

A complex increase in hepatitis C virus in a correctional facility: bumps in the road

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In 2018, there was successful micro-elimination of hepatitis C virus (HCV) in a Queensland Correctional Facility (QCF) population following rapid scale-up of direct-acting antiviral (DAA) therapy for men with chronic HCV infection.¹ While the prevalence of HCV at that time decreased significantly from 12.6% to 1.1% within a 22-month period, this was not sustained, with an increase in newly acquired cases of HCV in mid-2019.

The QCF concerned is a high-security men's prison with facilities to accommodate around 1,000 men. Approximately 70% of these men identify as Aboriginal and/or Torres Strait Islander.² The increase in cases was initially detected at the same time as an increase in injection-site abscesses was observed in the incarcerated population. These abscesses were unusual in that culture revealed commensals usually found in the mouth rather than the skin.

The overall HCV prevalence in Australian prisons is 30%, however, this rises to 60% among men who inject drugs.³ The *National Prison Entrants Blood Borne Virus Survey* provides the prevalence of injecting drug use estimates among those entering prison. In Queensland 2013, 52% of entrants reported injecting drug use, giving the state the highest prevalence in Australia.⁴ HCV is often transmitted through the sharing of paraphernalia used for injecting drugs and there is a demonstrated positive correlation between imprisonment, people who inject drugs (PWID) and HCV.⁵ The risk from these activities is amplified in prisons because

Abstract

Objective: The prevalence of hepatitis C virus (HCV) in correctional facilities in Australia among people who inject drugs is 60%, with disproportionate effects observed in Aboriginal and Torres Strait Islander people. Following the micro-elimination of HCV in a Queensland correctional facility (QCF), newly acquired cases began to increase in mid-2019. Here we discuss the public health response to increasing HCV in a QCF.

Methods: Enhanced surveillance was performed to obtain contextual outbreak data on risk factors including injecting drug use, sharing of personal hygiene equipment and do-it-yourself-tattooing.

Results: In the sixteen months, there were 250 notifications of new and re-infected HCV infections in prisoners in the QCF. Qualitative data revealed the leading factor in transmission to be injecting drug use.

Conclusions: Drivers for increased HCV transmission in correctional facilities include boredom, waiting lists for opioid substitution programs, changes in injecting behaviours and sharing of injecting paraphernalia. Point-of-care testing combined with education and the development of a needle and syringe program may be promising ways forward for managing HCV in correctional facilities.

Implications for public health: Correctional facilities are key locations to target sexually transmitted infection (STI) and blood-borne virus (BBV) testing and treatment as well as health promotion to improve the health of inmates and the communities they return to.

Key words: hepatitis C, prison, Aboriginal and Torres Strait Islander, injecting drugs

inmates often share injecting and personal hygiene equipment with multiple other men.⁶ Sexual transmission is uncommon outside of co-infection with HIV.⁷

As a population group, Aboriginal and Torres Strait Islander peoples are more likely to be incarcerated than non-Indigenous people⁸ and in 2020 made up 29% of all people in prison⁹ (2,434 per 100,000 vs. 160 per 100,000 people, respectively).¹⁰

Aboriginal and Torres Strait Islander people are also disproportionately affected by HCV,

making up just 3% of the population but 11% of all hepatitis C notifications.¹¹ This is likely to be multifactorial in cause and related to the social determinants of health, including over-incarceration, poverty, social marginalisation, substance misuse and low health literacy.¹²

New DAA therapy became available on the Australian Pharmaceutical Benefits Scheme (PBS) in March 2016. DAA agents target multiple steps in the HCV replication lifecycle, are highly effective and safe, and have a short treatment duration.¹³ These medications

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have an average cure rate of >90%¹⁴ and are therefore an important factor in achieving HCV cure and possible future elimination.

Despite the potential efficacy of curative antiviral treatment, HCV remains a significant public health problem in Australia and the economic costs of treating the burden of this disease are significant, with a current cost of \$37,000 per treatment course.¹⁵

In this paper, we examine the events that contributed to the re-emergence of HCV in a QCF within a year of micro-elimination. We will outline the public health response that we are undertaking, however, as the response is ongoing, it is not possible to determine its success at the time of writing.

