

# Interventions to reduce HIV transmission related to injecting drug use in prison

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The high prevalence of HIV infection and drug dependence among prisoners, combined with the sharing of injecting drug equipment, make prisons a high-risk environment for the transmission of HIV. Ultimately, this contributes to HIV epidemics in the communities to which prisoners return on their release. We reviewed the effectiveness of interventions to reduce injecting drug use risk behaviours and, consequently, HIV transmission in prisons. Many studies reported high levels of injecting drug use in prisons, and HIV transmission has been documented. There is increasing evidence of what prison systems can do to prevent HIV transmission related to injecting drug use. In particular, needle and syringe programmes and opioid substitution therapies have proven effective at reducing HIV risk behaviours in a wide range of prison environments, without resulting in negative consequences for the health of prison staff or prisoners. The introduction of these programmes in countries with an existing or emergent epidemic of HIV infection among injecting drug users is therefore warranted, as part of comprehensive programmes to address HIV in prisons.

## Introduction

There has been much research into behaviours that put prisoners at risk of contracting HIV and other blood-borne infections through injecting drug use. As with data regarding HIV prevalence,<sup>1</sup> much of the data comes from high-income countries; data from low-income and middle-income countries is limited. Existing data show that injecting drug use is a reality in many prison systems and that most incarcerated injecting drug users (IDUs) share injecting equipment. This creates environments that promote the transmission of blood-borne infections among prisoners.

Prevalence of HIV infection among prisoners in many countries is substantially higher than in the general population.<sup>1,2</sup> For example, in Russia, by late 2002 the registered number of people living with HIV or AIDS in the penal system exceeded 36 000 (4% of the prison population), and accounted for about 20% of all known cases of HIV/AIDS in the country.<sup>3</sup> Hepatitis C virus (HCV) prevalence is even higher.<sup>4</sup> Most prisoners living with HIV contract their infection before imprisonment. However, the risk of being infected in prison, specifically through the sharing of contaminated injecting equipment, is high. Outbreaks of HIV infection in prison associated with shared injecting equipment have been reported in several countries.<sup>2,3,5-8</sup>

Coincident with the emergence of HIV, and later HCV, many countries have been experiencing a striking increase in the size of their incarcerated population.<sup>9</sup> As of 1998, over 8 million people were held in penal institutions throughout the world, either as pre-trial detainees or those who had been convicted and sentenced. By 2006, the global prison population had risen to 9.25 million people.<sup>9</sup>

To gain a better understanding of HIV risk behaviours in prisons, and of the effectiveness of interventions to address HIV in prisons, we examined whether interventions to address HIV in prisons have been scientifically shown to reduce the spread of HIV among

prisoners or to have other positive effects on the health of prisoners or on the prison environment. The evidence was assessed according to the criteria originally proposed by Bradford Hill to allow a causal relationship to be inferred from observed associations,<sup>10</sup> and by using additional criteria, including absence of negative consequences, feasibility of implementation and expansion, acceptability to the target audience of the intervention, and unanticipated benefits.

Comprehensive data about HIV prevalence in prisons has been published elsewhere.<sup>1,2,11,12</sup> This Review focuses on the evidence regarding injecting drug use and resulting HIV transmission in prison, and on the evidence of the effectiveness of interventions to reduce that risk. It is part of a broader review of interventions to address HIV in prisons commissioned by WHO, together with the UN Office on Drugs and Crime, and UNAIDS, to guide countries in their efforts to scale-up towards universal access to HIV prevention, treatment, care, and support by 2010.<sup>13</sup> Such universal access commitments cannot be achieved without introducing and rapidly expanding comprehensive HIV programmes in prisons (including the interventions not covered in this Review, for which evidence of effectiveness also exists, as summarised in the webappendix and reviewed in much greater detail elsewhere.<sup>2,13-15</sup>

