New Zealand Needle and Syringe Exchange Programme Review

Final Report

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The Centre For Harm Reduction

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1. Executive summary

The Centre for Harm Reduction carried out a review of New Zealand's Needle and Syringe Exchange Programme (NSEP) between April and September 2002. The Review's aim was to assess whether the NSEP is working in the most effective and efficient way possible within available resources.

Methods

Information was collected through a review of relevant literature, consultations with the NSEP stakeholders (the New Zealand Ministry of Health, the Pharmacy Guild of New Zealand, the Pharmaceutical Society of New Zealand, and Needle Exchange New Zealand) and other key agencies (including representatives of New Zealand's law enforcement agencies), a survey of NE users, and a call for public submissions. A major feature of the Review was the adaptation of methods and data used in *Return On Investment In Needle & Syringe Programs In Australia* (Health Outcomes International et al, 2002) to enable projections of the numbers of people living with HIV and HCV infections and produce cost/benefit estimates for New Zealand's NSEP.

Results

Effectiveness

Most of the scientific evidence clearly demonstrates that needle and syringe programmes worldwide are effective in reducing prevalence and/or incidence of HIV infection in injecting drug users. New Zealand enjoys one of the lowest prevalences of HIV infection in IDUs (0.9%) among more developed nations, lower even than countries such as Australia and The Netherlands which have (arguably) employed more comprehensive and intensive needle exchange strategies. It is estimated - by adapting the work of Health Outcomes International et al (2002) to suit New Zealand - that had the NSEP not been introduced, by the end of 2001 New Zealand would have had an extra 1,454 people living with hepatitis C, another 1,031 people living with HIV/AIDS, and an extra 20 people would have died following an HIV infection.

A gradual decline has occurred in the prevalence of needle-sharing among New Zealand IDUs since the mid-80s, and the most recent survey data show a substantial reduction in prevalence of sharing (in the month prior to survey), from 50 in 1994 to six per cent in 2002. While proving a direct link between NSEP activities and behaviour is difficult, the implication is that the NSEP has contributed to a reduction in needle-sharing among IDU.

The NSEP appears to be effective in reaching New Zealand's IDUs, with less than 5% of survey respondents reporting frequent difficulty in obtaining injecting equipment. Over 90% of respondents perceived little or no difficulty with access due to distance from an outlet. Nevertheless, the Review identified several regions which were under-serviced by NEs, including Auckland, Southland and the West Coast of the South Island. There are also some concerns about the NSEP's reach in terms of Maori and smaller ethnic groups.

Efficiency

A cost/benefit analysis was conducted based on the estimated numbers of HIV and HCV infections prevented by NSEP introduction, annual treatment costs for people living with HIV or HCV disease, and annual investment in the NSEP. Treating the estimated 1,031 extra people living with HIV/AIDS and the estimated 673 diagnosed with chronic HCV by the end of 2001 (had the NSEP not been introduced) would have added $35,678,516 to New Zealand's total healthcare outlay between 1988 and 2001, while total expenditure on the NSEP over that period was estimated at $10,644,588. Thus the net benefit due to the NSEP – based on HIV and HCV treatment costs avoided between 1988 and 2001 – is $25,033,928. Every $1 spent on New Zealand's NSEP saved an estimated $3.35 in healthcare costs which would otherwise have accrued over the period of investment. Extending the projections forward until all the extra New Zealanders infected with HIV or HCV between 1988 and 2001 due to non-establishment of the NSEP were estimated to have died produces a cumulative net benefit of $202,274,686; using this approach, every $1 spent on the NSEP between 1988 and 2001 yields $20.00 in lifetime treatment costs avoided.

Each needle and syringe distributed by New Zealand's NSEP costs approximately $0.90, making the programme about as efficient in terms of unit cost as the Australian state of Victoria, but less efficient than the average of all Australian state programmes (NZ$0.74). Economies of scale and population density are probable explanations.

Service delivery

The NE users' survey revealed that NE users were very happy with the service they received at NEs (96.5% selecting "good" or "very good"). The most popular options for improving service were one-for-one (new for old) syringe exchange and out-of-hours electronic syringe dispensers.

NE users were less satisfied with pharmacy exchange services, with 21.2% rating it as good or very good. Better staff attitudes (towards IDUs) and lower prices of injecting equipment were the options favoured for improved service.

Other issues

In the consultations, nearly universal support was expressed for removing the anomaly of possession of injection equipment being an offence under the Misuse of Drugs Act [section 13(1)(aa)] while a defence exists under the Health (Needles and Syringes) Regulations 1998.

One for one (new for old) needle and syringe exchange is the mode of service favoured by all NE staff. Experience to date with one-for-one has been very positive in terms of increasing distribution of new and return of used equipment, and (anecdotally) reducing syringe re-use. The Review's survey of NE users found that IDUs attending NEs offering one-for-one exchange reported significantly lower prevalences of needle and syringe sharing and re-use than IDUs attending other NEs.

Electronic dispensers (vending machines) currently used by NEs in Auckland and Christchurch to provide after-hours service are working well, and were frequently nominated as a potential method of improving the reach of the NSEP.

The concept of providing syringe disposal bins in public places was supported by many of those consulted as a way of enabling safer disposal and reducing the visible aspects of illicit drug use.

Training for pharmacy staff and NE workers and volunteers was widely approved as a means of increasing the effectiveness and efficiency of the programme.

Conclusion

New Zealand's NSEP is both effective and efficient, particularly with respect to prevention of HIV infections among injecting drug users.

Recommendations

1. That the effectiveness and efficiency of New Zealand's NSEP be acknowledged.
2. That New Zealand's government and community recognise the vital role of the NSEP in preventing HIV infections.
3. That consideration be given to opening a second peer-based NE in Auckland, to bring per-capita service coverage closer to the level which exists elsewhere in New Zealand.
4. That consideration be given to improving NSEP coverage on the South Island's west coast and Southland by opening branch NEs and/or upgrading and expanding existing pharmacy outlets.
5. That consideration be given to increasing the reach of the NSEP by enabling and/or encouraging the provision of needle exchange services through existing health service infrastructure, such as Community Health Centres and Sexual Health clinics.
6. That consideration be given to expanding the use of electronic dispensers at NEs to provide after-hours exchange services.
7. That the costs and benefits that would result from the introduction of free one-for-one (new for old) needle and syringe exchange in New Zealand be formally investigated.
8. That the crucial role of NE volunteers in New Zealand's NSEP be affirmed, and that any resolution of the "reimbursement problem" must not jeopardise volunteers' input to the programme.
9. That New Zealand's parliament approve the proposed amendment to the Misuse of Drugs Act which would remove the offence of possession of needles and syringes legally obtained through the NSEP.
10. That the (perceived) problems of pharmacy staff attitudes towards needle exchange clients be addressed in a systematic way by the Ministry of Health, NENZ and the Pharmacy Guild; research into pharmacy exchange users' perceptions of service would be a useful first step.

11. That the Pharmaceutical Society provide NEST with details of pharmacy closures, openings, and changes of ownership on a monthly basis.
12. While return of used needles and syringes to NEs or pharmacies for destruction should remain first priority, NEs should address the issue of disposal of needles and syringes, by means other than return to NEs or pharmacies, in their IDU education activities in order to reduce visibility of needles and syringes in public places and risk of needlestick injury.
13. That training modules for pharmacy staff be developed by NENZ and NEST in consultation with the Pharmacy Guild and Pharmaceutical Society, promoted by them, and delivered by NEST staff.
14. That GP training in New Zealand include a component on aspects of illicit drug use, including the NSEP (its rationale and operation) and methadone maintenance programmes.
15. That the Ministry of Health liaise with the NZMA about encouraging GPs to work with their local NE to provide improved access to testing, counselling and primary healthcare services.
16. That basic training for NZ police include a short session on New Zealand's harm minimisation policy and the NSEP. NENZ should liaise with police to achieve this goal.

2. Introduction and Aim

The Centre for Harm Reduction (CHR) was commissioned to review New Zealand's Needle and Syringe Exchange Programme (NSEP) in March 2002. (The terms of reference for the Review are shown in Appendix 1.) A CHR team collated existing data, collected new data (via consultations with stakeholders, a survey of NSEP users, and a call for public submissions in major daily newspapers) and analysed it to produce this report. It includes recommendations for action to improve the effectiveness of needle exchange services in New Zealand.

2.1 Aim of the review

To assess whether the NSEP is working in the most effective and efficient way possible within available resources.

The key words in the aim were interpreted as follows:

Effectiveness – is the NSEP achieving its stated objective(s)?

Efficiency – is the NSEP achieving its stated objective(s) cost-effectively?

2.2 Terminology

On advice from the Ministry of Health, throughout this report the term 'Needle and Syringe Exchange Programme' (NSEP) is used to denote the entire system of provision and collection of injecting equipment that operates in New Zealand. 'Needle Exchange (NE) is used to mean any one of the (at the time of writing) 12 peer-based organisations which provides injecting equipment and associated services to people who inject drugs in New Zealand.

All dollar amounts are in New Zealand dollars unless otherwise indicated.

2.3 Report structure

This report is organised by the key points contained in the terms of reference; it brings together the information gathered from all sources on each point in turn. Thus, instead of describing the outcomes of the consultations in a single section (which would involve considerable repetition, as essentially the same points were covered in each), they are used in conjunction with other data to form conclusions on key questions.

3. Background

3.1 The rationale behind Needle and Syringe Exchange Programmes

The fundamental reason for the establishment of needle and syringe programmes is to reduce transmission of the Human Immunodeficiency Virus (HIV) between people who inject drugs, and hence reduce the rate of infection for the entire community. Injection of illicit drugs using needles and syringes contaminated with HIV-infected blood is an extremely efficient way of transmitting the virus, which then moves into the non-injecting population via unprotected sexual contact. In the United States, injecting drug use and IDUs' sexual activity accounts for approximately half of all new HIV infections each year (Holmberg, 1996). Needle and syringe programmes seek to interrupt HIV transmission by enabling IDUs to inject with sterile equipment, collecting used equipment for safe disposal, and educating IDUs about preventing infections. The first needle and syringe programme opened in Amsterdam in 1984 (van den Hoek et al, 1989; since then programmes have been established in developed and developing countries the world over.

3.2 Establishment of NSEP in New Zealand

Needle exchange became possible in New Zealand through the introduction of the Health (Needles and Syringes) Regulations 1987 (later replaced by the Health (Needles and Syringes) Regulations 1998). The regulations allow for the sale of needles and syringes to injecting drug users. The programme allows pharmacists, medical practitioners and other authorised representatives to provide clean needles and syringes.

The strategies of the NSEP are:

- The sale and distribution of new (sterile) injection equipment.
- Safe disposal of used needles and syringes.
- Free distribution of safer sex products to NSEP clients.
- Provision of clear simple messages about the transmission of diseases and safer drug use techniques to every person using the NSEP.

The NSEP is based on a philosophy of problem limitation; that is to reduce as far as possible the potential harm resulting from injecting drug use rather than attempting to curtail the activity itself. Problem limitation aims to modify behaviour to minimise the spread of HIV and other blood-borne diseases. The NSEP, while not condoning the use of illegal drugs, accepts that drug use continues to occur despite its legal sanctions.

3.3 The context of New Zealand's NSEP

Because an NSEP is a response to a public health problem directly associated with injection of illicit drugs, it is important to understand the wider context – legal, drug use, and public health aspects - of NSEP in New Zealand.

3.3.1 Drugs

Heroin imported from Asia – the mainstay of drug injectors in Europe, Australia and North America – has only briefly (in the mid-1970s) been widely or reliably available in New Zealand (Kemp, 1996). As a result, since the early 1980s New Zealand's injecting drug users (IDUs) have been injecting prescribed opiates - such as methadone and morphine - diverted from their original licit sources, and producing their own injectable opiates. These include 'homebake', made from over-the-counter painkillers containing codeine; morphine sulphate tablets (prescribed for serious pain relief); and in season, opium harvested from locally-grown poppies. More recently, New Zealanders have begun converting pseudoephedrine extracted from commercial cough and cold preparations to methylamphetamine. This characteristic of self-reliant manufacturing in the absence of imported opiates and amphetamines has shaped the New Zealand IDU culture into a peculiarly underground one. Street drug markets or 'scenes' like those which exist in the major cities of other nations are unknown. The lack of street drug scenes means drug problems are much less visible in New Zealand than elsewhere – injecting in public and publicly discarded injecting paraphernalia are rare (Kemp, 1996). The apparent recent increase in amphetamine use in New Zealand may alter this picture, producing more chaotic and event-associated injecting (Field and Casswell, 1998, cited in Brunton, 2002; Henderson C and Nimmo S, *pers comm.,* cited in Brunton, 2002*).*

3.3.2 Legal environment

Needle exchange was made possible in New Zealand through the introduction of the Health (Needles and Syringes) Regulations 1987, which allowed the sale of needles and syringes to injecting drug users provided their sale is part of the NSEP. The regulations (later replaced by Health (Needles and Syringes) Regulations 1998) also create a legal defence to the charge of possession of injection equipment, which remains an offence under the Misuse of Drugs Act [section 13(1)(aa)].

Under the regulations a person can be charged and prosecuted for possession of needles and syringes obtained under the NSEP but – if he or she can prove that the equipment was legally purchased under the NSEP - cannot be found guilty. (This apparent anomaly received a good deal of attention in the Review and is referred to several times in this report.)

3.3.3 Public Health

New Zealand's NSEP was a response to a feared epidemic of HIV among injecting drug users in the 1980s, an epidemic which – unlike in the United States and some other western countries - did not eventuate. There is considerable ecological evidence that countries with needle exchange programmes have lower HIV prevalence and incidence among IDUs than countries without (see section 6.1). Whatever the reason, it is certainly true that New Zealand enjoys one of the lowest rates of HIV infection among IDUs in the world (see section 6.2).

The hepatitis C virus (HCV) is at substantially higher prevalence among New Zealand's IDUs than HIV, and will continue to be the major viral threat to their health and a cause of

substantial healthcare costs. HCV is more efficiently transmitted than HIV, and this fact, combined with a much higher background prevalence and historical endemicity in the IDU population, makes it much more difficult to control (Crofts et al, 1999). With prevalence among NSEP users measured at 72-84.2% among IDUs in opioid treatment (Judson, 1999; Carter et al, 2001) and 53% among IDUs tested at NEs (Kemp and MacDonald, 1999), HCV has rightly become the focus of the programme's blood-borne virus (BBV) prevention efforts.

4. Methods

4.1 Personnel

The review team consisted of Dr Campbell Aitken (team leader - CHR, Burnet Institute, Australia), Helen Fraser (research assistant - CHR, Burnet Institute, Australia), Dr Nick Crofts (technical director - CHR, Burnet Institute, Australia), and Dr Cheryl Brunton (New Zealand collaborator - Department of Public Health & General Practice, Christchurch School of Medicine and Health Sciences). Brendon Baker of the New Zealand Ministry of Health was our liaison officer and provided support in the form of contacts and data.

A steering group was formed to provide expert advice and direction to the review team. It included Nick Crofts, Owen Westcott (NSW Department of Health), Robert Kemp (Queensland Health – formerly manager of the Drugs and Health Development Project, Wellington, New Zealand), Dr Greg Dore (National Centre for HIV Epidemiology and Clinical Research (Australia), and Campbell Aitken.

4.2 Data collection

The review team used four distinct approaches to collect information – a literature review, consultations with key agencies, a survey of NE users, and a call for public submissions.