Methods

An interagency Incident Management Team (IMT) was established to respond to the increase in notifications and support the endeavours of an existing stakeholder working group. These groups included representation from public health services, sexual health services, specialist liver services, Queensland Correctional Services, the correctional facility health services, and Alcohol, Tobacco and Other Drugs services. Following IMT formation, enhanced surveillance forms were developed to obtain contextual outbreak data on risk factors including injecting drug use, sharing of personal hygiene equipment and do-it-yourself tattooing. These forms were completed by a visiting clinician accompanied by an Aboriginal and Torres Strait Islander Health Worker. Men who met the case definition and consented to the enhanced surveillance were interviewed and

anonymised data were recorded and retained in a password-protected system within Queensland Health.

Outbreak case definition

An outbreak case definition was developed: *Any newly acquired or reinfected case of HCV detected at the QCF since June 1st 2019*. This required a negative test on entry and then a subsequent positive case while incarcerated at the prison.

Testing and treating

On entry to the QCF, all men are offered an HCV antibody test as part of a standard health check. For the outbreak response, the existing testing and treatment protocol was reviewed, and the algorithm was subsequently updated (see Figure 1). If there is a positive antibody test on file, HCV RNA and HCV genotype tests are ordered. Further tests are ordered for HCV RNA, HCV genotype, full biochemistry panel (chem20), Full Blood Count and STIs/BBVs (HIV, syphilis, hepatitis A, hepatitis B, (sAb, sAg, cAb), and swabs (if indicated, urine PCR for chlamydia and gonorrhoea).

If a person is HCV antibody positive, they have been exposed to HCV. They may have acute or chronic ongoing infection or previously treated infection or be in a minority of patients who naturally cleared the infection without intervention.¹⁶ For positive cases in the QCF, an appointment is made with the Liver Clinic Outreach Team (LCOT) for follow-up and treatment decisions. Men who test positive for HCV are advised that there is treatment available (DAA) in the prison that cures 98% of people, with other treatments available for the remaining 2%.¹⁷ Multiple and consecutive treatments are possible for

those who are reinfected. People in prison are vaccinated for hepatitis A and B if they are not immune.

The LCOT also assisted in upskilling the local prison health service to provide HCV screening and treatment, resulting in improved timely access to treatment. Local prescribing within the prison assisted in greatly ramping up treatment numbers and reducing wait times to start treatment.

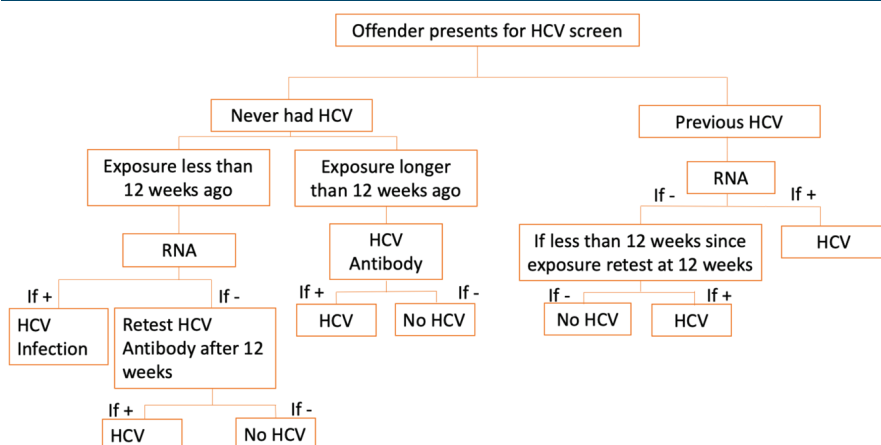
The test of cure is a Sustained Virological Response (SVR; HCV RNA, Chem20) 12-weeks post-treatment. If a person has cirrhosis of the liver, they will require lifelong six-monthly reviews and ultrasound monitoring to check for hepatocellular carcinoma.

Education and health promotion

A need for education and health promotion was identified for prison staff, health service staff and people in prison. A team was created as a subunit from the IMT to oversee the response for education and health promotion. Following consultation with Aboriginal and Torres Strait Islander Health Workers, it was decided that yarning with the prison population would be the best way to informally begin an educational process. This approach contributes to a culturally safe and respectful process and empowers Aboriginal and Torres Strait Islander individuals to engage in self-determined decision making, partnership and collaboration in their healthcare.¹⁸

A public health alert was developed for general practitioners and medical officers describing the recent increase in notifications of HCV associated with residence in correctional facilities. The alert encouraged clinicians to increase opportunistic testing to avert spread in the community.