## Drug dependence and injecting drug use among prisoners

In many countries, a substantial proportion of prisoners are drug dependent. Estimates of drug use or dependence in male prisoners (eight studies, n=4293) range from 10% to 48%, and in female prisoners (six studies, n=3270) from 30.3% to 60.4%.<sup>16</sup> For IDUs, imprisonment is a common event because of the illegality of their behaviour in many countries and because many are forced to commit crimes against property because of the high price of drugs on the black market. Studies report that between 56% and 90% of IDUs had been imprisoned.<sup>17-19</sup>

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See Online for webappendix

People who used drugs before imprisonment often continue to use drugs while imprisoned, although for most people the prevalence and frequency of drug use declines during imprisonment.<sup>20</sup> Some people discontinue drug use in prison, whereas other prisoners start using drugs, often as a means to release tensions and to cope with being in an overcrowded and often violent environment.<sup>5,21</sup>

Injecting drug use in prison is of particular concern given the potential for transmission of HIV and other blood-borne infections, including HCV. Those who inject drugs in prisons often share needles and syringes and other injecting equipment, which is an efficient way of transmitting HIV (table 1).<sup>43</sup> Studies show that (1) the extent and pattern of injecting and needle sharing vary substantially among prisons, (2) many people who inject before imprisonment reduce or stop injecting when they enter prison, but many resume injecting on release, (3) some people start injecting in prison, and (4) those who inject in prison will usually inject less frequently than outside, but are much more likely to share injecting equipment than are IDUs in the community.<sup>2</sup> Furthermore, these IDUs share injection equipment

with a population (fellow prisoners) that often has a high prevalence of infections.

### HIV and HCV transmission resulting from drug use in prisons

A large number of studies from countries in many regions of the world have reported HIV and/or HCV seroconversion within prisons or shown that a history of imprisonment is associated with prevalent and incident HIV, HCV, or hepatitis B virus (HBV) infection among IDUs. HIV infection has been highly associated with a history of imprisonment in countries in western and southern Europe (including among female prisoners),<sup>44-49</sup> but also in Russia,<sup>50</sup> Canada,<sup>51</sup> Brazil,<sup>52</sup> Iran,<sup>53</sup> and Thailand.<sup>19,54</sup> Use of non-sterile injecting equipment in prison was found to be the most important independent determinant of HIV infection.<sup>2</sup> The strongest evidence of extensive HIV transmission through injecting drug use in prison has emerged from documented outbreaks in Australia,<sup>7</sup> Lithuania,<sup>8</sup> Russia,<sup>3</sup> and Scotland, UK.<sup>5,6</sup> Outbreaks of HIV have also been reported from other countries.<sup>1</sup> HCV infection by sharing of injecting equipment in prison has been reported in Australia and Germany.<sup>55-57</sup>

	Location	Study population (N)	Injected in prison (%)	Shared equipment (%)
Rutter et al (1995) <sup>22</sup>	Australia (New South Wales)	7 studies	31-74%*	70-94%†
Gaughwin et al (1991) <sup>23</sup>	Australia (South Australia)	50	52%*	60%†
Canadian Correctional Service (1995) <sup>24</sup>	Canada	4285	11%	..
Ford et al (2000) <sup>25</sup>	Canada	350	18.3%	..
DiCenso et al (2003) <sup>26</sup>	Canada	105 women	19%	..
Martin et al (2005) <sup>27</sup>	Canada	102	21%	86%
Small et al (2005) <sup>28</sup>	Canada	>1200	27%	80%
Calzavara et al (2003) <sup>29</sup>	Canada	439 men, 158 women	3.3%	32%
Dufour et al (1995) <sup>30</sup>	Canada	450	2.4%	92%
Edwards et al (1999) <sup>31</sup>	England	378	11.6%	73%
Rotily et al (2001) <sup>32</sup>	Europe‡	871	13%	..
European Monitoring Centre on Drugs and Drug Addiction (2005) <sup>33</sup>	European Union, Norway	..	0.2-34%	..
Malliori et al (1998) <sup>34</sup>	Greece	544	24.1%	92%
Koulierakis et al (1999) <sup>35</sup>	Greece	861	20.2%	83%
Allwright et al (2000) <sup>36</sup>	Ireland	1178	..	70.5%
Rapid Situation Assessment (2005)§	Mauritius	100 men, 50 women, 50 youth (25 men, 25 women)	10.8% of adults, 2.1% of youth	..
Van Haastrecht et al (1998) <sup>37</sup>	Netherlands	497 IDUs	3%	0
Frost and Tchertkov (2002) <sup>38</sup>	Russia	1044	10%	66%
Dolan et al (2004) <sup>39</sup>	Russia	277	13%	..
Gore et al (1995) <sup>40</sup>	Scotland, UK	..	15.9%	..
Thaisri et al (2003) <sup>41</sup>	Thailand	689	25%	77.8%
Clarke et al (2001) <sup>42</sup>	USA	281 men, 191 women	31%¶	..

