EVIDENCE FOR ACTION TECHNICAL PAPERS

# INTERVENTIONS TO ADDRESS HIV IN PRISONS

# NEEDLE AND SYRINGE PROGRAMMES AND DECONTAMINATION STRATEGIES

World Health Organization

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World Health Organization, UNODC, UNAIDS / Geneva, 2007

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# CONTENTS

# PREFACE

The global environment for the HIV response has shifted substantially towards a massive scaling up of prevention, treatment and care interventions. In particular, Governments made an unprecedented commitment during the United Nations Special Session on HIV/AIDS in 2001 to halting and reversing the epidemic by 2015. More recently, at the 2005 World Summit and at the 2006 High Level Meeting on AIDS, Governments committed to pursue all necessary efforts towards the goal of universal access to comprehensive prevention programmes, treatment, care and support by 2010. In support of this, substantial additional resources to fund an expanded response have become available, including through the Global Fund to Fight AIDS, Tuberculosis and Malaria.

Governments face the challenge of translating these commitments into practical programmes, which includes implementing a comprehensive range of interventions to address HIV transmission related to injecting drug use, including in their prison systems. This publication is part of a series of Evidence for Action Technical Papers, which aim to make the evidence for the effectiveness of interventions to manage HIV in prisons accessible to policy-makers and programmers. The series consists of:

1. Four papers that consider the effectiveness of a number of key interventions in managing HIV in prisons, including:
   - needle and syringe programmes and decontamination strategies;
   - prevention of sexual transmission;
   - drug dependence treatments; and
   - HIV care, treatment and support.
2. A comprehensive paper on *Effectiveness of Interventions to Address HIV in Prisons* which (1) provides much more detailed information about the interventions covered in the four above mentioned papers; and (2) reviews the evidence regarding HIV prevalence, risk behaviours and transmission in prisons, as well as other interventions that are part of a comprehensive approach to managing HIV in prisons, including HIV education, testing and counselling, and other programmes. This paper is available, in electronic format only, at http://www.who.int/hiv/idu/en.

WHO, UNODC and UNAIDS recognize the importance of this review in supporting the implementation and scale up of evidence-based interventions in prison settings aimed at HIV prevention, treatment and care.

## A NOTE ON TERMINOLOGY

In some jurisdictions different terms are used to denote places of detention, which hold people who are awaiting trial, who have been convicted or who are subject to other conditions of security. Similarly, different words are used for various groups of people who are detained.

In this paper, the term '**prison'** has been used for all places of detention and the term '**prisoner**' has been used to describe all who are held in such places, including adult and juvenile males and females detained in criminal justice and prison facilities during the investigation of a crime; while awaiting trial; after conviction and before sentencing; and after sentencing. Although the term does not formally cover persons detained for reasons relating to **immigration or refugee status**, those **detained without charge**, and those sentenced to **compulsory treatment and rehabilitation centres** as they exist in some countries, nonetheless most of the considerations in this paper apply to them as well.

In this paper, the term '**needle and syringe programmes**' (**NSPs**) refers to programmes that provide people who inject drugs with access to sterile injecting equipment (needles and syringes, swabs, vials of sterile water) and most often also to health education, referrals, counselling and other services. This term has grown in popularity and is increasingly replacing terms such as "needle exchange programmes" or "syringe exchange programmes." In prisons, in some NSPs used injecting equipment is exchanged for new injecting equipment, for example through automated machines. However, in most prison-based NSPs, as in the community, injecting equipment is distributed, information about and the means for the safe disposal of syringes are provided, and additional services are also offered.

# EXECUTIVE SUMMARY

HIV hit prisons early and hit them hard. The rates of HIV infection among prisoners in many countries are significantly higher than those in the general population. Hepatitis C virus (HCV) seroprevalence rates are even higher. While most of the prisoners living with HIV or AIDS in prison contract their infection outside the institutions before imprisonment, the risk of being infected in prison, in particular through sharing of contaminated injecting equipment and through unprotected sex, is high. Studies from around the world show that injecting drug use is a reality in many prisons and that most prisoners who inject have to share injecting equipment, creating a serious risk of spread of infection. Even countries that have invested heavily in drug demand and drug supply reduction efforts in prisons have not been able to stop injecting drug use. Outbreaks of HIV infection have occurred in a number of prison systems, demonstrating how rapidly HIV can spread in prison unless effective action is taken to prevent transmission.

The importance of implementing HIV interventions, including needle and syringe programmes, in prisons was recognized early in the epidemic. After holding a first consultation on prevention and control of HIV in prisons in 1987, WHO responded to growing evidence of HIV infection in prisons worldwide by issuing guidelines on HIV infection and AIDS in prisons in 1993. With regard to health care and prevention of HIV, the guidelines emphasize that "all prisoners have the right to receive health care, including preventive measures, equivalent to that available in the community without discrimination, in particular with respect to their legal status or nationality". In particular, the guidelines recommend that "in countries where clean syringes and needles are made available to injecting drug users in the community, consideration should be given to providing clean injection equipment during detention and on release". Such recommendations were recently re-affirmed in the 2006 framework for an effective national response to HIV/AIDS in prisons, jointly published by the United Nations Office on Drugs and Crime (UNODC), WHO, and UNAIDS.

An increasing number of countries has introduced HIV programmes in prisons since the early 1990s. However, many of them are small in scale, restricted to a few prisons, or exclude necessary interventions for which evidence of effectiveness exists. There is an urgent need to introduce comprehensive programmes (including information and education, particularly through peers; drug dependence treatment, in particular opioid substitution therapy with methadone and/or buprenorphine; provision of condoms; diagnosis and treatment of STIs, voluntary counselling and HIV testing; and HIV care and support, including provision of antiretroviral treatment), and to scale them up rapidly. As part of these programmes, prison systems should consider introducing needle and syringe programmes.

## Needle and syringe programmes

There is evidence that **needle and syringe programmes** (NSPs) are **feasible** in a wide range of prison settings, including in men's and women's prisons, prisons of all security levels, and small and large prisons. There is evidence that providing clean needles and syringes is readily accepted by IDUs in prisons and that it contributes to a significant reduction of syringe sharing over time. It also appears to be effective in reducing resulting HIV infections. At the same time, there is no evidence to suggest that prison-based NSPs have serious, unintended negative consequences. In particular, they do not appear to lead to increased drug use or injecting, nor are they used as weapons. Evaluations have found that NSPs in prisons actually facilitate referral of drug users to drug dependence treatment programmes. Ultimately, since most prisoners leave prison at some point to return to their community, implementing NSPs in prisons will benefit not only prisoners and prison staff, but also society in general. Therefore, it is recommended that

- **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**. The higher the prevalence of injecting drug use and associated risk behaviour is in prison, the more urgent introduction of prison-based NSPs becomes.
- **Prisoners should have easy, confidential access to NSPs**, and prisoners and staff should receive information and education about the programmes and be involved in their design and implementation.
- **Carefully evaluated pilot programmes of prison-based NSPs may be important in allowing the introduction of these programmes**, **but they should not delay the expansion of the programmes**, particularly where there already is evidence of high levels of injecting in prisons.
- **Additional research about prison-based NSPs should be undertaken**. In particular,

more research in resource-poor systems outside Western Europe could allow for more rapid expansion of NSPs in these settings. Research should be designed to address operational issues and research gaps rather than replicate existing studies. Evaluation of pilot programmes may be justified if: (1) the evaluation takes place in settings that are sufficiently different from settings in which evaluations have already been undertaken; or (2) it addresses research gaps.

## Bleach and decontamination strategies

Evaluations of **bleach** programmes in prisons have shown that distribution of bleach or other disinfectants is feasible in prisons and does not compromise security. However, disinfection and decontamination schemes in the community outside prisons **are not supported by evidence of effectiveness**. Studies undertaken in prisons have shown that conditions in prisons further reduce the probability that injecting equipment may be effectively decontaminated. **Because of their limited effectiveness, bleach programmes can only be regarded as a second-line strategy to NSPs**. Therefore:

- Bleach programmes should be available in prisons where authorities continue to oppose the introduction of NSPs despite evidence of their effectiveness, and to complement NSPs. However, they cannot replace NSPs.
- Where bleach programmes are implemented, bleach should be made easily and discreetly accessible to prisoners in various locations in the prison, together with information and education about how to clean injecting equipment and information about the limited efficacy of bleach as a disinfectant for inactivating HIV and particularly HCV.
- Where bleach programmes exist in prisons, but not NSPs, public health practitioners should continue to advocate for the introduction of NSPs.

# METHODOLOGY

A comprehensive search of the published literature was carried out. Electronic library and HIV/AIDS databases, and websites of various government and non-governmental bodies, relevant conferences, and prison health and health news sites were searched. 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 "condom(s)", "bleach", "needle exchange" etc) and, were 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 developing countries and to access the 'grey' literature through professional contacts, and direct contact with known researchers and research centres. Nevertheless, the review had limitations: not all papers could be obtained and publications in languages other than those mentioned are not included.

