

## Review

# HIV in prison: what are the risks and what can be done?

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**ABSTRACT.** Prisons are recognised worldwide as important sites for transmission of blood-borne viruses (BBVs). There are two reasons why transmission risks in prison are higher than in the community. First, in most western countries, many prison entrants have histories of injecting drug use, and thus already have high prevalences of BBVs. Second, the lack or under-supply of preventive measures (such as clean needle and syringes or condoms) in most prisons, combined with extreme social conditions, creates extra opportunities for BBV transmission. HIV prevalence in prisoners in more developed countries ranges from 0.2% in Australia to over 10% in some European nations. There are case reports of HIV being transmitted by sharing injecting equipment and sexual activity. Tattooing has been reported as a risk factor for the transmission of BBVs in prison. Access to condoms and needle and syringe programmes in prisons is extremely limited, despite success when they have been introduced. The vast majority of prison inmates are incarcerated for only a few months before returning to the community — thus they are, over the long term, more appropriately regarded as ‘citizens’ than ‘prisoners’. Public health policy must involve all sections of the community, including prison inmates, if we are to reduce transmission of HIV and other BBVs.

*Additional keywords:* blood-borne viruses, injecting drugs, sexual transmission.

## Introduction

Prisons are recognised worldwide as important sites for transmission of HIV, hepatitis B virus (HBV) and hepatitis C virus (HCV). There are two reasons why transmission risks in prison are higher than in the community. First, in Australia and many other western countries, many prison entrants have histories of injecting drug use (IDU), and thus already have high prevalences of blood-borne viruses (BBVs). Second, the lack or under-supply of preventive measures (such as clean needle and syringes or condoms) in most prisons, combined with extreme social conditions and consequent prisoner behaviour, creates extra opportunities for BBV transmission. Viruses like HIV can be transmitted sexually, through sharing injecting drug equipment, by non-sterile tattooing, and transmission of blood or bodily substances during assaults, all of which occur inside prisons.<sup>1</sup>

In this article, we review research on the prevalence of HIV in prisoners and prison entrants and describe in detail the

behaviours that place prisoners at risk of HIV infection. We also discuss interventions that may reduce HIV transmission within prisons.

## Prisoners in Australia and overseas

The prisoner population of Australia increased from 15 559 at 30 June 1992 to 22 492 at 30 June 2002. The 45% increase in prisoners during this period greatly exceeded the 15% growth in the Australian adult population, resulting in the adult imprisonment rate increasing from 118 to 148 prisoners per 100 000 adult population.<sup>2</sup> Several studies have estimated that over 60% of prisoners are incarcerated for drug-related (mostly heroin-related) offences.<sup>3,4</sup> Most Australian prisoners have a history of IDU, and many continue or resume IDU in prison (*ibid*). High rates of IDU background in prisoners have been observed elsewhere in the world – 20% in France,<sup>5</sup> 30% in the USA (60% of women in federal custody in the USA are serving sentences for drug offences).<sup>6–8</sup>

### Prevalence of HIV in prisoners

Numerous studies worldwide have shown that HIV prevalence is higher in prisons than the community (Table 1). The estimated prevalence of HIV in Australia at the end of 2001 was 0.066%<sup>9</sup> compared with 0.2% in prisoners throughout Australia, and 0.4% and 0.3% in NSW and Victoria respectively. The majority of HIV-positive prisoners had been diagnosed at a previous prison entry, but 36% were newly diagnosed at reception. It is worth noting that in the early 1990s 76% of Australian prisoners were tested, but this had decreased ( $P < 0.001$ ) to 67% by 1997.<sup>10</sup> In Victoria, the percentage of prisoners tested for HIV on reception to prison in 2002 was 30%, down from 64% in 1997 and 98% in 1991 (Department of Human Services, Victoria, pers. comm).<sup>10</sup>

The prevalence of HIV in prisoners elsewhere in the world varies widely; it was 4% in IDUs and 1% in non-IDUs in a 1996–97 study involving six European prisons (France, Germany, Italy, The Netherlands, Scotland and Sweden), and 13.1% among female prisoners in Marseilles in the early 1990s.<sup>5,11,12</sup> A cross-sectional study involving over 1000 inmates of nine Irish prisons in 1998 reported an HIV prevalence of 2% (CI 1.3%, 3%); those who reported a history of anal sex were eight times as likely to be HIV positive, and those who reported IDU three times as likely, as prisoners who did not report such histories.<sup>13</sup> A 1999 study of Irish prisoners reported the prevalence of HIV was 2% in 607 prison entrants (CI 1%, 4%) but the prevalence of HIV in prisoners who had never previously been incarcerated was 0%.<sup>14</sup> Two Canadian studies reported the prevalence of HIV in prisoners to be 2–3%.<sup>15,16</sup>