Unless otherwise indicated, data show the percentage of the total prison population who injected and the percentage of those who injected who shared equipment. \*Data from Australia refer to the percentage of IDUs who injected. †Data from Australia refer to the percentage of IDUs who shared equipment. ‡Cross-sectional study in France, Germany, Italy, Netherlands, Scotland, and Sweden. §Unpublished data from the Rapid Situation Assessment Mauritius (2005), available from RJ on request. ¶Percentage of IDUs with history of imprisonment who had used illegal drugs in prison; nearly half of these had injected in prison.

**Table 1: Studies that have examined drug injecting behaviour in prison**

## Strategies to address the risks associated with drug use

### Needle and syringe programmes

The first prison needle and syringe programme (NSP) was established in Switzerland in 1992.<sup>58</sup> Since then, NSPs have been introduced in over 50 prisons in 12 countries in western and eastern Europe and in central Asia. In some countries, only a few prisons have NSPs, but in Kyrgyzstan and Spain, NSPs have been rapidly scaled up and operate in a large number of prisons. Only in one country, Germany, have prison NSPs been closed.<sup>59</sup> At the end of 2000, NSPs had been successfully introduced in seven prisons, and other prisons were considering implementing them. However, since then, six of the German programmes have been closed as a result of political decisions by newly elected state governments. The decision to cancel the programmes was made without consultation with prison staff. Since the closures, prisoners have returned to sharing injecting equipment and to hiding it, increasing the likelihood of transmission of HIV and HCV, as well as the risk of accidental needlestick injuries for staff.<sup>60</sup> Staff have been among the most vocal critics of the governments' decision to close down the programmes, and have lobbied the governments to reinstate the programmes.<sup>2</sup>

Changes to laws or regulations have been required in only a few countries to allow the opening of prison NSPs—eg, Kyrgyzstan and Moldova. Several models for the distribution of sterile injecting equipment have been used, including automatic dispensing machines, hand-to-hand distribution by prison health-care staff, drug counsellors, or external community health workers, and distribution by prisoners trained as peer outreach workers.

Systematic assessments of the effects of NSPs on HIV-related risk behaviours and of their overall effectiveness in prisons have been undertaken in ten projects. Summaries of the most relevant results are provided in table 2. There are no published evaluations of NSPs in eastern Europe and central Asia, but several reports, papers, and presentations provide information about these NSPs and their effects.<sup>59,69</sup> With the exception of one prison in which sharing continued because of insufficient supply with needles and syringes,<sup>68</sup> all available reports have shown that sharing of injecting equipment either ceased after implementation of the NSP,<sup>64,70</sup> or substantially declined.<sup>62,65,67</sup> IDUs in Moldovan prisons with NSPs also reported few incidents of sharing injecting equipment.<sup>71</sup>

No new cases of HIV were reported in any study. In five of the six prisons in which blood tests were done for HIV or hepatitis infection, no seroconversion was observed,<sup>61</sup> and self-reports in other prisons also indicated no new cases of infection. In another prison in which the incidence of HIV, HBV, and HCV was determined through repeated testing, no HIV and HBV seroconversions were observed, but four HCV seroconversions were noted, one of which had definitely