4.2.1 Literature review

All available relevant material – published and unpublished, official reports and scientific articles – was collated and evaluated. Data which could be used to evaluate the performance of the NSEP were also collected for later analysis. All published material used in this review is cited in the text and listed in the References section.

4.2.2 Consultations

The Review team leader held face to face consultations with the stakeholders of the NSEP (the New Zealand Ministry of Health, the Pharmacy Guild, the Pharmaceutical Society, and Needle Exchange New Zealand) and other key agencies in four New Zealand cities between the 13th and 17th of May 2002. Representatives - usually the managers, but frequently including other staff, volunteers, and trustees - of nine of the 12 peer-based Needle Exchange programmes (NEs) were consulted in four sessions in Auckland, Wellington, Christchurch and Dunedin. Table 4.1 shows the consultation schedule and gives details of participation.

Table 4.1. People consulted and their roles in or relationships to the NSEP.

Date	Consultation host	People consulted
May 13th	Rodger Wright Centre, Christchurch	Maggie Treweek (RWC Manager), Charles Henderson (NENZ – former RWC manager), Ian Smith (RWC Trustee), Jan Thomas (employee, Timaru NE), Lyn Waller (Manager, Nelson NE)
May 13th	NENZ, Christchurch	Charles Henderson (National coordinator), Patsy Davison (South Island coordinator)
May 13th	Hepatitis C Resource Centre, Christchurch	Bill Jang (Manager)
May 14th	DIVO, Dunedin	Hilary Lawrence (DIVO Community Worker), Gregor Richardson (Pharmacy Support Worker and Exchange Assistant), Donald Reid (Office Administrator), Fyfe, Rob, Steve (volunteers), Peter (client), Peter Barron, Stephen Farquhar, Paul Fawcett, Jimmy (DIVO trustees), Rosemary Friend (sessional GP)
May 15th	Pharmaceutical Society, Wellington	Euan Galloway (Manager, Pharmacy Practice and Legislation)
May 15th	Ministry of Health, Wellington	Brendon Baker (Analyst - National Drug Policy), Michael Baker (previous NSEP reviewer)
May 16th	New Zealand Police	Paul Marriott-Lloyd (Strategic Policy Group), Richard Schurr (National Drug Intelligence Bureau), Gary Knowles (National Bureau of Criminal Intelligence), Mike Arnerich (Wellington Metro Organised Crime Unit)
May 16th	Drugs Project, Wellington (NE)	Kelley Auerbach (manager), Drew Thomas (manager, Palmerston Nth NE), Sandy (manager, Napier NE), David (Palmerston Nth employee), Simon (volunteer)
May 17th	Pharmacy Guild, Auckland	Maree Jensen (Member of the Guild National Council)
May 17th	New Zealand AIDS Foundation, Auckland	Kevin Hague (Director)
May 17th	ADIO Trust, Auckland (NE)	Karen Blacklock (Manager); Gerry MacPhail (NINE manager); Garth (employee), Bob (volunteer)

The Review team leader held an unscheduled telephone conversation with Dr Geoff Robinson (an opioid treatment specialist located in Wellington) at the instigation of Euan Galloway (Pharmacy Guild), and another with Dr Rosemary Friend (a GP who offers regular counselling and primary healthcare sessions at DIVO, Dunedin). These opportunities for medical perspectives on the NSEP were greatly appreciated as New Zealand's general practitioners, the Royal New Zealand College of GPs and the New

Zealand Medical Association, had been invited to provide representatives to participate in the Review, but both declined.

In late June, the Review team leader had a telephone conversation with Dr Richard Meech, chair of the AIDS Medical and Technical Advisory Committee (AMTAC).

4.2.3 Survey of NE users

In order to include the views of the 'clients' of New Zealand's NSEP, in consultation with Dr Cheryl Brunton and NE managers a brief questionnaire (see Appendix 2) was developed for use in a survey of users of NE users. The questionnaire was printed on both sides of a single page and was designed for respondents to complete independently; participation was voluntary and anonymous, questionnaires being identifiable only as having been completed at a particular NE. The questionnaire focused on users' perceptions of the NSEP (NEs *and* pharmacies) and its operation.

Dr Brunton printed the questionnaires and sent the NEs quotas based on their needle and syringe outputs for 2000 (NENZ Trust, 2000). The survey ran between the 17th and 29th of May 2002, and the views of 316 NE users were canvassed. Completed questionnaires were returned to Dr Brunton, copied, and posted back to Melbourne for analysis.

4.2.4 Call for public submissions

A call for public submissions (see Appendix 3) was placed as a public notice in *The Dominion*, *The New Zealand Herald, The Press* and the *Otago Daily Times* on Saturday 19th April 2002 and *The Dominion*, *The New Zealand Herald* and *The Press* on Saturday 26th April 2002. People wishing to make a submission could obtain the Review's terms of reference by writing, telephoning or faxing the Review's Ministry of Health liaison officer, or by copying or downloading them from the Centre for Harm Reduction's website.

No submissions were received by the closing date of Friday 7th June 2002.

4.3 Estimating the NSEP's effect on HIV infections among IDU

A study carried out for the Commonwealth Department of Health and Ageing (Australia) entitled *Return On Investment In Needle & Syringe Programs In Australia* has recently been released (Health Outcomes International et al, 2002). The authors made projections of the annual numbers of HIV infections which would have occurred among IDUs without the introduction of Australia's needle and syringe programs (NSPs), and subtracted from these from estimates of HIV infections occurring among IDUs with NSPs in place, to arrive at estimates of HIV infections prevented by NSPs. These figures were used in conjunction with HIV treatment costs and NSP expenditure to estimate annual returns on investment (ROI) in Australia's NSPs. The methods and data employed in the ROI study were made available to the Centre for Harm Reduction so the process could be adjusted to produce equivalent estimates for New Zealand. The fundamentals of the Australian study and how it was adapted to suit New Zealand's parameters are briefly described in the following paragraphs.

4.3.1 Methods used in the Australian 'Return On Investment' study re HIV

In order to produce estimates of the annual costs of treating the HIV infections which would have occurred without NSEP introduction in Australia, the following data (in many cases, also estimated) were required:

- annual HIV prevalences among Australian IDUs
- the number of IDUs
- past HIV incidence among IDUs
- annual treatment costs for each HIV disease stage.

HIV prevalence among IDUs in Australia between 1980 and 2000 was based on the estimated numbers of IDUs living with HIV and estimates of the numbers of IDUs in Australia. The number of dependent heroin users in Australia in 1997 was assumed to be 75,000 (Hall et al, 2000), and assuming a constant net 8% increase in dependent heroin users per year gave a reasonable fit to the estimated numbers for the previous 20 years. To allow for injecting of other drugs, the total number of regular IDUs was assumed to be 33% greater than the number of dependent heroin users (ie 100,000 regular IDUs in 1997 (Law 1999). The number of occasional IDUs was assumed to be 175,000 in 1997 (ibid) with the same annual percentage increases.

Health Outcomes International et al's (2002) estimates of past HIV incidence and future AIDS incidence as a result of injecting drug use were obtained using back-projection methods. Observed AIDS incidence data, adjusted for reporting delay, and knowledge of the rate at which HIV infected people progress to AIDS were used to reconstruct the likely pattern of past HIV incidence, thereby enabling projection of future AIDS incidence.

HIV incidence was fixed at 20 cases per year from 1994 onwards on the basis of the number of HIV diagnoses and diagnoses of newly acquired HIV infection reported to the National HIV Database. This incidence rate was consistent with the estimated HIV incidence obtained from the back-projection analyses. Estimates of the number of people living with HIV infection by disease stage were based on the estimated pattern of past HIV incidence.

All the data referred to above enabled Health Outcomes International et al to estimation of annual numbers of IDU living with HIV by disease stage, and of numbers of HIV infections by disease stage which would have occurred without NSP introduction. In their analyses, HIV incidence due to IDU was assumed to cease in 2001, and estimates were projected forward until all people infected with HIV to 2001 were estimated to have died. For each year, the differences between the two sets of estimates (representing numbers of HIV-infected IDUs prevented or caused by NSP introduction) were multiplied by the annual treatment costs for people in three stages of HIV disease (early = CD4 count less than 500, advanced = CD4 count more than 500, and AIDS) and the products totalled to give an annual gross cost or saving. To account for savings being more valuable now than in the future, estimated treatment costs avoided after 2001 were discounted back to that date at an annual rate of 5%.

4.3.2 Adjustments for New Zealand

Modifying the Australian estimates to predict the numbers of HIV infections which would have occurred among New Zealand's IDUs without the introduction of the NSEP required IDU population estimates, the NSEP start-up date, and HIV surveillance data.

4.3.2.1 Rationale for using Australian HIV data to model New Zealand's

Australia and New Zealand are similar in many ways, and maintain close economic, political and cultural links. Our British colonial pasts, our majority Anglo-Celtic populations, our very similar modes of life and of course our close geographical alignment have for many years facilitated the exchange of large numbers of temporary and permanent migrants. These similarities extend to the two countries' profiles in terms of drug-related HIV epidemiology and health policy responses. New Zealand established needle and syringe programs in the late 1980s (a year after Australia) with the aim of avoiding the HIV epidemics in injecting drug users already underway in the United States and Europe. As will be shown in later sections, HIV prevalences among Australian and New Zealand IDUs have never reached the levels experienced elsewhere in the world, and in the 21st century remain very low by world standards. Accordingly, perhaps the best justification for applying a simple adjustment of Australian HIV projections to the New Zealand situation is the historical consistency of HIV diagnosis data across the two countries. The correlation between the annual numbers of HIV diagnoses in Australian and New Zealand IDUs, 1990-2000, is 0.792 (Pearson's correlation), significance = 0.004, meaning the two trends are strongly related.

4.3.2.2 Data used to create HIV projections for New Zealand

In 2000, Nesdale et al (2000) produced estimates of the size of New Zealand's IDU population to facilitate projections of the prevalence and future impact of hepatitis C in New Zealand. Estimates were based on previous New Zealand studies and assumptions about the pattern of injecting drug use over time, and compared with estimates based on Australian data, adjusted for New Zealand population size. Nesdale et al's preferred estimate was 15,000 *regular* IDU and 7,000 *occasional* IDU, giving a total IDU population of 22,000 (range 20,000-24,000) in New Zealand in 2000. To obtain a 2001 figure, the annual 8% net increase used by Health Outcomes International et al (2002) for Australian IDUs was assumed to apply in New Zealand. Thus, for 2001, the estimated IDU population of New Zealand was 22,000 * 1.08 = 23,760. This figure was divided by the total estimated Australian IDU population for 2001 (projected forward at 8% per annum) of 340,122, and the resulting ratio applied to Health Outcomes International et al's estimates of Australians who acquired HIV through injecting drug use to generate corresponding estimates for New Zealand. Happily (for our purposes), this process results in an estimate of cumulative IDU-acquired HIV infections in New Zealand by end 2001 of 47, exactly matching the total number of diagnosed infections (Eberhart-Phillips, 2002).

New Zealand's NSEP began operating in 1988. Hence, any effect of the NSEP on HIV prevalence among IDUs would be apparent from 1989 onwards. The New Zealand-

adjusted data were shifted a year forwards to account for the delay over implementation in Australia.

A further adjustment was made to the estimates of HIV cases prevented by NSEP introduction to try to account for differences between Australia's and New Zealand's IDU scenes. In New Zealand imported opiates are rare and few readily injectable drugs are available, there are no street drug scenes or markets and (plausibly) less social mixing among IDUs as a result; therefore it seems appropriate to be relatively conservative in estimating HIV incidence without the NSEP. (As actual HIV diagnoses to 2001 match our estimate, there is no incentive to adjust our estimates of HIV incidence *with* the NSEP.) These differences between estimated HIV cases and deaths per annum with and without NSEP introduction, calculated by adjusting the Australian ROI data tables (Health Outcomes International et al (2002), were regarded as the upper bounds on the NSEP's prevention effect. As no meaningful way exists to create confidence intervals on these projections, it was decided that the best course was to be consistent with the procedure used with respect to HCV (see section 4.4.2). Therefore, the "middle-bound" estimates were calculated at 1/1.74 and the lower bounds at (1-0.74)/1.74 of the adjusted ROI model's results (so that the upper bound estimates is 74% greater than the "middle" and the lower bound estimates are 74% smaller). Note that these bounds do not provide any basis for evaluating the statistical significance of the results, rather they enable an apprehension of the sensitivity of projections to variation in the numbers of infections prevented.

Annual treatment costs are converted into New Zealand dollars at an average exchange rate of $A1 = 1.2$NZ.

4.4 Estimating the NSEP's effect on HCV infections among IDU

Health Outcomes International et al's (2002) study, described in more detail in section 4.3 with respect to HIV, included projections of the annual numbers of HCV infections with and without the introduction of NSPs in Australia, and estimated annual returns on investment due to the NSP's effects on HCV transmission. The methods used to do so, and the adjustments made to adapt Health Outcomes International et al's data to a New Zealand context, are briefly explained below.

4.4.1 Methods used in the Australian 'Return On Investment' study re HCV

In order to produce estimates of the annual costs of treating the HCV infections which would have occurred without NSEP introduction in Australia, Health Outcomes International et al (2002) made the following assumptions:

- The HCV incidence rate in regular IDUs was 18% per annum between 1960 and 1985, after which it decreased linearly to 13% in 1989 and continued to decrease at that rate thereafter.
- The HCV incidence rate in occasional IDUs was 20% of that in regular IDUs.
- Starting or stopping injecting, or occasional IDUs becoming regular, was independent of HCV status.

- HCV incidence due to receipt of infected blood or blood products was 15% of HCV incidence in IDUs until 1983, after which it gradually decreased due to the introduction of donor self-deferral related to injecting drug use, and was zero from 1990 due to blood donation screening.
- HCV incidence through other non-IDU-related transmission routes (such as needle stick injuries in health care workers, or tattoos) was 10% of HCV incidence in IDUs between 1987 and 1997 (reflecting the data on risk factors for recent incident HCV infections). Before 1987 it increased linearly to 20% of HCV incidence in IDUs in 1977, then stayed at this absolute number of infections per year (again broadly consistent with data on risk factors for prevalent HCV infections, and for people with HCV infection attending liver clinics).
- The number of HCV infections between 1950 and 1960 was held constant at a low level proportional to the modelled HCV incidence among IDUs. Any HCV infections prior to 1950 were assumed to have negligible effect on estimates and projections, and were not modelled.

Health Outcomes International et al's (2002) modelling of HCV incidence in Australian IDUs corresponds to a gradual increase in HCV prevalence among regular IDUs until the mid- to late-1980s, succeeded by a steady decline to around 52% HCV prevalence in 2000. NSPs were assumed to have reduced HCV prevalence among IDUs from 1988 onwards. HCV prevalence in the absence of NSPs was modelled by assuming that HCV prevalence would have remained at the 1988 level from that year onwards.

To cost the effect of NSPs in reducing the number of people living with HCV, estimates of the reduction in the number of people living with HCV by disease stage were made by subtracting the estimates obtained with NSPs from the corresponding estimates without NSPs (ibid), adjusting the remainder for under-diagnosis, and multiplying by the appropriate treatment costs. To account for money being more valuable now than in the future, treatment costs of HIV or HCV infections avoided are discounted back to 2001, at an annual rate of 5%.