Generally, the review examines whether interventions to manage HIV in prisons have been demonstrated scientifically to reduce the spread of HIV among prisoners or to have other positive health effects. The evidence has been evaluated according to the criteria originally proposed by Bradford Hill (1965) to allow a causal relationship to be inferred from observed associations, and by using additional criteria including:

- **Absence of negative consequences**: The presence of unintended negative consequences can have a major impact on the adoption or expansion of interventions. For example, fear that needle and syringe programmes might be seen as condoning drug use or that it may lead to security problems or violent behaviour or attacks.
- **Feasibility of implementation and expansion**: Is it feasible to implement programmes in prisons in diverse settings, including resource-poor settings, and in prisons of various types and security classifications, including in prisons for women?
- **Acceptability to the target of the intervention**: Do prisoners and staff accept the programmes and what conditions facilitate acceptance?
- **Unanticipated benefits**: Does the introduction of such programmes lead to other unintended and welcome benefits?

While the reliability of research conclusions without support from randomized clinical trials is often questioned, the difficulty of conducting such trials to evaluate public health interventions such as needle and syringe programmes in prisons should not be underestimated (e.g. Drucker et al, 1998). Generally, for a number of reasons, very few randomized clinical trials to evaluate HIV interventions in prisons have been undertaken.

# 1. EVIDENCE REGARDING INJECTING DRUG USE AND RESULTING TRANSMISSION OF HIV AND OTHER BLOOD-BORNE INFECTIONS IN PRISONS

## 1.1 Background

Illegal drugs are available in prisons despite the sustained efforts of prison systems to prevent drug use by prisoners by undertaking efforts to prevent the entry of drugs into prisons, by tightly controlling distribution of prescription medications, and enforcing criminal prohibitions on illegal drug possession and use among prisoners.

Many prisoners come to prison with established drug habits (Calzavara et al., 2003). Hiller et al. (1999) report that in the United States, 68% of all new admissions test positive for an illegal drug in urine screening, and similar findings have been reported across Europe (EMCDDA, 2005), North America, and Australia (Shewan, Stöver & Dolan, 2005). In other parts of the world, the situation is less clear because of the lack of systematic research (Dunn et al., 2000; Ohaeri, 2000), but in many countries, drug use among prisoners is common. In fact, many prisoners are in prison in the first place because of offences related to drugs (UNAIDS, 1997). These may be crimes related to drug production, possession, trafficking or use, or crimes committed to acquire resources to purchase drugs. Many prison systems have seen large increases in their population (and consequent overcrowding) attributable in large measure to a policy of actively pursuing and imprisoning those dealing with and consuming illegal substances (Stöver et al., 2001).

In particular for injecting drug users, imprisonment is a common event, with studies from a large number of countries reporting that between 56% and 90% of injecting drug users had been imprisoned at some stage (Ball et al. 1995; Normand et al. 1995; Millson, 1991; Wood et al., 2004; Beyrer et al., 2003). Multiple episodes of imprisonment are more common for IDU prisoners than for other prisoners (Gore et al., 1995). In a number of studies (Dolan, 2000), the percentage of prisoners with a history of injecting drug use before incarceration ranged from 11% in one study in England (Maden et al, 1992) to 64% in studies in New South Wales, Australia (Dolan et al., 1999).

People who used drugs prior to imprisonment often find a way to continue using on the inside, although prevalence and frequency rates for most – but not all (Plourde and Brochu, 2002; Swann & James, 1998) – prisoners decline with imprisonment (Shewan et al., 1994). Some people discontinue using drugs while in prison, while other prisoners start using drugs, often as a means to release tensions and to cope with being in an overcrowded and often violent environment (Taylor et al., 1995; Hughes & Huby, 2000). Plourde & Brochu (2002) found that drug use was significantly higher in maximum- (52%) and medium-security (35%) than in minimum-security institutions in Canada (19%). Cocaine use diminished considerably, while a significant number of prisoners who had not previously used heroin tried it in prison. This is consistent with findings of other studies revealing the popularity of heroin in prison (Swann & James, 1998).

Bullock (2003) found that the main reason provided by prisoners for their reduced levels of drug use in prisons was the relative lack of availability in prison (mentioned by 61% of those reporting reduced use), followed by attempts to stay off drugs (14%) and "get fit" (Kevin, 2000), not being able to afford drugs (13%), and concerns about punishment (6%: Bullock, 2003).

## 1.2 Injecting drug use in prison

Injecting drug use in prison is of particular concern with regard to transmission of HIV and other blood borne infections such as hepatitis B and C. This is because those who inject drugs in prisons often share needles and syringes and other injecting equipment (see infra, section 1.2.2), which is a very efficient way of transmitting HIV.

Studies may underestimate the prevalence of injecting drug use in prisons because of the many methodological, logistical, and ethical challenges of undertaking a study of prisoners' high-risk behaviours. Injecting drugs is a highly clandestine activity (Hughes, 2000a), and many prisoners decline to participate in studies because they claim not to have

engaged in any high-risk behaviours (Health Canada, 2004, with reference to Pearson, 1995). This can result in low generalizability and underreporting of risk behaviours affecting statistics in prisons worldwide. As well, prisoners who do participate can be reluctant to give information regarding risk behaviours and, in particular, injecting drug use (Health Canada, 2004). Prisoners are afraid of reprisal for admitting illegal behaviours (Rutter, 2001, with reference to Dolan, Wodak & Penny, 1995).

In addition, caution must be exercised when comparing the prevalence of injecting and injecting risk behaviour between prisons in different countries, since studies have used different methodologies and indicators. However, despite these challenges, there is ample evidence that injecting drug use is widespread in prisons and represents a serious risk of HIV (and/or HCV) transmission.

As shown in **Table 1**, a large number of studies from countries around the world report high levels of injecting drug use, including among female prisoners (DiCenso, Dias & Gahagan, 2003; Elwood Martin et al., 2005). Studies also show that

- the extent and pattern of injecting and needle sharing vary among prisons
- many people who inject before imprisonment reduce or stop injecting when they enter prison, but many resume injecting upon release
- some people start injecting in prison; and
- those who inject in prison will usually inject less frequently than outside, but are much more likely to share injecting equipment than are drug injectors in the community (Shewan et al., 1994)
- those who inject in prison are sharing injection equipment with a population – fellow prisoners – that often has a high rate of HIV and HCV infections.

Most of these studies were undertaken in developed countries, but there are data from a number of developing countries and countries in transition (see **Table 1** and Dolan et al., 2007). For example, Rowhani-Rahbar, Tabatabee-Yazdi & Panahi (2004) report that about 10% of Iranian prisoners are believed to inject drugs and more than 95% of them are reported to share needles. Injecting in prison is a serious problem in prisons in countries in Eastern Europe and Central Asia (Russia: Frost & Tchertkov, 2002; Drobniewski et al., 2005; Ukraine: Zhivago, 2005; Armenia: Weilandt, Eckert & Stöver, 2005; Tajikistan: Godinho, 2005), and there are also reports of injecting drug use in prisons in Latin America (e.g., Mexico: Cravioto P et al., 2003) and Africa (e.g., Rapid Situation Assessment Mauritius, 2005; Adjei et al., 2006).

### 1.2.1 Starting to inject in prison

Studies in prisons in many countries have reported that a relatively high percentage (13 to 23%) of people who inject in prison have started injecting in prison, for example in Irish prisons (Allright et al., 2000: 21% of injectors); Scottish prisons (Gore SM et al., 1995; Gore SM et al., 1997; Bird AG et al., 1997: 19% in one prison); Finland (Korte et al., 1998: 21.7%), Thailand (Thaisri et al., 2003: of 351 injectors, 15.9% initiated injecting while incarcerated), Russia (Frost & Tchertkov, 2002: 13.5%), Canada (Calzavara et al., 1997: 23%; Ford et al., 2000: 16%), and Australia (Dolan & Wodak, 1999). In other studies, the proportion of IDUs who started injecting in prison was somewhat lower (Bird AG et al., 1997: 4%; Bird AG et al, 1995: 6%; Power et al., 1992: 8% of a sample of male injectors in Scottish prisons). An overview prepared for the pre-expansion European Union reported that between 0.4% and 21% of injecting drug users started injecting in prison (EMCDDA, 2002).

Gill, Noone, and Heptonstall (1995) have suggested that the observation that a large number of prisoners begin injecting in prison should be interpreted with caution, saying that "if men who are at risk of becoming injecting drug users spend a substantial part of their young adult life in prison, the rate at which young men in prison become drug injectors may be no different from that for men of the same age outside prison."