	Incidence of HIV/HCV	Needle sharing	Drug use	Injecting
Am Hasenberg (Germany) <sup>61</sup>	..	Strongly reduced	No increase	No increase
Basauri (Spain) <sup>62</sup>	No seroconversion	Strongly reduced	No increase	No increase
Hannöversand (Germany) <sup>61</sup>	..	Strongly reduced	No increase	No increase
Hindelbank (Switzerland) <sup>63</sup>	No seroconversion	Strongly reduced	Decrease	No increase
Berlin, Germany (Lehrter Strasse and Lichtenberg) <sup>64</sup>	..	Strongly reduced	No increase	No increase*
Lingen 1 (Germany) <sup>65,66</sup>	No seroconversion	Strongly reduced	No increase	No increase
Realta (Switzerland) <sup>67</sup>	No seroconversion	Single cases	Decrease	No increase
Vechta (Germany) <sup>65,66</sup>	No seroconversion	Strongly reduced	No increase	No increase
Vierlande (Germany) <sup>68</sup>	No seroconversion	Little change or reduction	No increase	No increase

\*Two people who had previously only inhaled heroin reported injecting drug use on single occasions. ..=No data.

**Table 2: Assessments of NSPs in prisons (country)**

occurred in prison.<sup>64</sup> Additionally, the following ancillary benefits are associated with the implementation of NSPs: (1) a reduction of overdose incidents and deaths;<sup>59,66,72</sup> (2) facilitation of greater prisoner contact with drug-treatment programmes;<sup>62,65</sup> (3) reduction in abscesses, improved relationships between prisoners and staff, and increased awareness of infection transmission and risk behaviours;<sup>59,62</sup> and (4) increased staff safety, because accidental injuries from hidden injecting equipment during cell searches decreased.<sup>71,73</sup> There have been no reports of syringes having been used as weapons in any prison with an operating NSP. The availability of sterile injecting equipment has not resulted in an increased number of prisoners injecting drugs, an increase in overall drug use, or an increase in the amount of drugs in prisons.<sup>61,62,64-67</sup> Once in place, acceptance of NSPs is generally high among staff and prisoners.<sup>70,74,75</sup>

Ensuring that prisoners have easy and confidential access to NSPs has been shown to be a key factor in guaranteeing their success. Prisoners are reluctant to use NSPs if they fear negative consequences, either because they could be seen using a dispensing machine,<sup>68</sup> or because they could only access the NSP through health-care or other staff.<sup>65</sup> When prisoners have limited access to an NSP, are not provided with the right type of syringes, or lack trust in the programme, benefits for staff are also reduced, because some prisoners will continue to hide needles and syringes, thus increasing the risk of needlestick injuries for staff.<sup>68</sup> In Moldova, only a small number of prisoners accessed the NSP when it was located within the health-care section of the prison.<sup>59,71</sup> Only when prisoners could obtain injecting equipment from fellow prisoners who were trained to provide harm-reduction services did the quantity of equipment distributed increase substantially.<sup>59,71</sup>

### Bleach and decontamination strategies

Bleach or other disinfectants for sterilising needles and syringes have been made available in a wide range of prison systems in different parts of the world.<sup>2</sup> No studies

have reported any serious safety or security problems related to bleach programmes in prisons. The only study that examined whether there were any unintended consequences related to the distribution of bleach kits reported that, for both prisoners and staff, bleach had become a “fact of life” in prisons.<sup>76</sup>

Studies have shown that a large number of prisoners will clean syringes with bleach if it is accessible.<sup>76–78</sup> However, conditions in prisons make it even more unlikely than in the community that injecting equipment will be effectively decontaminated with bleach.<sup>79</sup> Studies that examined prisoners’ use of bleach reported the following: (1) that only a small number of prisoners report adoption of recommended syringe-cleaning guidelines;<sup>78</sup> (2) that bleaching of equipment in prisons “does not occur consistently”, and bleaching is often done too quickly when it is done;<sup>77</sup> and (3) that, although most prisoners claim always to clean used equipment, “because prisoners can be accosted at any moment by prison officers, injecting and cleaning is a hurried affair”.<sup>6</sup>