4.4.2 Adjustments for New Zealand

Adjustments similar to those used for HIV (see section 4.3.2.2) were applied to produce HCV projections for New Zealand from the ROI data (Health Outcomes International et al, 2002). Nesdale et al's (2000) estimate of the size of New Zealand's IDU population was projected forward to 2001 and divided by the corresponding figure for Australian IDUs, and the resulting ratio (23,760/340,122) applied to Health Outcomes International et al's estimates of Australians who acquired HCV through injecting drug use with and without NSP introduction. This procedure resulted in an estimate of 13,033 people living with HCV acquired via IDU by the end of 2000 – only 51% of Nesdale et al's estimate of 25,200 New Zealanders living with HCV acquired by all routes. If it is assumed that 90% of all HCV infections in New Zealand are IDU-acquired, then Nesdale et al's IDU-acquired figure for 2000 becomes 22,680, which is 74% greater than the ROI-derived estimate for 2000. Accordingly, it was decided to create upper-bound estimates by scaling the projection upward by 74% so the estimate for 2000 matched Nesdale's (adjusted) 22,680. Lower bounds were created by multiplying the ROI-derived estimates by (1-0.74).

This had the effect of making the results more conservative, which was necessary to try to account for the differences between Australia's and New Zealand's IDU scenes that are likely to mean lower rates of transmission in New Zealand in the absence of the NSEP.

Estimated annual treatment costs were converted into New Zealand dollars at an average exchange rate of $A1 = 1.2$NZ.

4.4.2.1 Rationale for using Australian HCV data to model New Zealand's

Essentially the same arguments apply here as for HIV (see section 4.3.2.1). The fundamental similarities and geographical closeness of Australia and New Zealand and very similar drug-related HCV epidemiology and health policy responses have been used by other authors as an argument for the validity of adjusting Australian data streams to model those in New Zealand.

4.5 Cost/benefit analysis

The return on investment in New Zealand's NSEP due to prevention of HIV and HCV infections combined was calculated using the method applied in the Australian ROI study (Health Outcomes International et al, 2002).

- The estimated cumulative costs of treatment for people who acquired HIV or HCV through IDU between 1988 and 2001 *with* the NSEP in place

are subtracted from:

- the cumulative estimated treatment costs for people who would have acquired HIV or HCV through IDU between 1988 and 2001 *without* NSEP introduction

leaving the cost of treatment for HIV or HCV infections avoided by the NSEP, from which is subtracted:

- New Zealand's investment in the NSEP between 1988 and 2001

to obtain a net return on investment, which can also be expressed as dollars saved per dollar invested.

Costs or benefits are reported for the period 1988 to 2001 (meaning only estimated treatment costs avoided between and including those years are counted), and also by counting treatment costs avoided until all the extra people who would have acquired HIV or HCV through IDU in that period *without* NSEP introduction are estimated to have died. The annual and cumulative investments in the NSEP for 1998-2001 remain unchanged.

4.6 NE users' survey data

Questionnaire data were entered into a Filemaker Pro 4.0 database, then exported to SPSS for analysis. Some descriptive statistics for the NE users who completed the questionnaire are given below; results relating to the Review's key questions (effectiveness of the NSEP, efficiency of the NSEP, etc) are dealt with in the appropriate sections of this report.

4.6.1 The sample of NE users

Three hundred and sixteen people completed questionnaires during visits to the 12 NEs in mid-May 2000. Of 311 respondents who provided their gender, 124 (39.9%) were female. Mean age (298 responses) was 32.3 years (range 17-60), 32.9 for males and 31.3 for females. Three hundred and three respondents specified their ethnic background, of whom 38 (12.5%) described themselves as Maori or New Zealander/European and Maori; 258 (85.1%) specified New Zealand/European ethnicity; the remaining 7 individuals were of Asian (5), Australian (1) and Pacific Islander (1) ethnicity.

4.6.1.2 Drugs injected

Respondents were asked to nominate the drug they had injected most often in the month prior to completing the questionnaire, but instead many listed *all* the drugs they had injected in that period. The result is a list of drugs injected that is incomplete for many survey participants (those who answered the question correctly), but nevertheless captures the most important drugs injected by all. One hundred and eighty-two reported injecting MST or morphine (57.6%), 102 (32.3%) methadone, 81 (25.6%) speed, 39 (12.3%) Ritalin, 34 (10.8%) homebake, 11 (3.5%) benzodiazepines, and 2 (0.6%) opium (percentages do not add to one hundred as many participants reported injecting multiple drugs). The very small number citing opium should be viewed in the light of the timing of the survey – opium poppies are harvested from approximately November to March in New Zealand, while the survey was conducted in mid-May, when stocks of drugs are very likely to have been very low (Robert Kemp, *pers comm*).

4.6.1.3 Injecting frequency

Recent injecting frequency was measured on a categorical scale, the categories being 1 or less often, 2-3, 4-7, 8-13, and 14 or more times per week. The modal category, with 79 (25.2%) of 313 respondents to this question, was 14 or more times per week; 53 (16.9%) injected 8-13 times, 67 (21.4%) 4-7 times, 78 (24.9%) 2-3 times, and 36 (11.5%) injected once or not at all. Taking the halfway mark of each category (and 0.5 injections per week for the first and 17 for the last) gives a mean frequency of 8.0 injections per week for the sample.

4.6.1.3 NE use

The frequency with which IDUs obtained needles and syringes from NEs was measured on a categorical scale, the categories being 1-2, 3-4, 5-8, 9-12, and 13 or more times in the month prior to the survey. The modal category, with 87 (27.5%) of 316 respondents to this question, was 13 or more times per month; 36 (11.4%) visited 9-12 times, 74 (23.4%) 5-8 times, 79 (25.0%) 3-4 times, 33 (10.4%) once or twice, and 7 (2.2%) did not get needles and syringes from an NE in the month prior to the survey. Taking the halfway mark of each category (and 15 times per month for the last) gives a mean frequency of 7.9 NE visits per month for the sample.

4.6.1.4 Pharmacy use

The frequency with which IDUs bought needles and syringes from pharmacies was measured in the same way as NE visits. The modal response was zero times in the past month, given by 188 (59.5%) of the 316 respondents to this question. Ten respondents (3.2%) bought needles and syringes from a pharmacy 13 or more times, 2 (0.6%) visited 9-12 times, 13 (4.1%) 5-8 times, 30 (9.5%) 3-4 times, 73 (23.1%) once or twice in the past month. Taking the halfway mark of each category (and 15 times per month for the last) gives a mean frequency of 1.5 visits per month for the sample.

4.6.2 Comparisons with the Consumer Survey, 2000

In 1999 Needle Exchange New Zealand (NENZ) surveyed 435 NE clients (NENZ Trust, 2000) using methods similar to those used in the Review's survey. NENZ's survey is henceforth referred to as the Consumer Survey.

When the two samples are compared, several differences are apparent. The Review sample contains a significantly higher proportion of female IDUs (39.9% vs. 31%, $p<0.01$), and its respondents are slightly older than the Consumer Survey's, although probably not significantly so (this cannot be tested without access to Consumer Survey raw data). No differences exist in the ethnic makeup of the samples, both being dominated (85+%) by European/New Zealander backgrounds.

The Review sample contains a significantly higher percentage of opiate injectors than the Consumer Survey (89.9% vs. 75%, $p<0.001$), a surprising result given the general recognition of increased prevalence of amphetamine injecting in New Zealand over recent years. A possible explanation is that 140 Consumer Survey questionnaires completed at the Rodger Wright Centre (Christchurch) and NICHE (Nelson) were lost prior to analysis, and opiate use has historically been much more prevalent in the South Island (NENZ Trust, 2000); thus the Consumer Survey very probably underestimated the prevalence of opiate use among New Zealand IDUs.

4.6.3 Other comments on survey sample

Recruiting IDUs through NEs and asking questions about satisfaction with NE and pharmacy-based exchange service is obviously less than ideal. Such a process excludes people who only ever obtain injecting equipment from pharmacies and biases the sample towards people who preferentially use NEs over pharmacies. Another bias introduced by our recruiting method is the under-sampling of people who visit NEs less frequently than they would like (or not at all) due to distance or transport problems, concerns about anonymity, unsuitable opening hours or financial difficulty.

5. New Zealand's Needle and Syringe Exchange Programme

5.1 NSEP Structure

New Zealand's NSEP operates by the New Zealand Ministry of Health contracting drug user groups, constituted as charitable trusts, to run individual NEs as separate businesses. The NSEP has four stakeholder groups - the Ministry of Health, Needle Exchange New Zealand (NENZ), the Pharmacy Guild, and the Pharmaceutical Society.

NENZ is the peak body for the peer-based NEs in New Zealand. NENZ is run by a board consisting of the NE managers and is responsible for:

- national coordination of needle exchange to enhance service delivery
- liaison with the Ministry of Health, and provision of feedback to the NEs
- pharmacy liaison and recruitment of new pharmacies to the NSEP
- liaison with non-pharmacy outlets (such as the New Zealand Prostitute's Collective) and allied organizations (such as the New Zealand AIDS Foundation)
- production and circulation of a newsletter for NENZ members
- publication of an annual directory of exchange outlets, an annual review of sales, and conducting a bi-annual consumer survey
- production of health education resource materials
- development of national purchasing arrangements
- following international developments in needle exchange and maintaining international linkages
- Organization of at least two NSEP stakeholder meetings per annum.

NENZ is also the controlling stakeholder in the Needle Exchange Services Trust (NEST), which supplies needle and syringe collection and destruction services throughout New Zealand on a commercial basis. Profits are fed back into NENZ projects.

5.2 Modes of operation

There are currently around 200 outlets in the Needle and Syringe Exchange Programme, of two main types – NEs and pharmacies. Other sources of injecting equipment exist to fill gaps in coverage – 10 'alternate outlets' (such as the New Zealand Prostitute's Collective), 8 outreach workers and 2 general practitioners. In 2000, NEs (7% of the total number of outlets) were responsible for 64% of sales (New Zealand Ministry of Health, 2002).

5.2.1 NEs

There were 12 NEs operating in New Zealand in May 2002.

Needle Exchange in New Zealand is largely run on a user-pays basis. At most outlets (all pharmacies and most NEs), drug-users must purchase new injection equipment; however,

NEs in Palmerston North, Napier and Wellington currently offer a free one for one (new for old) needle and syringe exchange service.

Prices for injection equipment are set independently by the outlets. Prices for a single needle and syringe are generally around $1; discounts off the price of new fits (generally around 20c) are offered by most outlets to encourage consumers to return used injection equipment.

NEs offer a complete range of needles and syringes as well as more unusual items such as butterflies. They also stock a range of accessories such as filters, sterile water, swabs and safer sex supplies. New Zealand's NEs are run by drug users, for drug users; therefore they are able to offer detailed advice about safer drug use and safer sex as well as referrals to other drug-user-friendly health services. Some NEs provide clients with primary healthcare services.

All dedicated NEs are able to offer courier delivery of new injection equipment throughout New Zealand. All goods dispatched by courier must be accompanied by printed educational material and details of safe disposal methods for used injection equipment.

5.2.2 Pharmacies

There were 185 pharmacies participating in the NSEP in May 2002, and 940 pharmacies in New Zealand in all (Euan Galloway, Pharmaceutical Society, *pers comm*.).

Pharmacies can offer needle exchange services at two levels. Level 2 outlets sell single fits, as well as packs, and stock filters, sterile water and swabs. They usually stock four or five of the more popular fit types. Most Level 2 outlets are higher volume pharmacies with strong demand for needle exchange services. Level 1 outlets sell only packs of 10 26-gauge 1/2" needles with 3ml syringes. All pharmacies are required to either sell needles and syringes or direct customers as to where they could obtain them.

5.2.3 Other outlets

Needle exchange services are offered by public health, sexual health or drug treatment services in some areas of New Zealand where no NEs and no or few pharmacy outlets exist. These outlets usually have limited opening hours.

The New Zealand Prostitutes' Collective (NZPC) offers full needle exchange services at all of their offices to complement their services for sex industry workers and their clients. These services are open to all, whether involved in the sex industry or not.

5.2.4 Electronic Dispensers

Three electronic dispensers (vending machines) provide after hours access to injection equipment in New Zealand. At the Sexual Health Centre at Auckland Hospital, a machine operates during office hours, selling packs (effectively the same as a level 1 pharmacy outlet). At ADIO Trust (7A Maidstone St Auckland) and the Rodger Wright Centre (10 Liverpool St Christchurch), the vending machines offer a wide range of stock and operate from 10pm to 10am everyday (ie, when the NEs are closed). The two NE-based machines

are responsible for approximately 15% of total needle and syringe distribution at each exchange (Maggie Treweek and Karen Blacklock, *pers comm*.).

5.3 NSEP distribution and collection statistics

In 2000, 1,004,679 needles and syringes were sold or exchanged for used ones in New Zealand (NENZ, 2001). The proportion of used needles and syringes returned for destruction improved from 26% of national sales in 1994 to 52.9% of sales in 2000 (NENZ website, 2002).

6. Effectiveness - Is the NSEP achieving its stated objective(s)?

The prime objective of New Zealand's NSEP is to reduce HIV transmission between people who inject drugs, and hence reduce the rate of infection for the entire community. Thus the most obvious ways to assess whether the NSEP is effective are to examine trends in HIV diagnoses in IDUs over time, and to compare New Zealand's HIV rates with those of countries with analogous programmes and epidemics. As noted by the first reviewers of New Zealand's NSEP (Lungley and Baker, 1990), Australia provides a comparable model for infection trends, and this review will use Australian data for most of its comparisons.

Secondary or implied measures of effectiveness also exist. For example, the sharing of needles and syringes is strongly associated with the transmission of HIV and other blood-borne viruses (Crofts et al, 1997); if this behaviour became less prevalent as the NSEP continued to operate, that would imply that needle and syringe provision and educative measures were influencing IDUs to reduce sharing frequency, thereby reducing transmission. If research could demonstrate that IDUs who use the NSEP were less likely to have or acquire HIV, that would also support the case for effectiveness.

6.1. Studies of Needle and Syringe Programmes' Effectiveness

This section (6.1) consists entirely of a lightly edited version of a portion of an article by Stephanie Strathdee and David Vlahov entitled "The Effectiveness of Needle Exchange Programs: A Review of the Science and Policy" (Strathdee and Vlahov, 2001).

Numerous authors have reported associations between needle and syringe programmes (NSPs) and positive health outcomes for IDUs. In 1988, Buning et al (1986) reported declines in needle sharing and injection frequency associated with NSP participation among IDUs in Amsterdam. Other studies have since reported reductions in incidence of HIV, HBV and HCV infections (Normand et al, 1995; Van Ameijden and Coutinho 1988; Lurie et al, 1993; Hagan et al, 1995; Vlahov et al, 1997; Drucker et al, 1988), decreased needle sharing among HIV-negative and HIV-positive persons (Vlahov et al, 1997; Bluthenthal et al, 2000; Vertefeuille et al, 2000) decreases in syringe re-use, (Stimson, 1995) and increased rates of entry into drug treatment programs (Heimer 1998; Brooner et al, 1998; Strathdee et al, 1999) in NSP attendees.

In the United Kingdom and Australia, where NSPs were introduced early as part of comprehensive prevention programs, HIV epidemics among IDU have been essentially averted (Des Jarlais et al,. 1995; Stimson, 1995; Stimson, 1996). An international comparison showed that in 29 cities with established NSPs, HIV prevalence decreased on average by 5.8% per year, but increased on average by 5.9% per year in 51 cities without NSP (Hurley et al, 1997). In New York, NSPs have been associated with a dramatic decline in HIV incidence among IDUs (Des Jarlais et al, 2000).