### 1.2.2 Using non-sterile injecting equipment in prison

Studies show that those who inject in prison are typically much more likely to share injecting equipment than are injecting drug users in the community (see **Table 1**), with most studies reporting sharing rates of between 60% and 90%. Because it is more difficult to smuggle needles and syringes into prisons than it is to smuggle drugs into them, needles and syringes are often in short supply. Often, only a handful of needles and syringes will circulate among a large population of prisoners who inject drugs. As a result, 15 to 20 people may inject using the same equipment (Correctional Service Canada, 1994; Small et al., 2005; Taylor & Goldberg, 1996). Sometimes, the equipment is home-made, and needle substitutes are fashioned out of hardened plastic and ball-point pens, often causing damage to veins, scarring, and

severe infections (Small et al., 2005; Mahon, 1996; Hughes, 2003; Turnbull, Stimson & Stillwell, 1994; Taylor & Goldberg, 1996; Bijl & Frost, 2000). In addition to the serious risk of infection, drug injectors in prison are at more risk of health complications, including scarring and bruising, abscesses and thrombosis from using extremely poor quality injecting equipment (Morrison, Elliott & Gruer, 1997).

In many cases, the successful record of risk reduction in the community contrasts with fairly stable reports of high risk using non-sterile injecting equipment in prison. In one study, over 15% of participants who reported injecting and sharing when last in prison also reported that was the first time they had ever shared injecting equipment (Crofts et al., 1995). Studies in Ireland, Scotland, and Australia reported that between 9.7% and 45.7% of those who were injecting prior to imprisonment reported having shared injecting equipment, but between 52.1% and 76% of those who were injecting in prison (Shewan et al., 1994; Allright et al., 2000; Kevin, 2000). The rate of sharing injecting equipment was particularly high among female prisoners (EMCDDA, 2002). Shewan et al. (1994) identified a number of factors significantly associated with current sharing of injecting equipment in prison: having injected a wider range of drugs in prison; frequency of Temgesic® (buprenorphine) use; and being prescribed methadone in the community, then having that prescription discontinued on entry into prison. Only one Canadian study found that the rates of injecting with non-sterile injecting equipment in prison were the same as pre-incarceration (Calzavara et al., 2003).

Use of non-sterile injecting equipment in prisons resembles that occurring in shooting galleries in that numerous strangers share syringes randomly in prison (Dolan, Wodak, Hall, Kaplan, 1998; Small, 2005). Generally, only friends or sexual partners share syringes in the community (Dolan et al, 1996a). The sharing that occurs in shooting galleries and in prisons is much more risky than other kinds of sharing and the difference is more pronounced when HIV prevalence is low (Allard, 1990). In prisons, interpersonal relationships and the possession of exchangeable resources determine access to scarce syringes. The scarcity of syringes results in patterns of sharing amongst large numbers of persons. In a study by Dolan et al. (1996a), 51 respondents outside prison shared syringes with 144 others; in prison, 60 respondents reported sharing with a total of 1,144 IDUs. Such continual reuse of scarce syringes poses serious health hazards (Small et al., 2005).

A small number of qualitative studies has examined HIV risk associated with injecting and sharing in prisons (Taylor & Goldberg, 1996; Hughes, 2003; Small et al., 2005). They report that used syringes may circulate for long periods and are used by many prisoners, and that sharing injecting equipment is difficult to avoid for prisoners who do inject because syringes are so scarce. Accessing syringes normally entails some form of payment unless a prisoner shares a close social relationship, like a friendship, with the owner. Ownership of injecting equipment can confer privileged position inside prison. It enables owners to levy a charge to others for the use of injecting equipment or trade drugs for the loan of injecting equipment. Some prisoners in the studies suggested that a prisoner may not disclose the fact that they are HIV positive, for fear that they would not be able to gain access to a syringe in future.

### 1.2.3 Determinants of injecting drug use in prison

A number of studies have found that drug use in prison is, at least partly, the product of a prison regime in which drugs are used in an attempt to combat boredom and isolation (Calzavara et al., 1997; Hughes & Huby, 2000). "It is important to recognise that the role of drugs in people's lives provides a meaningful social and self-identity inside prison, alleviates boredom, and fills the void that the absence of constructive regimes leaves" (Hughes, 2003, with reference to Her Majesty's Chief Inspector of Prisons for England and Wales, 1993; Hughes and Huby, 2000).

Studies have shown that motives for drug use prior to and during incarceration are quite different. Plourde & Brochu (2002) found that the majority of prisoners who had used drugs while in prison had used them to relax (62%), while prior to incarceration they had used drugs primarily to forget their problems (38%) and to have fun (31%). Calzavara et al. (1997) found that the top reasons for using drugs in the 12 months prior to incarceration were: "it makes me feel good", "because I'm addicted", and "a way to escape reality". In contrast, the top reasons for using drugs in the past 12 months of incarceration were: "it makes me feel good", "it makes the time pass easier", and "it helps me deal with feelings of boredom".

Furthermore, one study found that independent correlates of drug injecting while incarcerated were injection of heroin (OR=6.4) or other opiates (OR=7.9) and not injected with used needles (OR=0.20) outside in the year prior to incarceration; and ever being incarcerated in a federal prison (OR=5.3) (Calzavara

et al., 2003). A few other studies have suggested that prison-based drug use has more to do with the nature of the population and their pre-prison behaviour than the prison environment (Kevin, 2000; Thomas & Cage, 1975). Generally, there is agreement about the need for further research towards understanding why some prisoners maintain or even increase drug use in prison (see, e.g., Shewan, Stöver & Dolan, 2005). Health Canada (2004) points out that research studies undertaken to date often "lack more in-depth details regarding the motivations behind risk behaviours, which could aid in more effective planning and implementation of preventive measures" and suggests that future research should aim to identify the motivations of the prison population in engaging in high-risk conduct rather than elucidating specific behaviours and factors. This approach could help develop more tailored and effective prevention and intervention initiatives".

### 1.2.4 Injecting upon release

As mentioned above, many drug using prisoners, including injectors, stop using drugs upon incarceration and are physically and behaviourally healthier while in prison than when in the community. But there is evidence of a high number of relapses (or taking up the old using patterns) and overdoses after this period of abstinence. In one study, relapse to drug injecting during the week following release from prison was reported by 41% of study participants, in 82% of cases on the very day of release (Van Haastrecht, Anneke & Van Den Hoek, 1998). This is consistent with the results of other studies reporting that a majority of prisoners who stop injecting in prison said they "definitely intend to" or "will probably" inject when released (Strang et al., 1998; Shewan et al., 2001).

## 1.3 Evidence of HIV and HCV transmission

A large number of studies from countries in many regions of the world have reported HIV and/or HCV and/or hepatitis B virus (HBV) seroconversion within prisons or shown that a history of imprisonment is associated with prevalent and incident HIV and/or HCV and/or HBV infection among IDUs.

*With regard to HIV infection*, it was significantly associated with a history of imprisonment in a number of countries in Western and Southern Europe (including among female prisoners: Estebanez et al., 2000), but also in Russia, Canada, Brazil, Iran, and Thailand. Using non-sterile injecting equipment in prison was found to be the most important independent determinant of HIV infection in a number of studies (see **Table 2** and the chapter on "Evidence of the risk of HIV and HCV transmission in prisons" in the comprehensive paper on *Effectiveness of Interventions to Address HIV in Prisons* for more details).

The strongest evidence of extensive HIV transmission through injecting drug use in prison has emerged from a number of documented outbreaks in Australia (Dolan & Wodak, 1999), Lithuania (MacDonald, 2005), Russian Federation (Bobrik et al., 2005) and Scotland (Taylor et al., 1995). In the first documented outbreak, at least thirteen prisoners became infected at Glenochil prison in Scotland by using non-sterile injecting equipment (Taylor & Goldberg, 1996; Yirrell et al., 1997). A follow up study 12 months after the outbreak estimated that up to 20 prisoners had become infected (Gore et al., 1995).

In Lithuania, using non-sterile injecting equipment resulted in one of the largest documented HIV outbreaks in a prison. In May-June 2002, the Correctional Affairs Department and the Lithuanian AIDS Centre identified 207 HIV-positive prisoners at Alytus correctional facility. The survey was repeated in July 2002 and a further 77 HIV-positive prisoners were identified, of whom 44 had been found to be HIV-negative in May 2002. In total, 299 new HIV-positive cases were identified (MacDonald, 2005). A similar outbreak was also documented in a correctional colony in Tatarstan, Russian Federation, where 260 prisoners became HIV-infected in 2001 (Bobrik, 2005). Outbreaks of HIV have also been reported from other countries, but little information is available about these outbreaks (Dolan et al., 2007).

Finally, *HCV infection* by sharing of injecting equipment in prison has been reported in studies undertaken in Australia (Haber et al., 1999; O'Sullivan et al., 2003) and in Germany (Keppler, Nolte, Stöver, 1996; Keppler & Stöver, 1999).

# 2. EVIDENCE REGARDING PRISON-BASED NEEDLE AND SYRINGE PROGRAMMES

## 2.1 Background

Due to the prevalence of injecting drug use in prisons in many countries and the resulting risk of HIV and HCV transmission, providing sterile needles and syringes to prisoners has been widely recommended.