Figure 1: Prisoner HCV screening algorithm.



Results

In the 16 months from the onset of the outbreak in June 2019, there were 193 new notifications of HCV infection in prisoners in the QCF. This is more than three times the number of notifications received in the 16-month period prior to the outbreak (n=56; Figure 2). In addition to the 193 newly notified cases, 57 people who had previously demonstrated clearance of HCV were reinfected, bringing the total number of cases since the beginning of the outbreak to 250.

Notifications peaked in October 2019 and decreased in the first six months of 2020 but

remained three times the monthly average rate observed in the six months prior to the outbreak (11.3 vs. 3.6).

Demographic characteristics of cases

In the outbreak period, 69% of notifications were in Aboriginal and Torres Strait Islander people, compared with 44% in the 16 months prior to the outbreak. When reinfections are included, 60% of all HCV infections were in Aboriginal and Torres Strait Islander prisoners and 20% in non-Indigenous prisoners. Aboriginal and Torres Strait Islander status was not available for 20% of HCV cases.

Fifty-eight per cent of infections were in prisoners aged 20–29 years (Figure 3), with a median age at onset of 25 years for Aboriginal and Torres Strait Islander prisoners (range 18–50) and 30 years for non-Indigenous prisoners (range 18–61).

Enhanced surveillance

Qualitative data from 21 enhanced surveillance interviews revealed the leading factor in transmission to be injecting drug use (n=18), with men sharing needles (n=14) and other equipment with, reportedly, up to 50 other men. Interviewees attributed their drug use largely to boredom and lack of access to opiate substitute programs. Additionally, many men reported that inexperienced drug users had been commencing injecting drug use for the first time in prison without understanding safe injecting practices.

Other risk factors identified in interviews were do-it-yourself tattooing and sharing of razor blades and toothbrushes – these, however, were rare incidences.

Education

Efforts to educate the people in prison about the risks of contracting HCV were initiated, but these were stalled owing to prison lockdowns for the COVID-19 pandemic. Efforts to gain access to the prison for education are ongoing at the time of writing (December 2020).

Discussion

Following the near elimination of HCV in the QCF in 2018, notifications in 2019 began to increase. Notifications peaked in October 2019 and then decreased but remained higher than the pre-outbreak baseline. It is possible this decrease is artefactual owing to the COVID-19 pandemic, or it is possible

Figure 2: Hepatitis C notifications in the QCF, 1 January 2018 to 30 September 2020.

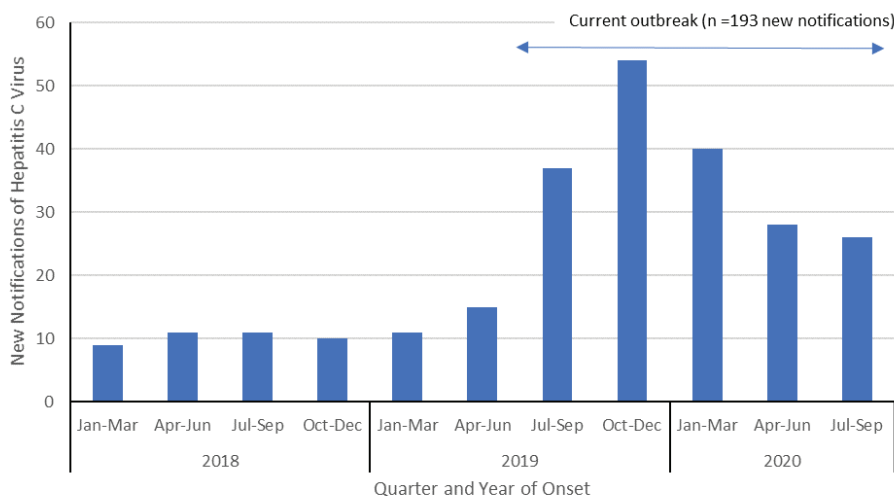
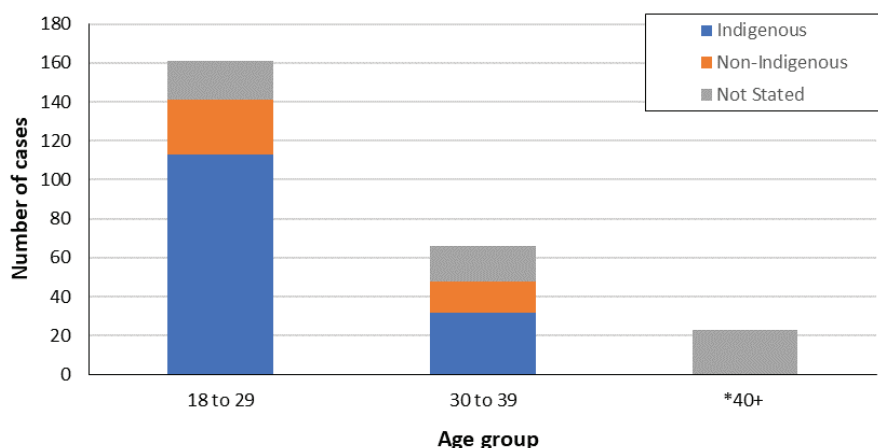


