European Monitoring Centre
for Drugs and Drug Addiction

A Short Briefing Paper

A European perspective on responding to blood borne infections among injecting drug users

A paper prepared by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) at the request of the Horizontal Drugs Group of the Council of the European Union.

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1. Purpose of this document

This paper, prepared at the request of the HDG of the Council of the EU, is intended to provide a short overview of issues pertinent to European participation in the planned CND thematic debates on drug abuse and HIV / AIDS prevention to be held at the forthcoming session of the Commission on Narcotic Drugs (CND) March 2005[1].

This paper is not intended as a comprehensive review of the considerable volume of evidence in this area; rather, the objective is to provide a short top-level summary of some of the key issues. A number of the more important supporting references are provided at the end of this document and the EMCDDA can be contacted for a more detailed discussion on the technical and scientific background to any of the summary points raised here.

2. Overview

Diversity exists across Europe in terms of the nature and scale of the drug injecting problem, historical experience of epidemics of HIV and other blood borne diseases, and the configuration and scale of responses.

Nonetheless, the European perspective has also been shaped by some common influences. First, all countries experienced rising levels of drug injection at some point from the 1980's onwards. Today, in a number of countries the prevalence of drug injecting appears to have stabilised or even fallen since the later part of the 1990's. However, in several of the old EU Member States and some of the new Members states of the Union concerns about high or rising levels of drug injection remain.

Second, EU Member States have committed themselves to a balanced and evidence-based approach to drug demand reduction that includes prevention measures, the provision of treatment for drug problems, the development of measures to access drug users not in contact with services, and in addition interventions that reduce the damage that drug use can cause both to individuals and their communities. The European perspective in this respect - and as elaborated in the Vilnius and Dublin declarations - accords with the international consensus that can be found in the deliberations from many international forums. Notably these include the Declaration of the Guiding Principles of Drug Demand Reduction that accompanied the Political Declaration of the United Nations Special Session on addressing the world drug problem together (UNGASS, June, 1998).

With particular reference to HIV prevention and within the overall context of a comprehensive approach to addressing drug problems these measures include education and counselling, low threshold services, increased access to treatment and substitution treatment in particular; and the provision of needles and syringe exchange services deserves special mention. A relatively robust evidence base exists for the

[1] In particular, the plenary session thematic debate (b) '*Prevention of HIV/AIDS and other blood borne diseases in the context of drug abuse*' and also discussions on a later agenda item '*world situation with regard to drug abuse*', where the commission secretariat will table a paper in response to CND resolution 47/2 *Prevention of HIV/AIDS among drug users* which will report on "*Progress made in the effectiveness of drug related HIV/AIDS prevention programmes".*

effectiveness of each of these approaches in preventing HIV transmission among drug users and all EU Member States include them in their demand reduction activities, although the extent of provision varies between countries. The balance of services also varies between Member States although over time there has been a general increase in investment in treatment and risk reduction measures, including needle and syringe exchange. One notable exception here is Sweden, where greater emphasis has been given to education, counselling and treatment initiatives and where needle and syringe exchange provision has remained very limited. In respect of the countries that joined the European Union in 2004, a number of countries have acted quickly to invest in HIV prevention measures and some evidence exists to suggest that this timely action is reflected in continuing low levels of infection among their IDU populations or, alternatively, that this action has been made as a response to outbreaks of HIV among IDUs.

Although it would be wrong to be complacent - for concern exists about the potential for new localised epidemics among IDU populations, especially, but not limited to, the new countries of the European Union - it is possible to detect some positive messages from the European experience in addressing HIV problems among drug injectors. The EU Action Plan 2000-2004 on Drugs explicitly targeted drug-related damage - including blood-borne infection - and increased treatment access. In these areas some progress can be observed. In the Snapshot analysis, restricted to the 15 EU Member States prior to enlargement, that was prepared by EMCDDA and EUROPOL to support the Commission in the evaluation of the action plan, it was noted that evidence from a range of indicators has suggested overall that the rate of drug injecting among heroin users has been declining in some countries, that the epidemic rise in heroin use seen in the 1980s and early to mid 1990s has now stabilised, though mostly at high levels, and that the number of new cases of drug injecting is also now likely to be correspondingly lower. This conclusion is supported by the observation that in some countries the ratio of injectors to non-injectors has fallen among those heroin users new to drug treatment. Although considerable variation exists between countries in terms of HIV prevalence among drug injectors, the available data suggests that rates generally remain stable or are even in decline in some of the most affected countries although as already noted new rises continue to occur in several countries or regions. Additionally the snapshot reported an overall increase in the availability of treatment over the period of review.

