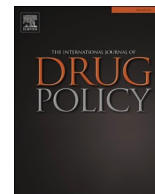


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## International Journal of Drug Policy

journal homepage: [www.elsevier.com/locate/drugpo](https://www.elsevier.com/locate/drugpo)

## Research Paper

## Challenges and facilitators in repeated bio-behavioural surveys for blood-borne virus infections in Australian prisons

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## ARTICLE INFO

## Keywords:

Prison  
Surveillance  
Facilitators  
People who inject drugs  
Blood borne viruses  
Hepatitis C

## ABSTRACT

**Background:** Prison-based blood-borne virus (BBV) surveillance is essential for evaluation of prevention and treatment programs for high-risk populations, such as people who inject drugs who are over-represented amongst those incarcerated. Regular triennial surveillance has been in place in Australian prisons for almost two decades, but has been focused to date only on new prison entrants. Recently, the Australian Hepatitis and risk survey in prisons (AusHep study) was established to provide improved surveillance via an expanded bio-behavioural survey representative of all people in prison, including those sentenced and those on remand. This paper aims to identify the challenges and facilitators in conducting bio-behavioural surveys for BBV infections in prison settings.

**Methods:** Randomly selected individuals in 23 prisons, representative of prisons and people in prison (male/female, security classification, rural location, Aboriginal or Torres Strait Islander), were offered point-of-care testing for HIV and hepatitis C (HCV) antibodies, hepatitis B virus surface (HBs) antigen, and HCV RNA (if HCV antibody positive). Data regarding risk behaviours, harm reduction measures, and prior BBV testing and treatment were collected by interview. Data was also collected on the challenges and facilitators encountered during planning and implementation at each participating prison.

**Results:** In the first round, AusHep recruited 1599 participants (98 % participation, 89 % male, median age 35 years, 49 % ever injected drugs). Major implementation challenges included: slow and complex ethics and governance requirements in each jurisdiction, and challenging logistical arrangements and participant access constraints in the prisons. Major facilitators included use of point-of-care testing allowing immediate feedback of results, strong support from jurisdictional stakeholders in correction and public health sectors, flexibility in the timing and detailed planning for each site, and computer tablet-based data collection.

**Conclusion:** The high participation and informative findings indicated clear feasibility of this improved surveillance system. Strong stakeholder engagement and flexibility in logistics facilitated successful implementation of multi-jurisdictional prison-based surveillance.

## Introduction

An estimated 11.5 million individuals worldwide were incarcerated during 2022 (Penal Reform International, 2022). In a majority of countries, people who inject drugs are over-represented in prisons, with about 20 % of people in prison globally being incarcerated for drug-law offenses (Penal Reform International, 2022), while an estimated 58 % of

people who inject drugs have an incarceration history (Degenhardt et al., 2023). However, it is important to note not all people in prison for drug law offence are using drugs and not all those in prisons with drug problems are in prison for drug law offence. Along with the high prevalence of injecting drug use amongst those in custodial settings (Cunningham et al., 2018; Degenhardt et al., 2019), people in prison have a high prevalence of blood-borne virus (BBV) infections, including

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<sup>1</sup> Members of the AusHep study group are listed in Acknowledgements.

<https://doi.org/10.1016/j.drugpo.2024.104401>

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hepatitis C (HCV), hepatitis B (HBV), and HIV. In 2014, an estimated 1, 547,000, 492,000 and 389,000 individuals incarcerated worldwide were living with HCV, HBV, and HIV, respectively (Dolan et al., 2016).

The Australian prison sector has an estimated 43,000 individuals that are incarcerated across 111 prisons, with approximately 92 % being male, and 30 % identifying as Aboriginal or Torres Strait Islander (Australian Institute of Health & Welfare, 2022). In 2022, 37 % of people in prisons were on 'remand' (Australian Bureau of Statistics, 2022), which refers to individuals who have been charged with a crime but not yet convicted, hence awaiting trial or sentencing. Of the 111 prisons in Australia, one is Federally run and 110 are state-run, including eight of which are contracted to private operators, and approximately 35 % are located in rural or remote regional areas (Australian Institute of Health & Welfare, 2021).

Models of BBV screening and clinical care in Australian prisons vary between, and within states and territories, ranging from general practitioner (GP) or specialist-led tertiary hospital style clinics (Lloyd et al., 2013), to decentralized and accessible nurse-led services. There is a general mandate, through jurisdiction policies, that correctional facilities should offer BBV testing to all new prison entrants across the country in response to the large number of people entering prisons on drug-related and or drug dependence offenses (Australasian Society of HIV, 2013; Simpson et al., 2023; Sullivan et al., 2021; Winter et al., 2023). Although some jurisdictions only offer risk-based screening, evidence from systematic reviews suggest that BBV testing uptake will increase significantly if universal opt-out programs are implemented especially in high risk settings such as prisons (Grebely et al., 2017).

