



# nsp

needle & syringe programs:  
a review of the evidence

Needle and Syringe Programs have been one of the major public health success stories. However, some people are still uncertain about their role. This Booklet provides a review of evidence for Needle and Syringe Programs in a question and answer format. More general answers to some of the most frequently asked questions about Needle and Syringe Programs are provided in the other booklet in this Kit - **needle & syringe programs:2005 your questions answered**

To obtain copies of the Needle and Syringe Program Information Kit contact: [phd.publications@health.gov.au](mailto:phd.publications@health.gov.au) or phone 1800 020 103 extension 8654. The Information kit is also available online. Go to <http://www.health.gov.au> and enter needle and syringe program information kit in the search field.

Suggested reference:

Dolan, K. MacDonald, M., Silins, E. & Topp, L. 2005. *Needle and syringe programs: A review of the evidence*. Canberra: Australian Government Department of Health and Ageing.

Needle and syringe programs: A review of the evidence  
ISBN: 0 642 82747 8  
Publications Approval Number: 3711

Copyright: Paper-based publications © Commonwealth of Australia [2005]  
This work is copyright. Apart from any use as permitted under the Copyright Act 1968, no part may be reproduced by any process without prior written permission from the Commonwealth. Requests and inquiries concerning reproduction and rights should be addressed to the Commonwealth Copyright Administration, Attorney General's Department, Robert Garran Offices, National Circuit, Canberra ACT 2600 or posted at <http://www.ag.gov.au/cca>

Summary	4
How many people inject drugs worldwide?	5
How many people inject drugs in Australia?	5
Which drugs are injected in Australia?	5
What is Australia's National Drug Strategy?	6
What are Australia's strategies on HIV/AIDS and hepatitis C?	8
What are Needle and Syringe Programs?	9
Why do we have syringe vending machines?	11
Do Needle and Syringe Programs prevent HIV, hepatitis C and hepatitis B?	12
Are sterile needles and syringes provided to prisoners?	15
How do we know the data collected about drug use are reliable?	16
Are Needle and Syringe Programs cost-effective?	16
Do Needle and Syringe Programs lead injecting drug users into treatment?	17
Do Needle and Syringe Programs increase drug use?	18
Do Needle and Syringe Programs increase crime or violence?	18
Do Needle and Syringe Programs increase discarded used needles and syringes?	19
What is the chance of getting HIV, hepatitis C or hepatitis B from a discarded used needle?	20
Why aren't retractable needles and syringes available to injecting drug users?	21
Is it legal for people who inject drugs to carry needles and syringes?	21
What can be learnt from overseas Needle and Syringe Programs?	22
What is the level of community support for Needle and Syringe Programs?	23
Conclusion	24
References	25

## Summary

This booklet summarises the literature on the provision of sterile needles and syringes to people who inject drugs and other related issues. The proportion of the Australian population thought to inject drugs is just under two percent, or approximately 313,500 people.<sup>1</sup> The first case of HIV infection in a drug injector without other risk factors in Australia was detected in 1985. Needle and Syringe Programs started in Australia the following year. At that time, hepatitis C infection was already well established among drug injectors with more than half being infected.<sup>2</sup>

Workers at Needle and Syringe Programs do much more than just provide injecting equipment. They are often the first point of contact between health services and people who inject drugs. Needle and Syringe Program workers are able to provide education and information on healthcare issues and drug related harm and facilitate entry into drug treatment. Some Programs also provide primary medical care to this disadvantaged population who often have very poor health.

Australian Governments invested \$130 million in Needle and Syringe Programs between 1991 and 2000. This resulted in the prevention of an estimated 25,000 cases of HIV and 21,000 cases of hepatitis C among injecting drug users. The savings to the health system in avoided treatment costs over a lifetime are estimated to be between \$2.4 and \$7.7 billion.<sup>3</sup>

While Needle and Syringe Programs enjoy strong public support in Australia, there have from time to time been misunderstandings about their role. In the past, Needle and Syringe Programs have been accused of encouraging drug use and increasing the number of inappropriately discarded needles and syringes in public places. However, Australian and international studies have shown that neither of these concerns are supported by impressive evidence. Research has shown that Needle and Syringe Programs do not increase injecting drug use. This could be attributed to the ability of health workers to offer health information, drug education and referral into treatment.

Some members of the public have also raised concerns about inappropriately discarded needles and syringes and the possibility of contracting HIV or hepatitis C from a discarded used needle. The chance of a member of the public contracting either HIV or hepatitis C from a discarded used needle is extremely low. Worldwide, there has never been a reported case of a member of the public contracting HIV in this way.

Countries where Needle and Syringe Programs have been implemented have averted HIV epidemics among injecting drug users, while countries that have not implemented these measures have often experienced uncontrolled epidemics. There is strong evidence that if HIV becomes endemic among injecting drug users it can then spread to their sexual partners and children resulting in high mortality rates and large social and economic costs to the entire community.

There is abundant evidence from Australia and international research of the substantial public health benefits of Needle and Syringe Programs. The Australian Medical Association supports Needle and Syringe Programs as one of a number of measures which prevent the spread of HIV and other blood borne diseases.<sup>4</sup>

### **How many people inject drugs worldwide?**

It is difficult to estimate how many people inject drugs because it is an illegal and highly stigmatised activity. Between 1998 and 2003 the number of injecting drug users worldwide was estimated to be approximately 13.2 million. Most (78%) injecting drug users live in developing or transitional countries in Eastern Europe, Asia and the Pacific. Injecting drug use also occurs in Western Europe, North America, New Zealand, Australia and many other countries.<sup>5</sup>

### **How many people inject drugs in Australia?**

According to the National Drug Strategy Household Survey, just under two percent of the Australian population, or 313,500 people, reported having injected drugs at some time in their lives.<sup>1</sup> People aged 20 to 29 were more likely to inject drugs than other age groups and males were more likely to inject than females.

### **Which drugs are injected in Australia?**

In 2004, methamphetamine (83.6%) was the most commonly reported drug recently injected by drug users, followed by heroin (23.1%).<sup>1</sup>

The proportion of the population reporting use of methamphetamine fluctuated between 2% and about 4% from 1991 to 2004.<sup>1</sup> The majority (76%) of dependent methamphetamine users in Australia are considered to be injecting drug users and therefore at risk of contracting and transmitting HIV and hepatitis C.<sup>6</sup>

The proportion of the population reporting heroin use in Australia has remained relatively stable, ranging between 0.4% of the population in 1991 and 0.2% of the population in 2004, with a peak at 0.8% in 1998.<sup>1</sup>

Current estimates of the number of dependent methamphetamine users suggests that the 'at risk' population for the transmission of blood borne viruses is likely to be at least double that of heroin injectors.<sup>6</sup>

Other drugs injected in Australia include morphine, cocaine, methadone and anabolic steroids.<sup>7</sup>

## What is Australia's National Drug Strategy?

Australia's National Drug Strategy, which was first developed in 1985, is widely recognised as one of the most progressive and respected drug strategies in the world.

An evaluation of the National Drug Strategy (1993-1997) found that the harm minimisation approach, which had been introduced in the initial strategy, was fundamental to its ongoing success. The National Drug Strategy, Australia's Integrated Framework 2004-2009, builds on the experience and achievements of the National Drug Strategic Framework 1998-99 to 2003-04.

Australia's harm minimisation strategy refers to policies and programs that aim to reduce drug related harm. A wide range of integrated approaches involve a balance between demand reduction, supply reduction and harm reduction. The strategy encompasses:<sup>8</sup>

- Supply reduction strategies to disrupt the production and supply of illicit drugs and the control and regulation of licit substances
- Demand reduction strategies to prevent the uptake of harmful drug use including abstinence oriented strategies and treatment to reduce drug use
- Harm reduction strategies to directly reduce drug related harm to individuals and communities.