3. Summary of main conclusions

Overall the European experience offers some valuable lessons that can inform a global debate on HIV prevention among injecting drug users. HIV infection among drug injectors has been recognised as an important public health problem and HIV prevention measures are recognised as a key part of a demand reduction strategy. European Countries have also worked to improve the information available in this area and the monitoring of infectious diseases among IDUs is one of the key indicators developed by EMCDDA. Although the national policies of Member States vary, reflecting their individual drug situation and political context, there is also increasing evidence of a consensus emerging at the European level on the key elements necessary for an effective response to combating HIV among injecting drug users.

Despite being faced with the potential for widespread HIV transmission among drug injectors during the 1980s and 1990s some European countries where able to avoid epidemic spread. A strong argument can be made that this was largely due to the rapid implementation of appropriate responses. These included enhanced access to drug treatment, the development of low threshold services, educational work and provision of sterile equipment although it must be noted that differences are observable between countries in respect to the emphasis they put on these different service elements.

Not all countries were as fortunate and in some Member States the rates of HIV infection among IDUs reached very high levels. Subsequently, however, and again usually accompanied by the implementation of appropriate demand reduction measures, HIV transmission among injectors in those countries has fallen from the initial high epidemic levels. Two important caveats to this analysis can be noted. First, the situation in the new Member States joining the Union in 2004 remains less clear. Some countries have experienced recent problems and the potential for further problems elsewhere remains. More positively though, a number of the new Member States have been quick to implement responses aimed at reducing the risk of HIV transmission among injectors; overall services access appears to be improving in many countries; and HIV prevalence among IDUs has also remained very low in a number of new Member States. Second, studies of drug injectors in treatment and non-treatment settings across Europe show high rates of HCV infection. HCV prevention therefore remains an important area for further research and service development and is likely to become an increasingly important public health issue across Europe.

Among the lessons that emerge from the European experience and that may be pertinent to a global debate is a balance of evidence suggesting: that it is possible to act to avert widespread epidemics of HIV among IDUs if appropriate measures are implemented before epidemic spread has occurred; that even when HIV prevalence rates are high among IDUs demand reduction measures can help stabilise prevalence and reduce incidence rates; that benefits accrue from the development of a comprehensive set of responses that includes elements targeting drug injectors out of contact with formal services; and that there is value in working to develop assessment tools for monitoring trends in drug injection, risk behaviour and infections in both institutional and non–institutional settings. It is also important to note that an analysis of the European experience shows, within the general framework of the comprehensive and balanced approach outlined above, differences in the investment and configuration of services by those Member States who have been able to maintain low rates of HIV infection. This indicates the importance of ensuring that services are configured to be sensitive to the national context within which they operate.

It is important to remember that in addition to HIV other blood borne diseases are also associated with drug injecting. Of particular concern is that rates of hepatitis C (HCV) infection among drug injectors in Europe, as elsewhere, remain worryingly high. The long term health and social costs of hepatitis C infection are likely to be considerable. Currently our understanding of how to respond effectively to this problem remains limited and hepatitis C prevention therefore remains a critically important area for research and service development.

SUPPORTING NOTES

A) Background to a European perspective

The potential for the use of non-sterile injecting equipment to result in the rapid spread of blood borne diseases among drug injectors has been well understood since the mid 1980's and it has been documented in a number of such outbreaks . Historically the main focus of concern has been HIV, but more recently attention has also been focused on hepatitis C virus (HCV), hepatitis B virus (HBV).