Although the overwhelming majority of studies have found NSPs to be associated with beneficial health outcomes, some studies have been equivocal in their findings. Strathdee et al (1997) described an outbreak of HIV infection among IDUs that occurred within the context of a large, high volume NSP that had been introduced early. More recently, Hagan et al (1999) reported no benefit of NSP attendance upon incidence rates of HBV and HCV among IDUs in Seattle, Washington. A study in Montreal found HIV incidence was higher

among NSP attendees than non-attenders (Bruneau et al, 1997). These findings have generated controversy surrounding the evidence of NSP effectiveness (Moss, 2000; Coutinho, 2000; Lurie, 1997).

In the scientific community, discussion has centred on possible explanations for higher observed incidence of HIV among NSP attenders relative to non-attenders in some settings (Coutinho 2000; Lurie 1997; Schechter et al, 1999). The most obvious explanation is selection bias; NSPs are likely to attract high-risk IDUs - people who engage in riskier behaviours than IDUs who mostly obtain syringes from other sources (Schechter, 1999; Gibson et al, 2001; Bastos et al, 1997). In fact, Vancouver researchers demonstrated that selection bias could have entirely accounted for the higher HIV incidence rates observed among frequent versus infrequent NSP attenders (Schechter et al, 1999). In San Francisco, IDUs who later began attending NSP had higher HIV incidence rates than those who never attended (Hahn et al, 1997). It has also been noted that discrepant findings usually occur in settings where IDUs are legally able to purchase syringes in pharmacies (Schechter et al**,** 1999; Bastos and Strathdee 2000; Vlahov and Junge, 1998). This would heighten differences in risks between NSP attenders and non-attenders, since IDUs who can afford to buy syringes at pharmacies are likely to be relatively socioeconomically secure and therefore also at lower HIV risk. Extended follow-up of the Montreal cohort has revealed no significant differences in HIV incidence between attenders and non-attenders of NSPs (Bastos and Strathdee 2000), which suggests that selection factors do indeed explain their earlier findings.

There is no published evidence that NSPs can cause negative societal effects such as increases in drug use (Vlahov et al, 1997) or crime (Marx et al, 2000), or the formation of high-risk needle-sharing networks (Schechter et al. 2000; Valente et al, 1998). Doherty et al (2000) demonstrated a significant decrease in the number of discarded needles on Baltimore's street following the introduction of a NSP. It is reasonable to state that there is now widespread agreement among scientists that NSPs do not cause social harms.

6.2 HIV in New Zealand IDUs

In this section the effectiveness of New Zealand's NSEP is assessed in several ways, but principally by comparing figures on HIV in New Zealand IDU with those for other countries, and making projections of HIV diagnoses in IDUs with and without the introduction of the NSEP.

6.2.1 HIV prevalence in New Zealand IDUs – international comparisons

In 1990, 759 syringes were randomly selected from NE returns and subjected to HIV testing; only two (0.26%) had evidence of HIV contamination (Baker et al, 1992). Testing saliva samples from 591 IDUs in 1992 yielded only 3 HIV-positives (0.51%) (Dickson et al, 1994). A cross sectional survey involving 279 IDU carried out through needle exchanges in Auckland, Wellington, Christchurch and Dunedin over one week in December 1997 (Kemp and MacDonald, 1999) found that just two (0.9%) were HIV positive. Thus (neglecting error bounds on these estimates, which are not available for the international figures used in coming comparisons in any case) HIV prevalence in New

Zealand IDUs is probably less than one per cent. It seems sensible to rely on the most recent estimate, 0.9%.

Table 6.1 Selected national HIV prevalences in injecting drug users (UNAIDS, 2000), in ascending order.

Country	Year	Prevalence (%)
Japan	1996	0.0
Russian Federation	1996	0.4
Iran	1998	0.8
New Zealand	**1997**	**0.9**
United Kingdom	1998	1.0
Mexico	1997	1.1
Australia	1996	1.7
Switzerland	1999	1.7
France	1990	3.0
Egypt	1994	3.8
Netherlands	1996	5.1
Sweden	1995	5.3
Ireland	1998	8.3
Canada	1998	4.6-14.2
Malaysia	1996	10.3-16.8
Brazil	1998	28.0
Peru	1990	28.1
Italy	1993	23.0-33.6
Thailand	1997	33.1-41.3
Spain	1998	39.3-48.3

New Zealand has the fourth-lowest HIV prevalence in IDUs of the countries listed in table 6.1, and the lowest among more the developed countries in which studies have actually detected any HIV infections. New Zealand's IDUs enjoy lower HIV prevalence than those in countries that have employed similar approaches to the HIV epidemic, such as Australia and the Netherlands.

6.2.2 HIV notifications in New Zealand IDUs – comparison with Australia

To the 31st of December 2001, 47 HIV infections for which the principal exposure category was injecting drug use had been notified to New Zealand's HIV/AIDS surveillance system (Eberhart-Phillips, 2002). The total number of HIV/AIDS cases reported was 1558, meaning 3.0% of all New Zealand's notifications were in injecting drug users (ibid). As a fraction of the estimated number of IDU in New Zealand in 2001 (23,760), HIV-infected IDU (assuming they were all alive and still injecting) would constitute 0.20%.

In Australia, 20,953 HIV/AIDS infections had been notified to the end of 2000, of which 953 were in injecting drug users (National Centre in HIV Epidemiology and Clinical Research, 2001 – numbers estimated from percentage data), or 4.5% of all notified Australian HIV/AIDS cases. As a percentage of the estimated number of IDU in Australia in 2001 (340,122), following the same assumptions as above, HIV-infected IDU would constitute 0.28%.

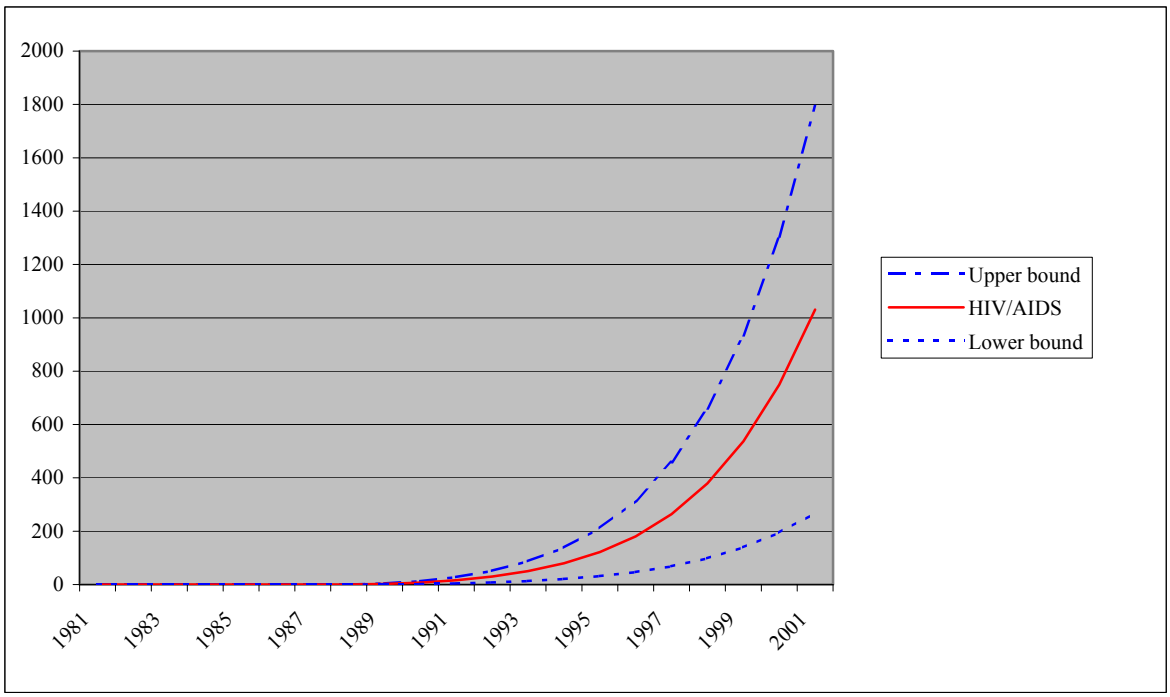
Fewer of New Zealand's IDUs appear to be diagnosed with HIV, and IDU as an exposure category represents a smaller fraction of overall diagnoses in New Zealand than in Australia. Are these results potentially biased by proportionately higher rates of diagnosis in men who have sex with men (MSM) in New Zealand? In Australia, by 2000 16,324 MSM had been diagnosed with HIV, approximately 0.08% of the Australian population. In New Zealand, 816 people with the exposure category "homosexual contact" had been diagnosed with HIV, or approximately 0.02% of the total population. Thus (allowing for the crudity of this comparison) it appears as though HIV notification rates really are lower among New Zealand than Australian IDUs.

6.2.3 Projected HIV infections in New Zealand IDUs

As described in the Methods section, New Zealand HIV infection data and IDU population estimates were used to adjust Australian data to estimate the number of HIV infections that would have occurred in IDUs in New Zealand if the NSEP had *not* been introduced, and to make projections of infections occurring with the NSP in place. The annual differences between the two projections are the estimated numbers of *extra* HIV cases and deaths per annum that would have occurred in New Zealand if the NSEP had not been introduced in 1988. However, given the marked differences between Australia's and New Zealand's IDU scenes (described in the Methods section) which plausibly make HIV transmission less rapid in the latter, it was decided to treat those raw differences as upper bounds on the NSEP's prevention effect, with the "mid-range" and lower-bound projections calculated by ratios derived from the HCV projection adjustment process (see section 4.4.2). Figure 6.1 shows the annual numbers of HIV cases avoided due to NSEP introduction with upper and lower bounds (raw data in table 1, Appendix 5; table 2 contains estimates of numbers by disease stage).

On these estimates, by the end of 2001, New Zealand would have had 1,031 extra people living with HIV/AIDS had the NSEP not been introduced (range 268 - 1,793). An estimated 20 more people (range 5 – 35) would have died due to HIV infections. Therefore, on the basis of our projections, New Zealand's NSEP has been and remains effective in preventing HIV infections among IDUs.

Figure 6.1 Estimated numbers of HIV cases avoided per annum in IDUs as a result of NSEP introduction in New Zealand, 1981-2001



6.3 Hepatitis C in New Zealand IDUs

The hepatitis C virus (HCV) was measured for the first time among New Zealand IDUs (in prison) in late 1991 (Brunton, 1995), thus was not a target for the NSEP when initially established in 1988. Nevertheless, with HIV remaining well under control, the principal viral threat to New Zealand IDUs' health is the hepatitis C virus.

6.3.1 HCV prevalence in New Zealand's IDUs – international comparisons

HCV is thoroughly entrenched in New Zealand's IDU population, just as in Australia and other western countries. Five studies of HCV seroprevalence in IDUs in drug treatment programmes have been carried out in New Zealand. Woodfield et al's (1994) study of 110 Auckland IDUs returned a seroprevalence of 73%; Robinson et al's (1995) study of 92 IDUs in Wellington found a rate of 77%; among 116 IDUs in Christchurch, Chetwynd et al (1995) measured a prevalence of 84.1%; in Taranaki, 72% of 88 IDUs were found to have been exposed (Judson, 1999); and Carter et al (2001) surveyed 195 Wellington IDUs, 84.2% of whom were HCV-antibody-positive. In a national study that recruited 241 injecting drug users from both treatment and community settings, a rate of 64.3% was detected (Kemp et al, 1998). A cross-sectional survey involving 279 IDUs carried out through needle exchanges in Auckland, Wellington, Christchurch and Dunedin over one week in December 1997 found that 53% (95% CI, 47-60%) were anti-HCV positive (Kemp and MacDonald, 1999).

Hepatitis C prevalences found in IDUs in other countries vary enormously, frequently depending on methods of recruitment (eg. through social networks, drug treatment centres, or NSPs) and nature of the target sample (eg. adults, recent initiates, prisoners); however, it is reasonable to state that in all countries in which injecting drug use has been occurring for two decades or more, the minimum hepatitis C prevalence measured among adult IDUs is about 50%, and most studies report higher figures. Hocking et al (2001) calculated a weighted mean HCV seroprevalence measured in 160 studies involving 46,419 IDUs from 34 countries of 70.2%. Regional mean prevalences were 77.2% in all Asian studies, 67.3% in Europe, 84.2% in North America, 73.3% in South America studies, and 59.1% in Australasia (ibid). New Zealand's most recent seroprevalence measurement of 53% (Kemp and MacDonald, 1999) is therefore towards the lower end of the global range.

In Australia, annual national NSP surveys between 1995 and 2001 have returned HCV antibody prevalences (adjusted for state population size biases) of 63%, 54%, 51%, 49%, 53%, 53%, and 58% (NCHECR, 2001; NCHECR, 2002). The 1997 figure was statistically inseparable from that measured in New Zealand by Kemp and MacDonald (1997) using identical methods; and the crude mean of the seven survey prevalences is 54.4%. It seems clear that the HCV epidemics among Australian and New Zealand IDUs are at similar stages.

Several reasons have been postulated for the high prevalence of hepatitis C in IDUs in New Zealand and elsewhere, despite clear evidence of risk behaviour reduction and very low prevalences of HIV. HCV is much more infectious than HIV, with the probability of infection following a needlestick injury from an infected person being 3-10%, against an estimated 0.3% for HIV (Crofts et al, 1999a). A greater-than-50% background prevalence of HCV in IDUs means that any time two or more IDUs inject together, the chances are excellent that at least one will be carrying the virus (ibid). HCV infection among Australian (and presumably, New Zealand) IDUs predated the introduction of needle and syringe exchange programmes by at least 15 years, whereas the arrival of HIV in our IDU populations was probably nearly concurrent (Crofts et al, 1999b). Finally, even though IDUs' main HCV risk behaviour – sharing needles and syringes - appears to have been greatly reduced in both prevalence and frequency, it has been shown that many items of other injecting equipment can be contaminated with blood and (theoretically) transmit HCV. Several authors have now produced convincing support for the probability that transmission of HCV can occur in the absence of needle-sharing (Thorpe et al, 2002; Crofts et al, 2000).