As early as 1993, in its *Guidelines on HIV Infection and AIDS in Prisons*, WHO recommended that "in countries where clean syringes and needles are made available to injecting drug users in the community, consideration should be given to providing clean injection equipment during detention and on release"(WHO, 1993). The same recommendation was made by UNAIDS (1997a; 1997b) and many other national and international bodies, including the Australian Medical Association (Editor, 1996) and the Ontario Medical Association (2004). The *International Guidelines on HIV/AIDS and Human Rights* also state that prison authorities should provide prisoners with the means for HIV prevention, including "clean injection equipment" (Office of the United Nations High Commissioner for Human Rights and UNAIDS, 2006, at 29e).

The rationale for establishing NSPs in prisons where injecting drug use takes place is even stronger than in communities (Rutter et al., 2001). Although injecting drug use in prison is usually less frequent than in the community, each episode involves more risk due to the scarcity of sterile injecting equipment and the higher prevalence of sharing of injecting equipment. Furthermore, the rapid turnover of prison populations means that there are more changes in injecting partners than in community settings; and also results in considerable interaction between prisoner- and community-based injecting drug user populations (Dolan, Rutter & Wodak, 2003).

The first prison NSP was established in Switzerland in 1992. Since then, NSPs have been introduced (or are about to be introduced), in over 50 prisons in 12 countries in Western and Eastern Europe and in Central Asia (see **Table 3**). 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.

NSPs were first introduced in small prisons in Switzerland, but have since been implemented in other countries in prisons for men and for women; in small, medium, and large institutions; in prisons of all security classifications; in civilian and military prisons; in different forms of custody (remand and sentenced, open and closed); and in institutions that house prisoners in individual cells as well as in those that house prisoners in barracks. Significantly, after having been introduced in well resourced prison systems in Western Europe, programmes have since been established in systems with very limited financial resources. Several models for the distribution of sterile injecting equipment have been used, including automatic dispensing machines; hand-to-hand distribution by prison physicians, other prison health care staff or drug counsellors, or by external community health workers; and distribution by prisoners trained as peer outreach workers. A brief overview of the history of prison NSPs can be found in the comprehensive paper on *Effectiveness of Interventions to Address HIV in Prisons* (available at http://www.who.int/hiv/idu/).

## 2.2 Evidence of effectiveness of NSPs in community settings

In many countries NSPs have become an integral part of a pragmatic public health response to reduce the risk of HIV transmission among injecting drug users and ultimately, to the general public. Up to 2007, some 60 countries have implemented legal and/or government sponsored NSPs in community settings.

Extensive studies have found NSPs to be effective in reducing HIV spread (General Accounting Office, 1993; Normand, Vlahov & Moses, 1995; Office of Technology Assessment of the US Congress, 1995; Institute of Medicine of the National Academy of Science, 2001; National Academy of Sciences, 2006). WHO has concluded that "measured against any objective standards, the evidence to support the effectiveness of NSPs in substantially reducing HIV must be regarded as overwhelming" (WHO, 2004, at 28).

## 2.3 Evidence of the effectiveness of NSPs in prison

Systematic evaluations of the effects of NSPs on HIV-related risk behaviours and of their overall effectiveness in prisons have been undertaken in at least 10 projects in Germany, Spain and Switzerland.

These evaluations were either of one or two years in duration, collecting data through a variety of means, and followed generally accepted scientific standards. Limitations include relatively small sample sizes, relatively short follow-up timeframes, inconsistent methodologies for assessing seroprevalence and seroincidence, and absence of comparison groups (Public Health Agency of Canada, 2006). Summaries of the most relevant results are provided in **Table 4**.

In addition, a study on the feasibility of NSPs in prisons was conducted in New South Wales, Australia, in 1995 (Rutter et al., 1995). Finally, while there are no published evaluations of NSPs in Eastern Europe and Central Asia, a number of published and unpublished reports, papers and presentations provide information about these NSPs and their effects.

The following questions guided the review and analysis of published and unpublished data on the effectiveness of prison-based NSPs.

(1) Do prison NSPs lead to decreased risk behaviours among IDUs and are these changes in behaviour associated with lower rates of infection among IDUs in prison?

(2) Do prison NSPs have additional and worthwhile benefits?

(3) Is there any evidence of any major, unintended negative consequences?

### 2.3.1 Reduction in the of use of non-sterile injecting equipment and of resulting blood-borne infections

With one exception (Heinemann & Gross, 2001), all available evaluations have shown that using non-sterile injecting equipment either ceased after implementation of the NSP (see, e.g., Nelles et al., 1998; Stark et al., 2005) or significantly dropped (see, e.g., Nelles, Fuhrer & Vincenz, 1999; Menoyo, Zulaica & Parras, 2000; Stöver, 2000) (see also **Table 4**). Injecting drug users in Moldovan prisons with NSPs also reported few incidents of sharing injecting equipment (Pintilei, 2005).

Due to the findings of ethical committees that comparison of different groups with and without access to NSPs would be unethical, the studies undertaken could not provide conclusive evidence of the impact of the NSPs on the incidence of blood-borne viral infections. However, no new cases of HIV were reported in any evaluation. In five of the six prisons in which blood tests were performed for HIV or hepatitis infection, no seroconversion was observed (summarized in Stöver & Nelles, 2003), 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 (Stark et al., 2005), one of which had definitely occurred in prison and was attributed to frontloading[1] (Stark et al., 2005).

Only in the evaluation of a NSP in the open prison of Hamburg-Vierlande, Germany, prisoners interviewed as part of a qualitative investigation reported only a small reduction in the use of non-sterile injecting equipment. Sharing continued because of insufficient supply with needles and syringes, mainly due to frequent break downs of the distribution machines, but also because the location of the machines did not allow for anonymous access, provision of the dummies that allowed for usage of the machines was inadequate, and because syringes of a particular size that was in high demand were not provided. However, the medical research team that conducted a quantitative investigation of prisoners' injecting behaviours reported more positive findings, including a much reduced rate of using non-sterile injecting equipment. In addition, no seroconversions were observed after the introduction of the NSP, while retrospective analysis of data recorded before the introduction of the NSP detected five hepatitis B and two hepatitis C seroconversions in the study group that must have happened in prison (Heinemann & Gross, 2001).

Overall, the observed reduction in the use of non-sterile injecting equipment is significant.

### 2.3.2 Additional benefits

There is evidence of ancillary health and social benefits associated with the implementation of NSPs.

#### *Reduction in overdose incidents and deaths*

A significant reduction of overdose incidents and deaths was reported in the first needle exchange pilot projects in Germany (Jacob & Stöver, 2000a; Jacob & Stöver, 2000b). Lines et al. (2004; 2005) also reported similar findings in the Hindelbank prison, Switzerland, which had averaged between one and three overdose deaths a year prior to the introduction of the NSP. In contrast, in the nine years after the NSP began, only one prisoner died of an overdose. Two reasons why NSPs have resulted in a decrease in overdose incidents and deaths have been offered:

1 Dividing up drug doses between two or more injecting drug users involved in syringe sharing or sharing of spoons for drug preparation.

- Providing each injecting drug user with his/her own injecting equipment enables the individual to consume a smaller amount of drug with each injection. In the past, when a syringe was shared among many prisoners, a person who injected drugs would only have limited access to it and would be more likely to inject large doses on those rare occasions when he/she was in possession of the syringe.
- The implementation of NSPs and the adoption of a harm reduction philosophy within the prison fundamentally changes the way that prison health and social work staff are able to engage in counselling with prisoners. Honest discussions about risk behaviours and overdose risk can take place in an atmosphere in which prisoners do not have to fear sanctions for admitting drug use (Lines et al., 2004; 2005).

### *Increase in referral to drug treatment programmes*

Evaluations of NSPs in Germany and Spain showed that they facilitated greater prisoner contact with drug treatment programmes, with referrals to drug treatment increasing (Stöver, 2000; Menoyo, Zulaica, Parras, 2000).

### *Other benefits*

A number of evaluations noted other benefits, such as reduction in abscesses, a reduction in stress, improved relationships between prisoners and staff, and increased awareness of infection transmission and risk behaviours (Menoyo, Zulaica, Parras, 2000; and the summary in Lines et al., 2004; Lines et al., 2005).

There are also reports of increased staff safety in prisons with NSPs, due to the fact that accidental injuries from hidden injecting equipment during cell searches have decreased (Jürgens, 1996; Lines et al., 2004). Rihs-Middel (cited in Rutter et al., 1995) suggested that the decrease in the risk of injury is due to the fact that prisoners are permitted to store injecting equipment in a particular area of their cell and therefore do not hide it, reducing the risk of needle-stick injury during searches. Meyenberg et al. (1999) found that prison staff believed that the introduction of NSPs made injecting equipment easier to control.