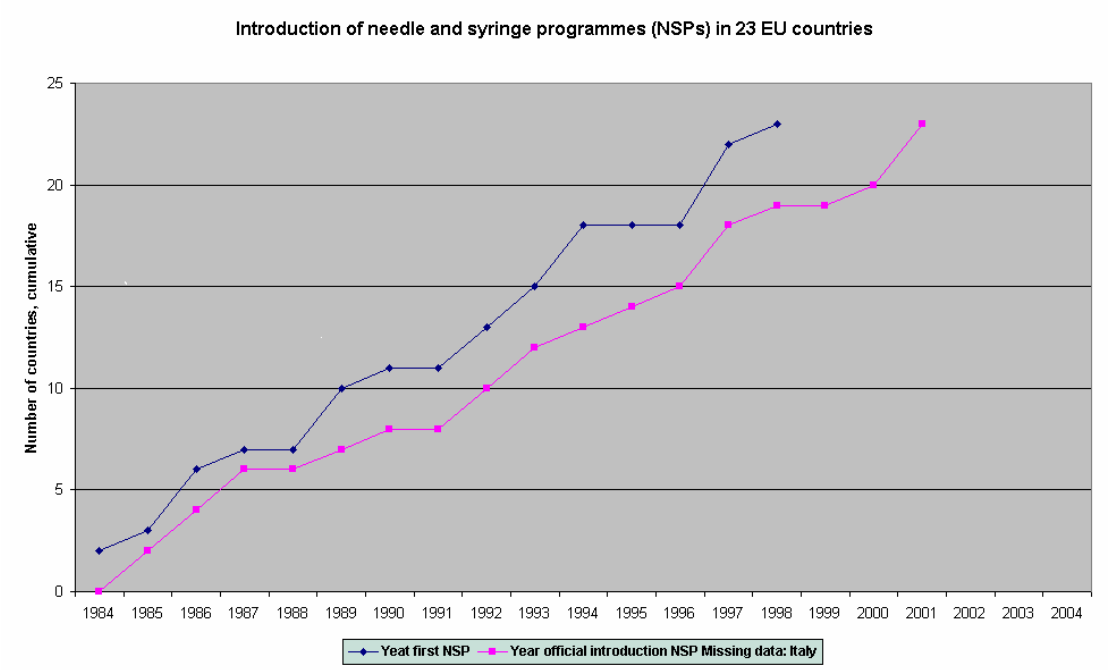
The spread of drug injecting that occurred from the 1980's onwards across most of the then EU countries meant that the potential for epidemic spread of HIV represented an important public health challenge. Some countries experienced large HIV epidemics among drug injectors; elsewhere the potential existed but problems remained localised or were largely avoided.

Currently HIV infection rates among injecting drug users vary considerably across Europe. Trends in prevalence among IDUs in the most affected countries generally show a slow decrease, but this is not uniform and in some regions and subgroups the there is no decrease or prevalence is even increasing. Outbreaks of HIV and increases in prevalence continue to occur in IDUs and are in some cases followed by more intense prevention efforts, including the setting up of needle and syringe exchange programmes. HIV incidence among IDUs has generally decreased strongly since the epidemic phase of the 1980s - in some countries, the early to mid 1990s - and is now generally very low; the exceptions are the mentioned outbreaks and local increases that continue occurring in different countries. The picture of generally low new infection rates, but with local variation, against a background of very large differences in established prevalence rates is confirmed by data on prevalence among young and new injecting drug users that in general show low levels, although again with worryingly high levels or increases in some countries.
In general terms the European approach that has developed to address this problem conforms to the agreed international consensus. Responses should be balanced and evidence-based. In particular, effective HIV prevention within the context of drug use is likely to require three elements – a) prevention, b) facilitating access to treatment, and c) outreach measures that engage drug users with prevention strategies that protect them and their contacts from exposure to HIV.

European countries have in large part developed demand reduction strategies that combine these three elements. The mix though of programmes and of emphasis varies somewhat between countries, in part reflecting the national context and nature of the local drug problem. The evaluation of the EU action plan for the 15 Member States prior to enlargement noted an overall increase in treatment capacity, stabilisation in the number of drug injectors in some countries - or in some cases even a fall - and generally low HIV transmission among drug injectors over the period reviewed.