Harm minimisation aims to improve health, social and economic outcomes for both the community and individuals. Harm minimisation does not condone illegal behaviours such as injecting drug use, but acknowledges that these behaviours occur despite vigorous efforts to reduce supply and demand. Consequently, authorities have a responsibility to develop and implement public health and law enforcement measures that contribute to reducing the harm to individuals and the community.

The current National Drug Strategy, Australia's Integrated Framework, achieves its objectives by adopting:<sup>8</sup>

- The principle of harm minimisation, including a balanced approach between supply reduction, demand reduction and harm reduction strategies, between preventing use and harms, and facilitating access to treatment
- A comprehensive approach, which includes all drugs and other mood altering substances
- A partnership between Commonwealth, State and Territory Governments, health, law enforcement and education agencies, community based organisations and industry in tackling drug related harm
- An emphasis on rigorous research, evidence based practice and evaluation and assessment of interventions.

While the practice of injecting drug use continues, the provision of sterile injecting equipment through Needle and Syringe Programs is an important harm reduction strategy to reduce the spread of blood borne viruses such as HIV and hepatitis C.<sup>9</sup>

A major component of the National Drug Strategy is the National Illicit Drug Strategy, Tough on Drugs. Development and implementation of the National Illicit Drug Strategy occurs in consultation with the Australian National Council on Drugs, State and Territory Governments, non-government organisations and the community sector.

In the 2003-04 Federal Budget, the Government reaffirmed its support for the Council of Australian Governments' Illicit Drug Diversion Supporting Measures for Needle and Syringe Programs Initiative under the National Illicit Drug Strategy.

The measures aim to:

- Increase education, counselling and referral services through Needle and Syringe Programs and increase training for healthcare workers
- Diversify existing Needle and Syringe Programs to increase the accessibility of Needle and Syringe Programs through pharmacies and other outlets, and provide information and training.

## What are Australia's strategies on HIV/AIDS and hepatitis C?

The first National HIV/AIDS Strategy was launched in 1989. According to Professor Richard Feachem, then at the World Bank:<sup>10</sup>

*The first National HIV/AIDS Strategy released by the Commonwealth Government in 1989 provided a framework for an integrated response to the HIV epidemic and a plan for action across a range of policy and program activities. Needle and Syringe Programs were a key component of the education and prevention strategy.*

Professor Feachem concluded that Needle and Syringe Programs should remain a foundation of Australia's prevention efforts.

In 2005, the government launched the fifth National HIV/AIDS Strategy, Revitalising Australia's Response. This strategy continued to support Needle and Syringe Programs as an effective health intervention.

Australia's HIV/AIDS Strategy has received international recognition. According to the Joint United Nations Programme on HIV/AIDS Best Practice Collection:<sup>11</sup>

*[In Australia], early and vigorous HIV prevention programmes aimed at injecting drug users resulted in stable and low rates of HIV prevalence among drug users and related population groups. It is generally agreed that this prompt - and sustained - action fundamentally altered the course of the country's epidemic.*

Hepatitis C is also a significant public health issue in Australia. Advanced liver disease due to hepatitis C is the most common reason for liver transplants in Australia. About one percent of the community is infected with hepatitis C. An estimated 16,000 new hepatitis C infections occur each year.<sup>12</sup> As hepatitis C is a slow progressing blood borne viral infection, many people with this condition are unaware they are infected until symptoms appear much later.

In 1999, Australia became a world leader in its strategic response to hepatitis C by developing the National Hepatitis C Strategy 1999-2000 to 2003-2004. The second National Hepatitis C Strategy 2005-2008 builds on the successes of the first. A priority area of the second strategy is to strengthen the capacity of Needle and Syringe Programs in providing hepatitis C education and referral to treatment.

The three focal points of the strategy are:

- Improving access to treatment and support, and increasing treatment uptake among people with hepatitis C
- Improving and increasing the reach of prevention and education efforts
- Improving the current hepatitis C surveillance system.

## What are Needle and Syringe Programs?

Needle and Syringe Programs are a public health measure, consistent with the National Drug Strategy's harm minimisation framework, to reduce the spread of infections such as HIV and hepatitis C among injecting drug users. They provide a range of services that include provision of sterile injecting equipment, education on reducing drug use, health information, and referral to drug treatment, medical care and legal and social services. The injecting equipment provided includes needles and syringes, swabs, vials of sterile water and 'sharps bins' for the safe disposal of used needles and syringes. Needle and Syringe Programs do not supply drugs or allow people to inject drugs on the premises. Governments provide sterile injecting equipment to prevent people sharing needles and syringes which can lead to the spread of HIV and hepatitis C. Needle and Syringe Program workers also address the transmission of HIV via sexual contact by providing condoms and safe sex education.

Needle and Syringe Program workers educate injecting drug users about the importance of responsible disposal of used needles and syringes. Needle and Syringe Programs are also an important point for collection of used injecting equipment. Many Needle and Syringe Program workers visit areas where injecting drug use is common and remove any used injecting equipment that has been discarded.

Research into the health needs of people who inject drugs suggests that this is a population with a wide range of complex healthcare needs. Needle and Syringe Programs are seen as a potential point of contact for referral to healthcare services designed to meet the needs of the target population. Some Needle and Syringe Programs provide primary health care that is accessible at the moment it is sought, and are staffed by people who are sympathetic to the needs of a very marginalised group.<sup>13</sup>

The first Australian Needle and Syringe Program began in Darlinghurst, Sydney in 1986 as a trial project.<sup>14</sup> The testing of syringes returned to this Program

detected an increase in HIV prevalence over time, suggesting that HIV was spreading among the clients.<sup>14,15</sup> In the following year Needle and Syringe Programs became New South Wales Government policy. The other states and territories followed soon after. There are now over 3,000 Needle and Syringe Program outlets in Australia. Needle and Syringe Programs tend to be located in relatively public places because they need to be accessible. Staff at Needle and Syringe Programs provide services in a non-judgemental manner and develop a rapport with individuals who are otherwise hard to reach. Several different types of Needle and Syringe Programs are in operation in Australia.

*Primary outlets* are stand-alone agencies that are specifically established to provide the full range of Needle and Syringe Program services, including dispensing of sterile injecting equipment and collecting of used needles and syringes, sometimes along with primary medical care, education and counselling and referral services.

*Secondary outlets* offer needle and syringe distribution and disposal as one of a range of other health or community services. In some cases they will also provide additional equipment, education and referral services as part of their commitment to the prevention of blood borne virus transmission. Typical secondary outlets include hospital Emergency Departments and Community Health Centres.

*Mobile and outreach services* visit hard to reach people who inject drugs but are unable or unwilling to attend other outlets. They provide Needle and Syringe Program services, often out of hours, by vehicle or on foot. The benefits of Needle and Syringe Programs are maximised if isolated, disadvantaged and vulnerable groups of injecting drug users are also provided with Needle and Syringe Program services.

*Pharmacy Needle and Syringe Programs* are another important way to maximise access to sterile injecting equipment. Many pharmacies across Australia provide sterile injecting equipment, needle and syringe disposal services, health information and sometimes referral services. Some pharmacy Needle and Syringe Programs operate on a commercial basis and others are supported by Government schemes.

Needle and Syringe Programs currently operate in many countries including: Argentina, Australia, Austria, Belarus, Belgium, Brazil, Bulgaria, Canada, China, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, India, Indonesia, Iran, Italy, Kazakhstan, Kyrgyzstan, Latvia, Luxembourg, Malaysia, Moldova, Myanmar, Nepal, Netherlands, New Zealand,

Norway, Philippines, Poland, Portugal, Russia, Slovak Republic, Salvador, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Thailand, Ukraine, United Kingdom, United States of America and Vietnam.