Among Western countries, the USA seems to have the greatest disparity between HIV/AIDS rates in prisoners and the general population. In the mid-1990s, AIDS prevalence in inmates was 199 per 100 000 (0.199%) compared with 31 per 100 000 (0.031%) in the USA's general population.<sup>16,17</sup> The overall rate of confirmed AIDS among the prison population (0.52%) was ~four times the rate in the general population (0.13%).<sup>18</sup> In 2000, 24 044 (2.2%) state prison inmates and 1014 (0.7%) USA federal inmates were known to be infected with HIV. The rate of HIV amongst females was higher than for males (3.4% v. 2.1%), which reflects the much high percentage of female prisoners with a history of drug and alcohol dependence.<sup>18–20</sup>

### Transmission of HIV in prison

One of the world's first cases of HIV transmission in prison occurred in New South Wales, when a prisoner incarcerated continuously since 1980 tested negative in 1987 and positive several years later.<sup>21</sup> Cases of HIV transmission in prison have been reported in Scotland among prisoners who shared injecting equipment.<sup>22</sup> In the early 1980s, a retrospective study of records for over 5000 prisoners in a southern state of the USA found that 5.2% of prisoners were HIV-positive;

0.63% were adjudged to have acquired their HIV in prison, and some, but not conclusive, evidence for acquisition in prison existed for many others. Almost 50% of prisoners who contracted HIV in prison reported male-to-male sex (MSM) in prison, 18% reported injecting drugs in prison, and 15% reported both behaviours.<sup>23</sup>

A study conducted in Nevada in 1990 followed 1069 prisoners who tested HIV negative on entrance to prison. Two prisoners became HIV positive during their period of incarceration during 1207 person-years of observation — 1 seroconversion per 604 years, or an annual incidence rate of 0.17% (23,24). Other studies in USA prisons have reported annual incidences of 0.41% and 0.3%.<sup>23</sup> These studies were limited in that they did not allow for an HIV incubation period at the preliminary test, thus overestimating HIV incidence.<sup>23</sup> Conversely, it has been postulated that many more cases of HIV transmission in prison occur than are recognised as such, because it is impossible to confirm that transmission occurred within prison in many cases.<sup>25</sup> In Thailand, which has a significant HIV epidemic among IDUs and a huge and overcrowded prison system, the virus is rampant among prisoners. Thaisri *et al.* measured an incidence of 4.2% per annum among 689 Bangkok Central Prison inmates in 2001–02, and 11.1% among the 351 inmates with a history of IDU.<sup>26</sup>

### Risk factors for HIV transmission in prison

#### *Injecting drug use*

The HIV transmission risks associated with IDU in Australian prisons appear to be at least as great as in the community; while individuals inject less frequently in prison, they are much more likely to use previously used injecting equipment. A 1993 study examining risk behaviours in NSW prisons reported that 68% of prisoners had ever injected in prison, 26% had injected and 20% had shared in the prison in which they were surveyed.<sup>27</sup> A later NSW study described similar prevalence of IDU in prison, and found that more than 60% of inmates who reported injecting in prison had shared needles.<sup>28</sup> A recent study conducted in Victorian correctional facilities showed that prisoners with a history of IDU injected less frequently, but less safely, while imprisoned; they were less likely to use a clean needle and syringe and they were more likely to share equipment with other people than when out of prison.<sup>4</sup>

Studies from many other countries have described prevalences of drug injection in prison and sharing of needles and other equipment.<sup>15,29</sup> A cross-sectional study of six European prisons (France, German, Italy, The Netherlands, Scotland and Sweden) conducted in 1996–97 reported that 27% of the study participants had ever injected drugs and 13% had done so in prison.<sup>12</sup> Similar prevalences of injecting in Irish, Greek, USA and Russian prisons have been reported.<sup>13,30–32</sup>