Given high prevalence of BBV in prisons, people who are incarcerated are a priority population for BBV testing and treatment (The World Health Organisation, 2022), while prison-based BBV surveillance is essential for evaluation of prevention and treatment programs. Many challenging factors at the system, organizational, and individual levels have been reported as impediments to prison-based research, and surveillance studies such as ethical concerns about prison-based research, logistical and security concerns for access to participants and sample collection, and making a trustful relationship with people in prison and other stakeholders (Liem & Kunst, 2013; Pascoe et al., 2022; Ross & Tewksbury, 2018; Simpson et al., 2017). In Australia, the major source of national BBV surveillance data from the prisons has been the National Prison Entrants' Blood Borne Virus Survey (NPEBBVS), a triennial bio-behavioural survey conducted in 2004, 2007, 2010, 2013, and 2016 (Butler & Simpson, 2017). The NPEBBVS recruited consecutive individuals entering the prisons over a two-week period. In 2016, the survey enrolled 431 participants across 19 correctional centres in six jurisdictions, with an overall participant response of 50 % (Butler & Simpson, 2017).

The Australian Hepatitis and risk survey in prisons (AusHep) is a new prison BBV surveillance system aiming to address limitations in sampling and data collection methods, ensuring adequate jurisdictional representation of participants, capturing data regarding prison-based BBV testing and treatment uptake, and improving the response rate. Here, we describe the methodologies and participant characteristics of the AusHep study and the NPEBBVS. We present a detailed account of challenging and enabling factors identified during the implementation of the AusHep study.

## Methods

The key methodological characteristics of the NPEBBVS and AusHep studies are summarised in Table 1. Further methodological details of the NPEBBVS have been reported previously (Butler & Simpson, 2017).

### National prison entrants' blood borne virus survey

**Study design and setting:** The NPEBBVS was a triennial cross-sectional bio-behavioral survey, conducted in 'reception centres',

**Table 1**

Characteristics of participants and methodology of the NPEBBVS and AusHep studies.

	AusHep (2022-23)	NPEBBVS (2016)
Number of prison sites	23	18
Number of jurisdictions	6	6
Australian prison population in participating jurisdictions	83 %	51 %
Number of participants	1599	431
Participation proportion	98 %	50 %
Median age (years)	35	33
Male	89 %	87 %
Aboriginal and/or Torres Strait Islander	49 %	35 %
Ever injected drugs	49 %	46 %
Study design	(Proposed) annual cross-sectional bio-behavioral survey	Triennial cross-sectional bio-behavioural survey
Study setting	Representative prisons	Reception prisons
Participant recruitment	Randomly selected	Consecutive prison entrants over a two-week period
Study procedures	Electronic tablet-based survey; oral fluid and blood tests	Paper-based survey; blood and urine tests.
Sample collection and testing methods	Oral fluid and fingerstick whole blood samples collected for point-of-care testing	Venepuncture whole blood and urine samples collected and sent to various laboratories
Laboratory tests	HIV Ab HBs Ag HCV Ab (HCV RNA if HCV Ab positive)	HIV Ab and antigen HBs Ag, HBs Ab, HbC Ab HCV Ab Treponema pallidum Ab Chlamydia trachomatis DNA Neisseria gonorrhoea DNA
Provision of results	Immediate	Delayed (1–2 weeks)

which are correctional facilities which receive and house individuals newly incarcerated from the community. In 2016, the study was conducted in 19 reception centres enrolling 431 individuals from six of eight Australian jurisdictions, including the Australian Capital Territory, Northern Territory, Queensland, South Australia, Tasmania, and Victoria. Two large states, including New South Wales and Western Australia, collectively housing 49 % of the people in prison in Australia in 2016, were not included (one conducted a separate survey).

**Study participants:** Consecutive new receptions (i.e., individuals entering prison from the community) over a two-week period were invited to participate. Individuals transferred from other prisons or returning from the courts were not included. Participation was voluntary, with no incentives or reimbursement provided.

**Study procedures:** All participants provided written consent. They completed a paper-based questionnaire, including questions about demographics, body piercing/tattooing, drug use (including injecting drug use inside or outside prison), detailed injecting risk behaviors, uptake of harm reduction measures, sexual activity, alcohol and tobacco use, previous HIV and HCV testing and treatment, and vaccination against HBV and Human Papillomavirus (HPV). Participants also provided a blood sample collected via venepuncture which was sent to central laboratories for testing for HIV antibody (HIV Ab) and antigen, HBV surface antigen (HBs Ag), HBV surface antibody (HBs Ab), HBV core antibody (HbC Ab), HCV antibody (HCV Ab), and Treponema pallidum (syphilis) antibody. Urine samples were also taken for Chlamydia trachomatis DNA and Neisseria gonorrhoea DNA testing. Different serological and molecular assays were used by the various laboratories, as

reported previously (Butler & Simpson, 2017). All participants were provided with pre-test counselling. When the results became available (1–2 weeks after testing), post-test counselling was also provided wherever possible, and for those requiring further clinical care a referral to relevant prison-based health services was initiated.

#### *Australian hepatitis and risk survey in prisons*

**Study design and setting:** The AusHep study was designed as an annual cross-sectional bio-behavioural survey of representative incarcerated populations in each jurisdiction, providing serial point-estimates of HCV, HBV and HIV prevalence, risk behaviours, and uptake of harm reduction, as well as participation in each step of the care cascade for these infections. The first round was conducted in 2022–23 (April 2022 to June 2023) in 23 correctional centres from six jurisdictions, including New South Wales, Northern Territory, Queensland, South Australia, Tasmania, and Western Australia. Two jurisdictions (Victoria and Australian Capital Territory), collectively housing 17 % of people in prison in Australia, were not included due to logistical (senior staff turnover) or governance (lack of political will) issues. In Northern Territory and Tasmania, at least half of the prisons were chosen. In the larger jurisdictions (New South Wales, Queensland, South Australia, Western Australia), at least one quarter of the prisons were chosen based on a selection strategy which included consideration of the available logistics and infrastructure in each prison whilst ensuring representation of all prison security classifications (minimum, medium, maximum), remoteness of location, female prisons, and prisons with large Aboriginal or Torres Strait Islander populations.