## Why do we have syringe vending machines?

Injecting drug use occurs during all hours and is not usually confined to the hours that services are open. Difficulties in accessing sterile needles and syringes have been cited as a factor contributing to sharing of injecting equipment which increases the risk of HIV and hepatitis C infection.<sup>16</sup> Ensuring 24 hour access to sterile needles and syringes remains important for Australia to maintain low rates of HIV transmission and to contain the further spread of hepatitis C among people who inject drugs.

Syringe vending machines dispense needle and syringe packs for a small fee. In some states and territories these packs are known as Fitpacks™. Fitpacks are sturdy plastic containers that contain sterile needles and syringes and other injecting equipment. Fitpacks also double as disposal containers. The containers have an internal moulded flap designed to 'lock in' used needles and syringes to prevent re-use and inappropriate disposal. A 'sharps bin' is located at each syringe vending machine to allow for the safe disposal of used injecting equipment.

Syringe vending machines usually operate 24 hours and provide sterile needles and syringes to injecting drug users who do not wish to access face to face Needle and Syringe Programs. The machines are monitored and restocked by Needle and Syringe Program staff. Most syringe vending machines are located outside hospitals, community or sexual health centres and alcohol and drug services. More than 100 syringe vending machines are located throughout metropolitan, regional and rural New South Wales. One machine operates in Western Australia and the Australian Capital Territory is currently conducting a 12 month trial of four machines. A syringe vending machine trial is also underway in Queensland. The New South Wales Department of Health is not aware of any instances where access by children has been reported to have occurred.<sup>17</sup> Syringe vending machines are also used in other countries including Austria, France, Germany and Switzerland.

In Marseille, France it was reported that 21% of injecting drug users used syringe vending machines as their main source of sterile needles and syringes. The majority of users were more likely to be under 30, less likely to have been in drug treatment and less likely to have shared injecting equipment than non-users.<sup>18</sup>

A study in Berlin, Germany found that more than three quarters (77%) of injecting drug users used syringe vending machines more than four times a week.<sup>19</sup>

A review conducted for the World Health Organization of the effectiveness of syringe vending machines in preventing HIV infection among injecting drug users identified no negative studies and no evidence that syringe vending machines caused non-injecting drug users to become injectors.<sup>20</sup>

## Do Needle and Syringe Programs prevent HIV, hepatitis C and hepatitis B?

HIV prevention strategies have resulted in an AIDS incidence in Australia of 1.5 per 100,000 population by 2003, similar to that recorded in Canada and the United Kingdom and considerably lower than in France (2.2), Spain (3.3) and the United States (15.0 in 2002). AIDS incidence refers to the number of new AIDS diagnoses reported over a certain time period. The estimated HIV prevalence (the proportion of people infected with HIV at any point in time) in Australia was substantially lower than that recorded in North America, Europe and most other countries within the Asia-Pacific region in 2003.<sup>21</sup>

12

### Estimated HIV prevalence 2003

Country	Rate per 100 000 population
<b>Asia Pacific</b>	
Cambodia	2600
Thailand <sup>1</sup>	1500
Myanmar	1200
Papua New Guinea	600
Malaysia	400
Australia	69
<b>Europe</b>	
Spain	700
Italy	500
France	400
United Kingdom	200
Germany	100
<b>North America</b>	
United States <sup>1</sup>	600
Canada	300

<sup>1</sup> Data not adjusted for reporting delays

Since reporting began, HIV incidence and prevalence among injecting drug users in Australia has been relatively low compared to many other countries.<sup>22,23,24</sup> In 1999-2003, HIV prevalence among people attending Needle and Syringe Programs in Australia remained around 1% and less than 0.5% among men and women seen at metropolitan sexual health centres who identified themselves as injecting drug users.<sup>21</sup>

In the United States, access to sterile needles and syringes is restricted by laws prohibiting the possession of needles and syringes and a Congressional ban on the use of federal funds to operate Needle and Syringe Programs. There are approximately 140 Needle and Syringe Programs in the United States. By comparison, more than 3,000 Programs operate across Australia. Among the estimated one to one and a half million injecting drug users in the United States, approximately 19,000 HIV infections occur annually.<sup>25</sup> The Centers for Disease Control and Prevention in the United States estimate that between 1994 and 2000 injecting drug users and their sexual partners represented approximately one third of all people infected with HIV.<sup>26</sup> In Australia between 1994 and 2003, approximately 8% of HIV diagnoses were in people with a history of injecting drug use.<sup>21</sup>

Professor Penny and Dr Wodak, leading Australian HIV experts, commented:

*The risk of HIV in injecting drug users is not limited to themselves but to their sexual partners and, tragically to their children. In New York City, which has a population about the same size as New South Wales but rampant HIV among IDUs [injecting drug users], more than 17,000 paediatric cases of AIDS have been reported, compared to 42 in New South Wales. These paediatric cases in New York City were in almost all cases the direct result of one or other parent being an IDU. There is a serious risk to Australian children of HIV infection acquired from their parents should an uncontrolled epidemic erupt among IDUs, if present programs are curtailed.<sup>27</sup>*

In sharp contrast to HIV infection, the prevalence and incidence of hepatitis C is high among injecting drug users in Australia. Hepatitis C has been more difficult to contain because the virus is spread more easily through blood to blood contact than HIV and was already well established among injecting drug users before the introduction of Needle and Syringe Programs. An injecting drug user sharing an unclean needle used by another injecting drug user of unknown infection status is at between 150 and 800 times higher risk of infection with hepatitis C than HIV.

Many people in the community, including some injecting drug users, are unaware of the risk factors for contracting hepatitis C and unknowingly engage in behaviours that put them at risk. Injecting drug use is the leading risk behaviour for transmission of hepatitis C in Australia. It is estimated that 81% of existing hepatitis C infections are due to unsafe injecting practices.<sup>12</sup> The prevalence of hepatitis C infection is likely to have been even higher in Australia if Needle and Syringe Programs had not been introduced.

The Australian National Council on Drugs (ANCD) recommended the following to help control hepatitis C:

*The ANCD believes that the hepatitis C epidemic requires a greater concentration of effort in regard to education and information through existing Needle and Syringe Program services in order to decrease its incidence within the injecting drug user population, particularly among those injecting stimulants and among young injectors.*

Over the past 15 years Needle and Syringe Programs have been the subject of extensive scientific evaluation. These studies have confirmed that Needle and Syringe Programs substantially reduce the number of HIV infections. Studies in the United States have found that providing needles and syringes can decrease HIV-risk injecting behaviour by up to 74%.<sup>28</sup> Almost all studies of risk behaviour of people attending Needle and Syringe Programs have found a decrease or at least no increase in risky practices.<sup>29,30,31,32,33,34</sup>

In Windham, Connecticut USA, a Needle and Syringe Program closed in March 1997, after several years of operation and following 10 months of heated community debate. Injecting drug users from Windham were interviewed before and three months after the closure of the Program. After the Program closed, 51% of injecting drug users were forced to obtain their syringes from unsafe sources, such as family, friends or street dealers, compared with 14% when the program was operating. The number of injections per syringe increased from 3.5 to 7.7 injections after the Program closed. The proportion of injecting drug users who reported sharing injecting equipment in the preceding month rose from 16% to 34%. There was no decrease in the number of needles and syringes discarded in public places and no effect of the visibility on the Windham illicit drug scene after the closure of the Needle and Syringe Program.<sup>35</sup>

In Australia there was a dramatic decrease in needle and syringe sharing among injecting drug users from almost 100% in 1986 to 28% in 1996.<sup>34,36</sup> In 2001, 13% of injecting drug users in Australia reported sharing a needle and syringe.<sup>37</sup>