**Table 1. Prevalence of HIV in prisoners (on entry or during their incarceration)**

Location	Year	Study method	Status of prisoners	Number (%) HIV +ve	Confidence interval
France <sup>11</sup>	1992	Cross sectional	Incarcerated	39/356 (10.9%)	7.7% – 14.2%
France, Germany, Italy, Scotland, The Netherlands, Sweden <sup>12</sup>	1996 1997	Cross sectional	Incarcerated	15/817 (1.8%) (saliva sample)	
Australia <sup>10</sup>	1991–1997	Cross sectional	Reception	378/222 925 (0.2%)	
Ireland – 9 prisons <sup>13</sup>	1998	Cross sectional	Committed	24/1193 (2%)	1.3% – 3%
Ireland – 5 prisons <sup>14</sup>	1999	Cross sectional	Entrants	12/596 (2%)	1% – 4%
USA – state prisons from a southern state <sup>23</sup>	Early 1980	Retrospective cohort	Incarcerated	33/5265 (0.63%)	
USA – California <sup>20</sup>	1994	Cross sectional	Entrants	3.1%	
			624 Female	2.4%	
			4140 Male		
USA – California <sup>20</sup>	1999	Cross sectional	Entrants	1.7%	
			719 Female	1.4%	
			4876 Male		

Studies of Thai prisoners have linked HIV infection with imprisonment.<sup>33–36</sup> A study conducted in Marseilles found that among 68 inmates who injected outside prison in the previous year, nine injected within the first 3 months of being in prison; four had shared injecting equipment and one was HIV positive.<sup>5</sup> These data suggest prison entrants can establish connections, commence using drugs and expose themselves to HIV transmission risks very rapidly. Other research has linked injecting behaviour in prison with BBV infection. A study of German IDUs demonstrated that HIV infection was strongly associated with borrowing injecting equipment in prison, as did studies conducted in the USA.<sup>37,38</sup> Likewise, Buavirat *et al.*'s case-control study of Thai convicts showed sharing needles while in holding cells prior to incarceration significantly increased HIV infection risk.<sup>33</sup>

### Sexual activity

Sexual activity in some prisons is sufficiently frequent and prevalent to support outbreaks of syphilis and hepatitis B.<sup>39,40</sup> Published estimates of the proportion of prisoners who engage in homosexual sex vary from 2% to 90%;<sup>23,41</sup> most studies report sexual activity at the lower end of this range. A 1993 Australian study found that 4% of prisoners had anal intercourse while in prison.<sup>27</sup> Six per cent of Canadian prisoners surveyed in the mid-1990s reported sex with another inmate, and 4% did not use a condom;<sup>42</sup> the reported level of sexual activity was lower in Scottish prisons (0.07%),<sup>42</sup> but much higher in federal prisons in the USA (30%).<sup>31</sup> A cross-sectional study of six European prisons conducted in 1996–97 found that 1% and 16%, respectively, of participants had ever had homosexual or heterosexual sex in prison,<sup>12</sup> and a Russian study reported that 9.7% of prisoners had ever had sex in prison.<sup>32</sup>

Sex in prison is not always consensual, and logic dictates that rape involves a greater risk of HIV infection. Reports on the prevalence of sexual coercion or sexual assault in prison vary considerably, from 1% of prisoners affected to over 40%.<sup>23,31,41</sup> In 1982, a Californian study found that 14% of 200 anonymously surveyed male inmates had been pressured to have sex against their will. In 1994, 12% of the inmates of Nebraska state prison reported being forced to engage in sexual intercourse at least once since incarceration, and another 10% reported less serious incidents of sexual coercion.<sup>43</sup> A recent study conducted in seven prisons in the American mid-west found 21% of prisoners had experienced pressured or forced sexual intercourse and at least 7% had been raped<sup>44</sup> (but only 25% of all prisoners responded to the survey, reducing the certainty of these estimates).

### Tattooing and body piecing

Tattooing and body piercing are increasingly popular in the community and even more so among IDUs.<sup>45</sup> Imprisonment and tattooing have long had a powerful association, a result of peer group pressure in prison, the desire to achieve and advertise group membership and status within and on release from prison, and boredom.<sup>46–49</sup> Tattooing is an illegal activity in all Australian prisons, therefore neither tattooing equipment nor disinfection facilities are provided. Nevertheless, Australian prisoners continue to perform and acquire tattoos behind bars; several studies describe over 25% of prisoners obtaining a tattoo in prison.<sup>4,46,50</sup> Furthermore, prisoners with a history of IDU are significantly more likely to receive a tattoo in prison than those without.<sup>4,51</sup>