6.3.2 HCV notifications in New Zealand IDUs

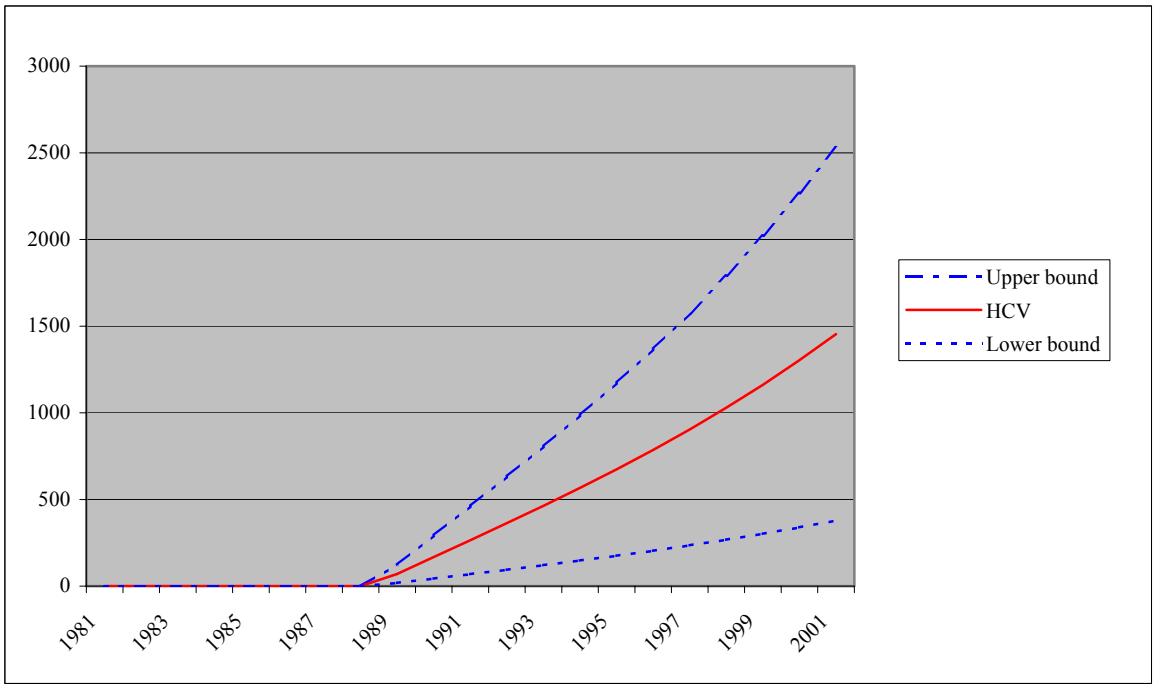
Unlike in the case of HIV, HCV diagnoses and notifications are a very poor reflection of the true prevalence or status of the epidemic in a population. HCV infections are frequently asymptomatic, and many people who have the virus do not discover it for years or even decades; therefore many diagnoses are "old" infections rather than recently acquired ones. Thus there is little mileage in comparing diagnoses (via notifications) across the two countries.

6.3.3 Projected HCV infections in New Zealand IDUs

As described in the Methods section, New Zealand IDU population estimates are used to adjust Australian data to estimate the number of HCV infections that would have occurred in IDUs in New Zealand to 2001 if the NSEP had not been introduced and with the NSEP in place. The differences between those projections are the estimated numbers of *extra* New Zealanders who would have been living with HCV if the NSEP had not been introduced, and are shown in figure 6.2 below. (Data used to produce figure 6.2 are shown in table 3, Appendix 5; table 4 shows numbers prevented by disease stage).

On these estimates, by the end of 2001, New Zealand would have had 1,454 extra people living with hepatitis C had the NSEP not been introduced (range 378 – 2,531) (but note that only an estimated 673 [range 175 – 1,171] of those would be diagnosed and therefore treated). On the basis of these projections, New Zealand's NSEP has been effective in preventing HCV infections among IDUs.

Figure 6.2 Estimated numbers of HCV cases avoided per annum in IDUs as a result of NSEP introduction in New Zealand, 1981-2001.



6.4 Rates of needle and syringe sharing

The fundamental reason for the existence of NSEPs is to give IDUs the means to inject with a new needle and syringe every time and therefore reduce transmission of blood-borne viruses between them and to other members of the community. NEs (in New Zealand) are also required to provide their clients with information about safer drug use, while pharmacy outlets provide generic health education and safer sex material.

Consequently, reported rates of sharing of needle and syringes can be used as an indicator of NSEP effectiveness in educating IDUs and providing them with clean equipment. Table 6.2 below shows rates of needle sharing recorded in surveys of New Zealand IDU, including that conducted as part of this Review.

Table 6.2 Prevalences of needle-sharing reported among New Zealand IDU, 1987-1999.

Study	**Year of survey**	**% used someone else's needle in last: 12 months**	**3 months**	**month**
Robinson et al, 1987	1985	92		
Robinson et al, 1987	1986	78		
Lungley et al, 1988	1987/88		57	
Lungley and Baker, 1990	1988/89		41	
Robinson et al, 1995	1992-4		33	
Robinson et al, 1995	1992-4	43		
Kemp et al, 1998	1994			50
Kemp and MacDonald, 1999	1997			19
NZ NSEP Review, 2002	2002			6

Although there are few data points to go on, these data certainly suggest that a gradual but sustained decline has occurred in the prevalence of needle-sharing among New Zealand IDUs since the mid-80s. In particular, the three most recent figures show a very substantial reduction in prevalence of sharing (past month), from 50 to six per cent over eight years. It is impossible to definitively associate this decline with the activities of New Zealand's NSEP, but as the programme is the primary means by which IDUs are educated about ways to reduce harm associated with injecting, it is reasonable to conclude that the NSEP has been effective in reducing needle-sharing among IDU.

While a very low 6% of Review survey respondents reported sharing a needle and syringe in the previous month, it should be noted that (perceived) inadequate service delivery on the part of some respondents means that this behaviour is certain to continue. One hundred and fifteen (37.7%) of 305 respondents reported difficulty in obtaining clean injecting equipment when required. Eighty-four of those 115 (73.0%) agreed that as a result they shared equipment or used someone else's equipment more often than they otherwise would. The most frequently-cited reason why IDUs reported difficulty in obtaining needle and syringes was limited hours of operation (see section 9.1 for details).

6.5 NSEP coverage

6.5.1 Meeting demand

In the NE users' survey conducted for this Review, 115 of 305 (37.7%) of respondents reported difficulty in obtaining clean injecting equipment when required. One hundred and seven people provided a response to question 7a, which asked how often obtaining clean injecting equipment had been difficult in the previous month; only one responded "always", four "most of the time", and nine "half the time". Thus, of all 316 respondents, only 14 (4.4%) frequently had difficulty in obtaining clean injecting equipment in the month prior to the survey.

It must be remembered that this survey was of NE users only, so neglected or under-sampled people who are (respectively) unable to or infrequently visit NEs. Nevertheless, the conclusion must be that the overwhelming majority of people who visit NEs are happy with their access to clean needles and syringes.

6.5.2 Geography

As noted in the section above, 115 of 305 (37.7%) of respondents reported difficulty in obtaining clean injecting equipment when required; of those 115, 27 (23.5%, or 8.9% of all people who responded to this question) said this was because they lived a long way from an outlet. Taken at face value, the survey suggests that the geographical coverage of the NSEP is excellent, with better than 90% of respondents perceiving little or no difficulty with access due to distance from an outlet. Of course, this is undoubtedly an overestimate – as described in section 4.4.3, the survey is certain to have under-sampled IDUs who have difficulty with access to the NSEP because it was conducted at the very locations being asked about.

In consultations, several NE staff said they were aware of many IDUs living an hour or more away by car who couldn't get to the NE regularly or often (due largely to transport costs) and were frequent re-users of injecting equipment. One staff member described receiving returned syringes with the lettering worn off their barrels and plungers wrapped in tape because the seals have perished from repeated boiling.

Several geographical regions were singled out for particular mention as being under-serviced by needle exchange. Wanganui, the Kapiti coast, Masterton, Hastings, Southland and the west coast of the South Island were mentioned as regions with significant injecting populations but no peer-based needle exchange. Invercargill is 200 km from Dunedin, has half as many residents and a similar proportion of IDUs (based on methadone provision), but has no NE. An informal survey of users revealed that the average frequency of reuse of needles and syringes in Invercargill is 6-7, against only 1-2 in Dunedin (Hilary Lawrence, pers comm.). Perhaps the most glaring gap in coverage is, paradoxically, in New Zealand's largest city. Auckland has only one NE (ADIO Trust), but on a per-capita basis, compared to any other urban region in New Zealand, it should have four. Its congested transport system and very low population density exacerbate the difficulty faced by many users in reaching the NE, particularly those from west and south Auckland. (On the other hand, it was also suggested that Aucklanders were less concerned about potentially risking their anonymity by using pharmacy-based exchange because of the

number of pharmacies available to them. Auckland's pharmacies provide a much larger fraction of overall distribution than those in other major New Zealand cities, although whether this is due to necessity rather than choice is impossible to say.)

Recommendations: That consideration be given to opening a second peer-based NE in Auckland, to bring per-capita service coverage closer to the level which exists elsewhere in New Zealand.

That consideration be given to improving NSEP coverage on the South Island's west coast and Southland by opening branch NEs and/or upgrading and expanding existing pharmacy outlets.

That consideration be given to increasing the reach of the NSEP by enabling and/or encouraging the provision of needle exchange services through existing health service infrastructure, such as Community Health Centres and Sexual Health clinics.

6.5.3 Ethnicity

In studies of New Zealand IDUs that included ethnicity data, (Chetwynd et al 1995, Kemp et al, 1998, Lim et al, 1999 and Judson, 1999) Maori were the largest proportion (6.8%, 9%, 12% and 11% respectively) after European. Twelve-and-a-half per cent of the NE users surveyed for this Review described themselves as having at least part-Maori ancestry. Whether any of these figures accurately represents the proportion of Maori amongst injecting drug users in New Zealand is unknown.

In consultations, North Island NE managers and staff opined that fewer Maori used their services than might be expected on a population basis. One reason advanced for this were that Maori are economically disadvantaged relative to the rest of New Zealand's population, so are less likely to purchase new equipment and less likely to have access to transport to visit NEs. Another proffered reason for (perceived) lower-than-expected Maori participation in the NSEP was cultural factors, notably familial disapproval – Maori are less likely to use NEs and pharmacies in case they are seen and their families find out. Of course, it is also entirely possible that fewer Maori inject drugs than do people of other ethnic backgrounds, but evidence is lacking.

The issue of culturally inappropriate approaches to blood associated with NE use is another factor potentially restricting Maori attendance. In traditional Maori belief systems, body fluids, and blood in particular, are regarded as tapu (sacred or special). These special wastes must be appropriately disposed of by burial in the earth (all sewage pre-European settlement went into pit latrines). This also means that burning blood (when syringes are destroyed) and keeping blood-stained materials (such as used syringes or disposal containers) in areas where food is prepared or served is culturally inappropriate.. The manager of NINE, Gerry MacPhail, has consulted Maori kaumatua in his region about what NE users should do with their bloodied fits, and received advice that they should wash them out with seawater, bury the seawater, then return the fits to the exchange. This sort of information, if widely communicated might improve the cultural safety of NEs. However, how much this would help to bring more Maori into NEs is still an open

question. Cost and fear of being identified as an IDU may be stronger influences on the behaviour of Maori IDI who are dislocated from their culture.

Consultations with NE managers and staff revealed some concern that other ethnic groups, South-East Asians in particular, were not being reached in proportion to their presence in New Zealand's IDU population. The Review's survey included only 5 individuals (1.7%) of Asian ethnicity. Pacific Islanders were mentioned by several consulted people as another group that is currently thought to be under-represented among NSEP users.

6.6 Collection effectiveness

The proportion of used needles and syringes returned for destruction improved from 26% of national sales in 1994 to 52.9% of sales in 2000 (NENZ website, 2002). Nevertheless, this is a surprisingly low return rate given the financial benefits to IDUs of returning their used equipment (in the form of discounts on new equipment), and given that in Australia, where distribution and collection are completely separated, the rate of returns is almost identical.

Several explanations for the low return rate may exist. The size of the syringes typically used by New Zealand IDUs (3 and 5mls) means they are difficult to conceal relative to the 1ml used in Australia, so fear of social stigma and police attention comes into play. New Zealand's relatively dispersed population may also be a factor, making it less attractive for people to transport used equipment.

In the Review survey, respondents were asked if they did not return all their used needles and syringes for destruction, why not? One hundred and sixty-four of the 316 respondents (51.9%) did not answer the question, presumably signifying that they *did* return all their used fits – in which case the calculated figure is nearly identical to the national return rate. In order of frequency, responses given were:

- it's a hassle – 53 responses
- fear of arrest - 51
- prefer to burn or otherwise discard myself - 22
- child safety - 13

The first response probably reflects the point mentioned earlier about the sheer bulk of the injecting equipment typically used in New Zealand, and is equally probably correlated with the second-most-frequent response, because a bulky load of syringes is difficult to conceal from view.

6.7 Consultation outcomes - effectiveness

All consultation participants were asked if they could specify any ways in which the NSEP might improve the effectiveness of its operations without necessarily consuming extra resources. This is obviously a very difficult question to answer, and few meaningful responses were received.

NE staff and other people closely associated with NEs were unanimous in saying that one-for-one (new for old) exchange would improve their ability to fight hepatitis C and improve syringe collection rates, but equally were unanimous in recognising that implementation of one-for-one would require extra funding.

Representatives of New Zealand's Police Services said they had very little to do with the NSEP and very few complaints, so assumed it must be working smoothly.

Euan Galloway (Pharmaceutical Society) suggested that ongoing training on needle exchange issues for pharmacists and pharmacy staff on would increase their effectiveness.

7. Efficiency - Is the NSEP achieving its objectives cost-effectively?

The efficiency of an NSEP can be gauged by calculating its cost-effectiveness in terms of cost of infections avoided per dollar invested in the NSEP, or by comparing its performance with other programmes.

7.1. Studies of Needle and Syringe Programme efficiency

Holtgrave et al (1998) estimated that a national policy of funding NEs, pharmacy sales and syringe disposal in the United States would cost $34,278 U.S. per HIV infection prevented, well below the lifetime costs of treating a single HIV infection. (The same authors also found that in settings where HIV incidence is low - below 2% per annum - the cost-effectiveness of sterile syringe provision through pharmacy sales exceeds that of NEs. If Holtgrave et al's finding holds true for New Zealand, this country's relatively dispersed population makes it even more important that the maximum possible number of pharmacies is involved in the NSEP, as well as other types of outlets.)

Several studies have compared BBV incidence or prevalence in NSP attendees and non-attendees (Bruneau et al, 1997; Des Jarlais et al, 1995; Hagan et al, 1999; van Ameijden et al, 1994). Hurley et al (1997) compared NSP implementation in countries with sustained low HIV prevalence to those with high HIV prevalence, and compared changes in HIV prevalence in cities with and without NSPs. The data generally show NSPs to be effective in preventing HIV transmission.

Health Outcomes International (2002) compared rates of change of HIV seroprevalence in cities that never introduced NSPs with cities that did introduce NSPs. Cities that introduced NSPs had a mean annual 18.6% decrease in HIV seroprevalence, compared with a mean annual 8.1% increase in HIV seroprevalence in cities that had never introduced NSPs (the difference being only weakly statistically significant, p=0.06). In cities with an initial HIV prevalence below 10% at least three years of sero-survey data, the mean annual decrease in HIV prevalence was 4.0% in cities that introduced NSPs, compared with a mean annual 28.6% increase in cities without NSPs (difference not statistically significant).

7.2 Cost/benefit analysis for New Zealand's NSEP

As described in detail in the methods section, the numbers of people living with HIV or HCV prevented by NSEP introduction can be multiplied by annual treatment costs to produce gross annual cost/benefit figures. Subtracting the annual investment in the NSEP gives an annual net return on investment, which can then be added to produce cumulative costs or benefits for a given period.

7.2.1 Public expenditure on the NSEP

Unfortunately the New Zealand Ministry of Health was unable to supply expenditure data relating to the NSEP prior to 2000. To model annual expenditures since 1988, it is

assumed that each year's expenditure was 95% of its successor – ie, that if the NSEP cost $1,380,206 in 2001 (according to Ministry of Health figures) it cost $1,311,195 in 2000. (Note that the Ministry of Health did supply an NSEP expenditure estimate for 2000 – $903,276 – but as it is considerably smaller than the 2001 figure, modelling earlier expenditures by simply drawing a line backwards through the 2001 and 200 figures gave unrealistically low results. Nevertheless, the 2000 expenditure figure is used to estimate needle and syringe distribution costs in section 7.3.) This procedure results in an expenditure estimate (unadjusted for inflation) for the first year of the NSEP of $708,508, and a total expenditure to end 2001 of $10,644,588, both of which are likely to be conservatively high. Annual and cumulative expenditure estimates are presented in table 5, Appendix 5.