Figure 3: Hepatitis C cases in the QCF, by age group and Aboriginal and Torres Strait Islander status, 1 June 2019 to 30 September 2020.



*Note: 40+ age group has been combined due to small numbers.

that effective management of positive cases led to the reduction (but not elimination) or transmission. Regardless, a significant increase of cases following the previous micro-elimination prompted a public health response, which remains ongoing at time of writing.

While most Aboriginal and Torres Strait Islander people do not use drugs, the proportion who use illicit substances is higher than in non-Indigenous people.¹⁹ A recent cross-sectional study demonstrated that injecting drug use is uncommon in Aboriginal and Torres Strait Islander peoples; just 3% of a survey of almost 3,000 people. This is similar to the results of surveys conducted in 1994.²⁰ The Australian Institute of Health and Welfare 2018-19 survey indicated that 28.3% of Aboriginal and Torres Strait Islander

people had used illicit substances in the previous twelve months, however, cannabis was the most commonly used, with other drugs, including injectable drugs, accounting for less than 10%.²¹ Compared with non-Indigenous Australians, Aboriginal and Torres Strait Islander peoples are more likely to start injecting at an early age, to share injecting equipment and to test positive for HCV.²²

Boredom in the correctional facility is associated with increased injecting drug use

Enhanced surveillance interviews with prisoners highlighted a few potential causes for the increase in notifications, including waiting lists for the opioid substitution program, boredom owing to the cessation of activity programs within the institution and

new injecting commencing in prison with increased sharing of injecting paraphernalia.

Entrants to the QCF are tested for HCV and treated if required, however, interviews with people in prison revealed that many are commencing injecting behaviour within the QCF and therefore transmission is occurring mostly within the prison. This correlates with interview reports that many people are injecting for the first time in the prison setting. This is important information for targeting education and health promotion programs as people enter the prison.

Interviews revealed that many HCV positive people in prison reported injecting drugs to alleviate a sense of boredom. Boredom has been associated with substance use in other correctional facilities, Woodall et al. (2011) interviewed English prisoners, learning that drugs were often used as an “escape” to counteract monotony. Additionally, the endeavour of prisoners to find funds for their drug use was reported to give a “sense of purpose”.²³ Cuts to the prison activity programs may have enhanced a sense of boredom and need for “escapism” among the people in prison, leading to increased injecting drug use, equipment-sharing and HCV transmission. Violence in prisons is also associated with increased risk of HCV transmission, including blood contact during fighting and drivers such as drug debts and social conflicts.²⁴ Additionally, prisoners reported long waiting lists to participate in the opiate substitution program, leading to reported feelings of hopelessness and continued addiction behaviours.²⁵

Increased injecting drug use may be an unintended consequence of tobacco control policies

Another potential contributing factor related to boredom may be the ban on tobacco within Australian corrective services.²⁶ Tobacco smoking has long been accepted as an integral part of prison life and culture, serving often as a form of currency, social control, stress relief and a symbol of freedom.²⁷ Tobacco control policies have successfully reduced smoking rates to less than 20% in the general Australian population and banning smoking in prisons has led to decreased smoking rates and exposure to second-hand smoke within incarcerated populations in Australia.²⁸ It is important to note that banning and quitting are not the same and there is little evidence that smoking bans reduce smoking-rates long-term in

those populations.²⁸ Tobacco prohibition in correctional facilities may have unintended consequences, including: the creation of a black market for cigarettes, increased prisoner stress, aggressive behaviour,²⁸ misuse of nicotine replacement patches and smoking of plastics and rubbers.²⁹