Studies continue to confirm the beneficial effect of Needle and Syringe Programs in reducing transmission of HIV. A study conducted between 1978 and 1999 compared HIV prevalence in 103 cities around the world. In the cities that had introduced Needle and Syringe Programs, the HIV prevalence had decreased by an average of 19% annually. In the cities that had not introduced Needle and Syringe Programs, the HIV prevalence had increased by an average of 8% annually.<sup>3</sup>

The World Health Organization commissioned a review of evidence of the effectiveness of Needle and Syringe Programs to reduce HIV which concluded:<sup>38</sup>

*There is compelling evidence that increasing the availability and utilisation of sterile injecting equipment for both out-of-treatment and in-treatment injecting drug users contributes substantially to reductions in the rate of HIV transmission.*

## **Are sterile needles and syringes provided to prisoners?**

In 1991, the World Health Organization Regional Office for Europe recommended the provision of sterile injecting equipment in prisons as part of a comprehensive HIV prevention strategy. Presently, Switzerland, Germany, Spain, Moldova, Kyrgyzstan, and Belarus have introduced these programs into prisons. Other countries which are planning to implement Needle and Syringe Programs in prisons include Greece, Iran, Italy, Kazakhstan, Portugal, Tajikistan and Ukraine. A 2004 Canadian review of prison Needle and Syringe Programs found these Programs to be safe, effective, and an essential part of the required response to HIV, hepatitis C and other problems associated with injecting drug use.<sup>39</sup> There is no evidence as yet of serious unintended negative consequences of Needle and Syringe Programs in prisons.

High rates of HIV and hepatitis C infection in prison populations have been reported in numerous countries. Fortunately, HIV prevalence among people entering prisons in Australia has remained relatively low, at less than 0.2% from 2000 to 2003.<sup>21</sup> However, hepatitis C infection among prisoners is much more prevalent than in the general community. Needle and Syringe Programs are currently not available in prisons in Australia.<sup>40</sup>

## How do we know the data collected about drug use are reliable?

Some of the data collected about Needle and Syringe Programs includes reports by drug users of their own illegal and socially stigmatised behaviours. This inevitably raises concerns about the accuracy of these data. However, numerous investigations have demonstrated that carefully collected self-reported data are generally accurate and can be used for studies of illicit drug users. A review of the literature found that reports by illicit drug users were reliable (likely to be confirmed on repeat testing) and valid (likely to be confirmed by interviews with significant others).<sup>41</sup> The data are likely to be accurate if the drug user is provided with strong assurances of confidentiality and anonymity.<sup>42</sup> Studies have specifically assessed the accuracy of self-reported risk behaviours of injecting drug users and found them to be reliable<sup>43</sup> and not significantly affected by attempts to provide socially desirable responses.<sup>44</sup>

## Are Needle and Syringe Programs cost-effective?

A 2002 review of HIV and hepatitis C prevalence in 103 cities around the world before and after Needle and Syringe Programs found that Needle and Syringe Programs were very cost-effective.<sup>3</sup>

Australian Governments invested \$130 million in Needle and Syringe Programs between 1991 and 2000. This resulted in:<sup>3</sup>

- An estimated 25,000 cases of HIV infection being prevented
- An estimated 21,000 cases of hepatitis C infection being prevented
- An estimated 4,590 lives being saved by 2010
- An estimated saving to the health system in avoided treatment costs over a lifetime of between \$2.4 and \$7.7 billion.

If the United States had adopted Needle and Syringe Programs in 1987 as Australia did, and continued their expansion until 1995 at the same rate as Australia, then between 4,400 and 10,000 HIV infections would have been prevented. This would have saved the United States health care system between US\$240 and US\$540 million.<sup>45</sup>

Five United States Government funded reviews concluded that Needle and Syringe Programs were cost-effective in the prevention of HIV without increasing illicit drug use.<sup>46,47,48,49,50</sup> These conclusions were confirmed at the 1997 United States National Institutes of Health Consensus Development Conference and further supported by a World Health Organization review in 2004.<sup>20</sup>

## **Do Needle and Syringe Programs lead injecting drug users into treatment?**

Needle and Syringe Programs can be important points of contact for the highly marginalised population of injecting drug users as they provide harm reduction education and referral to drug treatment, medical, legal and social services.<sup>51,52,53</sup> Many Needle and Syringe Program clients have never been in contact with other health or social services.<sup>32,54,55</sup>

The Australian Needle and Syringe Program Survey 2000-2004 found that the proportion of Needle and Syringe Program clients who participated in drug treatment had increased from 68% in 2000 to 76% in 2004.

Studies in London,<sup>56</sup> New Haven, USA<sup>57,58</sup> and Seattle, USA<sup>59</sup> found that Needle and Syringe Programs acted as 'gateways' to more traditional medical treatment for drug dependence for many clients. Over two years, almost 600 drug users attending a Needle and Syringe Program in New Haven requested treatment for drug problems. Over a 16 month period, 38% of clients attending a London Program were referred to drug treatment and medical services. In Seattle, drug users attending Needle and Syringe Programs were five times more likely to enter drug treatment than injectors who did not attend.

A 2000 study in America found Needle and Syringe Program attendance was associated with substantially reduced injecting or cessation of injecting compared to injecting drug users who had never attended a Needle and Syringe Program.<sup>60</sup>

In 2004, a policy brief published by the World Health Organization concluded that Needle and Syringe Programs involving face to face contact increased the enrolment of drug users into drug treatment and primary care services.<sup>38</sup>

## Do Needle and Syringe Programs increase drug use?

Despite numerous research studies investigating the possibility of serious negative consequences, there is no convincing evidence that Needle and Syringe Programs increase illicit drug use.<sup>61,62</sup> A 2004 review of potential unintended negative consequences associated with Needle and Syringe Programs found that the Programs:

- Do not encourage more frequent injection of drugs<sup>63,33</sup>
- Do not increase syringe lending to other injecting drug users<sup>52,63</sup>
- Do not increase recruitment of new injecting drug users<sup>57,33,64</sup>
- Do not increase social network formation<sup>65</sup>
- Do not increase transition from non-injecting drug use to injecting drug use<sup>62</sup>
- Do not affect injecting drug users' motivation to reduce drug use.<sup>66</sup>

In Australia, the proportion of the population who reported having injected drugs in the last 12 months remained at 0.6% to 0.7% between 1995 and 2001 and had decreased to 0.4% in 2004.<sup>1</sup> If Needle and Syringe Programs encouraged injecting drug use, it would be expected that, all other factors remaining equal, the proportion of the population reporting recently injecting drugs would have increased rather than decreased.

## Do Needle and Syringe Programs increase crime or violence?

There is no evidence to suggest that Needle and Syringe Programs increase crime or violence.

