Hepatitis C virus point-of-care RNA testing: Experience from screening an entire high-security Australian prison population over 3 days

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Abstract

Objective: Point-of-care testing for hepatitis C virus (HCV) in high-risk populations is key to diagnosing and eliminating HCV. We aimed to test all occupants for HCV in an entire prison.

Methods: All consenting participants at the Brisbane Women's Correctional Centre were tested for HCV over 3 days using fingerstick samples. Participants with HCV were linked to care by a Nurse Practitioner experienced in HCV management.

Results: 211 of 244 participants of the prison population at the time (86%) consented and were tested. 17 participants (8%) had HCV, of who 14 commenced antiviral therapy ≤1 week of testing, 1 was later approved for antiviral therapy in consultation with a physician, and 2 due for release were followed-up and linked to care in the community. Education and counselling provided before testing was rated as very good or excellent by 47% of participants.

Conclusions: Testing occupants in a high-security prison of this size is feasible and can provide an overview of HCV infectivity. Testing combined with linkage to care will support the elimination of HCV in this high-risk population.

Implications for public health: Point-of-care testing for HCV in prisons with dedicated clinicians, resources, and partnerships, particularly at prison entry, can contribute to eliminating HCV in Australia by 2030.

Key words: hepatitis C virus, injecting drugs, point-of-care testing, prison

Introduction

The number of hepatitis C virus (HCV) cases in Australian prisons is high, with an estimated seroprevalence of approximately 20%.[1] While many of these cases are the result of high rates of incarceration of people who inject drugs, prisons themselves also represent a high risk for HCV acquisition.[2]

The Australian Government has endorsed the World Health Organization goal of eliminating HCV as a public health threat by 2030.[3] However, there are several challenges to achieving this goal in Australia, in particular inadequate testing rates of people exposed to HCV and their linkage to care.[4] In response to these challenges, consensus recommendations have emphasised the importance of a number of strategies for managing HCV in Australian prisons, including high coverage testing, scale-up of streamlined direct-acting antiviral (DAA) therapy, and implementation and evaluation of regulated provision of prison needle and syringe programs to reduce HCV infection and reinfection.[5]

The approval of GeneXpert point-of-care testing for HCV RNA in Australia has facilitated rapid, high throughput, onsite testing that can provide test results in less than 1 hour and at a lower cost than traditional phlebotomy.[6] The ability to use a finger-stick blood sample is also a great advantage as venous access can be difficult for injecting drug users.[6]

Our objective was to use point-of-care testing to screen all consenting participants at the Brisbane Women's Correctional Centre for HCV over a 3-day period and to link all participants with a positive HCV result to care.

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Methods

The Brisbane Women's Correctional Centre is a high-security female prison located in Queensland, Australia. Participants were escorted from their respective accommodation blocks, one unit at a time, to attend the HCV testing clinic. Each participant was met at the clinic by a project team member who conducted confidential pretest screening and counselling, and recorded whether they consented to, or declined, the offer of a test. The testing was conducted by in-reach staff (8 in total over the 3 days) from the West Moreton Hospital and Health Service, the Kombi Clinic and the Queensland Injectors Health Network. All in-reach staff were accredited in point-of-care testing and had a specific interest in caring for people with blood-borne viruses, particularly in vulnerable populations. One hundred microlitres of blood was collected using a Minivette point-of-care test (Sarstedt, Nümbrecht, Germany) from each consenting participant by fingerstick, transferred to an Xpert HCV VL RNA cartridge and analysed on a GeneXpert machine (Cepheid, Sunnyvale, CA, USA). If a sample error occurred during the test, the participant was called back to the clinic for re-collection. A list of new prison receptions from the previous day was used to ensure testing was offered to these participants, with the aim to screen the entire consenting population of the prison during the testing period.

Test results were relayed to participants in-person, one at a time ensuring confidentiality. At this time, brief harm reduction education was also provided to participants. All participants with a positive HCV test result were linked to follow-up for review and treatment by a Nurse Practitioner experienced in HCV management.

Prior to testing, education materials were developed by Hepatitis QLD for both custodial officers and participants. Education sessions were delivered on-site to custodial officers and included topics such as HCV transmission; long-term consequences of HCV infection; current HCV tests and treatments; long-term benefits of HCV cure; expectations of custodial officers during testing. Education sessions for participants were held the week prior to testing and included Hepatitis QLD staff walking around the prison with the guidance of the general manager, speaking to smaller groups of participants and answering questions.

Results

Testing was conducted over a 3-day period, from 15 to 17 February 2021, for 211 of a possible 244 participants (86%) located within the prison at the time. A total of 174 participants completed the anonymous pre-test demographic survey (Table 1). Of those who completed the survey, 31.6% identified as Indigenous, 59.8% reported they had injected drugs in the community and 25.3% reported they had injected drugs in the prison. Education provided the week before testing was rated as very good or excellent by 47% of participants who completed the survey.

Overall, 17 participants (8%) were found to have detectable HCV RNA in blood samples, of who 14 were reviewed and commenced antiviral therapy within 1 week of testing, 1 was approved for DAA therapy in consultation with a consulting physician, and 2 due for imminent release were followed up by the Queensland Injectors Health Network and linked to care. On further analysis of later blood pathology of the participants who did not provide consent or request testing, 17 had no serological evidence of HCV, 13 had recent positive HCV antibody screens, 10 had a recent negative HCV RNA test, and 4 had a positive HCV RNA test. Of the 4 with known HCV infections, 2 commenced DAA therapy, 1 was released from prison prior to review, and 1 was pregnant and, therefore, not eligible for DAA therapy.