With one exception, evaluation studies report no problems with the safe disposal of used syringes, and exchange rates of injecting equipment have been high, reaching 98.9 and 98.3 percent respectively in two German prisons (Meyenberg et al., 1999). Only in the Hamburg-Vierlande prison there were reports of syringes not being disposed of properly. This was explained, at least in part, by two facts: prisoners felt that they would suffer negative consequences if they kept their syringe in the designated location; and access to sterile injecting equipment was limited (Heinemann & Gross, 2001).

## 2.3.3 Absence of unintended negative consequences

No serious unintended negative consequences were reported.

### *Syringes not used as weapons*

Among the most important findings from the evaluation studies is that there was no reported instance where prisoners have used syringes as weapons against other prisoners or staff. Since the first NSP started in 1992, there have been no reports of syringes ever having been used as weapons in any prison with an operating NSP. The only report of a syringe ever being used as a weapon is from a prison in New South Wales, Australia, which did not have a NSP. In that case, a prison guard was stabbed with a blood-filled syringe by a HIV-positive prisoner, and subsequently seroconverted and died (Rutter et al., 2001; Jones, 1991).

### *NSPs do not lead to increased drug use or injecting*

As outlined in **table 4**, evaluations of existing NSPs have found that the availability of sterile injecting equipment does not result in an increased number of injecting drug users, an increase in overall drug use or an increase in the amount of drugs in prisons (Jacob & Stöver, 2000a; Menoyo, Zulaica, Parras, 2000; Nelles, Fuhrer, Vincenz, 1999; Stark et al., 2005; Stöver, 2000; Stöver & Nelles, 2003). Evaluations of two programmes actually found that reported levels of drug use or injecting decreased (Nelles, Dobler-Mikola, Kaufmann, 1997).

Despite this evidence, there continues to be concern from some individuals that providing needles and syringes in prisons could lead to increased injecting drug use.. Because this claim has sometimes been used to oppose implementation of NSPs, the findings of some inconclusive studies are discussed here in more detail.

In one study (Stark et al., 2005), two individuals who had previously only inhaled heroin reported injecting drug use on single occasions. It could not be ruled out that the availability of sterile injecting equipment may have facilitated initiation of injecting drug use

for these two individuals, but the researchers concluded that it is more likely that this finding reflects the natural incidence of injecting drug use among inhalation heroin users in settings where peers frequently inject (Stark et al., 2005, with reference to Allright et al., 2000; Gore et al., 1995).

In a letter to the *British Medical Journal*, Langkamp (2000) claimed that the evaluation of one NSP (in the Hamburg-Vierlande prison) found that many prisoners who had stopped using drugs started using them again, and that many prisoners went from inhaling drugs back to injecting drug use "while sharing needles regularly". An analysis of the reports by the sociological and medical research teams (Gross, 1998; Heinemann & Gross, 2001) does show that a higher percentage of prisoners reported injecting at Hamburg-Vierlande than at the closed institutions from which they were transferred to Vierlande. Furthermore, some prisoners reported that they were tempted to recommence injecting drug use, though they had previously switched to other forms of drug use as a result of their fear of HIV and HCV transmission, in the absence of an NSP. However, the evaluation of the NSP does not make a link between increased drug use and injecting in Hamburg-Vierlande (an open prison, compared to the closed institutions from which prisoners were transferred) and the existence of the NSP at the prison. In addition, the evaluation report, while stating that prisoners' reports (that they could be tempted to go back to injecting drug use because of the NSP) need to be taken seriously, stresses that these reports need to "be interpreted with great caution since a change in the consumption behaviour can very easily be attributed to the syringe distribution machines so that the responsibility and the 'fault' can be given to others than the prisoners themselves" (Gross, 1998, translation from German original).

Further, a switch from inhaling or smoking to injecting drug use has also been noted in studies undertaken in prisons without NSPs and attributed to the low availability of heroin that encouraged the switch from smoking to injecting drug use, a more efficient mode of consumption (Long, 2004).

The fear that the introduction of NSPs in prisons could tempt some prisoners to return to or continue injecting drug use in prisons was also expressed in one of the reviews of prison NSPs, not based on any of the experiences with existing NSPs, but on a small study undertaken in a prison in Canada. In that study, one of 11 prisoners who reported having stopped injecting as a result of being arrested or imprisoned specifically stated that he stopped injecting due to his inability to get sterile injecting equipment and his concern over HIV transmission (Thomas, 2005). According to Thomas, "this appears to suggest that the introduction of sterile needles in prison could lead a small number of injecting drug users who had given up injecting because of the lack of sterile needles to return to using drugs intravenously." Thomas suggested that future evaluations of NSPs in prison should include ethnographic data collection for the assessment of these types of potential behavioural effects.

Smyth (2000) also speculated that, "[a]lthough there is no evidence that provision of needle exchange encourages individuals to start injecting in the community, implementation of such a service could cause many more of these established injectors to opt to continue injecting while in prison." He expressed a concern that NSPs in prisons could increase the incidence of HCV if more injecting drug users decide to continue injecting due to the presence of an NSP, and if some of them share injecting equipment occasionally, despite the presence of the NSP. He urged that a better understanding of the factors that mediate the observed reduction of injecting in this setting [prisons] is needed" and suggested that research evaluations of NSPs in prison should measure the proportion of prison entrants with injecting drug use histories who continue to inject before the introduction of the NSP and then re-measure that proportion after the introduction of the NSP. Smyth conceded that "there should still be substantial health gain for the wide population of injecting drug users from the provision of the NSP in the prison" if the proportion of injecting drug users who continue injecting "only increases marginally" (Smyth, 2006).

In conclusion, while evaluations of NSPs should continue to monitor the impact of NSPs on drug use and injecting in prisons, the evidence thus far shows that NSPs do not lead to increased drug use and injecting. The few reported instances in which a small number of prisoners may have switched to injecting drug use could be attributable to other factors. Even if they were related to the easier access to injecting equipment, they would not substantially impact the potential health benefits documented in the evaluations of NSPs.

## 2.3.4 Other findings

### *Adequate access to NSPs and need for confidentiality and trust*

Ensuring that all prisoners have easy and confidential access to NSPs and develop trust that they can access injecting equipment when they need it and without having to fear any negative consequences

is a key factor in ensuring their success. Evaluations have shown that prisoners are reluctant to use the NSP if they fear that accessing injecting equipment may result in negative consequences, either because they could be seen using a dispensing machine (Heinemann & Gross, 2001) or because they could only access the NSP through health care or other staff (Stöver, 2000). Technical failures of dispensing machines, leading to limited access to injecting equipment, were also noted (Stöver, 2000).

In one prison in which equipment was distributed through counselling staff and prisoners receiving opioid substitution therapy were excluded from the NSP, needles and syringes remained a commodity for trade in the prison. There was also reluctance to access the NSP due to the lack of anonymity and a fear that counsellors' knowledge of participants' drug consumption could affect parole (Meyenberg et al., 1997; Jacob & Stöver, 1997). In at least one prison, sharing of injecting equipment continued because syringes of a particular size which were in high demand were not available, highlighting that the injecting equipment provided needs to meet the prisoners' demand (Heinemann & Gross, 2001).

If prisoners have limited access to the programme, are not provided the right type of syringes, or lack trust in the programme, benefits for staff will also be reduced, as some prisoners will continue to hide needles and syringes, thus increasing the risk of needlestick injuries for staff (Heinemann & Gross, 2001).

The extent to which easy access, confidentiality and trust are important has been best demonstrated in Moldova, where only a small number of prisoners accessed the NSP when it was located within the health care section of the prison. It was only when prisoners could obtain injecting equipment from fellow prisoners, trained to provide harm reduction services, that the number of equipment distributed increased significantly i.e. 98.4 percent of prisoners reported easy access to injecting equipment (Pintilei, 2005; Lines et al., 2004; Canadian HIV/AIDS Legal Network, 2006). This suggests that in many prisons, distribution by prison nurses or physicians or even by non-governmental organizations or health professionals who come to the prison for this purpose will not be the best option, as many prisoners would not access the programme. In these prisons, distribution through peers has led to much greater access, without any unintended negative consequences (Pintilei, 2005; Wolfe, 2005; Lines et al., 2004; Lines et al., 2005).

Finally, distribution, rather than one-for-one exchange, guarantees greater access to injecting equipment, particularly for those prisoners who are reluctant to access the NSP themselves and prefer to have injecting equipment delivered by trusted peers, and where opening hours are limited.

### *Acceptance of NSPs by staff and prisoners*

Experience has shown that prior to the implementation of NSPs, prison staff have to be convinced to accept or at least tolerate them. Nevertheless, once in place, acceptance increases and is generally high among staff, as well as among prisoners who use drugs and those who do not (Nelles & Fuhrer, 1995; Nelles et al., 1998; Meyenberg et al., 1999).

The one exception was the Hamburg-Vierlande prison, where staff attitudes towards the NSP did not improve. The evaluators concluded that the NSP should not be extended to all prisons until staff had a chance to actively participate in the development of a model that responds to the needs and reality of each prison (Heinemann & Gross, 2001). Staff attitudes towards the NSP were least positive in those prisons in which prisoners experienced problems accessing syringes and/or did not trust that they could obtain them without suffering negative consequences, leading to the continued illegal trade of syringes and, generally, to reduced benefits of the NSP (Heinemann & Gross, 2001).