Researchers in Baltimore, USA examined arrest patterns in areas with and without Needle and Syringe Programs and found no difference.<sup>67</sup>

A 2001 survey of 220 residents from a large urban neighbourhood in New York, USA found that Needle and Syringe Programs did not adversely affect the rates of violent crime, such as assaults or robbery, in their vicinity.<sup>68</sup>

## Do Needle and Syringe Programs increase discarded used needles and syringes?

Numerous studies have found no evidence that Needle and Syringe Programs increase the number of used needles and syringes discarded in public areas.<sup>20,35,69</sup>

A survey of a random sample of 32 city blocks in areas with high levels of drug use in Baltimore, USA found no significant increase in the number of discarded needles and syringes during the first two months of a Needle and Syringe Program's operation.<sup>70</sup> A follow-up of the study two years later found there was still no difference in the number of discarded needles and syringes by distance from the Program site and that the Program did not increase the number of discarded needles and syringes.<sup>71</sup>

In Tasmania, it was found that approximately 99% of needles and syringes were disposed of in a responsible manner. Between 1997 and 1998, an estimated 2,800 needles and syringes were distributed in Tasmania for each single report of used discarded equipment.<sup>72</sup>

The Queensland Needle Availability Program in 1999 reported that 1.4 million needles and syringes were distributed during a twenty month period in Brisbane, with less than 0.1% discarded inappropriately.<sup>73</sup>

A 2003 survey of Local Governments in Western Australia found that on average, less than four inappropriately disposed needles and syringes were collected each month statewide. The survey also found almost half (44%) of Local Governments did not collect any inappropriately disposed needles and syringes and only three Local Governments collected 50 or more inappropriately disposed needles and syringes per month.<sup>74</sup>

All State and Territory Health Departments collect self-reported data from Needle and Syringe Program clients regarding their methods of disposal of injecting equipment. A 2004 study of 1,092 Needle and Syringe Program clients in New South Wales found most disposed of their last used needle and syringe safely. A relatively small minority (less than 1%) of those surveyed reported discarding their last used needle and syringe in a public place.<sup>17</sup>

## What is the chance of getting HIV, hepatitis C or hepatitis B from a discarded used needle?

There are two types of injuries from used needles. Occupational needlestick injuries are sustained by healthcare workers and other staff in the course of their work. The other type of injury is when a member of the public is pricked by a used needle that has been inappropriately discarded in the community.

The likelihood of HIV infection after an occupational needlestick injury from a HIV positive patient in a healthcare setting was estimated to be 0.3% or one in 316 occasions.<sup>75</sup> The risk of contracting hepatitis C (0% to 7%) and hepatitis B (23% to 37%) from a needlestick injury is higher in these cases.<sup>76</sup>

The probability of a member of the public becoming infected with HIV, hepatitis C or hepatitis B after being pricked by an inappropriately discarded used needle in the community is very much lower, for a variety of reasons:

- The needle often has to pierce clothes or shoes before penetrating the skin
- The needle and syringe may have been exposed to the elements for some time
- HIV is a fragile virus once outside the body, especially when exposed to unfavourable environmental conditions<sup>77</sup>
- The syringe is likely to contain much less blood than syringes encountered in a healthcare setting.<sup>78</sup>

A 2003 Australian review of injuries from discarded used needles in the community found the risk of blood borne virus transmission was very low.<sup>79</sup> An American study found the likelihood of HIV transmission after an injury from a discarded used needle sustained in the community was estimated to be one in 4,000 occasions.<sup>80</sup>

A retrospective analysis of 120 people with injuries from discarded used needles in the community attending a Sydney hospital from 1996 to 2001 found no individuals had acquired HIV, hepatitis C or hepatitis B as a result.<sup>81</sup>

In 2002, an Australian study of children with injuries from discarded used needles in the community was conducted to determine whether any of the

children had become infected with HIV, hepatitis C or hepatitis B. The study was conducted over 32 months. Out of 50 children, 36 were tested at least three months after the injury and there were no cases of HIV, hepatitis C or hepatitis B infection.<sup>82</sup>

There has been only one published case in the world of hepatitis C transmission after an injury from a discarded used needle in the community.<sup>83</sup> In Australia to date, there have been no cases published of a member of the public becoming infected with HIV, hepatitis C or hepatitis B after an injury from a discarded used needle in the community.

## **Why aren't retractable needles and syringes available to injecting drug users?**

Evidence based trials of retractable needles and syringes with injecting drug users were conducted in Australia in 2004. The trials were designed to assess the suitability and acceptability of retractable needles and syringes to injecting drug users.

The results indicated a number of technical limitations with the retractable needle and syringe technology piloted and an overall lack of retractable needles and syringes that are suitable to be used by injecting drug users.

## **Is it legal for people who inject drugs to carry needles and syringes?**

Legislation in all States and Territories, except Western Australia, excludes possession of a needle and syringe from being an offence. It is understood that the fear of prosecution for possession of needles and syringes may result inadvertently in injecting drug users being more likely to share injecting equipment and dispose of their equipment inappropriately.

Some studies suggest that drug users may be more likely to discard injecting equipment because they fear the police may use the equipment to charge them with a drug related offence.<sup>84,85,86</sup>

Some countries have different laws regarding the possession, sale or distribution of injecting equipment. In the United States, 43 States and the District of Columbia have drug paraphernalia laws that penalise injecting drug users for needle and syringe possession.<sup>87</sup> In jurisdictions in the United States where drug paraphernalia laws were strictly enforced, a higher

prevalence of HIV infection was observed despite lower risk taking behaviour.<sup>20</sup> Legal barriers to possessing needles and syringes in Houston, Texas resulted in a higher prevalence of HIV with up to 35% of injecting drug users infected with HIV.<sup>88</sup>

The American Psychiatric Association supports the removal of government restrictions on the availability of sterile needles and syringes specifically within the structure of organised Needle and Syringe Programs.<sup>89</sup> The Association encourages government sponsored efforts to:

- Broaden the availability of Needle and Syringe Programs in targeted areas
- Provide public health education to promote safer hygiene practices among injecting drug users
- Continue to endorse the core strategy of increasing the availability of quality detoxification and treatment programs for all substance users.

Legislation that penalises injecting drug users carrying their own needles and syringes and penalises outreach workers who make such equipment available was identified in a review published by the World Health Organization as an important barrier to HIV control among injecting drug users.<sup>20</sup>

## What can be learnt from overseas Needle and Syringe Programs?

Needle and Syringe Programs have been shown in many settings to attract high risk injecting drug users who are therefore more likely to have acquired HIV before attending the Program. This appears to explain why cities such as Vancouver and Montreal have observed higher rates of HIV among Needle and Syringe Program attendees compared to non-attendees.<sup>20</sup>

In Vancouver, which has the largest Needle and Syringe Program in North America, HIV infection among injecting drug users has still spread despite Needle and Syringe Programs. It was found that frequent Needle and Syringe Program attendees in Vancouver were younger, significantly more likely to report unstable housing, frequent injecting, frequent cocaine injecting, involvement in the sex industry, injecting in shooting galleries and incarceration within the preceding six months while also significantly less likely to report enrolment in methadone maintenance than non-attendees.<sup>90</sup> These risk factors among attendees were likely to account for the observed

association between frequent Needle and Syringe Program attendance and HIV infection.

A cohort of people who inject drugs has been studied in Montreal where a Needle and Syringe Program has operated since 1988. A report from this study found that attendees were more than twice as likely to become infected with HIV than non-attendees.<sup>53</sup> The authors concluded that the higher rates of HIV among Program attendees were associated with restrictions on the number of sterile needles and syringes which could be provided on each visit. Since attendees engaged in higher risk behaviours, including more frequent injecting than non-attendees, the authors concluded that the number of needles and syringes distributed was likely to have been substantially less than was actually required to control HIV infection.

The experience in Canada suggests that a comprehensive strategy must be adopted by Needle and Syringe Programs if they are to be effective in reducing the transmission of blood borne viruses among injecting drug users and should include:<sup>91</sup>

- Education for injecting drug users
- Increased availability of sterile injecting equipment
- Access to effective drug treatment acceptable to the target population
- Organised involvement of people who inject drugs

## **What is the level of community support for Needle and Syringe Programs?**

More than half (55%) of respondents to the 2004 National Drug Strategy Household Survey indicated that they support Needle and Syringe Programs.<sup>1</sup>

In Perth, 87% of a sample of 400 members of the general public agreed that injecting drug users 'should be legally able to obtain new needles from authorised sources', while 93% felt that the provision of new needles and syringes was important to stop the spread of HIV.<sup>92</sup>

In New South Wales, 90% of a sample of 300 members of the community from urban and rural areas supported the continuation of the State's Needle and Syringe Programs, and 96% agreed that Needle and Syringe Programs play an important part in stopping the spread of HIV in Australia.<sup>93</sup> In five suburbs around the Kings Cross area in Sydney, 305 residents were randomly selected for

a telephone survey and 82% agreed that Needle and Syringe Programs should continue.<sup>94</sup>

In Australia in November 1998, the Inaugural Metropolitan Mayors Statement on Drugs recognised the importance of Needle and Syringe Programs as part of the National HIV/AIDS Strategy and undertook to encourage appropriate agencies and pharmacies to provide needles and syringes.