B) The provision of sterile injecting equipment in Europe

Over recent years in many European countries a formal legal basis for the provision of sterile injecting equipment to drug injectors has been established. Needle and syringe programmes started in the EU in the mid 1980s as response to the threat of an HIV epidemic among drug injectors. By 1992, official programmes existed already in more than one third of the current 25 EU Member States. Today, needle and syringe programmes are available in all EU countries, except Cyprus, where sterile equipment is however available for free at pharmacies and an official needle and syringe programme is under consideration. Once introduced in a country, the geographical coverage of outlets for needle exchange has generally increased over time and many countries have now achieved full geographical coverage, with pharmacies being a crucial partner in several Member States. However in Sweden, the two programmes that were started in 1986 in the south of the country remain the only ones; and in Greece, needle exchange is only available in Athens.



Needle exchange activity is usually integrated firmly into the work of low-threshold drug counselling agencies, outreach work and the care for the homeless in the EU countries. As these services are often successful in reaching hidden populations of active drug users, they can be an important starting point for contact, prevention, education and advice, as well as for referrals to treatment. It is also increasingly recognised that low threshold services can be an important platform for offering basic medical care, infectious disease screening, vaccination and viral treatment to members of the community who, for a variety of reasons, may find it difficult to access more formal health care services.

In recent years, European countries have created a firmer legal basis for the provision of sterile injecting equipment to drug injectors. Needle exchange is the predominant approach to the prevention of infectious diseases among drug users in two thirds of EU Member States and a common approach in a further five (Source EMCDDA: SQ

23/2004, Q.5); and it is considered a priority policy response to infectious diseases in at least every second country.

C) Studies on the effectiveness of needle and syringe exchange

Evaluating the effectiveness of any drug demand reduction initiatives is never a simple business. Drug users are a stigmatised group and are hard to access, with considerable heterogeneity between sub-populations; all this makes the direct comparison of results from different studies difficult. Interventions themselves are rarely standardised and often contain differing elements. The strongest evidence of effectiveness comes from studies using experimental design, but these are rarely practical in the drugs field and the ability to control for important confounding effects is usually limited.

Despite these difficulties researchers have developed methods that allow us to have some reasonable confidence in assessing the effectiveness of different demand reduction approaches and the evaluation of needle and exchange provision is no different in this respect. Evaluation in this area is complicated by, among other things, differences in programme delivery, the characteristics and risk behaviour of the target population, the phase that the HIV epidemic has reached, cultural factors, interactions with patterns of sexual risk behaviour, other services' availability and overall service mix, interaction with other drug control measures and the choice of outcome measures to use. However, due to its importance and in part because of its sometimes controversial nature, this kind of activity has attracted considerable research attention. A number of papers offer a systematic review of the literature in this area and overall the evidence strongly supports the contention that needle and syringe exchange provision can make an important contribution to reducing HIV transmission in drug injectors. Furthermore, needle and exchange provision can be effective in engaging with populations of drug users not in contact with other services and may provide a conduit to drug treatment and primary health care services. No convincing evidence exists that its provision negatively impacts on other prevention or drug control activities.

In the context of drug control activities as a whole, then, the weight of the evidence is that individuals and their communities are more likely to benefit from than be harmed by inclusion of needle and syringe exchange provision within a comprehensive drug control strategy. There is a minority of studies that observe either a) no differences between the HIV risk profile of syringe exchange attendees and non-attendees or b) attendees reporting higher risk profiles. It is important to note that these observations can be attributed to differences in the study populations (i.e. attendees being a more chronic and higher risk group – sometimes referred to as the magnet effect) or to the widespread availability of sterile injecting equipment from other sources in the study location (saturation effect). As with all other interventions the possibility of poorly designed or managed schemes having an isolated negative impact exits. As with other demand reduction interventions, a number of different models of service delivery are possible and it is important to develop models of good practice that are sensitive to the needs of the communities where they are implemented.

With respect to the impact of providing sterile needle and syringes on the prevention of other drug-related, blood-borne infections, in particular hepatitis C (HCV), the position is less clear and this remains an important area for further research and service development in Europe as elsewhere

D) The European Context – towards a policy framework for reducing HIV transmission among drug injectors

Although differences exist in respect of how different Member States have responded to the challenge of reducing HIV transmission among IDUs, there is evidence of a developing consensus on some of the key elements that are necessary for effective action at the European level. In two recent Conferences, European Government representatives have confirmed their partnership in the fight against HIV/AIDS and defined measures to strengthen their responses in this area.