## 2.4 Conclusions and recommendations

**There is evidence that NSPs are feasible in a wide range of prison settings.**

Overall, the review of the evidence demonstrates that prison NSPs are feasible in a wide range of prison settings: in men's and women's prisons, prisons of all security levels, small and large prisons, and in prisons in which prisoners live in units of individual cells and in barracks-style facilities. It also demonstrates that NSPs can be successfully implemented in countries in which prison systems are relatively well resourced, as well as in countries in which prisons operate with significantly less funding and infrastructural support, such as in Eastern Europe (Moldova, Belarus, and Ukraine) and Central Asia (Kyrgyzstan).

**Prison-based NSPs appear to be effective in reducing needle sharing and resulting HIV infection.**

There is strong evidence that the provision of sterile injecting equipment is readily accepted by injecting drug users in prisons and may contribute to a signifi-

cant reduction of syringe sharing over time. Based on the data available and extrapolating from the vast literature on community-based programmes, prison NSPs also appear to be effective in reducing resulting HIV infections.

**Prison-based NSPs have additional and worthwhile benefits.**
In particular, there are reports that NSPs in prison

- lead to reduced overdose risk and a decrease in abscesses
- facilitate referral to drug dependence treatment programmes (where available) and lead to an increase in the number of prisoners accessing such programmes.

**There is no convincing evidence of any major, unintended negative consequences.**
There is no evidence to suggest that prison-based NSPs have serious, unintended negative consequences. In particular,

- NSPs do not appear to lead to increased drug use or injecting;
- Injecting equipment are not used as weapons;
- NSPs do not appear to undermine abstinence-based programmes, as drugs have remained prohibited within prisons where NSPs are in place. Security staff remain responsible for locating and confiscating illegal drugs. However, it is recognized that if and when drugs find their way into the prison and are used by prisoners, the priority must be to prevent the transmission of HIV and HCV via unsafe injecting practices. Therefore, while drugs themselves remain illegal, injecting equipment that is part of the official NSP is not.

**In order to be successful, prisoners need to have easy, confidential access to NSPs, and prisoners and staff should receive information and education about the programmes and be involved in their design and implementation.**
The review also showed that there are a number of key determinants of the success of prison-based NSPs:

- easy and confidential access by prisoners to NSPs
- support by prison staff and prisoners, emphasizing the importance of information and education of both staff and prisoners about the programme and its expected benefits for prisoners, staff, and the public
- developing a mechanism for safe disposal of syringes, and
- involvement of staff and prisoners in the design and development of the programmes.

**Additional research about prison-based NSPs would be beneficial if it leads to reducing gaps in evidence.**
The review has shown that there are areas in which future evaluation studies could reduce gaps in research. Most importantly, NSPs in prisons in countries outside Western Europe have not been scientifically evaluated. Moldova has been collecting various data and is undertaking prevalence studies (Pintilei, 2005), but none of the programmes implemented outside Western Europe collected data before the programmes began or has attempted to more systematically gather research data. Gathering additional data would be important to inform the prison systems in Eastern Europe and Central Asia in which NSPs are increasingly being introduced.

For additional studies, Rutter et al. (1995) recommend using a two-year evaluation using multi-method strategies including: quantitative and qualitative interviews of prisoners and staff; testing prisoners for blood borne viral infections and drug use; and review of prison records for assaults and/or drug seizures. According to Thomas (2005), the "key tasks" in evaluating future pilot prison-based NSPs "is to collect reliable information on a wide-range of relevant indicators before, during and after implementation of the program, analyse any changes that can be attributed to the needle exchange program, compare the 'positive' and 'negative' effects, and make a determination as to whether the positive effects (e.g., a reduction in the amount of needle sharing and disease transmission, etc.) outweigh the negative effects (e.g., prisoners being introduced to, returning to, or increasing injecting because of the availability of needles, etc.)."

In the end, as the United States National Academy of Sciences' Institute of Medicine stated in the context of its analysis of the evidence on NSPs in the community, it has to be recognized that "the improbability of being able to carry out the definitive study … does not necessarily preclude the possibility of making confident scientific judgments." Citing Bradford Hill, the Institute continued saying that "incomplete" scientific evidence "does not confer upon us a freedom to ignore the knowledge we already have, or to postpone the action that it appears to demand" (Normand, Vlahov & Moses, 1995, cited in WHO, 2004; National Academy of Sciences, 2006).

To reject prison-based NSPs, based on limitations of the design of the studies undertaken thus far, would ignore both the preponderance and pattern of the evi-

dence and be "both poor scientific judgment and bad public health policy" (WHO, 2004) Or, in the words of WHO Europe (2005): "The relatively little experience available appears to show that, where risks are great, such as in countries with high prevalence rates of HIV and hepatitis, carefully introducing a syringe- and needle-exchange programme would be justifiable based on the experience already available … When prison authorities have any evidence that injecting is occurring, they should consider an exchange scheme, regardless of the current prevalence of HIV infection".

**It is therefore recommended that:**

1. **Prison authorities in countries experiencing or threatened by an epidemic of HIV infections among IDUs should introduce needle and syringe programmes urgently and expand implementation to scale as soon as possible**.

   The overall success of the evaluated prison-based NSPs and the other available data reviewed for this report present a compelling case that prison-based NSPs are feasible, and suggest that they reduce sharing of injecting equipment and the resulting spread of HIV infections. This suggests that similar programmes may be beneficial in any prison with a problem of injecting drug use and associated sharing of injecting equipment.

   The higher the prevalence of injecting drug use and associated risk behaviour is in prison, the more urgent introduction of prison-based NSPs becomes.

   Monitoring and evaluation is an important component of any programme. While pilot projects of prison-based NSPs may be important in allowing the introduction of these programmes and to overcome objections against such programmes, they should not delay the expansion of the programmes, particularly where there already is evidence of high levels of injecting in prisons.

2. **Additional research about prison-based NSPs should be undertaken to address remaining knowledge gaps.**

   This review has demonstrated significant gaps in research. In particular, more research in resource-poor systems outside Western Europe could allow for more rapid expansion of NSPs in these systems. Research in other systems should be designed to address research gaps rather than replicate existing studies.Evaluation of pilot programmes may be justified if: (1) the evaluation takes place in settings that are sufficiently different from settings in which evaluations have already been undertaken; or (2) it addresses research gaps.

# 3. EVIDENCE REGARDING BLEACH AND DECONTAMINATION STRATEGIES

## 3.1 Background

Programmes providing bleach or other disinfectants for sterilizing needles and syringes to reduce HIV transmission among injecting drug users in the community were first introduced in San Francisco, United States, in 1986 (Normand, Vlahov, Moses, 1995). Such programmes have received support particularly in situations where opposition to NSPs has been strongest, including in prisons in most countries (Rutter et al., 2001).

The number of prison systems that make disinfectants – mainly in the form of bleach - available to prisoners has continued to grow, but already in 1991, 16 of 52 prison systems surveyed made them available, including in Africa and Central America (Harding & Schaller, 1992). In surveys undertaken in Europe, the proportion of prison systems that make bleach available rose from 28 percent in 1992 to 50 percent in 1997 (European Network on HIV/AIDS and Hepatitis Prevention in Prisons, 1997). Today, bleach or other disinfectants are available in many other prison systems, including in Australia, Canada, Indonesia, Iran, and some systems in Eastern Europe and Central Asia (Lines, 2002, Dolan, 1999; Canadian HIV/AIDS Legal Network, 2006).

## 3.2 Evidence of effectiveness of programmes providing bleach in community settings

WHO (2004, at 28) has concluded that the "evidence supporting the effectiveness of bleach in decontamination of injecting equipment and other forms of disinfection is weak." WHO pointed out that the efficacy of bleach as a disinfectant for inactivating HIV has been shown in numerous laboratory studies; that higher concentrations of bleach, although not always necessary, are more effective; and that contact time with bleach and the presence of other matter, such as clotted blood in syringes, are also important factors influencing efficacy (WHO, 2004 at 9). However, notwithstanding the strength of the laboratory data, field studies have cast "considerable doubt on the likelihood that these measures could ever be effective in operational conditions" (WHO, 2004 at 28). They concluded that disinfection of needles with bleach appeared to offer no protection, or at best little protection, against HIV infection (Chaisson et al., 1987; Vlahov et al., 1991; Titus et al., 1994; Vlahov et al., 1994).

Moreover, two studies assessed the effect of bleach on hepatitis C virus (HCV) prevalence and neither found a significant effect of bleach on HCV seroconversion (Kapadia et al., 2002; Hagan et al., 2001). At best, one of the studies (Kapadia et al., 2002) suggests a small (and probably insignificant) reduction of HCV infection.