A 1997 United States telephone survey found that 71% of respondents supported the lifting of a ban on federal funding for Needle and Syringe Programs.<sup>95</sup> In a national referendum in Switzerland, 70% of voters rejected a proposal to discontinue Needle and Syringe Programs.<sup>96</sup>

The 2<sup>nd</sup> International Policy Dialogue on HIV/AIDS in Warsaw in 2003 developed a framework for effective action on HIV and injecting drug use. This emphasised the need for a pragmatic focus on factors which reduce the immediate risks and harms of HIV transmitted through injecting drug use, such as Needle and Syringe Programs.<sup>97</sup>

A 2004 review published by the World Health Organization concluded:<sup>20</sup>

*There is overwhelming evidence that increasing the availability and utilisation of sterile injecting equipment to injecting drug users contributes substantially to reductions in HIV transmission, and that there is no convincing evidence of major unintended negative consequences of such programs.*

## Conclusion

There is always bound to be a degree of controversy about Needle and Syringe Programs. For some people, personal beliefs and values shape their attitudes towards public health interventions to a greater extent than scientific evidence. However, evidence of the effectiveness of Needle and Syringe Programs is consistent and compelling and has been sufficient to persuade many major scientific authorities and governments around the world about the substantial benefits of these programs. Needle and Syringe Programs are a critical component of strategies to reduce the spread of HIV, hepatitis C and other blood borne viral infections among injecting drug users and the wider community. These Programs have been found to be highly cost-effective compared to the cost of treating HIV and hepatitis C infection. Needle and Syringe Programs have not been found to increase drug injecting, discarded used injecting equipment or result in any other serious negative consequences. These programs also facilitate referral to drug treatment and other health services. In areas where Needle and Syringe Programs have been established, they generally receive strong community support.

Authors:

Dr Kate Dolan, Mr Edmund Silins and Ms Libby Topp, National Drug and Alcohol Research Centre, UNSW, Sydney.

Ms Margaret MacDonald, National Centre in HIV Epidemiology and Clinical Research UNSW, Sydney. 1999, 2005.

## References

1. Australian Institute of Health and Welfare. 2005. *National Drug Strategy Household Survey 2004*. Canberra: Australian Institute of Health and Welfare.
2. Australian National Council on AIDS and Related Diseases. 1998. *Estimating the number of injecting drug users in Australia using the Delphi technique*. Sydney: National Centre in HIV Epidemiology and Clinical Research.
3. Commonwealth of Australia. 2002. *Return on investment in needle and syringe programs in Australia*. Canberra: Commonwealth Department of Health and Ageing.
4. Australian Medical Association. 2004. *Position Statement: Blood borne viral infections*. Canberra: Australian Medical Association.
5. Aceijas, C., Stimson, G., Hickman, M. and Rhodes, T. 2004. Global overview of injecting drug use and HIV infection among injecting drug users. *AIDS*. 18: 2295-2303.
6. McKetin, R., McLaren, J., Kelly, E., Hall, W. and Hickman, M. 2005. *Estimating the number of regular and dependent methamphetamine users in Australia: Technical Report*. Sydney: National Drug and Alcohol Research Centre, University of New South Wales.
7. Thein, H., Maher, L. and Dore, G. 2004. *Illicit Drug Reporting System Drug Trends Bulletin October 2004*. Sydney: National Centre in HIV Epidemiology and Clinical Research, University of New South Wales.
8. Commonwealth of Australia. 2004. *National Drug Strategy - Australia's Integrated Framework: 2004-2009*. Canberra: Australian Government Department of Health and Ageing.
9. Ministerial Council on Drug Strategy. 1998. *National Drug Strategic Framework 1998-99 to 2002-03. Building partnerships. A strategy to reduce the harm caused by drugs in our community*. Canberra: Commonwealth of Australia.
10. Feachem, R.G.A. 1995. *Valuing the past ... Investing in the future. Evaluation of the National HIV/AIDS Strategy 1993-94 to 1995-96*. Canberra: Australian Government Publishing Service.
11. UNAIDS. 1999. *Drug use and HIV/AIDS, UNAIDS Best Practice Collection Key Material*. Geneva: UNAIDS.
12. Commonwealth of Australia. 2005. *National Hepatitis C Strategy 2005-2008*. Canberra: Australian Government Department of Health and Ageing.

13. Rowe, J. 2003. *Who's using?: The Health Information Exchange [HIE] and the development of an innovative primary health care response for injecting drug users.* Melbourne: Salvation Army Crisis Service.
14. Wodak, A., Dolan, K.A., Imrie, A.A., Gold, J., Wolk, J., Whyte, B.M. and Cooper, D.A. 1987. Antibodies to human immunodeficiency virus in needles and syringes used by intravenous drug abusers. *Medical Journal of Australia.* 147: 275-276.
15. Wolk, J., Wodak, A., Morlet, A., Guinan, J.J., Wilson, E., Gold, J. and Cooper, D. 1988. Syringe seroprevalence and behavioural and demographic characteristics of intravenous drug abusers using syringe exchanges in Sydney, Australia, 1987. *AIDS.* 2: 373-378.
16. Dwyer, R., Fry, C., Carruthers, S., Bolleter, A., Dolan, K., Donald, A., Byrne, J. and Loxley, W. 2002. *ABRIDUS: The Australian Blood-borne Virus Risk and Injecting Drug Use Study- A study of hepatitis C risk practices and contexts in Melbourne, Perth and Sydney.* Melbourne: Turning Point Alcohol and Drug Centre Incorporated.
17. New South Wales Department of Health. 2005.
18. Obadia, Y., Feroni, I., Perrin, V., Vlahov, D. and Moatti, J.P. 1999. Syringe vending machines for injection drug users: an experiment in Marseille, France. *American Journal of Public Health.* 89(12): 1852-1854.
19. Stark, K., Leicht, A. and Muller, R. 1994. Characteristics of users of syringe vending machines in Berlin. *Sozial und Praventivmedizin.* 39(4): 209-216.
20. Wodak, A. and Cooney, A. 2004. *Evidence for action technical papers: effectiveness of sterile needle and syringe programming in reducing HIV/AIDS among injecting drug users.* Geneva: World Health Organization.
21. National Centre in HIV Epidemiology and Clinical Research. 2004. *HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2004.* Canberra: National Centre in HIV Epidemiology and Clinical Research, Australian Institute of Health and Welfare.
22. Crofts, N., Aitken, C.K. et al., 1999. The force of numbers: why hepatitis C is spreading among Australian injecting drug users while HIV is not. *Medical Journal of Australia.* 170: 220-221.
23. National Centre in HIV Epidemiology and Clinical Research. 2005. *Australian NSP Survey, Prevalence of HIV, HCV and injecting and sexual behaviour among IDUs at Needle and Syringe Programs, National Data Report.* Sydney: The University of New South Wales.
24. MacDonald, M., Wodak, A.D., Ali, R., Crofts, N., Cunningham, P., Dolan, K., Kelaher, M., Loxley, W., van Beek, I. et al., 1997. HIV prevalence and risk behaviour in needle exchange attenders: A national study. *Medical Journal of Australia.* 166: 237-240.
25. Strathdee, S.A., Patrick, D.M., Currie, S.L. 1997. Needle exchange is not enough: Lessons from the Vancouver injecting drug use study. *AIDS.* 11: F59-F65
26. Lee, L., McKenna, M. and Sharpe, T. 2003. HIV diagnoses among injection-drug users in states with HIV surveillance - 25 states, 1994-2000. *Morbidity and Mortality Weekly Report.* 52(27): 634-636.
27. *Sydney Morning Herald.* 1997. August 19, p15.