In the Dublin Declaration (February 2004), among other recommendations, agreement was reached to "… *scale up access for injecting drug users to prevention, drug dependence treatment and harm reduction services through promoting, enabling and strengthening the widespread introduction of prevention, drug dependence treatment and harm reduction programmes* [2] *(e.g. needle and syringe programmes, bleach and condom distribution, voluntary HIV counselling and testing, substitution drug therapy, STI diagnosis and treatment) in line with national policies"*; and in the Vilnius Declaration (September 2004) agreement to *"provide universal, affordable, non-judgmental and non-discriminating access to prevention services for HIV/AIDS and other sexually transmitted infections, including i.a. preventive information and activities, voluntary and confidential counseling and testing, condoms, drug dependence treatment and harm reduction services for drug injectors* [3] *and prevention of mother-to-child transmission.*

The relevance of specific responses aiming at a reduction of infectious diseases and deaths among drug users with regard to public health in a wider European Union context had also been highlighted in Summer 2003, when the Council of Ministers achieved consensus on a list of recommendations on the prevention and reduction of health-related harm associated with drug dependence (2003/488/EC).

As the first EU Recommendation in the field of public health concerning drugs, this text recommends that:

- Member States should, in order to provide for a high level of health protection, set as a public health objective the prevention of drug dependence and the reduction of related risks, and develop and implement comprehensive strategies accordingly.
- Member States should, in order to reduce substantially the incidence of drug-related health damage (such as HIV, hepatitis B and C and tuberculosis) and the number of drug-related deaths, make available, as an integral part of their

[2] The WHO recommends that at least 60% of injecting drug users have access to drug dependence treatment and harm reduction programmes in order to have an impact on the epidemic among this group

[3] Accordance with agreed definitions in the Dublin Declaration (para.10 – quoted above)

overall drug prevention and treatment policies, a range of different services and facilities, particularly aiming at risk reduction; (…), bearing in mind the general objective, in the first place, to prevent drug abuse (...).

- Member States should consider a specified list of actions, in order to develop appropriate evaluation to increase the effectiveness and efficiency of drug prevention and the reduction of drug-related health risks (...).

E) The International context – an on-going debate

International consideration of the issue of reducing HIV and other blood-borne diseases among injectors is not new and the CND debate can be seen as part of an on-going dialogue in which some consensus has already been established. To large extent, policy and practice in Europe directly concords with many of the key international conclusions in this area. Some of the most relevant sources are noted below.

Among the useful international sources of reference in this area that provide a context for the current debate are:

 The Political Declaration of the General Assembly devoted to countering the world drug problem together 8-10 June 1998, (UNGASS) and the accompanying Declaration on the Guiding Principles of Drug Demand Reduction. Importantly here, the following were noted:

- the commitment of a balanced and integrated approach between demand and supply reduction actions, the explicit linked aims *of preventing the use and reducing the adverse consequences of drug abuse* (section III.8.b.i.),
- the need to integrate demand reduction measures into *broader social welfare and health promotion policies and prevention education programmes and that such efforts should be comprehensive, multifaceted, coordinated and integrated with social and public policies that influence the overall health and social and economic well-being of people (*section C.12)*;*
- the need for evidence based, culturally sensitive and evaluated actions.

 The United Nations paper – ***Preventing the Transmission of HIV Among Drug Abusers – A position paper of the United Nations System*** – endorsed on behalf of ACC by the High Level Committee on Programme (HLCP) at its first regular session of 2001, Vienna 26-27 February 2001. Among the salient points noted in this document are the following:

- The importance of needle sharing for the transmission of HIV and the speed at which infection can spread among drug injectors is recognised (paragraph 3).
- Studies have demonstrated that interventions can be effective in preventing the transmission of HIV among injectors. Prevention activities which have shown impact on HIV prevalence and risk behaviour *include AIDS education, access to condoms and clean injecting equipment, counselling and drug abuse treatment* (paragraph 7).
- Drug abuse treatment may impact on HIV prevention and injecting risk behaviour, although evidence for the impact on sexual risk behaviour is less clear (paragraph 8).