## 3.3 Evidence from studies undertaken in prisons

Only a small number of studies have evaluated programmes providing bleach or other disinfectants in prison, and even fewer have focused on the health effects of such programmes.

### 3.3.1 Reduction of risk behaviours and of infections

The first two studies to allow the independent monitoring of a prison bleach-distribution programme were undertaken in Australia. They found that most prisoners could obtain bleach and that virtually all prisoners who were using non-sterile injecting equipment reported cleaning the syringes with bleach (Dolan et al., 1994; Dolan et al., 1996b; Dolan, Wodak, Hall, 1998; Dolan, Wodak, Hall, 1999). The studies also found that there was a significant improvement in access to bleach between the first and second study. Other Australian studies also showed that, when bleach is made available, a significant proportion of injecting drug users in prison clean syringes with bleach, but rates in some prisons were significantly lower (Rutter et al, 2001).

An evaluation of harm reduction measures in the Canadian federal prison system also reported relatively easy access to bleach, though in a few prisons access was not discreet (Correctional Service of Canada, 1999). In contrast, in a small qualitative study designed to examine the health risks experienced by male prisoners who inject drugs in British Columbia, Canada, prisoners claimed that the supply and quality of bleach in prisons was inconsistent, and that bleach is not always kept in an appropriate, accessible location (Small, 2005).

While studies show that a significant number of prisoners will clean syringes with bleach if it is accessible, studies also highlight that conditions in prisons make it even more unlikely than in the community that injecting equipment will be effectively decontaminated with bleach. The research

team that conducted the evaluation in the Canadian federal prison system (Correctional Service of Canada, 1999) stated that it had "no confidence that the distribution of bleach alone will effectively reduce transmission of infection from Hepatitis or HIV". It concluded that "because of the clandestine and furtive nature under which injection drug users operate in prison settings; of the primitive and make shift equipment used to inject drugs; and, of the tendency of injection drug users to "cut corners" when their cravings overcome their judgment, there is no guarantee that the use of bleach alone will effectively reduce transmission of infection from HIV or Hepatitis C."

This is consistent with the findings of the other studies that examined prisoners' use of bleach, which reported that only a small number of prisoners reported adopting recommended syringe cleaning guidelines (Dolan & Wodak, 1998); bleaching of equipment in prisons "does not occur consistently, and most likely bleaching is performed too quickly when it is done" (Small, 2005); and that, while most prisoners claimed always to clean used equipment, "because prisoners can be accosted at any moment by prison officers, injecting and cleaning is a hurried affair" (Taylor & Goldberg, 1996).

### 3.3.2 Safety and security

There are no reports of any serious safety or security problems related to bleach programmes in prisons. The only evaluation that examined whether there were any unintended consequences related to the distribution of bleach kits in prison reported that both prisoners and staff said that bleach had become a 'fact of life' in prisons. Interviews with staff indicated that, with a few exceptions, staff concerns in terms of safety have abated (Correctional Service of Canada, 1999).

## 3.4 Conclusions and recommendations

**Disinfection and decontamination schemes in the community outside prisons are not supported by evidence of effectiveness. In prisons, effectiveness may be reduced even further.**
The type of syringes available in prisons may be more difficult to effectively disinfect with bleach, prisoners may have problems accessing bleach, and cleaning is a time consuming procedure and prisoners may be reticent to engage in any activity that increases the risk that prison staff will be alerted to their drug use. As WHO Europe has pointed out, "prisoners are highly unlikely to spend 45 minutes shaking the syringes to clean them while waiting to inject in some hidden corner of the prison. Bleach can therefore create a false sense of security between prisoners sharing paraphernalia. The effectiveness of disinfection procedures … depends greatly on the method used. Effectiveness varies and disinfection is now regarded as a second-line strategy to needle- and syringe-exchange programmes" (WHO Europe, 2005).

**Distribution of bleach or other disinfectants is feasible in prisons and does not compromise security.**
Disinfectants (mainly in the form of bleach) have been made available in a wide range of prison systems in different parts of the world. No reports of any serious safety or security problems related to bleach programmes could be found.

**Because of their limited effectiveness, bleach programmes can only be regarded as a second-line strategy to NSPs.** Therefore:

- Bleach programmes should be available in prisons where authorities continue to oppose the introduction of NSPs despite evidence of their effectiveness, and to complement NSPs. However, they cannot replace NSPs.
- Where bleach programmes are implemented, bleach should be made easily and discreetly accessible to prisoners in various locations in the prison, together with information and education about how to clean injecting equipment and information about the limited efficacy of bleach as a disinfectant for inactivating HIV and particularly HCV.
- Where bleach programmes exist in prisons, but not NSPs, public health practitioners should continue to advocate for the introduction of NSPs.

# Table 1: Examples of studies that have examined injecting behaviour in prison

| Location | Nr | % injected | % shared | Reference |
|---|---|---|---|---|
| Australia | 2,482 | 36 | 60 | Wodak 1989 |
| Australia (NSW) | 7 studies | 31-74 | 70-94 | Dolan & Wodak, 1999, with further references |
| Australia (SA) | 50 | 52 | 60 | Gaughwin, Douglas & Wodak 1991 |
| Canada | 4,285 | 11 | | Correctional Service Canada 1996 |
| Canada | 350 | 18.3 | | Ford et al. 2000 |
| Canada | 105 f | 19 | | DiCenso, Dias, Gahagan 2003 |
| Canada | 102 | 21 | 86 | Elwood Martin et al 2005 |
| Canada | >1,200 | 27 | 80 | Small et al., 2005 |
| Canada | 439 m, 158f | 3.3 | 32 | Calzavara et al., 2003 |
| Canada | 450 | 2.4 | 92 | Dufour et al 1996 |
| England | 378 | 11.6 | 73 | Edwards, Curtis, Sherrard, 1999 |
| Europe (cross-sectional: France, Germany, Italy, Netherlands, Scotland, Sweden) | 871 | 13 | | Rotily et al 2001b |
| European Union & Norway | | 0.2-34 | | EMCDD, 2005 |
| Greece | 544 | 24.1 | 92 | Malliori et al 1998 |
| Greece | 861 | 20.2 | 83 | Koulierakis et al 1999 |
| Ireland | 1178 | | 70.5 | Allright et al. 2000 |
| Mauritius | 100 m, 50 f, 50 youth (25 m, 25f) | 10.8 of adults, 2.1 of youth | | RSA Mauritius, 2005 |
| Netherlands | 497 injecting drug users | 3 | 0 | Van Haastrecht et al., 1998 |
| Russian Federation | 1,044 | 10 | 66 | Frost & Tchertkov, 2002 |
| Russian Federation | 277 | 13 | | Dolan, Bijl & White, 2004 |
| Scotland | | 15.9 | | Gore et al. 1995 |
| Thailand | 689 | 25 | 77.8 | Thaisri et al. 2003 |
| United States | 281 m, 191 f | 31% of injecting drug users with history of imprisonment had used illegal drugs in prison, and nearly half of these had injected in prison | | Clarke et al. 2001 |

# Table 2: Association of HIV, HCV, and HBV among injecting drug users with a history of imprisonment

| Eastern Europe | Study | Finding |
|---|---|---|
| Russian Federation | Heimer et al., 2005 | In this study of 826 injecting drug users in various cities in the Russian Federation, 44.8% reported ever having been to prison. Four health factors were correlated with imprisonment (HIV-positive; TB-positive, overdose and abscesses), while three were not (STIs, HBV and HCV). |

| Latin America | Study | Finding |
|---|---|---|
| Brazil | Varella et al., 1996 | In this study of 82 male transvestites imprisoned in Sao Paulo, the factors associated with significant differences in positivity were the time spent in prison and the number of sexual partners during the previous year. |
| Brazil | Kallas et al., 1998 | In this study of 780 prisoners in Sao Paulo, multivariate logistic regression analysis identified previous incarceration as an independent risk factor for HIV seropositive. |
| Brazil | Marins et al., 2000 | In this study of prevalence and risk factors for HIV among 1059 prisoners, the number of previous incarcerations (1 compared to 0) (*OR* = 1.7, 95% *CI* 1.07–2.7) was an independent predictor of HIV. |
| Brazil | Guimaraes et., 2001 | In this study of 779 prisoners of a prison in Sao Paolo, a time of current imprisonment longer than 130 months and previous incarceration at the same prison were associated with a positive anti-HCV serological test. |
| Brazil | Hacker et al., 2005 | 609 active/ex-injecting drug users were recruited from different communities, interviewed, and tested for HIV. Among male long-term injectors, "to have ever injected with anyone infected with HIV" (Adj OR = 3.91; 95% CI 1.09-14.06) and to have "ever been in prison" (Adj OR = 2.56; 95% CI 1.05-6.24) were found to be significantly associated with HIV infection. |