**Study participants:** All people in prison, including those on remand and those who had been sentenced, were eligible for inclusion. Individuals were randomly selected, using computer-generated random numbers and the list of all people present in the prison, and then invited to participate. Participation was voluntary and selected individuals who were unwilling to participate were replaced by another randomly selected individual. Selected participants were mostly willing to participate in the study, and were agreeable to provide study consent, complete the interview, and undertake the point of care tests. The sample size was calculated with the primary aim of estimating HCV prevalence at the jurisdiction-level with 5 % precision and 95 % confidence, using the principles of simple random sampling ( $n = 1592$ ). For jurisdictions with more than one study prison site, the sample size in each prison was calculated proportional to the population of that centre.

**Study procedures:** All participants provided written consent and were able to withdraw consent at any time during the study. To best account for low literacy, the bio-behavioural survey was conducted by interview with trained study nurses, using computer tablet-based data collection. The interview included questions about demographics, body piercing/tattooing, drug use (including injecting drug use), detailed injecting risk behaviors, uptake of harm reduction measures, sexual activity, previous HIV, HBV, and HCV testing and treatment, and vaccination against HBV. Participants also provided oral fluid and fingerstick whole blood samples for point-of-care testing for HIV Ab, HBsAg, HCV Ab and HCV RNA. No urine samples were collected.

HCV Ab testing was performed using OraQuick® HCV Rapid Antibody Test with oral fluid samples (OraSure Technologies, USA). Oral fluid samples were collected by the trained nurses via an oral swab (time to result is 20 min) (Kimble et al., 2019). Participants with a positive HCV Ab oral fluid test were immediately offered point-of-care HCV RNA viral load testing with a fingerstick whole blood sample collected into a 100 µL minivette collection tube. The sample was placed directly into a Xpert® HCV Viral Load Fingerstick test (Cepheid, USA; lower limit of quantification of 100 IU/mL) using a GeneXpert R2 6-colour, four module machine (Cepheid, USA) operated by the study nurses (time to result is 60 min). The Xpert® HCV Viral Load Fingerstick test has very high sensitivity and specificity (Catlett et al., 2022; Lamoury et al., 2018).

HBsAg testing was performed using Alere Determine™ II HBsAg test (Alere International, Ireland) with fingerstick whole blood samples (1–2 drops of blood per test, time to result is 20 min). This rapid diagnostic test is a visually-read, lateral flow, solid state immunoassay with very high sensitivity and specificity (World Health Organisation, 2019).

HIV Ab testing was performed using the OraQuick Advance® Rapid HIV-1/2 Antibody Test (Orasure Technologies, USA) with oral fluid samples. Oral fluid samples were collected by the study nurses via an oral swab (time to result is 20 min) (Guillon et al., 2018).

Participants who had one indeterminate test result had a repeat test and only the final result was recorded. Participants who had more than one repeat indeterminate test result were referred to the prison health services for further diagnostic testing. All participants received pre-test and post-test counselling. During post-test counselling, the meaning of the results was explained to participants, including if further assessments were required. Participants also received a summary of the results of their negative BBV tests on a tailored patient advice card, either at the end of their study visit or via a mail-drop to their cell the day after testing. All positive results were communicated verbally, in person. Participants who received a positive test result and required further clinical care were referred to the prison health services.

**Challenges and facilitators:** During data collection at each participating prison, a research nurse collated data on challenges and facilitators experienced during implementation of the AusHep study. After completion of the study, these data were reviewed by the research team and categorised into five domains:

- a) Access to inmates – referring to how readily accessible the selected participants were for participation in the study during normal business hours. This domain specifically considered how many participants per day were assessed by the research nurses. For example, a list of 8–12 randomly selected participants was given to the officer in charge by the research nurse at the start of the day. The actual number of participants seen was then compared to the requested number.
- b) Organisational support (Corrective Services) – referring to the level of active support provided by custodial staff with the overall implementation of the study. In this context, it was considered important to develop and maintain a positive relationship with the various correctional staff on duty during the conduct of the study as they were responsible for the safety of the research nurses, and for ensuring that all research tasks were completed in a timely manner. This domain was assessed in relation to the nurses' rating of how flexible custodial staff were in accommodating requests or advice from, or provision of support to the research team, which in turn helped the research nurses efficiently navigate the prison system
- c) Dedicated officer to transfer inmates – defined as the proportion of the time a dedicated corrective services officer was available to transfer selected inmates from their cell or wing to the research venue for participation in the study
- d) Organisational support (Health Services) – referring to the level of active facilitation of the implementation of the study by the health care staff, both on the ground staff and high level organizational justice health administrators. This included ensuring that timely and appropriate referrals to the health service could be made on behalf of study participants, and facilitating access for the research nurses to navigate participants' medical records that were available either in hard copy (files), or electronically.
- e) Space for interviewing and testing – referring to provision of suitable space(s) to the research nurses, including a room with a desk and two chairs, and a power point source for the GeneXpert machine.