Needle and syringe programs may be an effective public health intervention to address injecting drug use in correctional facilities

Sharing injecting equipment is the greatest risk for HCV transmission.³⁰ One study has demonstrated a per-sharing event probability of HCV transmission in injecting drug use to be 0.57% (95%CI 0.32-1.05%).³⁰ Studies have suggested that when using injecting drugs, needle sharing is more prevalent in Aboriginal and Torres Strait Islander people than within the non-Indigenous population.^{10,31} The culture of sharing may go some way to explain this,³¹ however, within custodial settings, evidence suggests that a lack of access to needle and syringe programs (NSPs) is likely to be a contributing factor.

NSPs involve providing ‘sharps’ bins for safe disposal of injecting paraphernalia and provision of clean and sterile injecting materials.³² In community settings, NSPs have been shown to decrease needle sharing rates from 70–90% to 17% and reduce HIV prevalence in injecting drug users to <1%.³³ NSPs are highly cost-effective compared with the costs of treating BBVs such as HIV.³⁴ From 2000 to 2009, NSPs in the Australian Capital Territory resulted in a net cost saving of AUD \$2.6m and more than 2,000 disability-adjusted life years.³⁴ Despite good outcomes and cost-effectiveness, NSPs are currently not available in custodial settings, where the prevalence of injecting drug use is higher and the risk of sharing equipment is greater.³²

Prison NSPs are effective harm-reduction strategies and in the few places they have been successfully implemented (Switzerland, Germany, Spain, Kyrgyzstan, Belarus and Moldova)³⁷ there has been no increase in injecting drug use or general drug consumption and no increased risk to the safety of prison employees or other prisoners.³⁸ Meta-analysis demonstrated that the introduction of NSPs increased safety for both prison staff and other prisoners. Evaluation of prison NSPs in Europe (2001) has revealed favourable outcomes, with drug use stabilised or decreased and no further cases of HIV or hepatitis reported following

the introduction of a program.³⁶ Harm-reduction strategies such as NSPs are highly effective at reducing rates of HCV.³² Despite this, NSPs are available in only 60 prisons out of >10,000 worldwide.³²

As per the United Nations (UN), prisoners, despite incarceration, should retain the same human rights to healthcare as non-prisoners.³⁵ The UN also lists NSPs at the top of their list for evidence-based prevention of BBVs and prison NSPs are among the list of 15 approaches to reducing BBVs in correctional facilities.³⁹ While NSPs are widely available across the community and are a major contributor to Australia’s low transmission rates for a range of BBVs, the introduction of this program continues to be rejected by prisons across Australia. This has meant that while HCV treatment is available and effective, re-infection post-treatment within the prison environment is a growing concern.⁴⁰

Conclusion and recommendations

HCV infection remains problematic within correctional facilities in Australia and near elimination is no guarantee that the prevalence will remain low, despite the availability of curative treatments.

Drivers for increased HCV notifications in correctional facilities include boredom, waiting lists for opioid substitution programs, changes in injecting behaviours (commencing injecting drug use on entering prison) and sharing of injecting paraphernalia. NSPs are an effective method of reducing the transmission of HCV and other BBVs, however, few correctional facilities find this acceptable. If NSPs are utilised alongside strong education and testing and treatment programs and delivered in a culturally safe manner, the prevalence of HCV in the prison settings may remain low or even be eliminated.

The authors made the following recommendations to address the HCV outbreak in the QCF during the study period:

- Commencement of a point-of-care testing program for all current prisoners in the facility, with prompt serological testing and treatment for all positive tests
- Provision of education and hygiene products for improved injecting practices within the facility

- Development of an acceptable NSP to reduce transmission within the prison should be considered. This would potentially complement the enhanced testing and treatment and reduce re-infection rates.

Implications for public health

Correctional facilities are key locations to target STI and BBV testing and treatment programs as well as health promotion to improve the health of inmates and the communities they return to. We highlight the need for culturally appropriate programs to ensure engagement and uptake by people in prison. We also urge further discussion surrounding controversial but important harm reduction methods such as the use of bleach and needle and syringe programs in correctional facilities.

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