- Research has found that outreach activities to reach out-of treatment drug injectors increase drug treatment referral and may reduce drug-related HIV risk behaviours (paragraph 9), since drug treatment may be unattractive to some injectors, particularly early in their careers, and successful treatment may not necessarily be achieved in one attempt.
- *Several reviews of the effectiveness of syringe and needle exchange programmes have shown reductions in needle risk behaviour and HIV transmission and no evidence of increased injecting drug use or other public health dangers.*
- *The benefits of such programmes increase considerably if they go beyond syringe exchange alone and include AIDS education counselling and referral to a variety of treatment options* (paragraph 10).

Furthermore in the discussion on principles and strategic approach the following principles are noted and elaborated: respect for human rights, the need to start HIV prevention as early as possible, the need for regular assessment, comprehensive coverage of the target population, integration of demand reduction and HIV prevention programmes into the broader health and social welfare policies, the recognition that drug abuse problems cannot be solved by criminal justice initiatives alone, the need for readily available and flexible treatment, need to consider the views of drug abusers and their communities, the need for drug treatment to provide assessment for HIV/AIDS and counselling to encourage behaviour change, the need to address sexual risk behaviour of drug abusers, the value of outreach, the need to encourage community participation.
Of particular salience in the discussion here is that it is noted:

- that the ability to halt the epidemic requires a three-part strategy
  i) preventing drug abuse especially among the young,
  ii) facilitating entry into drug abuse treatment: and
  iii) establishing effective outreach to engage drug abusers in HIV prevention strategies that protect them and their partners and families from exposure to HIV and encourage the uptake of substance abuse treatment and medical care (paragraph 31).
- and that a comprehensive package of interventions for HIV prevention among drug abusers could include:
  AIDS education,
  life skills training,
  condom distribution,
  voluntary and confidential counselling and HIV testing,
  access to clean syringes, bleach materials and
  referral to a variety of treatment options (paragraph 31).

 The views of the International Narcotic Control Board, which, in its 2003 report. (**Report of the International Narcotics Control Board for 2003**, United Nations, New York 2004), clarifies its position on harm reduction measures. The report reiterates that in 1993 they had acknowledged the importance of certain harm reduction activities as a tertiary prevention strategy for demand reduction and that in 2000 they had reiterated that 'harm reduction' programmes could play a part in a comprehensive demand reduction strategy but that they should not be carried out at the expense of other important activities to reduce demand. (paragraph 219).

With particular relevance to the issue of needle exchange:

- the Board notes in paragraph 221 that, in a number of countries, since the end of 1980s, programmes for the exchange or distribution of needles and syringes have been implemented for drug addicts with the aim of limiting the spread of HIV/AIDS.

- and the Board maintains its position expressed by it already in 1987 *that Governments need to adopt measures that may decrease the sharing of hypodermic needles among injecting drug abusers in order to limit the spread of HIV/AIDS, at the same time stressing that any prophylactic measures should not promote and/or facilitate drug abuse (paragraph 221).*

The Control Board go on to note that substitution and maintenance treatment, when prescribed by a medical doctor to treat drug addicts, *does not constitute any breach of treaty provisions, whatever substance may be used for such treatment in line with established national and sound medical practice* (paragraph 222).

F) Abbreviations used in the text

ACC - Administrative Committee on Co-ordination
AIDS - Acquired Immunodeficiency Syndrome
EU - European Union
EMCDDA - European Monitoring Centre for Drugs and Drug Addiction
CND - Commission on Narcotic Drugs
HBV - Hepatitis B Virus
HCV - Hepatitis C Virus
HDG - Horizontal Drugs Group
HIV - Human Immunodeficiency Virus
IDUs - Injecting drug users
UNGASS - United Nations General Assembly Special Session
WHO - World Health Organization

G) Some useful references

i) EU documents:

The EU drugs strategy 2005 – 2012 (15074/04).

EU Council Recommendation of 18 June 2003 on the prevention and reduction of health-related harm associated with drug dependence (2003/488/EC).

HIV/AIDS key documents (available at:
http://europa.eu.int/comm/health/ph_threats/com/aids/keydocs_aids_en.htm)

Commission Working Paper: Coordinated and Integrated Approach to Combat HIV/AIDS within the European Union and in Its Neighbourhood. C (2004) 3414 of 8 September 2004.

Dublin Declaration on partnership to fight HIV/AIDS in Europe and Central Asia (February 2004).