All five domains were scored by consensus amongst the research team using a grading scale that ranged from –3 to +3, namely: very good (+3), moderately good (+2), good (+1), poor (–1), moderately poor (–2), very poor (–3). More details about the grading scales, including

the definition of each score are provided in Supplementary Figure 1. To evaluate the acceptability of point of care BBV testing, the questionnaire included a question asking participants how acceptable they found each of oral fluid and fingerstick tests, with four choices including definitely acceptable, somewhat acceptable, neither acceptable or not acceptable, and not at all acceptable.

**Human research ethics approvals:** Ethics approval was initially obtained from the University of New South Wales (UNSW) Human Research Ethics Committees (HREC) (HC190778).

In New South Wales, ethics approvals were obtained from Justice Health and Forensic Mental Health Network (Justice Health NSW, 2019/ETH13823); Aboriginal Health and Medical Research Council (AH&MRC, 1643/20); and Corrective Services New South Wales (CSNSW, D21/0583450). In Tasmania, the University of Tasmania (UTAS, 23824) provided HREC approval. In Queensland, the ACT HREC approval (2020/ETH00024) was used under the National Mutual Acceptance scheme which covers research studies conducted in all Queensland Offender services, in addition to approval from Queensland Corrective Services (QCS, QCS/02797-2021). In South Australia, Central Adelaide Local Health Network (CALHN, 21SAPHS0341) ratified ACT Health HREC; Aboriginal Health Research Ethics Committee (AHREC, 04-21-923); and South Australia Department of Corrective Services (SA DCS,CEN/20/1538). In the Northern Territory (NT), ethics approvals were obtained from Central Australia HREC (CAHREC, CA-20-3866); Menzies School of Health Research (2020-3655); and Northern Territory Corrective Services (NTCS, HC190778) provided in-principle support. In Western Australia (WA), ethics approvals were obtained from Western Australian Aboriginal Health Ethics Committee (WAAHEC, 991); and WA Research Applications and Advisory Committee - Department of justice (DoJ, 468).

**Results**

*Study participants*

Characteristics of participants in the 2016 NPEBBVS and the AusHep studies are summarized in Table 1. A total of 431 and 1599 individuals were enrolled in NPEBBVS and AusHep, respectively, with a higher

participation in AusHep (98 %), compared to NPEBBVS (50 %). Although six of eight jurisdictions participated in each of the studies, the prisons in the jurisdictions that participated in NPEBBVS housed 51 % of people in the Australian prisons, while those participating in AusHep housed 83 %. The distribution of age and gender of participants were comparable between two studies, while AusHep included a higher representation of Aboriginal or Torres Strait Islander people.

*AusHep study challenges and facilitators*

Fig. 1 illustrates the variation in key domain measures across prisons and jurisdictions. Of 23 prison sites, access to inmates was considered good to very good in 18 prisons, and the organisational support from the correctional service was good to very good for 16 prisons. In one jurisdiction that had eight participating prisons, a dedicated officer was not available due to state-wide correctional staff shortages. However, among the other jurisdictions (14 prisons), at least one dedicated officer was available in 13 prisons for the duration of the study. The organisational support from the health services was considered good to very good for 19 prisons sites, and the space provided for interviewing and testing was good to very good 23 prisons.

The challenges and facilitators for the conduct of the AusHep study were also considered a three-level framework, including system, organisational, and personal levels.

*System level*

The multi-layered processes of applying for and gaining human research ethics and governance approvals (the latter includes legal and other jurisdictional risk assessments) was a major challenge, and took over 40 months to obtain all approvals. The AusHep study was conducted across multiple Australian jurisdictions, with each state or territory having multiple separate research ethical review processes mandated, ranging from two to four distinct application and approval processes per jurisdiction. In most jurisdictions, these applications had to be undertaken sequentially, as one approval was dependent on another body's approval and none mutually recognising the other's decisions. Figs. 2a and 2b illustrate the time (in months) taken from the