28. Center for AIDS Prevention Studies. Does needle exchange work, University of California. Website <http://www.caps.ucsf.edu/NEPrev.html>
29. Frischer, M. and Eliot, L. 1993. Discriminating needle exchange attenders from non-attenders. *Addiction*. 88: 681-687.
30. Hankins, C., Gendron, S., Bruneau, J. and Roy, E. 1994. Evaluating Montreal's needle exchange CACTUS-Montreal, in *Proceedings of the Workshop on Needle Exchange and Bleach Distribution Programs*. Washington: National Academy Press, p83-90.
31. Peak, A., Rana, S., Maharjan, S.H., Jolley, D. and Crofts, N. 1995. Declining risk for HIV among injecting drug users in Kathmandu, Nepal: The impact of a harm reduction programme. *AIDS*. 9: 1067-1070.
32. van Ameijden, E.J.C., van den Hoek, J.A.R., van Haastrecht, H.J.A. and Coutinho, R.A. 1992. The harm reduction approach and risk factors for human immunodeficiency virus (HIV) seroconversion in injecting drug users, Amsterdam. *American Journal of Epidemiology*. 136: 236-243.
33. Watters, J.K., Estilo, M.J., Clark, G.L. and Lorvick, J. 1994. Syringe and needle exchange as HIV/AIDS prevention for injection drug users. *Journal of the American Medical Association*. 271: 115-120.
34. Crofts, N., Webb-Pullman, J. and Dolan, K. 1996. *An analysis of trends over time in social and behavioural factors related to the transmission of HIV among IDUs and prison inmates. Evaluation of the National HIV/AIDS Strategy*. Canberra: Australian Government Publishing Service.
35. Broadhead, R.S., van Hulst, Y. and Heckathorn, D.D. 1999. Impact of the closure of a needle exchange program. *Social Problems*. 46(1): 48-66.
36. MacDonald, M., Wodak, A., van Beek, I., Cunningham, P. et al., 2000. Hepatitis C virus antibody prevalence among injecting drug users at selected needle and syringe programs in Australia, 1995-1997. *Medical Journal of Australia*. 172(2): 55-56.
37. Australian Institute of Health and Welfare. 2003. *Statistics on drug use in Australia 2002*. Canberra: Australian Institute of Health and Welfare.
38. World Health Organization. 2004. *Evidence for action on HIV/AIDS and injecting drug use. Policy brief: Provision of sterile injecting equipment to reduce HIV transmission*. Geneva: World Health Organization.
39. Lines, R., Jurgens, R., Betteridge, G., Stover, H., Laticevschi, D. and Nelles, J. 2004. *Prison needle exchange: Lessons from a comprehensive review of international evidence and experience*. Montreal: Canadian HIV/AIDS Legal Network.
40. Black, E., Dolan, K. and Wodak, A. 2004. *Supply, demand and harm reduction strategies in Australian prisons: implementation, cost and evaluation. Research paper 9*. Canberra: Australian National Council on Drugs.
41. Darke, S. 1998. Self-report among injecting drug users: A review. *Drug and Alcohol Dependence*. 51: 253-263.
42. Magura, S., Goldsmith, D., Casriel, C., Goldstein, P.J. and Lipton, D.S. 1987. The validity of methadone clients' self-reported drug use. *International Journal of the Addictions*. 22: 727-749.

43. De Irala, J., Bigelow, C., McCusker, J., Hindin, R. and Zheng, L. 1996. Reliability of self-reported human immunodeficiency virus risk behaviours in a residential drug treatment population. *American Journal of Epidemiology*. 143: 725-731.
44. Latkin, C., Vlahov, D. and Anthony, J.C. 1993. Socially desirable responding and self-reported HIV infection risk behaviors among intravenous drug users. *Addiction*. 88: 517-526.
45. Lurie, P. and Drucker, E. 1997. An opportunity lost: HIV infections associated with lack of a national needle-exchange programme in the USA. *Lancet*. 349: 604-608.
46. Lurie, P., Reingold, A.L., Bowser, B. eds. 1993. *The public health impact of needle exchange programs in the United States and abroad*. San Francisco: University of California.
47. Normand, J., Vlahov, D. and Moses, L.E. eds. 1995. *Preventing HIV transmission: The role of sterile needles and bleach*. Washington: National Academy Press.
48. National Commission on Acquired Immune Deficiency Syndrome. 1991. *The twin epidemics of substance use and HIV*. Washington DC: National Commission on Acquired Immune Deficiency Syndrome.
49. United States General Accounting Office. 1993. *Needle exchange programs: Research suggests promise as an AIDS prevention strategy*. Washington DC: House of Representatives.
50. Office of Technology Assessment. 1995. *The effectiveness of AIDS prevention efforts*. Washington: Office of Technology Assessment.
51. Hahn, J.A., Vranizan, K.M. and Moss, A.R. 1997. Who uses needle exchange? A study of injection drug users in treatment in San Francisco, 1989-1990. *Journal of Acquired Immune Deficiency Syndrome and Human Retrovirology*. 15: 157-164.
52. Schechter, M.T., Strathdee, S.A., Cornelisse, P.G.A., Currie, S., Patrick, D.M., Rekart, M.L. and O'Shaughnessy, M.V. 1999. Do needle exchange programs increase the spread of HIV among injection drug users: An investigation of the Vancouver outbreak. *AIDS*. 13(6): F45-F51.
53. Bruneau, J., Lamothe, F., Franco, E., Lachance, N., M, D., Soto, J. and Vinclette, J. 1997. High rates of HIV infection among injection drug users participating in needle exchange programs in Montreal: Results of a cohort study. *American Journal of Epidemiology*. 146: 994-1002.
54. Klee, H. and Morris, J. 1995. The role of needle exchanges in modifying sharing behaviour: Cross-study comparisons 1989-1993. *Addiction*. 90: 1635-1645.
55. Stimson, G.V. 1989. Syringe exchange programmes for injecting drug users. *AIDS*. 3: 253-260.
56. Carvell, A.M. and Hart, G.J. 1990. Help-seeking and referrals in a needle exchange: A comprehensive service to injecting drug users. *British Journal of Addiction*. 85: 235-240.
57. Heimer, R., Kaplan, E.H., Khoshnood, K., Jariwala, B. and Cadman, E.C. 1993. Needle exchange decreases the prevalence of HIV-1 proviral DNA in returned syringes in New Haven, Connecticut. *American Journal of Medicine*. 95: 214-220.
58. Heimer, R. 1998. Can syringe exchange serve as a conduit to substance abuse treatment. *Journal of Substance Abuse Treatment*. 15(3): 183-191.