Note that figures for expenditure on injecting equipment by NSEP consumers, included in total Australian NSP expenditure by Health Outcomes International et al (2002), were unavailable for New Zealand.

7.2.2 Costs of treating HIV

Annual costs of treating people living with HIV infection were reconstructed from Health Outcome International et al's (2002) ROI data and converted to New Zealand dollars. Amounts range from $1,164 per annum for early-stage HIV disease in the early 1980s to $88,310 per annum for AIDS between 1990 and 1996. Costs of treating AIDS have since shrunk, while the costs of treating early-stage IV have increased approximately eight-fold due to the advent of anti-retroviral therapy in the mid-1990s. The full dataset is in Appendix 5, table 6.

7.2.3 Costs of treating HCV

Annual costs of treating people living with (diagnosed) HCV were reconstructed from Health Outcome International et al's (2002) ROI data. Amounts range from $244 per annum for an early-stage chronic hepatitis C infection in the late 1980s to $456 per annum for cirrhosis, $120,924 per episode of hepatocellular carcinoma and $200,531 per episode of liver failure (see Appendix 5, table 7).

7.2.3 Value of HIV and HCV cases avoided, 1988-2001

It is estimated that New Zealand would have had 1,031 extra people (range 268 – 1,793) living with HIV/AIDS by the end of 2001 had the NSEP not been introduced (details in section 6.2.3). Treatment costs for these people (and those who died) would have added an estimated $34,363,706 (range $8,934,564 - $59,792,849) to New Zealand's total healthcare outlay between 1988 and 2001.

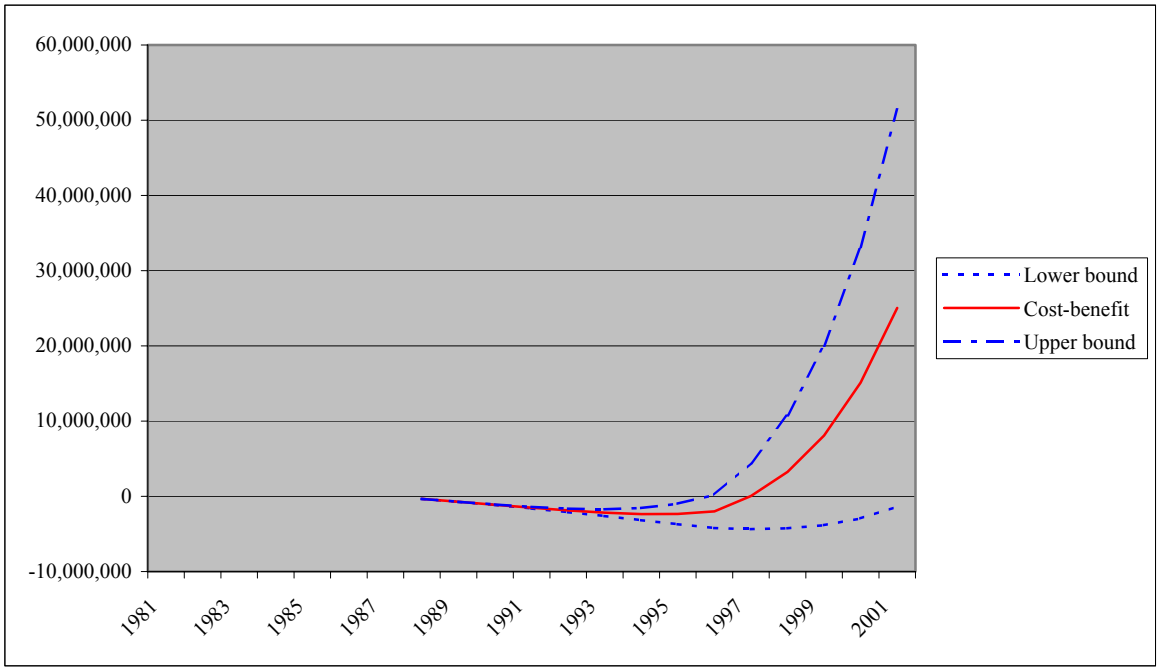
New Zealand's extra healthcare costs between 1988 and 2001 due to treating the 673 (range 175 – 1,171) extra *diagnosed* HCV infections that would have resulted from the non-introduction of the NSEP are estimated at $1,314,810 (range $341,851 - $2,287,769).

Combining the savings from HIV and HCV infections prevented ($35,678,516), and subtracting estimated total expenditure on the NSEP between 1988 and 2001 of $10,644,588, gives a net benefit due to the NSEP of $25,033,928 (range -$1,368,174 - $51,436,030) for the period 1988-2001. Put another way, every $1 spent on the NSEP has saved an estimated $3.35 (range $0.87 - $5.83) in healthcare costs avoided over the period of investment.

Annual return on investment in the NSEP (counting only the costs that were estimated to have been avoided between 1988 and 2001) was negative until 1995, when the estimated net benefit to the taxpayer was $15,129. The programme's estimated net benefit for 2001 was $9,925,643. In cumulative terms (again counting only the costs that were estimated to have been avoided between 1988 and 2001), the NSEP represented a net cost to the New Zealand taxpayer until 1997, when its total benefits first exceeded costs by an estimated $44,420.

Figure 7.1 shows the cumulative cost/benefit accruing from the estimated cases of HIV and HCV avoided as a result of investment in the NSEP for 1988-2001 (data in table 8, Appendix 5).

Figure 7.1 Cumulative cost/benefit of New Zealand's NSEP, 1988 - 2001.



7.2.4 Value of HIV and HCV cases avoided, 1988 until death

When the costs of treatment for the extra New Zealanders infected with HIV between 1988 and 2001 in the absence of the NSEP are projected forwards until all have died (by the year 2070), their cumulative estimated value is $197,829,040 (range $51,435,550 - $334,222,530).

Estimated treatment costs until all extra New Zealanders infected with HCV due to non-establishment of the NSEP have died (by 2076) total $15,090,234 (range $3,916,013 - $26,256,400).

Combining the estimated avoided treatment costs for HIV/AIDS and HCV, minus estimated total expenditure on the NSEP between 1988 and 2001 of $10,644,588, gives an estimated net benefit due to the NSEP of $202,274,686 (range $44,706,975 - $359,834,342). Every $1 spent on the NSEP between 1988 and 2001 saves an estimated $20.00 (range $5.20 - $34.80) in lifetime healthcare costs avoided.

7.3 Distribution efficiency

In 2000, 1,004,679 needles and syringes were sold or exchanged for used ones in New Zealand (NENZ, 2001). The entire NSEP cost $903,275.93 in 2000, meaning the average cost to the taxpayer of distributing a single needle and syringe to an IDU in New Zealand in 2000 was $0.90.

In Australia, NZ$23,607,600 of public money (not including consumer expenditure, nor costs associated with retail pharmacies which sell needles and syringes on a commercial basis, for which reliable data are not available) was spent on the NSP in 1999-2000, and 31,848,000 needles and syringes were distributed to IDUs, at a unit cost of NZ$0.74 (Health Outcomes International et al, 2002).

The difference between the Australian and New Zealand programmes' unit costs is probably the result of economies of scale, demography and geography. Australia's NSP delivered over 30 times as many needles and syringes as New Zealand's NSEP in 2000 to an IDU population estimated to be nearly 15 times as large. New Zealand's population is relatively dispersed compared to Australia's, where around 65% of the population resides in the state and territory capital cities alone (Australian Bureau of Statistics, 1996). About a third of New Zealand's population lives in Auckland, but the bulk of the remainder of the population is spread across dozens of cities and towns with populations between 250,000 and 10,000. As the target group – IDUs – is a very small fraction of the overall population, service efficiency is greatly improved if the population is highly centralised in urban areas. New Zealand's unique geography may also contribute to the NSEP's relative inefficiency, the country being divided into two main islands and containing other significant natural barriers such as mountain ranges, lakes and rivers which further isolate communities, and mean that direct distances between urban centres are much less indicative of actual travelling time and efficiency than they would be in Australia.

Rather than comparing New Zealand's NSEP unit output cost with Australia's as a whole, a better comparison might be with the unit cost for the Australian states. Estimated unit cost per needle and syringe per state varied from NZ$0.33 in 1999/2000 in South Australia to NZ$1.34 in Western Australia (Health Outcomes International et al, 2002). Unit costs in the two most populous states, New South Wales and Victoria, were NZ$1.07 and NZ$0.93 respectively, very similar to the New Zealand NSEP's NZ$0.90.

It could also be argued that it is a simpler matter to estimate total costs for New Zealand's NSEP than to do so across all Australian programs. Australian NSPs are integrated with other healthcare programs to varying extents, whereas in New Zealand the NSEP is

essentially a stand-alone entity. Because it is more difficult to account for all costs for Australian NSPs, total expenditure figures are likely to be understated relative to New Zealand's.

7.4 Consultation outcomes - efficiency

As was the case when asked about effectiveness, few NE staff or associated persons were able to pinpoint anything which might increase efficiency of NSEP output within the current resource level.

Suggestions included improved networking and sharing of resources between NENZ and Australian and international needle exchange organizations, one-for-one (new for old) needle exchange, and training for pharmacy and NE staff.

8. Regulatory issues

8.1 The Misuse of Drugs Act

Needle exchange was legalised in New Zealand through the introduction of the Health (Needles and Syringes) Regulations 1987, which allowed the sale of needles and syringes to injecting drug users provided their sale is part of the NSEP. The regulations (amended in 1998) also create a legal defence to the charge of possession of injection equipment, which (at the time of writing) remained an offence under the Misuse of Drugs Act [section 13(1)(aa)].

Under the Misuse of Drugs Act a person can be charged and prosecuted for possession of needles and syringes obtained under the Needle and Syringe Exchange Programme but has a defence under the Health (Needles and Syringes) Regulations. Nevertheless, police are empowered to detain a person and bring him or her to trial for the offence, and this process itself constitutes a penalty. In 2000, more than 100 people were successfully prosecuted for possession of instruments legally obtained under the scheme (Needle Exchange Services Trust, 2002). This occurs because drug users charged with possession of injection equipment simply plead guilty rather than defending the charge since this improves their chances of immediate release. The possession of needles and syringes charge is also sometimes used as a holding charge while searches are conducted and further investigations made (ibid).

The threat of arrest and prosecution under the Misuse of Drugs Act [section 13(1)(aa)] has made IDUs reluctant to risk being caught carrying injection equipment, particularly if it has been used. IDUs are in effect being deterred from disposing of their used injecting equipment in the safest possible way – by returning it to an exchange or pharmacy – and from acquiring clean equipment to help them reduce risks of BBV infection. The NSEP is funded to reduce re-use and sharing of needles and maximise return of used injecting equipment for the benefit of public health and safety, yet simultaneously police are arresting IDUs for carrying such equipment; this means public funds are being wasted and public health is at risk. The legislation also makes little sense from a police occupational health and safety perspective; if IDUs have an incentive to deny possession of injecting equipment (ie, to avoid arrest), police may be at risk of a potentially infectious needlestick injury during a body search. During the consultation with police for this Review, it was clear that needlestick injuries are their single greatest point of interest in the entire field of injecting drug use. Several police spokesmen expressed approval for the concept of carriage of clean injecting equipment being unequivocally licit. They described the situation which existed before the current Act came into force, in which police conducting a house search would not be told if needles and syringes were present and were therefore at risk of needlestick injuries, with the present situation in which people could warn police about their injecting equipment without (in theory) fear of prosecution for possession of an illegal article.

The Ministry of Health is also of the view that this anomaly needs to be withdrawn. In the Ministry of Health consultation for this Review, it was clear that the Ministry is well aware of the way the Act works against public health principles. In early 2002, the Ministry succeeded in getting New Zealand's inter-agency committee on drugs to agree to submit an

amendment to the Act to Parliament, which will have the effect of making it no longer an offence to possess legally-obtained needles and syringes (Brendon Baker, Ministry of Health, pers comm.). Its passage is obviously dependent upon New Zealand's political processes (including an election due sometime in 2002) but as to date the NSEP has been strikingly non-controversial, one imagines the amendment will eventually pass. The result should be mutually beneficial to the NSEP, the police and public health.

Recommendations: That New Zealand's parliament approve the proposed amendment to the Misuse of Drugs Act which would remove the offence of possession of needles and syringes legally obtained through the NSEP.

That basic training for NZ police include a short session on New Zealand's harm minimisation policy and the NSEP. NENZ should liaise with police to achieve this goal.

8.2 One for one (new for old) needle and syringe exchange

Free 'one-for-one' is universally seen as the holy grail for needle and syringe exchange in New Zealand by the NEs, both in terms of provision and disposal. This view is based on the experiences of NEs which have attempted or continue to offer one-for-one exchange. Distribution increases, both as a result of the exchange's hinterland expanding and frequency of re-use dropping, and return rates rise towards and even over 100% (due to IDUs returning syringes bought or obtained elsewhere). Drugs Project (Wellington), and the Palmerston North and Napier NEs have been offering one-for-one more or less continuously since 1995 (on 3ml syringes and choice of needle), and achieve rates of return always close to and sometimes over 100%. The experience at DIVO is salutary; a trial of one-for-one exchange began in mid-1999 with Ministry support, and was continued as long as possible using core NE funding, during which time return rates rose to 90%. The policy had to be abandoned in late 2001 due to its cost, and six months afterwards the return rate had dropped below 80% (Hilary Lawrence, DIVO, pers comm.). A single year of running a one-for-one policy cost DIVO $13,000 (Hilary Lawrence, DIVO, pers comm.) - approximately 1½ times the annual cost of treating one early-stage HIV infection in 2001.

The NE users' survey provides some numerical evidence of the effectiveness of one-for-one exchange as a problem limitation mechanism. Mean frequency of needle and syringe re-use reported by IDUs who completed questionnaires at Drugs Project, Palmerston North and Napier (the NEs offering one-for-one at the time of the survey) was significantly lower than that for IDUs at other NEs (1.07 vs 1.70 times, $p < 0.01$). Furthermore, mean frequency of reported needle and syringe sharing was lower among IDUs at the three NEs offering one-for-one (0.03 vs 0.13 times in the previous month, $p < 0.05$). Syringe re-use promotes vein damage, abscesses and increases risk of cellulitis and other bacterial infections, and sharing a used needle is the primary risk factor for HIV and hepatitis C infection; if one-for-one decreases the frequency of these behaviours it must logically lead to reduced incidence of disease and lower overall healthcare costs.

The Ministry of Health's own Hepatitis C prevention discussion document contains the statement "ideally we would provide a new for old policy but there is no new money being made available".

Recommendation: That the costs and benefits that would result from the introduction of free one-for-one (new for old) needle and syringe exchange in New Zealand be formally investigated.

8.3 Sharps disposal bins in public areas

Support for syringe disposal bins in public places was expressed by many of the people consulted, including Maree Jensen (Pharmacy Guild) and the New Zealand Police. The value to the wider community of enabling safe needle disposal was widely recognised. Potential locations suggested included the standard ones of public toilets, as well as 24 hour service stations. Benefits for users include the preservation of anonymity and - as IDUs remain fearful of being arrested with used equipment – less chance of unwanted police attention. They may also have to role to play if the apparent trend towards amphetamine injecting continues in New Zealand, because drug injecting may become more visible than has historically been the case with home-based opiate use.