Key challenges and facilitators across prisons and jurisdictions

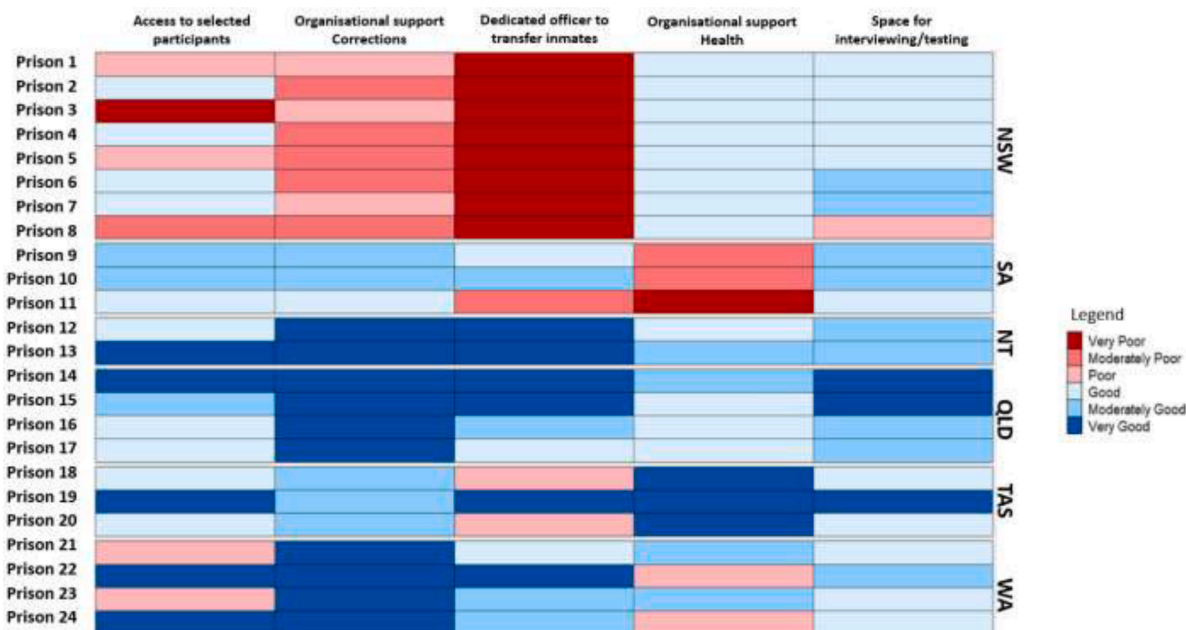
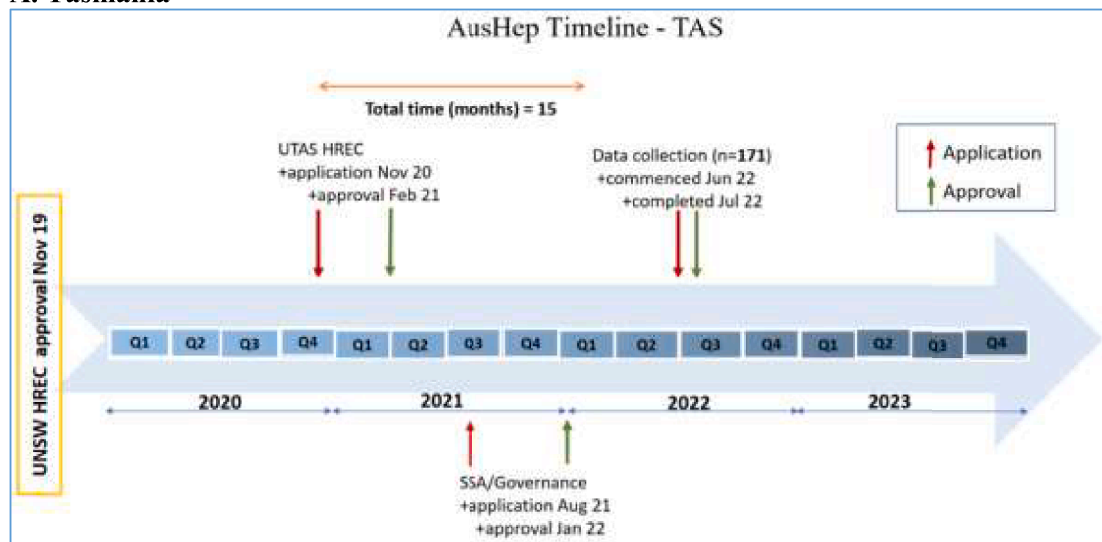


Fig. 1. Key challenges and facilitators across prisons and jurisdictions.

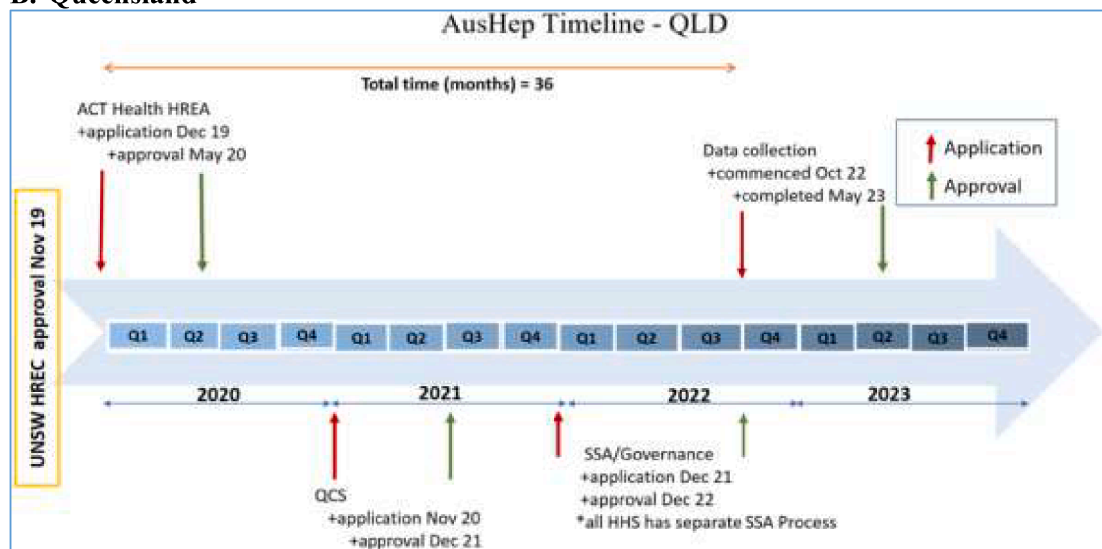
## Timeline for ethics and governance approvals in selected jurisdictions