59. Hagan, H., McGough, J.P., Thiede, H., Hopkins, S., Duchin, J. and Alexander, E.R. 2000. Reduced injection frequency and increased entry and retention in drug treatment associated with needle-exchange participation in Seattle drug injectors. *Journal of Substance Abuse Treatment*. 19(3): 247-52.
60. Gibson, D.R. 2000. Two- to seven-fold decreased risk associated with use of needle exchange. In *University of California 3rd annual Conference on AIDS Research in California, 17th Annual AIDS Investigators' Meeting*. San Francisco.
61. Wolk, J., Wodak, A., Guinan, J.J., Macaskill, P. and Simpson, J.M. 1990. The effect of a needle and syringe exchange on a methadone maintenance unit. *British Journal of Addiction*. 85: 1445-1450.
62. Guydish, J., Bucardo, J., Young, M., Woods, W., Grinstead, O. and Clark, W. 1993. Evaluating needle exchange: Are there negative effects? *AIDS*. 7: 871-876.
63. Hartgers, C., Buning, E.C., van Santen, G.W., Verster, A.D. and Coutinho, R.A. 1989. The impact of the needle and syringe-exchange program in Amsterdam on injecting risk behaviour. *AIDS*. 3(9): 571-576.
64. van Ameijden, E.J. and Coutinho, R.A. 2001. Large decline in injecting drug use in Amsterdam, 1986-1998: explanatory mechanisms and determinants of injecting transitions. *Journal of Epidemiology & Community Health*. 55(5): 356-363.
65. Junge, B., Valente, T., Latkin, C., Riley, E. and Vlahov, D. 2000. Syringe exchange not associated with social network formation: results from Baltimore. *AIDS*. 14(4): 423-426.
66. Bluthenthal, R.N., Gogineni, A., Longshore, D. and Stein, M. 2001. Factors associated with readiness to change drug use among needle exchange users. *Drug & Alcohol Dependence*. 62: 225-230.
67. Bor, J. 1999. Needle programs no spur to crime. *Baltimore Sun*, p1B.
68. Galea, S., Ahern, J., Fuller, C., Freudenberg, N. and Vlahov, D. 2001. Needle exchange programs and experience of violence in an inner city neighbourhood. *Journal of Acquired Immune Deficiency Syndromes*. 28(3): 282-288.
69. Oliver, K.J., Friedman, S.R., Maynard, H., Magnuson, L. and Des Jarlais, D.C. 1992. Impact of a needle exchange program on potentially infectious syringes in public places. *Journal of Acquired Immune Deficiency Syndromes & Human Retrovirology*. 5: 534-535.
70. Doherty, M.C., Garfein, R.S., Vlahov, D., Junge, B., Rathouz, P.J., Galai, N., Anthony, J.C. and Beilenson, P. 1997. Discarded needles do not increase soon after the opening of a needle exchange program. *American Journal of Epidemiology*. 145: 730-737.
71. Doherty, M.C., Junge, B., Rathouz, P., Garfein, R.S., Riley, E. and Vlahov, D. 2000. The effect of needle exchange program on numbers of discarded needles: a 2-year follow-up. *American Journal of Public Health*. 90(6): 936-939.
72. Department of Community and Health Services, personal communication. Tasmania.
73. Queensland Department of Health. 1999. *Report on the Queensland Needle Availability Support Program*. Brisbane: Queensland Department of Health.

74. Western Australia Department of Health. 2005.
75. Bell, D. 1997. Occupational risk of human immunodeficiency virus infection in healthcare workers: an overview. *American Journal of Medicine*. 102(5B): 9-15.
76. Centers for Disease Control. 2001. Updated U.S. public health service guidelines for the management of occupational exposure to HBV, HCV and HIV and recommendations for post exposure prophylaxis. *Morbidity and Mortality Weekly Report*. 50(RR11): 1-42.
77. Resnick, L., Vere, K., Salahuddin, S.Z., Tondreau, S. and Marham, P.D. 1986. Stability and inactivation of HTLV III/LAV under clinical and laboratory environments. *Journal of the American Medical Association*. 225: 1187-1191.
78. Gaughwin, M.D., Gowans, E., Ali, R. and Burrell, C. 1991. Bloody needles: The volume of blood transferred in simulations of needlestick injuries and shared use of syringes for injection of intravenous drugs. *AIDS*. 5: 1025-1027.
79. Thompson, S., Boughton, C. and Dore, G. 2003. Blood-borne viruses and their survival in the environment: is public concern about community needlestick exposure justified? *Australian and New Zealand Journal of Public Health*. 27(6): 602-607.
80. AIDS/TB Committee of the Society for Healthcare Epidemiology of America. 1997. Management of healthcare workers infected with hepatitis B virus, hepatitis C virus, human immunodeficiency virus, or other blood-borne pathogens. *Infection Control and Hospital Epidemiology*. 18: 349-363.
81. O'Leary, F. and Green, T. 2003. Community acquired needlestick injuries in non-health care workers presenting to an urban emergency department. *Emergency Medicine Australasia*. 15(5-6): 434-440.
82. Russell, F. and Nash, M. 2002. A prospective study of children with community-acquired needlestick injuries in Melbourne. *Journal of Paediatrics and Child Health*. 38(2): 322.
83. Libois, A., Fumero, E., Castro, P., Nomdedeu, M., Cruceta, A., Gatell, J.-M. and Garcia, F. 2005. Transmission of hepatitis C virus by discarded-needle injury. *Clinical Infectious Diseases Journal*. 41: 129-130.
84. Fitzgerald, J.L., Broad, S. and Dare, A. 1999. *Regulating the street heroin market in Fitzroy/Collingwood*. Melbourne: University of Melbourne.
85. Aitken, C., Moore, D., Higgs, P., Kelsall, J. and Kerger, M. 2002. The impact of a police crackdown on a street drug scene: evidence from the street. *International Journal of Drug Policy*. 13: 189-198.
86. Maher, L. and Dixon, D. 2001. The cost of crackdowns: policing Cabramatta's heroin market. *Current Issues in Criminal Justice*. 13(1): 5-22.
87. Burris, S., Vernick, J., Ditzler, A. and Strathdee, S. 2002. The legality of selling or giving syringes to injection drug users. *Journal of American Pharmaceutical Association*. 42(2): S13-18.
88. Richard, A.J., Mosier, V. and Atkinson, J.S. 2002. New syringe acquisition and multi-person use of syringes among illegal drug users. *Journal of Public Health Policy*. 23(3): 324-343.

89. American Psychiatric Association. 2003. Needle Exchange Programs Position Statement. *American Psychiatric Association Operations Manual*.
90. Schechter, M., Strathdee, S.A., Cornelisse, P.G., Currie, S., Patrick, D.M., Rekart, M.L. and O'Shaughnessy, M.V. 1999. Do needle exchange programmes increase the spread of HIV among injection drug users: an investigation of the Vancouver outbreak. *AIDS*. 13(6): F45-51.
91. Wodak, A., Strathdee, S.A., Friedman, S.R. and Byrne, J. 1998. The global response to the threat of HIV infection among and from injecting drug users. *AIDS Targeted Information*. 12: R41-R44.
92. Lenton, S. 1994. Illicit drug use, harm reduction and the community: *Attitudes to cannabis law and needle and syringe provision in Western Australia*. Perth: National Centre for Research in to the Prevention of Drug Abuse.
93. Schwartzkopf, J., Spooner, S., Flaherty, B., Braw, J., Grimsley, A., Scanlon, K. and Stewart, K. 1990. *Community attitudes to needle and syringe exchange and to methadone programs*. Sydney: New South Wales Department of Health.
94. MacDonald, M., Rutter, S., Wodak, A. et al., 1999. *K2 and Kings Cross community attitudes to the needle syringe program, discarded syringes and public injection, 1997-1998*. Sydney: New South Wales Department of Health.
95. The Lindesmith Centre. 1997. *71% of Americans Support Lifting Ban on Federal Funding for Needle Exchange Programs*. Press release.
96. *Sydney Morning Herald*. 1997. September 30, p8.
97. UNAIDS, Health Canada, Open Society Institute and Canadian International Development Agency. 2003. The Warsaw Declaration: A Framework for Effective Action on HIV/AIDS and Injecting Drug Use. In *Second International Policy Dialogue on HIV/AIDS*. Warsaw, Poland.



**Australian Government**

**Department of Health and Ageing**