In a slightly different twist, Palmerston North council has reportedly installed a syringe disposal bin in their recycling centre (where people drop off cans, bottles, paper and other domestic recyclables), which seems an excellent idea. This must also serve to reinforce the fact that syringes are not permitted in domestic rubbish and should be separated.

8.4 The Action on Hepatitis C prevention discussion document

The universal response received when people were asked for their views on the *Action on Hepatitis C prevention discussion document* this was that it is a good framework but essentially worthless unless backed up with resources. Most people consulted were pleased that the Ministry of Health recognises that hepatitis C virus is primarily transmitted by IDU and has a sound understanding of all the associated issues, but were not confident that any action would result from the process.

9. Service Delivery Issues

9.1 Meeting consumer's needs

In the Review's survey of NE users, people who responded in the affirmative to the question "Do you ever find it hard to get fits when you want them?" were asked to provide reasons why. Three of the responses related to service delivery issues;

- "Exchange's hours don't always suit me" - 57 of 115 (49.6%)
- "Nearest pharmacy's hours don't suit me" - 18 (15.7%)
- "prices of injecting equipment are too high" - 5 (4.3%)

NEs' hours of operation were the most frequently-given reason given for difficulty in obtaining injecting equipment. Hours of operation were also NE users' sixth-most frequently-chosen of option for improving NE services (chosen by 23.1% of respondents). (It should be noted that the 57 respondents citing hours of operation as a problem are only 18.7% of the 305 who reported difficulty in getting fits.)

Recommendation: Consideration should be given to expanding the use of electronic dispensers at NEs to provide after-hours exchange services.

9.2 NE users' perceptions of NE service

When asked to rate their local NE's service on a five-point Likert scale (very poor, poor, middling, good, very good) 68 of 308 respondents (22.1%) selected "good" and 229 (74.4%) "very good", giving a combined "good or very good" response frequency of 96.5%.

Survey respondents were then asked "what would most improve the exchange's service for you?", and given a set of fifteen options from which to choose up to four. The response frequencies are shown in table 9.1.

Just over 55% of respondents selected "free one-for-one exchange" or "a lower price for fits" as one or two of their four preferred options for improving NE service, and over just over 47% chose "out-of-hours fit vending machines" or "longer opening hours". Clearly, NE users see the best ways to improve NE service as being increased availability of equipment in terms of economic and temporal access.

Options for improving NE services which related to *quality* of service were chosen by very few survey respondents. Only 14 (4.5%) selected "better staff attitudes", 12 (3.9%) "more or better harm reduction info", and 5 (1.6%) "better-trained staff". NE users appear to be very satisfied with the quality of the service they receive at NEs.

Table 9.1 NE users' preferred methods of improving NE services.

Option	Number selecting	Percentage (of 308)
free one-for-one (new for used) exchange	132	42.9
out-of-hours fit vending machines	113	36.7
lower prices for fits	92	29.9
on-site hepatitis C and HIV testing	79	25.6
lower prices for other injecting equipment	76	24.7
longer opening hours	73	23.7
on-site hepatitis A & B vaccinations	58	18.8
on-site counselling services	45	14.6
a greater range of injecting equipment	27	8.8
more information about hepatitis C & HIV	21	6.8
more time for staff to advise & refer	21	6.8
more or better general healthcare info	19	6.2
better staff attitudes	14	4.5
more or better harm reduction info	12	3.9
better-trained staff	5	1.6

9.3 NE users' perceptions of pharmacy exchange service

When asked to rate their local pharmacy's exchange service, 37 of 250 respondents (14.8%) selected "good" and 16 (6.4%) "very good", giving a combined "good or very good" response frequency of 21.2%. Sixty respondents (24.0%) selected "middling", 69 (27.6%) "poor" and 68 (27.2%) "very poor", giving a combined "poor or very poor" response frequency of 54.8%.

The 66 people who did not supply any responses are assumed to never use pharmacy exchange services. Note also that 188 (59.5%) of all 316 respondents had not bought needles and syringes from a pharmacy in the month prior to the survey.

Survey respondents who had used pharmacy exchange services were asked "what would most improve pharmacies' exchange services for you?", and given a set of seven options from which to choose up to two. The response frequencies are shown in table 9.2.

Table 9.2 NE users' preferred methods of improving pharmacies' exchange services.

Option	Number selecting	Percentage (of 250)
better staff attitudes	155	62.0
lower prices for fits and other equipment	122	48.8
more anonymity/privacy	104	41.6
a greater range of injecting equipment	97	38.8
better discounts when old fits are returned	93	37.2
better-trained staff	76	30.4
provision of safer using information	35	14.0

The most popular method chosen by NE users to improve pharmacy exchange services was "better staff attitudes", the third-most popular was "more anonymity/privacy", and "better-trained staff" was selected by a substantial minority. Taken together, these three service quality options were chosen by 197 participants (78.8%). "Lower prices" or "better discounts" were chosen by a combined total of 151 respondents (60.4%).

Overall, these data show that few NE users are satisfied with the quality of the exchange service they receive at pharmacies (but the issues of survey bias away from pharmacy users – a group that may include people whose perceptions of pharmacy exchange service are excellent, and who never use NEs as a result - outlined in section 4.4.3 should be kept in mind).

Recommendation: That the (perceived) problems of pharmacy staff attitudes towards needle exchange clients be addressed in a systematic way by the MoH, NENZ and the Pharmacy Guild; research into pharmacy exchange users' perceptions of service would be a useful first step.

9.4 Volunteer NE workers

The recognition accorded to drug user groups through the Ministry of Health's contracting process is a striking feature of New Zealand's NSEP. This recognition, and the autonomy given to the user groups in the running of the NEs, are undoubtedly powerful reasons for the strong feelings of ownership displayed by many NE staff, and help explain why so many unpaid and volunteer hours are worked.

The issue of volunteer reimbursements is clearly a major one for NE managers, volunteers and trustees. Many NEs reimburse their volunteers for the time they spend working in the NEs and on NE projects, a typical amount being $25 for a four-hour shift. Such reimbursements are (reportedly) standard practice in many New Zealand charitable organizations; however, concern has arisen that the Inland Revenue Department may determine that volunteers who receive reimbursements for regular, scheduled periods of work are in fact employees and are thus tax-liable. Such a ruling would mean that NEs would be hit with a double whammy in that they would face back-tax bills, and their volunteers would be forced to pay tax and thus be less motivated to offer their time in future. The NEs could not afford to turn their volunteers into employees; the NEs I consulted operated on nearly 40% volunteer labour on average; none could afford to replace these free or low-paid hours with minimum-wage hours under their current contracts. NE staff are vehemently opposed to becoming employees, as the concept of volunteerism is universally seen as fundamental to the operation of the NEs, bringing with it passion and a sense of ownership.

Notwithstanding the overwhelmingly pro-volunteer views of NE staff, some perceived problems with the volunteer culture were described. These included that volunteers do not have to commit to their work like they would to a job, and professionalism is not encouraged; the culture erodes management control, and the non-hierarchical structure of an organization which relies heavily on volunteers may lead to difficulty in implementing change.

On the positive side, the peer basis of New Zealand's NEs is seen as important for education, both informal (over the counter and in the community) and formal (outreach and workshops). Non-peers don't always have credibility, so may not be able to convince people that their information is correct – and lacking direct experience, it may actually not be correct. Volunteering is also seen as an important empowerment process for drug users, in that people learn that they're still productive members of the community. Volunteering involves the community, increases stores of specialist knowledge at the exchanges, and is a form of community development – volunteers gain skills which help them to find paid employment or simply go back into the community with increased knowledge about ways to reduce drug-related harm which they can continue to impart through their social networks.

Recommendation: That the crucial role of NE volunteers in New Zealand's NSEP be affirmed, and that any resolution of the "reimbursement problem" must not jeopardise volunteers' input to the programme.

9.5 Electronic dispensers

Electronic dispensers (vending machines) enable sterile syringes and other equipment to be provided to IDUs without any human interaction. Several countries, including France, Switzerland, Germany and Australia use syringe vending machines to varying extents. The advantages of vending machines include reduced staffing costs, 24 hour access, anonymity for the user, and provision of services to IDUs who might not otherwise be reached at all and may be at extremely high risk (Strathdee and Vlahov, 2001). Obadia et al (1999) found that IDUs using vending machines were significantly younger, more likely to be homeless, HIV+, in drug treatment and share needles.

The vending machine at ADIO Trust (Auckland) is a typically innovative New Zealand solution to the problems of providing exchange services after hours. At the end of each day, a solid steel mobile unit containing the vending machine is wheeled into a steel frame fitted to the existing wooden frame of the front doorway and locked there. When not in place during office hours, the original door functions normally. This design enables exchange services to continue after hours in a secure manner, without the need to make structural alterations which may not be approved by leasors. The machine offers a full range of sterile injecting equipment, and safer injecting educational material is included with each item.

Many of those consulted, including NENZ, were in favour of the installation of more electronic dispensers to provide after-hours access to needle exchange services in urban centres. They were seen as valuable for improved security, reducing the occurrence of break-ins aimed solely at obtaining injecting equipment (a significant problem at several NEs). Some saw electronic dispensers as possible solutions to the economics and anonymity problems involved in servicing small communities.

Recommendation: That consideration be given to expanding the use of electronic dispensers at NEs to provide after-hours exchange services.

9.6 IDU education and health promotion

During a telephone conversation with Dr Richard Meech, chair of New Zealand's AIDS Medical and Technical Advisory Committee (AMTAC) in late June, he expressed the view that NEs should address the issue of safe disposal of needles and syringes *by public means* in their IDU education activities. Dr Meech pointed out that the national return rate (to NEs or pharmacies for destruction) of around 50% meant that hundreds of thousands of syringes were being disposed of in domestic and public waste and in other ways (such as the sewerage system or burial) which potentially put members of the public at risk of needlestick injury. It is true that in New Zealand syringes are not permitted in domestic rubbish, but a problem limitation approach acknowledges that this is happening and is going to continue, so the best course is to advise IDUs on the best disposal methods under the circumstances. Obviously return to an NSP or pharmacy for destruction should remain the priority method of disposal.

During the consultation period I inspected the health promotion materials produced by NENZ and the NEs, and was extremely impressed by their range and quality. Even the more mundane items such as posters and pamphlets were frequently fresh and innovative in their approaches, and often tailored to respond to specific local needs or drug issues. Videos and other information resources are also of high quality. The NENZ website is a tremendously useful resource, but requires some updating (underway during the Review).

Recommendation: While return of used needles and syringes to NEs or pharmacies for destruction should remain first priority, NEs should address the issue of safe disposal of needles and syringes *by public means* in their IDU education activities in order to reduce visibility of needles and syringes in public places and risk of needlestick injury.

9.7 Safety in pharmacies and exchanges

The fact that "every now and then you get somebody who is really in your face and does upset you greatly" (Maree Jensen, Pharmacy Guild, *pers comm*.) is an unfortunate fact of life for people involved in the NSEP. A Wanganui pharmacy stopped participating in the NSEP in early 2002 after two incidents involving IDUs on its premises, and it is clear that perceptions of unacceptable difficulties resulting from delivering exchange services is a major deterrent to the recruitment of new pharmacies to the NSEP. Maree Jensen and others consulted viewed the apparent escalation of New Zealand's amphetamine scene as likely to increase the frequency of unpleasant interactions between NSEP clients and staff.

9.8 Training for pharmacy and exchange staff

Both Euan Galloway and Maree Jensen (Pharmaceutical Society and Pharmacy Guild respectively) were enthusiastic about development of a defined set of training procedures for pharmacy staff as a way of improving staff confidence about needle exchange, improving exchange services and reducing unpleasant interactions with NSEP clients.

These would be best administered by NEST during brief, pre-arranged, on-the-job training sessions with pharmacy staff.

Many NE staff regarded training as very important for workers and volunteers, in such areas as infection control, dealing with users, emergency procedures, information provision. NE managers saw benefits in business skills and human resources management training for improved financial security. Several NE managers talked about a national template for NE worker training, and formal acknowledgement of skills through certification, which would raise self-esteem and improve employability. NENZ was seen as the logical vehicle for organising training.

Recommendation: That training modules for pharmacy staff be developed by NENZ and NEST in consultation with the Pharmacy Guild and Pharmaceutical Society, promoted by them, and delivered by NEST staff.

9.9 Vaccination, testing and counselling

Two of the exchanges whose staff I consulted (Nelson and DIVO) are already providing some of these services. Both are entirely reliant upon the goodwill of local GPs. At Nelson, two local GPs provide free hepatitis A, B and C and HIV testing and hepatitis A&B vaccines on a sessional basis. In Dunedin, Rosemary Friend offers counselling and testing for hepatitis A, B and C and HIV two mornings a week.

In the survey of NE users, hepatitis C and HIV testing, hepatitis A & B vaccinations and counselling were quite high on the list of ways IDUs thought NEs could improve their services (4th, 7th and 8th, selected by 25.6%, 18.8% and 14.6% respectively).

Recommendations: That GP training in New Zealand include a component on aspects of illicit drug use, including the NSEP (its rationale and operation) and methadone maintenance programmes.

That the Ministry of Health liaise with the New Zealand Medical Association about encouraging GPs to work with their local NE to provide improved access to testing, counselling and primary healthcare services.

9.10 Some impressions from the consultations

Throughout the consultation process, the passion and commitment that so many NE staff bought to their work was obvious. The peer ethos and the extraordinary contribution made by peer volunteer workers to the programme is clearly vital to the operation of the NSEP in its current form. The self-reliance and innovative thinking displayed by NE staff was also impressive. One example is the manufacture and sale of Velcro tourniquets by Rodger Wright Centre volunteers in response to the realisation that commercially-available products were too expensive for many IDUs and the lack of tourniquets was leading to increased health risks. Some NEs – recognising the relatively high prevalence of piercing

among their clients - carry sterile piercing equipment so that their clients can perform piercings with reduced risk of BBV transmission. Many NEs independently raise funds for activities beyond basic exchange services, by making applications to other charitable trusts and foundations. There is a community spirit to needle exchange in New Zealand which should be regarded as a valuable asset.

10. Prison issues

Prisoners are one of the key risk groups for transmission of blood-borne viruses, and in particular, prisons are one of the engines of the hepatitis C epidemic (Crofts et al, 2001). Drug offences are one of the most common reasons for incarceration in western countries, and many prisoners committed drug-related and other crimes to support their drug habits; therefore, large proportions of prison entrants are IDUs. Prevalence of antibody to the hepatitis C virus among IDUs in New Zealand was most recently measured at 53%, and HIV 0.9% (Kemp and MacDonald, 1999). Once inside, many IDUs - and some people who had never previously injected – inject drugs, almost invariably with well-used and shared equipment. Other blood exposures also contribute to transmission within prisons, such as tattooing with inadequately disinfected equipment.

High prevalence of hepatitis C among prison inmates is well documented around the world, and much lower prevalences of HIV have also frequently been reported. In California in 1994, 39.4% of male inmates (Spaulding et al, 1999), in Ireland, 22% of 718 inmates (Long et al, 2001), and in the UK, 31% of prisoners with a history of IDU were found to be HCV antibody-positive (Weild et al, 2000). In Australia, prevalences of 37% (Butler et al, 1997) and 39% (Crofts et al, 1995) among inmates have been reported, rising to 66% and 64% respectively among prisoners who had a history of IDU. Long et al (2001) measured an HIV prevalence in Irish prisoners of 2%; Spaulding et al (2002) estimated that up to a quarter of all people living with HIV infection in the United States enter a prison each year; in a European multi-centre study, Rotily et al (2001) found an HIV prevalence of 4% among IDUs and 1% among non-IDUs. Sharing needles and syringes is much more common in prison than in the community, and needles may be used multiple times by multiple individuals, making transmission within prison more likely per sharing event (Crofts et al, 1995).