## A. Tasmania



UNSW HREC: University of New South Wales Human Research Ethics Committee – primary approving body; UTAS: University of Tasmania – reviews all health research that occur in Tasmania; SSA: Site specific assessment – organisational specific assessment of the research study; TAS: Tasmania

## B. Queensland



UNSW HREC: University of New South Wales Human Research Ethics Committee – primary approving body; ACT HREA: Australian Capital Territory Human Research Ethics Application – provides the national mutual acceptance scheme that allows the acceptance of a single ethics review by multiple public health organisations; QCS: Queensland Corrective Services – runs the state prisons and evaluates research that occur in every corrective service in Queensland; SSA: Site specific assessment – organisational specific assessment of the research study; HHS: Hospital and Health Service – statutory bodies (health) that cover certain geographical region in Queensland; QLD: Queensland

Fig. 2. Timeline for ethics and governance approvals in selected jurisdictions.

initial ethics application and approval to final governance approval in two jurisdictions (chosen as examples), with other jurisdictions were presented in Supplementary Figure 2. The time taken to obtain all required approval ranged from 15 (least time taken) to 36 months (most time taken) across jurisdictions. The total time taken from submission of the first application to receipt of the last approval was 40 months. Due to this, we had to implement sequentially (as approvals came through) and it extended the overall study timeline. The duration of conducting the

study varied across prison sites, ranging from two weeks to eight weeks.

To ensure representativeness of all Australian prisons and people living in prisons, rural and remote regional prisons were also selected for inclusion in the study. Sites were selected collaboratively between research team and jurisdictional contacts. There were 12 prisons selected which were classified as 'regional', and 3 prisons selected that were 'remote/very remote'. For example, one of the prisons selected to participate in the study is classified as a 'very remote' area prison, and is

located 40 km east of the township of Karratha, and approximately 1570 km north of Perth in Western Australia (Western Australian Government, 2023). The distance required to travel between these prisons imposed many logistical challenges including time constraints involved with travel, and transportation of the research team along with point of care testing machines and consumables to these remote locations.

During this initial round of the AusHep study, national coverage (i.e., all states and territories) was not obtained as Victoria and Australian Capital Territory did not participate, due to concurrent turnover in key senior personnel within the justice health organisation in one jurisdiction, and changeover in health service contract as well as internal turmoil in the other jurisdiction during the planning and implementation phases.

People living in prisons often have a low education level, and also often have language barriers, and low health literacy levels (Kripalani et al., 2008). As such, having a computer tablet-based survey administered by a trained research nurse in an interview/conversation style to ask and record responses to questions ensured that high fidelity data were gathered in a timely fashion (Baggio et al., 2022), and was indeed a facilitator for good data collection for the study. Given security concern/restrictions associated with bringing electronic devices into prisons, the tablet computers were suitably deactivated (limited applications, Wi-Fi disabled, and no SIM card) and authorisation from each prison centre to allow the device to be approved for entry into the centre was obtained. Further, as access to the internet was strictly controlled whilst on the prison grounds, the research nurses had to upload the data saved on the online study database (ReDCap) once they left the prisons. This was undertaken after every shift to limit chances of losing data.

#### Organization level

There were 23 individual prison centres which participated in the first round of the AusHep study. As the prisons are environments in which security and safety are paramount (rather than health research), the study team sought to identify key stakeholders in both corrections and health organisations within each centre as research partners. These included the: prison ‘governor’ (or general manager of the corrective service) and the operational or security manager; as well as the justice health service director, nursing unit manager, and local medical officer. These individuals were each approached, informed of the study, and subsequently engaged in the conduct of the study as appropriate. This was achieved through several channels such as via emails, phone calls, and online meetings, to discuss the operational needs and impacts of the study.

This process of identifying key stakeholders in each prison to help the research team navigate the varied systems to facilitate access to participants was also time consuming. However, once this was achieved, the input of the key stakeholders was key to the smooth conduct of the study. For example, once the prison operations manager was informed of the study, and saw the overall merits of the research, they were uniformly willing to accommodate the research team and ensure appropriate spaces and logistical support were provided. Generally, the organisational support for the study by the health team, and the correction team in individual prisons was considered good to very good in most prisons (Fig. 1). The prisons in most jurisdictions provided adequate space and logistical support required for the interviewing and testing. Most jurisdictions were also able to provide a dedicated officer to transfer participants for the study. There were some jurisdictions and individual prisons which could not provide a dedicated officer to transfer participants due to local staff shortages (e.g., high proportion of staff were off sick).

#### Participant level

People in prison were generally found to be very willing to participate in the study including to provide study consent, complete the

interview, and undertake the point of care tests (98 % participation). It was evident that the use of point of care tests, which was only offered to study participants, was an important facilitator for engagement of people in prison in the study. Among 1599 study participants, the oral fluid-based and fingerstick point of care tests were considered ‘definitely acceptable’ by 98.1 % ( $n = 1568$ ) and 97.9 % ( $n = 1565$ ), respectively (Fig. 3)

Overall, participants reported to the study nurses that they found the point of care testing was very simple and acceptable. In particular, they appreciated that they were not required to have venipuncture performed for BBV testing, which some considered to be quite challenging as they had limited venous access. The participants also commented on the benefit of receiving their test results ‘on the spot’ as well as being given a paper copy of their results on an ‘advice card’, with some participants reporting that traditional BBV test results could often take up to three weeks to be fed back to them, and sometimes they would not receive test results at all.