| North America | Study | Finding |
|---|---|---|
| Canada | Tyndall et al., 2003 | In this study of injecting drug users in Vancouver, having been incarcerated in the last six months was independently associated with a markedly elevated incidence of HIV infection |
| Canada | Hagan, 2003 | This external evaluation of the data in Tyndall et al. (2003) suggested that 21% of HIV infections among injecting drug users in Vancouver between 1996 and 2001 may have been attributable to infection during incarceration (Hagan, 2003). |
| Canada | Wood et al., 2005 | Behaviours that can directly contribute to HIV infection (syringe borrowing and lending) were strongly and independently associated with reports of recent incarceration |
| Canada | Calzavara et al., 2005 | Having a previous federal incarceration was found to be a risk factor significantly associated with HIV and HCV infection among adult prisoners in the Ontario provincial prison system. |
| United States | Fox et al., 2005 | In this study of HCV infection among prisoners in the California state correctional system, independent correlates of HCV infection among both injecting drug user and non- injecting drug user prisoners included cumulative time of incarceration. |

| Pacific, South and South-East Asia | Study | Finding |
|---|---|---|
| Australia | Butler et al., 1997 | Among prisoners entering the New South Wales correctional system, multivariate analysis identified previous imprisonment as a significant predictor for HCV infection |
| Australia | Butler et al., 1999 | Multivariate analysis identified injecting while in prison as a major risk factor for HBV, and institutionalization as a factor for HCV. |
| Australia | Van Beek et al., 1998 | A history of imprisonment was found to be an independent predictor of HCV seroconversion; HCV incidence was substantially higher among injecting drug users who had been imprisoned (60,8/100 person years) than those who had not (12,5/100 person years) . |
| Australia | Hellard, Hocking, Crofts (2004) | HCV-positive prisoners were more likely to have injected drugs (OR 29.9) and to have injected drugs in prison during their current incarceration (OR 3.0); injecting drugs whilst in prison during this incarceration was a risk factor for HCV. |
| Australia | Gates et al., 2004 | A history of prior imprisonment was a risk factor associated with HCV infection. |
| Islamic Republic of Iran | Zamani et al., 2005 | Among male injectors visiting treatment centres in Tehran, a history of shared injection inside prison (adjusted odds ration (OR, 12.37; 95% CI, 2.94-51.97) was the main factor associated with HIV-1 infection. |
| Thailand | Choopanya et al., 1991 | Bangkok injecting drug users with a history of prison were about twice as likely to be HIV-positive as those who had never been jailed. |
| Thailand | Kitayaporn et al., 1998 | Concluded that Bangkok injecting drug users continue to be at high risk for HIV infection related to use of non-sterile injecting equipment and incarceration. |
| Thailand | Vanichseni et al., 2001 | In a cohort of injecting drug users in Bangkok, people who injected while incarcerated had a higher incidence of HIV infection (35.3 per 100 person years of observation) than those who had been incarcerated but had not injected (11.3 per 100) and those who had not been incarcerated (4.9 per 100). The authors concluded that the "great risk associated with incarceration warrants special attention. Although the risk associated with incarceration is not fully characterized, it is likely that a large proportion of this risk results from the use of non-sterile injecting equipment in settings where access to clean syringes and needles is severely limited." |
| Thailand | Beyrer et al., 2003 | This study reaffirmed the association between incarceration and HIV infection among Thai male and female injecting drug users. |

| Western Europe | Study | Finding |
|---|---|---|
| England & Wales | Weild et al., 2000 | Presence of anti-HCV was associated with injecting drug use inside prison and number of previous times in prison |
| France | Richardson et al., 1993 | Imprisonment associated with HIV infection. |
| Germany | Stark & Muller, 1993; Muller et al., 1995; Stark et al., 1995a; 1995b; 1997 | The use of non-sterile injecting equipment in prison was the most important independent determinant of HIV infection among a sample of injecting drug users in Berlin, and also an important determinant of HBV and HCV infection. |

| | | |
|---|---|---|
| Greece | Malliori et al., 1998 | The use of non-sterile injecting equipment in prison, and multiple imprisonments are the most important risk factors for HCV infection in injecting drug users. |
| Greece | Koulierakis et al., 2000 | In this study among prisoners in 10 Greek prisons, logistic regression analysis suggested that total time in prison, previous drug conviction, being a convict (as opposed to on remand) and having multiple female sexual partners 1 year before incarceration were significant HIV risk behaviour correlates. For every year of imprisonment, the risk of injection in prison increased by about 17% [OR = 1.17 (95% CI: 1.07-1.27) |
| Ireland | Allright et al., 2000 | Time in prison over the past ten years and the use of non-sterile injecting equipment while in prison associated with HCV positivity. Concluded that "being in prison in Ireland may be an independent risk factor for contracting hepatitis C infection." |
| Italy | Babudieri et al., 2005 | Frequency of imprisonment and tattoos were associated, respectively, with HIV and HCV positivity in a sample of prisoners from 8 Italian prisons. |
| Scotland | Davies et al., 1995 | HIV infection was significantly associated with being imprisoned among a city-wide sample of injecting drug users in Edinburgh who had injected in the previous 6 months. |
| Scotland | Champion et al., 2004 | Ever having injected drugs (relative risk= 13.0, 95% CI: 1.5, 114.3) and having shared needles/syringes in prison (relative risk= 9.0, 95% CI: 1.1, 71.7) were significantly associated with HCV seroconversion in prison. |
| Scotland | Seaman & Bird, 2001 | No conclusive effect of incarceration on risk of HIV infection was found, but there was a suggestion that imprisonment might have been a significant relative risk factor for infection after risk behaviour among drug users in the community was reduced, due to introduction of NSPs. |
| Spain | Estebanez et al., 1990 | Seropositivity increases with the number of times individuals are incarcerated. |
| Spain | Granados et al., 1990 | Imprisonment associated with HIV infection. |
| Spain | Anon et al., 1995 | HCV correlated with duration & number of imprisonments. |
| Spain | Pallas et al., 1999 | Reincarceration and long-term injecting were the foremost risk factors for HBC-HCV and for HIV-HBV-HCV co-infection among injecting drug using prisoners. |
| Spain | Martin et al., 1998 | Multiple incarceration histories and long-term imprisonment associated with higher risk of HIV infection. |
| Wales | McBride et al., 1994 | HCV associated with history of imprisonment. |
| Multi-centre | Estebanez et al., 2000 | In a multicentred, cross-sectional study undertaken in a population of female injecting drug users recruited from a variety of settings in Berlin,, London ,Madrid, Paris and Rome, factors independently associated with HIV prevalence in the regression analysis included previous imprisonment (OR = 1.4). |

## Table 3: Countries with needle and syringe programmes in prisons

| Country | Start of programmes | Number of prisons with NSPs (as of 2006) |
|---|---|---|
| Switzerland | 1992 | 7 |
| Germany | 1996 | 1 (6 NSPs were closed as a result of political decisions) |
| Spain | 1997 | 38 |
| Republic of Moldova | 1999 | 7 |
| Kyrgyz Republic | 2002 | 11 |
| Belarus | 2003 | 1 (as of 2004) |
| Armenia | 2004 | 3 |
| Luxembourg | 2005 | 1 |
| Islamic Republic of Iran | 2005 | 1 to 6 (five programmes to be opened in 2006) |
| Ukraine | 2007 | 2 pilot projects expected to start in 2007 |
| Scotland | 2007 | one 2-year pilot study approved for start in 2007 |
| Portugal | 2007-2008 | implementation of NSPs by 2008 |

## Table 4: Sample evaluations of needle and syringe programmes in prisons

| Prison, Country | Incidence of HIV/HCV | Needle Sharing | Drug Use | Injecting |
|---|---|---|---|---|
| Am Hasenberge (D) (reported in Stöver & Nelles, 2003) | no data | strongly reduced | no increase | no increase |
| Basauri (E) (Menoyo, Zulaica, Parras, 2000) | no seroconversion | strongly reduced | no increase | no increase |
| Hannöversand (D) (reported in Stöver & Nelles, 2003) | no data | strongly reduced | no increase | no increase |
| Hindelbank (SUI) (Nelles, Dobler-Mikola, Kaufmann, 1997) | no seroconversion | strongly reduced | decrease | no increase |
| Berlin (Lehrter Strasse and Lichtenberg (Stark et al., 2005) | | strongly reduced | no increase | no increase* |
| Lingen 1 (D) (Stöver, 2000; Jacob & Stöver, 2000a) | no seroconversion | strongly reduced | no increase | no increase |
| Realta (SUI) (Nelles, Fuhrer, Vincenz, 1999) | no seroconversion | single cases | decrease | no increase |
| Vechta (D) (Stöver, 2000; Jacob & Stöver, 2000a)) | no seroconversion | strongly reduced | no increase | no increase |
| Vierlande (D) (Heinemann & Gross, 2001) | no seroconversion | little change or reduction | no increase | no increase |

(adapted from Thomas, 2005; Stöver & Nelles, 2003; Rutter et al., 2001)
* 2 people who had previously only inhaled heroin reported injecting drug use on single occasions.

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