The "Vilnius Declaration" on measures to strengthen responses to HIV/AIDS in the European Union and in Neighbouring Countries (September 2004).

ii) Selected studies, reports and reviews:

Amundsen EJ, Eskild A, Stigum H, Smith E, Aalen O. (2003) legal access to needles and syringes/ needle exchange programmes versus HIV counselling and testing to prevent transmission of HIV among intravenous drug users – A comparative study of Denmark, Norway and Sweden. *European Journal of Public Health* 2003; 13: 252-258.

Bastos, F.I., Strathdee, S.A. (2000) Evaluating effectiveness of syringe exchange programmes: current issues and future prospects. *Social Science and Medicine*. 51/12 :1771-82.

Burns SM et al. The epidemiology of HIV infection in Edinburgh related to the injecting of drugs: (1996) an historical perspective and new insight regarding the past incidence of HIV infection and derived from retrospective HIV antibody testing of stored samples of serum. *The Journal of Infection*, 1996, 32:53-62.

Buning EC et al. (1986). Preventing AIDS in drug addicts in Amsterdam. *Lancet*, 1986, 1:1435

Coutinho RA. HIV and hepatitis C among injecting drug users: (1998). Success in preventing HIV has not been mirrored for hepatitis C. *British Medical Journal,* 1998, 317(7156):424-425.

Commonwealth Department of Health and Ageing (2002), Return on investment in needle and syringe programs in Australia – Report, Commonwealth of Australia. Available at: http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-pubhlth-publicat-document-metadata-roireport.htm

Cox G et al. (2000) Syringe exchange: a public health response to problem drug use. *Irish medical Journal*, 2000, 93(4).

Bastos FI & Strathdee SA. (2000) Evaluating effectiveness of syringe exchange programes: current issues and future prospects. *Social Science & Medicine*, 2000, 51(12):1771-82.

Des Jarlais D, Marmor M, Paone D, Titus S, Shi Q, Perlis T, Jose B, Friedman S. (1996) HIV incidence among injecting drug users in New York City syringe-exchange programmes. *Lancet*. 1996;348:987-91.

de Wit, A., Bos, J. (2004). Cost-effectiveness of needle and syringe programmes: a review of the literature. In: Hepatitis C and injecting drug use: Impact, costs and policy options, Jager J., Wien, L., Kretzschmar, M., Postma, M. and Wiessing, L. (eds.), European Monitoring Centre for Drugs and Drug Addiction, (2004). Lisbon. Available at: http://www.emcdda.eu.int/?nnodeid=428

Dolan K, Rutter S, & Wodak A. (2003) Prison based syringe exchange programmes: A review of international research and development. *Addiction*, 2003, 98:153-158

Donoghoe MC, Dolan, K, Stimdon GV. (1992) Life-style factors and social circumstances of syringe sharing in injecting drug users. *British Journal of Addiction*, 1992, 87:993-1003

Drucker E et al. (1998). Measuring harm reduction: the effects of needle and syringe exchange programmes and methadone maintenance on the ecology of HIV. *AIDS*, 1998, 12(Suppl. A):S217-30.

Frischer M & Elliot L. (1993) Discriminating needle exchange attenders from non-attenders. *Addiction*, 1993, 88:681-687.

Gibson,D.R., Flynn, N.M., Perales, D. (2001) Effectiveness of syringe exchange programs in reducing HIV risk behavior and HIV seroconversion among injecting drug users. *AIDS*. Jul 27;15(11):1329-41.

Gowing, L., Farrell, M., Bornemann, R. and Ali, R. (2004) Substitution treatment of injecting opioid users for prevention of HIV infection (Cochrane Review). Abstract available at: http://www.cochrane.org/cochrane/revabstr/AB004145.htm

Hartgers C et al. (1989) The impact of the needle and syringe-exchange programme in Amsterdam on injecting risk behaviour. *AIDS, 1989, 3(9):571-6*

Health Outcomes International. *(2002)* Return on investment in needle and syringe programmes in Australia. Canberra, Commonwealth Department of Health and Ageing,

Holtgrave DR, Pinkerton SD, Jones TS, Lurie P, Vlahov D. (1998) Cost and cost-effectiveness of increasing access to sterile syringes and needles as an HIV prevention intervention in the United States. *Journal of Acquired Immune Deficiency Syndromes & Human Retrovirology*. 1998;18 Suppl 1:S133-8.