As much of the data collected was based on ‘self-report’, it was important that participants had adequate levels of knowledge to respond accurately. The general health literacy of some participants was found to be quite low, and in some cases extremely limited. To address this, the research nurses spent extra time explaining to low literacy participants the meaning of the health issue being studied and what information was being asked of them. With appropriate informed consent, the AusHep study also collected corroborative data from participants’ medical records, including pathology testing results.

#### Discussion

In this manuscript, we described the methodology of the AusHep study and NPEBBVS and provided a detailed evaluation of the challenges and facilitators for conducting prison-based bio-behavioural surveys. The AusHep study is unique internationally (Busschots et al., 2021; Peña-Orellana et al., 2011; Rumble et al., 2015; Wirtz et al., 2018), as it was purposively designed to monitor national trends in BBV testing and treatment uptake in the prison setting, including having a representative and randomly selected study population and reliable jurisdiction-level data to accurately capture BBV prevalence along with risk behaviour data. The data generated by the AusHep study, as a prison-based BBV surveillance system, will not only help in understanding the BBV prevalence but also will inform targeted screening programs, facilitate early detection and treatment, and support the development of interventions to improve BBV clinical care in prisons. Prison-based surveillance of infectious diseases, particularly BBV is crucial from a public health perspective to mitigate the risk of disease transmission within correctional facilities and beyond. Prisons, in most countries, can serve as breeding grounds for infectious outbreaks given close quarters and limited healthcare resources. Monitoring and controlling diseases in this setting not only protect the incarcerated population but also prevent the spread of infections to staff and the broader community upon release. Effective surveillance enables early detection, prompt intervention, and the implementation of preventive measures (Tavoschi et al., 2019).

The point of care testing methods in this study utilised oral fluid and fingerstick blood samples to provide efficient on-the-spot BBV testing results, which met the surveillance objectives of the study and overcome traditional testing methods, ensured rapid feedback to participants, and facilitated access to services for further assessment and treatment. Our study indicated that point of care testing can be used in prison-based studies effectively given that it was almost universally well accepted by our study participants, as indicated by both the high participation for the study, and the high reported acceptability for the testing methods. Similar point of care testing methods for BBV infections have been demonstrated to have significant benefits in increasing the uptake of testing in the prisons, as it offers several desired elements such as reliability, timeliness, accessibility, and cost-effectiveness (Grebely et al.,

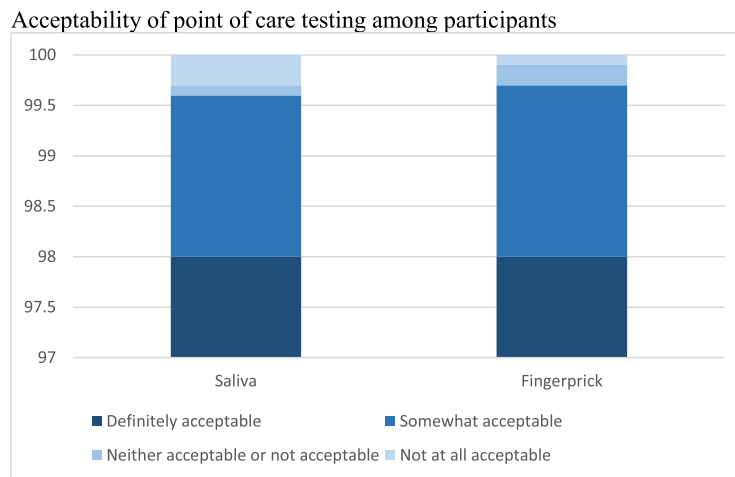


Fig. 3. Acceptability of point of care testing among participants.

2020); and are considered acceptable by people living in prisons (Lafferty et al., 2023). Point of care testing can be used more broadly for BBV research among people who inject drugs, given the evidence demonstrating its effectiveness in testing and treatment uptake in other settings (Grebely et al., 2023).

The AusHep study faced considerable delays and challenges in gaining multiple ethical and governance approvals in each jurisdiction across the country with no mutual recognition both within and between jurisdictions of other committees' decisions. The protracted ethics approval process required for prisoner and offender health research has important implications for funding, research staff morale, research staff retention, the development of new studies, evidence generation, and the efficient implementation of research in the justice setting. More recently, there has been growing support for the argument that involvement of people in prisons in research should be prioritised as they carry a disproportionate burden of conditions which are the topic of the research – well exemplified by BBV infections (McLeod & Martin, 2018). The Nelson Mandela Rules (United Nations Standard Minimum Rules for the Treatment of Prisoners) (McCall-Smith, 2016), mandate that all individuals living in prisons have the right to the same standard of health care that is available to the wider community, which also includes health research participation (Charles et al., 2016). Although it is important to involve people living in prison in relevant research activities, it is equally important to recognise that their rights, privacy and confidentiality should always be maintained, and that they are not coerced into participating in research, reflecting their diminished personal autonomy in this setting (Simpson et al., 2021). Similarly, it is argued that key issues to consider when conducting research in prison population is their level of literacy and mental health state (Dalen & Jones, 2010). To address these concerns, the AusHep study provided clear explanation of the aims of the study and obtained written consent prior to enrolment, including information about privacy, confidentiality, and the participants' rights. The research nurses ensured that all participants were tested and interviewed in a private space, without a correctional officer in the room or within earshot.

