitis C Trust, and Gilead Sciences Ltd has also implemented a reception testing pathway across all prisons with healthcare provided by PPG in England. Between May 2019 and April 2021, over 90% of new arrivals across 47 prisons were offered a BBV test during reception.[39] Combining large scale reception testing with HITT events would allow for all new arrivals, and all residents already residing in prison to be tested for HCV, and could provide a feasible strategy to eliminate HCV in prisons worldwide. This combination approach was used successfully in a Spanish prison to test 99.5% of residents resulting in HCV elimination within that institution.[21]

6 | CONCLUSION

The HITT initiative was designed to offer rapid HCV testing and treatment to all residents within prisons as part of the 2019 NHSE HCV elimination plan. The HITT initiative achieved the target of

screening over 95% of all prison residents within 5 days and initiated DAA treatment in over 75% of HCV RNA-positive residents within a maximum of 14 days in 13 prisons in England between January 2020 and September 2021. Between October 2019 and October 2021, a total of 29 HITT events took place across English prisons with healthcare provided by PPG or other providers. The HITT toolkit developed during this project provides a framework for rapid HCV testing and treatment that can be adapted for use in other prison systems in the United Kingdom and globally. The HITT initiative, in combination with reception testing, provides the opportunity for HCV micro-elimination within individual prisons.

AUTHOR CONTRIBUTIONS

Rachel Halford: Conceptualization; investigation; methodology; project administration; supervision; writing—original draft; writing—review and editing. **Lee Christensen**: Conceptualization; investigation; methodology; project administration; writing—original draft; writing—review and editing. **Sean Cox**: Conceptualization; investigation; methodology; project administration; writing—original draft; writing—review and editing. **Julia Sheehan**: Conceptualization; investigation; methodology; project administration; writing—original draft; writing—review and editing. **Iain Brew**: Conceptualization; data curation; investigation; methodology; project administration; supervision; writing—original draft; writing—review and editing. **Mark Gillyon-Powell**: Conceptualization; data curation; investigation; methodology; project administration; supervision; writing—original draft; writing—review and editing. **Georgia Threadgold**: Conceptualization; data curation; investigation; methodology; project administration; supervision; writing—original draft; writing—review and editing. **Éamonn O'Moore**: Conceptualization; writing—original draft; writing—review and editing. **Philip J. F. Troke**: Conceptualization; investigation; methodology; project administration; supervision; writing—original draft; writing—review and editing. **Andy Jones**: Conceptualization; data curation; formal analysis; investigation; methodology; project administration; supervision; writing—original draft; writing—review and editing.

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CONFLICTS OF INTEREST STATEMENT

Iain Brew has received honoraria from AbbVie, Gilead Sciences, and Janssen, and consulting fees and support for attending meetings from Gilead Sciences. Andy Jones is an employee of and owns stock in Gilead Sciences. Philip Troke was an employee of Gilead Sciences at the time of engagement in this project; he is now an employee of GSK and owns shares in both Gilead Sciences and GSK. The remaining authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Research data are not shared.

TRANSPARENCY STATEMENT

The lead author Andy Jones affirms that this manuscript is an honest, accurate, and transparent account of the initiative being reported; that no important aspects of the initiative have been omitted; and that any discrepancies from the initiative as planned (and, if relevant, registered) have been explained.

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