Overseas studies have also discovered high levels of tattooing in prison; one French study reported that 8.9% of prisoners had a tattoo in the first 3 months of their being incarcerated and that tattooing was more common in

prisoners with a history of injecting drug use.<sup>5</sup> Researchers in Canada, Europe and Russia have reported up to 50% of prisoners acquiring a tattoo in prison and that many prisoners were uncertain if clean equipment was used.<sup>12,16,23,32,42</sup>

Associations between tattooing and BBV prevalence in prison settings have been established. Recent Australian research showed that having a tattoo in prison was an independent risk factor for HCV,<sup>4</sup> and a study of Thai prisoners demonstrated an independent association between tattooing and HIV positivity.<sup>26</sup> Samuel *et al.* found that receiving a tattoo in prison was associated with HBV and HCV exposure among IDUs in New Mexico.<sup>52</sup>

#### *Other risk factors*

Assaults are common in prisons, with reports of the proportion of prisoners suffering physical assaults from other prisoners ranging from 10% to 21%. Reviews in the early 1990s by the British Prison Service and the Scottish Prison Service measured prevalences of physical assaults of 9% and 13% respectively; in the latter survey, 12% of inmates also reported assaults by staff.<sup>42</sup> An inmate survey conducted in Canada in 1995 found that 21% of prisoners reported a physical assault from a fellow inmate, and 8% claimed to have been assaulted by staff members in the previous 6 months.<sup>42</sup> While the risks of HIV transmission during violence appear to be small relative to other modes, there are case reports of prisoners contracting HCV from physical assaults, with two possible cases occurring in NSW.<sup>53</sup>

#### **Prevention and management of HIV in prison**

Injecting drugs, sexual behaviour, tattooing and body piercing are all risk factors for the transmission of HIV in prison; other risks include assaults, wounds acquired through work or recreation, and sharing equipment for shaving and haircutting. If the risk of HIV and other BBV transmission in prisons is to be reduced, effective harm reduction programmes need to be implemented.

#### *Education*

Many prisons have introduced education programmes to inform prisoners about the risks of BBV transmission. The effectiveness of these programmes is difficult to measure; there is little published information outlining the educational interventions that have the greatest impact on reducing prisoners' risk behaviours. Factors thought to be important include the comprehensiveness of the programme, whether it is instructor led or peer based, whether it is associated with pre- and post-test counselling and whether the education programme sits within a more comprehensive harm reduction programme that includes drug treatment, the provision of condoms and bleach or a needle and syringe programme.<sup>31</sup>

#### *Pharmacotherapy programmes in prison*

Pharmacotherapy drug treatment programmes have been shown to reduce risky injecting behaviour and risk of contracting HIV in IDUs in the general community.<sup>36</sup> Several studies have suggested that methadone programmes can reduce injecting frequency and BBV exposure in prison<sup>36,54,55</sup> but direct evaluations of such drug treatment programmes are required (particularly with respect to the increasing use of buprenorphine).

Despite the high proportions of IDUs among prisoners and good evidence supporting the efficacy of use of pharmacotherapy, it is often unavailable or not available in a timely fashion, usually due to a combination of limited resources and the logistics of prisons. For example, in Victoria any prisoner who comes into prison on methadone can remain on it regardless of sentence length, but a person who was not on methadone in the community who enters prison is required to go through a complex assessment process prior to commencing methadone; this assessment may take a number of weeks. Also methadone is only available to prisoners who have at least 8 weeks remaining on their sentence, so it is not available for short-term prisoners. While acknowledging the Victorian pharmacotherapy programme has markedly improved over the past few years and is better than in many other jurisdictions (where treatment may not be available to prisoners) its limitations highlight some of the problems of prisoners accessing pharmacotherapies.

#### *Bleach*

Bleach programmes have been introduced into several Australian prisons in an effort to reduce BBV transmission associated with injecting drug use. The success of these programmes depends on prisoners being able to obtain and use bleach without feeling they will be targeted by prison staff for 'random' drug screening tests. It is also important that prisoners are educated about how to use bleach correctly. A NSW study assessed prisoners' awareness of the provision of bleach in prison, ease of access and methods for using disinfectant; and only 54% of the 102 respondents were aware of the policy.<sup>27</sup> Of the 50 who had attempted to obtain bleach, 56% reported easy access, while 40% said the major impediment to obtaining bleach was unavailability; of the 31 participants who reported sharing injecting equipment in prison, 62% used outdated guidelines for syringe cleaning. These data suggest that even where a bleach policy exists, prisoners' physical access to bleach and knowledge of its correct use cannot be assumed.