Many of the challenges and facilitators described in this paper are common to research in prison settings in many countries, and should be considered by researchers intending to conduct prison-based studies. At the organisational level, collaboration with correctional and health staff, both at the organisational level and on the ground staff, has been established as one of the key measures to ensure that health research amongst incarcerated populations occurs smoothly (Apa et al., 2012; Pascoe et al., 2022). Correctional staff are considered 'the gatekeepers' in prison settings (Pascoe et al., 2022), responsible for supervising all movements within the prison environment and having a notional mandate to either 'encourage' or 'discourage' the involvement of people

living in prison in research activities (Apa et al., 2012). As such, it is imperative that positive relationships are established with corrections staff prior to and during research activities, and there is adequate staff available to assist with the research.

It is widely established that prison settings present very challenging working environments, and inadequate staffing levels are consistently evident across most prisons due to the challenging nature of the work (Dennard et al., 2021). For the successful roll-out of the AusHep study, the active involvement of corrections staff was crucial, and ensured the safety of both the study nurse and the participants, as well as efficient movement of participants from their cells to the research nurse. On the other hand, when there was inadequate staff available at a facility, movements of participants ceased, and research activities were effectively halted.

Some limitations should be acknowledged for this study. First, data collected on the challenges and facilitators for the implementation of this study were collected by the study nurses who were directly involved in conducting the study. An independent research may have decreased the risk of bias in assessments of the challenges and facilitators. The AusHep study was conducted right after COVID-19 pandemic, during which time many healthcare resources were redirected to address the surge in COVID-19 cases, with many healthcare facilities temporarily suspended and classed as non-essential services. This could have impacted routine screenings, testing, and follow-up care for BBV in some prisons. Also, data on previous testing and treatment for HCV, HBV, HIV as well as information on risk behaviours, sexual behaviours and harm reduction uptake were obtained through self-reporting, which might have been impacted by recall bias or under-reported. Testing for sexually transmitted infections was not included in the AusHep study due to limited funding.

## Conclusion

The AusHep study was successful in recruiting a representative study population and collecting required data to estimate the BBV prevalence as well as testing and treatment uptake in the Australian prison setting. Surveillance for BBV and other infectious diseases in prisons allows for early detection and treatment, which subsequently disrupts the transmission amongst people living in prisons, and between people living in prisons and the community. Ongoing annual BBV surveillance in the Australian prisons and other countries will underpin the key role this sector plays in national elimination efforts for HCV and HBV. To be able to successfully implement multi-jurisdictional prison-based surveillance, it is important to allocate sufficient time and resources to obtain ethics and governance approvals, seek to have a strong stakeholder engagement, and allow flexibility in time and logistics required to

implement the survey.

### CRedit authorship contribution statement

**Rugi Bah:** Writing – original draft, Project administration, Investigation. **Yumi Sheehan:** Writing – review & editing, Project administration. **Xiaoying Li:** Project administration. **Nicola Price:** Investigation. **Tony Butler:** Writing – review & editing. **Gregory J Dore:** Writing – review & editing. **Jason Grebely:** Writing – review & editing. **Andrew R. Lloyd:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Conceptualization. **Behzad Hajarizadeh:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Conceptualization.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. BIGGSP 08-APR-2024 10:59 'none'

### Acknowledgements

The Kirby Institute and AusHep study are funded by the Australian Government's Department of Health and Ageing. BH, GJD and JG are supported by NHMRC Investigator Grants. ARL is supported by an NHMRC Practitioner Fellowship. RB is supported by the Australian government research training scholarship.

The Authors thank all participants who took part in the AusHep study. The AusHep study group includes: Andrew Lloyd, Behzad Hajarizadeh, Yumi Sheehan, Rugi Bah, Charlotte Li, Marianne Byrne, Tony Butler, Bridget Musarurwa, Elmira Hooshmand, Annabeth Simpson, Meya Alrayyani, Jason Grebely, Greg Dore (The Kirby Institute); Nikki Price and Melissa Groom (Ascott). We gratefully acknowledge the support we received from all our collaborators, nationally:

New South Wales - Colette McGrath, Tracey Brown (Justice Health NSW); Luke Grant (CSNSW); Tasmania - Deb Siddall, Barry Nicholson, David Onu (Correctional Primary Health Service), Ian Thomas (Tasmania Prison Service); South Australia: Andrew Wiley, Tom Turnbull, Dan Pronk, Adam Spicer (SAPHS), Tom Rees (South Australia Health), John Strachan (DCS); Queensland - Graham Kraak, Robert Kemp (Queensland Health), Jenny Bell (QCS); Western Australia - Joy Rowland, Holly Beasley, Peter Illich (Dept of Justice); Northern Territory- Priscilla Moore, Dy Kelaart (Northern Territory Health), Bill Carroll, David Gordon (NTCS); Victoria - Teri van Geelen, Helen Meyer-Tinning (Justice Health); Australian Capital Territory - Cameron Edgell, Alex Misev, Katerina Lagios (Justice Health ACT). We also thank all of the on-the-ground staff at the participating sites, including the general managers/governors, nursing staff, and correctional staff.

### Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.drugpo.2024.104401](https://doi.org/10.1016/j.drugpo.2024.104401).

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