### Opioid substitution therapies

Since the early 1990s, there has been a marked increase in the number of prison systems providing opioid substitution therapy (OST) to prisoners.<sup>2</sup> To match the situation in the community, most prison systems make OST available in the form of methadone maintenance therapy (MMT). Buprenorphine maintenance therapy is available in only a small number of systems.<sup>80</sup>

All studies of prison-based MMT programmes found that prisoners who inject heroin and other opioids who receive MMT inject substantially less frequently than those not receiving this therapy.<sup>81–84</sup> However, a sufficiently high dose of methadone (more than 60 mg per day) is required,<sup>81,83</sup> and programmes need to allow for sufficiently long treatment duration (>6 months,<sup>83</sup> or even for the duration of incarceration<sup>81</sup>) if concomitant drug use is to be reduced. A 4-year follow-up study to a randomised controlled trial of MMT versus wait-list control in prison examined the longer-term impact of MMT on mortality, re-incarceration, and HCV and HIV seroconversion.<sup>82,85</sup> Retention in treatment was associated with reduced HCV infection, whereas short MMT episodes (less than 5 months) were significantly associated with greater risk of HCV.

Evaluations of prison-based MMT have found other benefits, including reduced mortality among prisoners retained in MMT.<sup>85</sup> A positive effect on criminal recidivism and re-incarceration has also been reported,<sup>86–88</sup> particularly if methadone is provided for longer, uninterrupted periods,<sup>85</sup> if moderate-to-high doses of methadone are provided,<sup>89</sup> and if provision of methadone is accompanied by additional support.<sup>90</sup> MMT also facilitates entry and retention in post-release treatment,<sup>90,91</sup> and the reduction in drug-seeking behaviour has a positive effect on institutional behaviour, thus

improving prison safety.<sup>87,90,92–94</sup> Although concerns have often been raised about security, violent behaviour, and diversion of methadone, none of these problems have been associated with prison-based MMT programmes.<sup>84,88,92,94</sup>

### Other forms of drug-dependence treatment

By contrast with OST, other forms of drug-dependence treatment—eg, therapeutic community programmes or counselling programmes—have not been introduced in prisons with HIV prevention as one of their objectives. Indeed, few studies of other forms of incarceration-based drug-dependence treatment have assessed programme effects on drug use, particularly during imprisonment, instead focusing on whether the programmes reduce recidivism.<sup>95</sup> Therefore, few data exist on the effectiveness of these forms of treatment as an HIV prevention strategy.

### Drug-free units

Some prison systems have established so-called drug-free units (DFUs).<sup>96–98</sup> Typically, DFUs are separate living units within a prison that focus on limiting the availability of drugs and house prisoners who have volunteered to sign a contract promising to remain drug free. The establishment of DFUs recognises that, often because drug use is so common, anyone who is not using drugs or is attempting abstinence in prison may experience substantial difficulties. DFUs provide the possibility of living in an environment where other prisoners have also agreed to a regime in which no drugs will be available.

A few studies show that prisoners in DFUs report substantially lower drug use than do other prisoners,<sup>98,99</sup> and that even with increased levels of searching, less substance-related contraband is found in DFUs.<sup>98</sup> However, very little is known about the long-term effectiveness of DFUs. Programmes vary widely, so the precise factors that contribute to a positive rehabilitative environment are unknown.<sup>80</sup> Research on the impact of DFUs on criminal recidivism also remains limited and somewhat conflicting.<sup>96,98,100,101</sup>

### Mandatory drug testing programmes

Mandatory drug testing programmes (MDTs) are used in several prison systems, mainly in high-resource countries such as England, Canada, Australia, and the USA. These programmes are intended to discourage prisoners from consuming illicit drugs through the imposition of sanctions on prisoners who test positive for illicit drugs. Concerns have been raised that these programmes may increase prisoners’ risk of HIV infection. Whereas MDTs may contribute to reducing the demand for and use of cannabis in prisons, they seem to have little effect on the use of opioids.<sup>24,102–108</sup> Additionally, a small number of people may begin to inject drugs to avoid detection of smoked cannabis.<sup>24,102,103,105–107,109</sup>