Hurley SF, Jolley DJ, Kaldor JM. (1997) Effectiveness of needle-exchange programmes for prevention of HIV infection. *Lancet.* 1997 Jun 21; 349(9068):1797-800.

Ingold FR & Ingold S (1989). The effects of the liberalization of syringe sales on the behaviour of intravenous drug users in France. *Bulleting on Narcotics*, 1989, 1:67-81

Jacobs P, Calder P, Taylor M, Houston S, Saunders LD, Albert T. (1999) Cost effectiveness of Streetworks' needle exchange program of Edmonton. *Canadian Journal of Public Health*. 1999;90:168-71.

Klee H et al. (1991). The sharing of injection equipment among drug users attending prescribing clinics and those using needle exchange. *British Journal of Addiction*, 1991, 86:217-223

Laufer FN. (2001) Cost-effectiveness of syringe exchange as an HIV prevention strategy. *Journal of Acquired Immune Deficiency Syndromes* 2001;28:273-8.

Ljungberg B et al. (1991). HIV prevention among injecting drug users: three years of experience from a syringe exchange programme in Sweden., *Journal of Acquired Immune Deficiency Syndromes* 1991, 4(9):890-5.

Lurie P, Drucker E. (1997), An opportunity lost: HIV infections associated with lack of a national needle-exchange programme in the USA. *Lancet.* 1997;349:604-8.

Lurie P & Reingold AL, eds.(1993) The public health impact of needle exchange programs in the United States and abroad, Vol. 1. Atlanta, Center for Disease Control and Prevention.

Marx MA, Crape B, Brookmeyer RS, Junge B, Latkin C, Vlahov D, Strathdee SA. (2000) Trends in crime and the introduction of a needle exchange program. *American Journal of Public Health*. 2000;90(12):1933-6.

National Institutes of Health, (2000), Interventions to prevent HIV risk behaviors. National Institutes of Health Consensus Development Conference Statement February 11-13, 1997. *AIDS*. 2000;14 Suppl 2:S85-96.

Paone D, Des Jarlais DC & Shi Q. (1998) Syringe exchange use and HIV risk reduction over time. *AIDS*, 1998, 12(1): 121-3.

Pinkerton SD, Holtgrave DR, DiFranceisco W, Semaan S, Coyle SL, Johnson-Masotti AP. (2000) Cost-threshold analyses of the National AIDS Demonstration Research HIV prevention interventions. *AIDS*. 2000;14:1257-68.

Satcher D, (2000) Surgeon General. Evidence-based findings on the efficacy of syringe exchange programs: an analysis of the scientific research completed since April 1998. Washington, DC, United States Department of Health & Human Sciences, 2000

Schlumberger MG, Desenclos JC, Papaevangelou G, Richardson SC, Ancelle-Park R. (1999) Knowledge of HIV serostatus and preventive behaviour among European injecting drug users: second study. European Community Study Group on HIV in Injecting Drug Users. *European Journal of Epidemiol*ogy. 1999;15:207-15.

Schechter M et al. (1999). Do needle exchange programmes increase the spread of HIV among injection drug users: an investigation of the Vancouver outbreak. *AIDS*, 1999, 13(6)F45-51

Vlahov D, Junge B.(1998) The role of needle exchange programs in HIV prevention. *Public Health Rep*. 1998;113 Suppl 1:75-80.

Watters J et al. (1994). Syringe and needle exchange as HIV/AIDS prevention for injecting drug users. *Journal of the American Medical Association*, 1994, 271(2):115-20.

Weinhardt LS, Carey MP, Johnson BT, Bickham NL.(1999). Effects of HIV counseling and testing on sexual risk behavior: a meta-analytic review of published research, 1985-1997. *American Journal of Public Health*. 1999;89:1397-405.

Wolitski RJ, MacGowan RJ, Higgins DL, Jorgensen CM. (1997) The effects of HIV counseling and testing on risk-related practices and help-seeking behavior. *AIDS* Educ Prev. 1997;9(3 Suppl):52-67.

WHO (2004) Effectiveness of sterile needle and syringe programming in reducing HIV/AIDS among injecting drug users. Series: Evidence for Action Technical Papers, Geneva: World Health Organization. (ISBN 92 4 159164 1)