Table 1: Demographics and perceptions of education provided about HCV testing

	Overall N = 174
Age	
18 to 30 years	70 (40.2)
31 to 60 years	99 (56.9)
≥61 years	1 (0.6)
Indigenous	55 (31.6)
Time in prison on this occasion	
<0.5 to 1 years	133 (76.4)
1 to 5 years	22 (12.6)
6 to ≥10 years	2 (1.1)
Had a previous HCV test	114 (65.5)
Had a positive HCV test result	34 (19.5)
Time since previous HCV test	
<0.5 to 1 years	34 (19.5)
1 to 10 years	19 (10.9)
11 to ≥20 years	4 (2.3)
Received prior treatment for HCV	25 (14.4)
Completed prior treatment for HCV	18 (10.3)
Injected drugs in the community	104 (59.8)
Length of time injecting drugs in the community	
<0.5 to 1 years	4 (2.3)
1 to 10 years	29 (16.7)
11 to ≥20 years	23 (13.2)
Injected drugs in prison	44 (25.3)
Length of time injecting drugs in prison	
<0.5 to 1 years	11 (6.3)
1 to 10 years	9 (5.2)
11 to 15 years	1 (0.6)
Perception of education provided about HCV testing	
Poor/fair	30 (17.2)
Good	44 (25.3)
Very good/excellent	82 (47.1)

Data are presented as n (%).

Discussion

We believe our project offering HCV testing to the entire consenting population of a prison over a 3-day period was the first of its kind in Australia. Our experience within a high-security prison setting shows point-of-care testing followed by prompt linkage to care and treatment of all positive cases is achievable and can support elimination goals in discrete populations at high risk for transmitting HCV (also referred to as "micro-elimination"). Our later follow-up of the participants who did not provide consent or request testing showed many were negative for HCV antibody and had negative HCV RNA tests on file, supporting the tenet that micro-elimination of HCV is possible within prsions.

Unfortunately, elimination of HCV in this setting can only be maintained with continued screening and treatment. In 2018, HCV was successfully micro-eliminated from another prison in Queensland

following a rapid scale-up of DAA therapy, only to rebound with newly acquired cases of HCV in the following year.[2] Consensus recommendations for the management of HCV in Australia's prisons endorse a number of strategies to address this challenge, including universal opt-out testing, point-of-care testing, simplified assessment protocols, and earlier confirmation of cure.[5] In particular, all newly incarcerated people should be tested for HCV as standard care unless they decline, complemented by repeat annual testing for the entire prison population.[5]

Key to the success of this project was a well-coordinated approach that included (1) access to equipment and resources; (2) a strong project team of motivated healthcare professionals experienced in point-of-care testing who could overcome logistical issues and ensure quality assurance; (3) partnerships with all stakeholders. Pre-testing preparation in the form of education also ensured buy-in from custodial officers.

While it is hoped that future micro-elimination projects could take place in other high-security prisons, it is unlikely the entire population could be tested at once due to the larger size of other prisons, in particular high-security men's prisons that may house up to 1000 people who are incarcerated. In these larger settings, micro-elimination using point-of-care testing is likely to be achievable on a unit-to-unit basis, with a focus on units such as reception and high incidence accommodation areas within those prisons.

Conclusions

The introduction of point-of-care testing for HCV has enabled us to rapidly test large numbers of people in high-risk settings. Testing the consenting population of a high-security prison of this size is feasible and can provide an overview of HCV infectivity and facilitate linkage to care, supporting the elimination of HCV in this high-risk population.

Implications for public health

Optimisation of HCV management within the prison system is critical to prevent adverse outcomes for this marginalised population living with HCV.[5] A unique public health opportunity exists within the prison setting to screen high-risk populations for blood-borne infections such as HCV and initiate prevention and treatment measures where appropriate.[1] Scale up of point-of-care testing for HCV in prisons, with dedicated clinicians, resources and partnerships, will be a crucial component of Australia's goal of eliminating HCV as a public health threat by 2030.

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Author contributions

All authors contributed to designing the project; collecting, analyzing and interpreting the data; writing the manuscript; and approved the final version of the manuscript for publication.

Ethical statement

An application for ethics approval was submitted to the West Moreton Hospital and Health Service Human Research Ethics Committee, who deemed the the point-of-care HCV test, including the anonymous pre-test demographic survey, to be a "quality improvement project" based on service innovation, rather than a research project, and advised that ethics approval was not required.

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Conflicts of interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Chris Wallis reports financial support, article publishing charges, equipment, drugs, or supplies, and writing assistance were provided by Gilead Sciences Pty Ltd. Chris Wallis reports equipment, drugs, or supplies was provided by Cepheid. Chris Wallis reports a relationship with Gilead Sciences Pty Ltd that includes: consulting or advisory. Mim O'Flynn reports a relationship with Gilead Sciences Pty Ltd that includes: consulting or advisory and funding grants. Mary Fenech reports a relationship with Gilead Sciences Pty Ltd that includes: speaking and lecture fees. Dorrit Grimstrup has no relationships, activities or interests to disclose.

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