## Discussion

As in the community, where there has been evidence for over a decade that HIV epidemics among IDUs can be prevented, stabilised, and reversed,<sup>79</sup> there is now also an increasing body of knowledge and practice on effective prevention of the spread of HIV through drug use in prison. For the past decade, prison systems and governments have argued that measures such as needle and syringe programmes or opioid substitution therapy cannot be introduced in prisons for safety reasons, and that making them available would mean condoning drug use in prisons.<sup>10</sup> Many prisoners are in prison because of drug or drug-related offences. Preventing their drug use is seen as an important part of their rehabilitation. In the eyes of many, acknowledging that drug use is a reality in prisons would be to acknowledge that prison authorities have failed. Far from condoning drug use in prisons, however, making available to prisoners the means that are necessary to protect them from HIV (and HCV) transmission acknowledges that protection of prisoners' health needs to be the primary objective of drug policy in prisons. As the Scottish report on drug use and prisons pointed out, "the idea of a drug free prison does not seem to be any more realistic than the idea of a drug free society", and "stability may actually be better achieved by moving beyond this concept".<sup>11</sup>

Introducing preventive measures such as NSPs and OST is also not incompatible with a goal to reduce drug use in prisons. Making sterile injecting equipment available to prisoners who use drugs has not led to an increase in drug use. Similarly, making substitution therapy available to prisoners dependent on opioids does not mean giving up on the ultimate goal of getting prisoners off drugs. Rather, it is a realistic acknowledgment that for some this requires time, and that they need an option that will allow them to break the drug-and-crime cycle, reduce their contact with the black market, link with needed services, and reduce the risk of their becoming infected with HIV. Nevertheless, there are several limitations to our review. Not all papers could be obtained, and publications in languages other than English, French, German, Italian, Portuguese, and Spanish were not included.

NSPs are feasible in a wide range of prison settings. Providing clean needles and syringes is accepted by IDUs in prisons and contributes to a substantial reduction of syringe sharing. NSPs also seem to be effective in reducing resulting HIV infections, despite the fact that studies of NSPs could not provide conclusive evidence of the impact of the NSPs on the incidence of blood-borne viral infections. Although the reliability of research conclusions without support from randomised clinical trials is often questioned, the difficulty of doing such trials to assess public-health interventions should not be underestimated.<sup>12</sup> In this case, research ethics boards found that comparison of different groups with and without access to NSPs would be unethical, and therefore

did not allow for randomised clinical trials to evaluate prison-based NSPs. Studies provided no evidence to suggest that prison-based NSPs have serious, unintended negative consequences for the health or safety of prisoners or prison staff.

The rationale for establishing NSPs in prisons where injecting drug use takes place is even stronger than in the community. Although people dependent on drugs inject less frequently during incarceration, each episode involves more risk because of the scarcity of sterile injecting equipment and the high prevalence of equipment sharing. Furthermore, the rapid turnover of prison populations means that there are potentially more changes in injecting partners than in community settings, which in turn results in substantial interaction between prison and community IDU populations. Since most prisoners leave prison at some point to return to their community, implementing NSPs in prisons benefits not only prisoners and prison staff, but also the people in the sexual and drug injecting networks in which prisoners participate after their release.

Although the number of prisons with NSPs continues to grow, it remains small, and many prison systems continue to resist introduction of such programmes. More research, particularly in resource-poor systems which have not yet evaluated their NSPs, could allow for more rapid expansion of NSPs in these settings. Such research would be most beneficial if it was designed to address operational issues and research gaps rather than replicate existing studies.<sup>22</sup> Additionally, it may be valuable to analyse what made rapid expansion of NSPs possible in some countries, with a view of replicating the experience in other countries.

Rather than providing NSP, many systems continue to provide bleach or other disinfectants. Such an approach is not supported by evidence. Because of their limited effectiveness in decontaminating injecting equipment, particularly in prisons, bleach programmes should be regarded as a second-line strategy to NSPs.