#### *Needle and syringe programmes*

The first prison-based needle and syringe programme began in 1992 in Switzerland, and programmes are now functioning in prisons in Switzerland, Germany, Spain and

Moldova. Some operate using dispensing machines, others through counselling or medical staff, and some rely on prisoners themselves. The best-evaluated programmes in Germany and Switzerland show positive effects in reducing sharing of injecting equipment but also in increased referrals to drug rehabilitation programmes.<sup>56–58</sup> Transmission of BBVs amongst prisoners appears to be lessened, and no assaults or violent incidents involving syringes have been reported.<sup>56–58</sup> It should be noted that these programmes operate in relatively small prisons — programmes reaching larger numbers of prisoners would provide more powerful evidence of their effectiveness.

### Condoms

Condom availability in prisons varies markedly worldwide. The World Health Organization surveyed 52 prison systems in 1991 and found that only 23 allowed condom distribution.<sup>59</sup> In Australia, New South Wales was the first state to introduce condoms (in 1996), and they are now available in Western Australian and South Australian prisons. Condoms were available in Queensland prisons until 2003 (cost was cited as the reason for their removal); Tasmania is considering their introduction, and condoms are not supplied to Victorian prisoners.

In the United States, where over 2.1 million people<sup>19</sup> are currently incarcerated, only two state prison systems and five city or county jail systems make condoms available to male inmates.<sup>7</sup> In Europe, the proportion of prison systems known to make condoms available to inmates rose from 53% in 1989 to 81% in 1997. In Canada, condoms have been available in the federal prison system since 1992 and also in many provincial prison systems. In England and Wales, despite a 1995 review by HM Prison Service's AIDS Advisory Committee recommending all prisons should be required to provide condoms to prisoners, there is no scheme for general availability of condoms; however, prison governors can authorise condom distribution and many prison doctors 'prescribe' condoms for prisoners.<sup>59</sup>

### Tattooing and piercing

Prisoners get tattooed for many reasons and frequently go to great lengths to do so, substituting a variety of materials for the tattoo gun and inks.<sup>46</sup> Simple prohibition of tattooing in prison clearly does not work. Allowing tattooing in prisons and giving prisoners the means to acquire tattoos safely seems the obvious solution but is difficult to implement. Efforts to establish tattooing services in Australian prisons to date have not been sustained. Obstacles preventing the provision of safe tattooing in prison include resistance from professional tattooing associations, who believe that hard-won gains in 'mainstreaming' the image of the industry would be lost if there was a formal association between tattooing and jails. There is also resistance from prison workers and management because of concerns that the materials may

be used as weapons. Finally, public opinion (and therefore, political will) is unlikely to support the concept of prison inmates being provided with such luxuries as tattoos, public health or economic arguments notwithstanding.

As there is no evidence that allowing or facilitating prisoners to be tattooed safely will reduce the occurrence of illicit tattooing, this and other options, such as non-penetrative tattoos, are a worthwhile subject for investigation.

### What needs to be done?

Prison harm reduction programmes require the support of prisoners and prisoner support groups, prison staff and management, governmental departments involved in the management of prisons, politicians and the public if they are to successfully reduce the risk of BBV transmission in prison. Not all prisoners support the provision of condoms in prison because of concerns about the risk of sexual assault,<sup>40</sup> thus, it is important for interventions to be discussed with prisoner peers and prisoners prior to their introduction. Prison workers are often resistant to introducing condoms, needle and syringe programmes and tattooing programmes into prison,<sup>60</sup> for reasons that include a lack of training, concern for personal safety, the illegal nature of some of the behaviours involved, and increasing work loads.<sup>40,61</sup> These issues must be addressed if harm reduction programmes in prisons are to be successful.

The key stakeholders and the community need to be informed that the provision of condoms, needle and syringe programmes and tattooing in prison is good public health policy. In Australia, the vast majority of prison inmates are incarcerated for only a few months before returning to the community, thus they are, over the long term, more appropriately regarded as 'citizens' than 'prisoners'. Our public health policy must involve all sections of the community, including prison inmates, if we are to reduce transmission of HIV and other BBVs.

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