In the absence of effective drug-dependence treatment, a high proportion of drug-dependent prisoners are likely to continue using drugs and engage in criminal behaviours. Many will be at risk of contracting HIV, during imprisonment, and on their return to the community. The potential impacts of drug-dependence treatment programmes on HIV prevention programmes, include reduced injecting drug use, reduced use of non-sterile injecting equipment, reduced sexual risk behaviours, and opportunities for HIV counselling, education, and medical care.<sup>113</sup>

From an HIV prevention perspective, drug-dependence treatment efforts in prisons need to be particularly concerned with decreasing injecting drug use. Research shows that opioid use and injecting is more prevalent in most prison systems than use and injecting of cocaine.<sup>2,106</sup> A wealth of scientific evidence has shown that, in the community, OST is the most effective intervention

available for the treatment of opioid dependence.<sup>114</sup> More recently, a small but increasing body of research has delivered important findings regarding the effectiveness of MMT in prison settings in reducing injecting drug use in prisons and achieving other beneficial outcomes. Nevertheless, OST remains unavailable in most prison systems. By contrast with MMT, little research has examined buprenorphine maintenance therapy in prison settings, highlighting the need for further research on the provision of this type of therapy.<sup>80</sup>

The effectiveness of other types of drug-dependence treatment in the context of HIV has not been studied. However, good quality, accessible treatment has the potential to improve prison security, as well as the health and social functioning of prisoners, as long as it provides continuing treatment and post-release care and meets the individual needs of prisoners.<sup>115</sup> Such treatment in prison also has the potential to reduce the amount of drug use in prisons and on release. Given that many prisoners have severe problems with illegal drugs, it would be unethical not to use the opportunity that imprisonment provides for treatment.<sup>116</sup> Because relatively few prison-based treatment programmes have been the subject of rigorous outcome assessments,<sup>95,117</sup> there is an urgent need for independent and systematic outcome assessment of these interventions, and for examining their effectiveness in reducing injecting drug use and sharing of injecting equipment.

A broad range of search and seizure techniques and procedures are being used in an attempt to reduce the availability of drugs in prisons, including random cell searches, staff and visitor entry/exit screening and searches, drug-detection dogs, and other drug-detection technologies, perimeter security measures, and MDT. These measures are not aimed at addressing HIV in prisons, but may assist HIV prevention efforts by reducing the supply of drugs and injecting in prisons. At the same time, they could make such efforts more difficult. In particular, concerns have been raised that the disruption in supplies of drugs and injecting equipment in prison may result in the increased risk of infection transmission,<sup>118</sup> and that some prisoners may switch to injectable drugs to avoid detection of cannabis through drug testing. The high costs of MDT may not be justified in light of the limited evidence that such programmes reduce levels of drug use in prisons and their potential unintended negative consequences.<sup>105,107,118,119</sup> Efforts to improve the documentation and assessment of supply reduction strategies are also needed.<sup>97</sup>

Finally, as reported by the UN Office on Drugs and Crime, reducing the size of prison populations and prison overcrowding should be seen as an integral component of a comprehensive strategy to prevent HIV transmission in prisons.<sup>13</sup> According to UN agencies, this should include legislative and policy reforms aimed at substantially reducing the use of incarceration for non-violent drug users and developing alternatives to prison

for people convicted of offences related to drug use, with the aim of reducing the number of drug users sent to prison.<sup>13</sup>

### Future policy directions

The importance of implementing HIV interventions in prisons was recognised early in the epidemic.<sup>120</sup> After holding a first consultation on prevention and control of HIV in prisons in 1987,<sup>121</sup> WHO issued guidelines on HIV in prisons in 1993, emphasising that, “all prisoners have the right to receive health care, including preventive measures, equivalent to that available in the community.”<sup>122</sup> Since the early 1990s, many countries in which injecting drug use is an important factor contributing to HIV incidence have introduced HIV prevention programmes in prisons. However, many of these programmes are small in scale, restricted to a few prisons, or exclude necessary interventions for which evidence of effectiveness now exists.

WHO, together with UN Office on Drugs and Crime and UNAIDS, commissioned our original review<sup>2</sup> to guide countries in their efforts to scale-up towards universal access to HIV prevention, treatment, care and support by 2010.<sup>123</sup> Such universal access commitments cannot be achieved without introducing and rapidly expanding comprehensive HIV programmes in prisons (including the interventions not covered in this review, for which evidence of effectiveness also exists [webappendix]).

As part of these programmes, measures to reduce the risk of HIV infection through drug use are particularly important because of the extensive evidence of injecting drug use in prisons around the world and the resulting risk of HIV and HCV transmission. Bleach programmes should be available in prisons where authorities continue to oppose the introduction of NSPs, and to complement NSPs. However, they cannot replace NSPs. Prison authorities in countries experiencing or threatened by an epidemic of HIV infections among IDUs should introduce NSPs urgently and expand implementation to scale as soon as possible. In countries in which OST is available in the community, introduction of OST programmes in prisons is another urgent priority. Prison authorities should also provide a range of other drug-dependence treatment options for prisoners with drug dependence, in particular for other substances, such as amphetamine-type stimulants and cocaine. Because there is little data on the effectiveness of these other forms of treatment as an HIV prevention strategy, studies of their effectiveness in terms of reducing drug injecting and sharing of injecting equipment should be undertaken. Improving the documentation and assessment of DFUs and of other drug-demand and drug-supply reduction measures should be another priority for prison systems making substantial investments in such measures. Finally, states should affirm and strengthen the principle of providing treatment, counselling, education, and

### Search strategy and selection criteria

A comprehensive literature search was done in 2005–2006 and updated in 2007. Data were identified by searches of electronic library and HIV databases, websites of governmental and non-governmental bodies, conferences, and prison health and health news sites, as well as by references from relevant articles; many articles were identified through searches of the extensive files of the authors. Key search terms used included: “prison(s)”, “jail(s)”, “detention centre(s)”, “correctional facility(ies)”, “prisoner(s)”, “inmate(s)”, “HIV”, “human immunodeficiency virus”, “hepatitis C”, and “HCV”. These search terms were combined with specific interventions (such as “bleach”, “needle and syringe programmes”, etc) and, where useful, with specific countries or regions. Studies and other materials reported in English, French, German, Italian, Portuguese, and Spanish were reviewed. Attempts were made to access information from low-income countries and to access the grey literature.

rehabilitation as an alternative to conviction and punishment for drug-related offences.

In addition to issuing evidence-based recommendations to prison systems, the UN Office on Drugs and Crime, WHO, and UNAIDS have scaled-up action in countries to assist implementation of HIV programmes in prisons and have issued guidelines for an effective national response to HIV in prisons.<sup>13</sup> These guidelines, along with other UN documents, recognise that governments and the international community have much to do to meet their “obligations on human rights, prison conditions, and public health” and state that “the transmission of HIV in prisons is an integral part of reducing the spread of infection in the broader society”.<sup>13</sup> They suggest that, in addition to implementing comprehensive and evidence-based HIV programmes, transferring control of prison health to public-health authorities could also have a positive impact.<sup>14</sup> This recognises that health care in prisons can be delivered more effectively by public-health authorities, as long as they are provided with sufficient resources and guaranteed freedom of action.<sup>14</sup>

The renewed emphasis on HIV and broader health issues in prisons represents a recognition that “public health can no longer afford to ignore prison health”.<sup>124</sup> We now know which HIV interventions are feasible and effective in prisons. Recognising that “prison health is public health”,<sup>125</sup> that “prisoners are entitled to a standard of health equivalent to that available in the outside community, including preventive measures”,<sup>13</sup> and that protecting and promoting the health of prisoners benefits not only prisoners, but also prison staff and the communities outside prison,<sup>13</sup> implementation of evidence-based HIV programmes in prisons is an important component of national AIDS programmes that can no longer be neglected.

### Conflicts of interest

We declare that we have no conflicts of interest.

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