In New Zealand, the situation appears little different to that in other countries. Couper and Croxson (1993) investigated a suspected outbreak at an Auckland maximum security prison, and eight of 31 prisoners tested (25.8%) were found to be HCV-seropositive and viraemic. Brunton (1994) reported that of 270 inmates of a Christchurch medium security prison, just over half (52%) had ever injected drugs and around a third (31%) had injected while in prison. Just under a quarter (23%) of the prisoners tested were anti-HCV positive.

As this review demonstrates, the NSEP has been effective in preventing HIV and HCV transmission among IDUs in the New Zealand community, and prisoners are highly likely to have histories of IDU; thus the most pragmatic course of action would be to extend the NSEP into New Zealand's prisons. Provision of sterile injecting equipment to prisoners has been trialled in Switzerland, with apparently excellent outcomes (Nelles and Harding, 1995). Unfortunately, despite the benefits to public health that would result such initiatives are frequently unpalatable to governments due to their potential for political misrepresentation ("encouraging drug use by convicted criminals", etc). Nevertheless, the topic continues to be raised, most recently in Australia by the Australian National Council on Drugs in their position paper on Needle and Syringe Programs (Australian National Council on Drugs, 2002). Their recommendations on drug-related BBV prevention in prisons were:

1. That comprehensive and appropriate education and information programs on drug use, hepatitis C and other blood borne viral infections be provided to all prisoners and juvenile detainees, with an emphasis on new entrants, in all Australian prisons and juvenile detention centres.
2. That appropriate drug use and related education programs for families of prisoners and juvenile detainees be introduced in each jurisdiction.
3. That bleach be made freely available and accessible in all Australian prisons and juvenile detention centres, as a matter of urgency.
4. That each jurisdictional department responsible for the management of prisons and juvenile detention centres, in consultation with staff, health authorities and relevant community-based organisations, develop occupationally safe and culturally appropriate policies, protocols and procedures regarding the introduction of trial needle and syringe programs within at least one of its prisons and juvenile detention centres.

11. Conclusions

Effectiveness

Most of the scientific evidence shows that needle and syringe programmes worldwide are effective in reducing prevalence and/or incidence of HIV infection in injecting drug users. New Zealand enjoys one of the lowest prevalences of HIV infection in IDUs (0.9%) among more developed nations, lower even than countries such as Australia and The Netherlands which have (arguably) employed more comprehensive and intensive needle exchange strategies. It is estimated - by adapting the work of Health Outcomes International et al (2002) to suit New Zealand - that had the NSEP not been introduced, by the end of 2001 New Zealand would have had 1,031 extra people living with HIV or AIDS, and an extra 20 people would have died following an HIV infection, and a further 1,454 would be living with HCV.

A gradual decline has occurred in the prevalence of needle-sharing among New Zealand IDUs since the mid-80s, and the most recent survey data show a substantial reduction in prevalence of sharing, from 50 to six per cent (in the month prior to survey) between 1994 and 2002. While proving a direct link between NSEP activities and behaviour is difficult, the strong implication is that the NSEP has reduced needle-sharing among IDU.

The NSEP appears to be effective in reaching New Zealand's IDUs, with less than 5% of survey respondents reporting frequent difficulty in obtaining injecting equipment. Over 90% of respondents perceived little or no difficulty with access due to distance from an outlet. Nevertheless, the Review identified several regions which were under-serviced by NEs, including Auckland, Southland and the West Coast of the South Island. There are also some concerns about the NSEP's reach in terms of Maori and smaller ethnic groups.

Efficiency

A cost/benefit analysis was conducted based on the estimated numbers of HIV and HCV infections prevented by NSEP introduction, annual treatment costs for people with HIV or HCV disease, and annual investment in the NSEP. Treating the 1,031 extra people living with HIV/AIDS and the 673 diagnosed with chronic HCV infections by the end of 2001 had the NSEP not been introduced would have added $35,678,516 to New Zealand's total healthcare outlay between 1989 and 2001, while total expenditure on the NSEP over that period was estimated at $10,644,588. Thus the net benefit due to the NSEP – based on HIV and HCV infections prevented between 1988 and 2001 – is $25,033,928. Every $1 spent on New Zealand's NSEP between 1988 and 2001 saved an estimated $3.35 in healthcare costs accruing in that period alone. Extending the projections forward until all the extra people infected with HIV or HCV between 1988 and 2001 were estimated to have died produces a total net benefit of $202,274,686, meaning every $1 spent on the NSEP in that period yielded $20.00 in lifetime treatment costs avoided.

Each needle and syringe distributed by New Zealand's NSEP costs approximately $0.90, making the programme about as efficient in terms of unit cost as the Australian state of Victoria, but less efficient than the average of all Australian state programmes ($0.74). Economies of scale and population density are probable explanations.

Service delivery

The NE users' survey revealed that NE users were very happy with the service they received at NEs (96.5% selecting "good" or "very good"). The most popular options for improving service were one-for-one (new for old) syringe exchange and out-of-hours electronic syringe dispensers.

NE users were less satisfied with pharmacy exchange services, with 21.2% rating it as good or very good. Better staff attitudes (towards IDUs) and lower prices of injecting equipment were the options favoured for improved service.

Other issues

In the consultations, nearly universal support was expressed for removing the anomaly of possession of injection equipment being an offence under the Misuse of Drugs Act [section 13(1)(aa)] while a defence exists under the Health (Needles and Syringes) Regulations 1998.

One for one (new for old) needle and syringe exchange is the mode of service favoured by all NE staff. Experience to date with one-for-one has been very positive in terms of increasing distribution of new and return of used equipment, and reducing syringe re-use. The Review's survey of NE users found that IDUs attending NEs offering one-for-one exchange reported significantly lower prevalences of needle and syringe sharing and re-use than IDUs attending other NEs.

The concept of providing syringe disposal bins in public places was supported by many of those consulted as a way of enabling safer disposal and reducing the visible aspects of illicit drug use.

Electronic dispensers (vending machines) currently used by NEs in Auckland and Christchurch to provide after-hours service are working well, and were frequently nominated as a potential method of improving the reach of the NSEP.

Training for pharmacy staff and NE workers and volunteers was widely approved as a means of increasing the effectiveness and efficiency of the programme.

New Zealand's NSEP is both effective and efficient, particularly with respect to its core aim - prevention of HIV infections among injecting drug users.

12. Recommendations

1. That the effectiveness and efficiency of New Zealand's NSEP be acknowledged.
2. That New Zealand's government and community recognise the vital role of the NSEP in preventing HIV infections.
3. That consideration be given to opening a second peer-based NE in Auckland, to bring per-capita service coverage closer to the level which exists elsewhere in New Zealand.
4. That consideration be given to improving NSEP coverage on the South Island's west coast and Southland by opening branch NEs and/or upgrading and expanding existing pharmacy outlets.
5. That consideration be given to increasing the reach of the NSEP by enabling and/or encouraging the provision of needle exchange services through existing health service infrastructure, such as Community Health Centres and Sexual Health clinics.
6. That consideration be given to expanding the use of electronic dispensers at NEs to provide after-hours exchange services.
7. That the costs and benefits which would result from the introduction of free one-for-one (new for old) needle and syringe exchange in New Zealand be formally investigated.
8. That the crucial role of NE volunteers in New Zealand's NSEP be affirmed, and that any resolution of the "reimbursement problem" must not jeopardise volunteers' input to the programme.
9. That New Zealand's parliament approve the proposed amendment to the Misuse of Drugs Act which would remove the offence of possession of needles and syringes legally obtained through the NSEP.
10. That the (perceived) problems of pharmacy staff attitudes towards needle exchange clients be addressed in a systematic way by the Ministry of Health, NENZ and the Pharmacy Guild; research into pharmacy exchange users' perceptions of service would be a useful first step.
11. That the Pharmaceutical Society provide NEST with details of pharmacy closures, openings, and changes of ownership on a monthly basis.
12. While return of used needles and syringes to NEs or pharmacies for destruction should remain first priority, NEs should address the issue of disposal of needles and syringes, by means other than return to NEs or pharmacies, in their IDU education activities in order to reduce visibility of needles and syringes in public places and risk of needlestick injury.
13. That training modules for pharmacy staff be developed by NENZ and NEST in consultation with the Pharmacy Guild and Pharmaceutical Society, promoted by them, and delivered by NEST staff.

14. That GP training in New Zealand include a component on aspects of illicit drug use, including the NSEP (its rationale and operation) and methadone maintenance programmes.
15. That the Ministry of Health liaise with the NZMA about encouraging GPs to work with their local NE to provide improved access to testing, counselling and primary healthcare services.
16. That basic training for NZ police include a short session on New Zealand's harm minimisation policy and the NSEP. NENZ should liaise with police to achieve this goal.

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References

Australian Bureau of Statistics, *Australian Social Trends 1996: Capital city growth and development*. 1996: http://www.abs.gov.au/

Australian National Council on Drugs, *Position paper on Needle and Syringe Programs*. ANCD, Canberra, 2002.

Baker M, Brady H, Tobias M, Detection of HIV antibodies in used syringes in New Zealand. *Communicable Diseases New Zealand* 1992, 92:13-15.

Bastos FI, Strathdee SA, Evaluating Effectiveness of Syringe Exchange Programmes: Current Issues and Future Prospects. *Social Science & Medicine* 2000; 51:1771-1782.

Bluthenthal RN, Kral AH, Gee L, Erringer EA, Edlin BR. The effect of syringe exchange use on high-risk injection drug users: a cohort study. *AIDS* 2000; 14(5):605-11.

Brooner R, Kidorf M, King V, Beilenson P, Svikis D, Vlahov D, Drug abuse treatment success among needle exchange participants. *Public Health Reports* 1998; 113 Suppl 1:129-39.

Bruneau J, Lamothe F, Franco E, et al, High rates of HIV infection among injecting drug users participating in needle exchange programs in Montreal: results of a cohort study. *American Journal of Epidemiology* 1997; 145: 994-1002.

Brunton, 2002 – PhD thesis (unpub)

Brunton C, Kemp R, Raynel P, Harte D, Baker M, Cumulative incidence of hepatitis C seroconversion in a cohort of seronegative injecting drug users. *New Zealand Medical Journal*. 2000 Mar 24; 113(1106):98-101.

Brunton C, The outbreak that wasn't: hepatitis C in a New Zealand prison. *Australasian Corrections Health Conference*, Pakatoa, 1994.

Buning EC, Coutinho RA, van Brussel GH, van Santen GW, van Zadelhoff. Preventing AIDS in drug addicts in Amsterdam. *Lancet* 1986; 1:1(8495):1435.

Butler TG, Dolan KA, Ferson MJ, McGuinness LM, Brown PR, Robertson PW. Hepatitis B and C in New South Wales prisons: prevalence and risk factors. *Medical Journal of Australia*, 1997; 166(3):127-30.

Carter H, Robinson G, Hanlon C, Hailwood C, Massarotto A. Prevalence of hepatitis B and C infection in a methadone clinic population: implications for hepatitis B vaccination. *New Zealand Medical Journal* 2000; 114:324-6

Chetwynd J, Brunton C, Blank M, Plumridge E, Baldwin D, Hepatitis C seroprevalence amongst injecting drug users attending a methadone programme. *New Zealand Medical Journal* 1995; 108(1007):364-366

Couper A, Croxson M. An unusual strain of hepatitis C virus in New Zealand. *New Zealand Medical Journal,* 1993; 106:199-202

Coutinho R. Needle exchange, pragmatism, and moralism. *Am J Public Health* 2000; 90(9):1387-8.

Crofts N, Caruana S, Bowden S, Kerger M, Minimising harm from hepatitis C virus needs better strategies. *British Medical Journal,* 2000; 321(7265):899.

Crofts N, Aitken CK, Kaldor, J, Reply to comment on "The force of numbers: ..." [*MJA* 170(5):220-1], *Medical Journal of Australia*, 1999; 171(3):165.

Crofts N, Aitken CK, Kaldor J, The force of numbers: why hepatitis C is spreading among Australian injecting drug users while HIV is not. *Medical Journal of Australia*, 1999; 170(5):220-1.

Crofts N, Aitken CK, Incidence of and risk behaviours for blood-borne viruses in a cohort of injecting drug users in Victoria, 1990-1995. *Medical Journal of Australia*; 1997; 167, 17-20

Crofts N, Thompson S, Wale E, Hernberger F, Risk behaviours for blood-borne viruses in a Victorian prison. *Australian and New Zealand Journal of Criminology*, 1996; 29:20-28.

Crofts N, Stewart T, Hearne P, Yi Ping X., Breschkin AM, Locarnini SA, Spread of blood-borne viruses among Australian prison entrants. *British Medical Journal*, 1995; 310:285-288.

Des Jarlais DC, Marmor M, Friedmann P, Titus S, Aviles E, Deren S, Torian L, Glebatis D, Murrill C, Monterroso E, Friedman SR. HIV incidence among injection drug users in New York City, 1992-1997: evidence for a declining epidemic. *American Journal of Public Health,* 2000; 90(3):352-9.

Des Jarlais DC, Hagan H, Friedman S, et al, Maintaining low HIV seroprevalence in populations of injecting drug users. *Journal of the American Medical Association*, 1995; 274: 1226-1231.

Dickson NP, Austin FJ, Paul C, Sharples KJ, Skegg DC. HIV surveillance by testing saliva from injecting drug users: a national study in New Zealand. *Journal of Epidemiology and Community Health* 1994;48(1):55-7.

Doherty MC, Junge B, Rathouz P, Garfein RS, Riley E, Vlahov D. The effect of a needle exchange program on numbers of discarded needles: a 2-year follow-up. *American Journal of Public Health,* 2000; 90(6):936-9.

Drucker E, Lurie P, Wodak A, Alcabes P. Measuring harm reduction: the effects of needle and syringe exchange programs and methadone maintenance on the ecology of HIV. *AIDS* 1998; 12(Suppl A):S217-30.

Eberhart-Phillips J, *AIDS – New Zealand*. 2002; 49.

Gibson DR, Flynn NM, Perales D. Effectiveness of syringe exchange programs in reducing HIV risk behavior and HIV seroconversion among injecting drug users. *AIDS* 2001; 15(11):1329-1341.

Hagan H, DesJarlais DC, Friedman SR et al. Reduced risk of Hepatitis B and Hepatitis C among injection drug users in the Tacoma Syringe Exchange Program. *American Journal of Public Health,* 1995; 1531-37.

Hagan H, McGough JP, Thiede H, et al. Syringe exchange and risk of infection with hepatitis B and C viruses. *American Journal of Epidemiology*, 1999; 149: 203-213.

Hahn JA, Vranizan KM, Moss AR. Who uses needle exchange? A study of injection drug users in treatment in San Francisco, 1989-1990. *Journal of Acquired Immune Deficiency Syndromes & Human Retrovirology,* 1997; 15(2):157-64.

Hall WD, Ross JE, Lynskey MT, Law MG, Degenhardt LJ, How many dependent heroin users are there in Australia*? Medical Journal of Australia* 2000*;* 173: 528-531.

Health Outcomes International, The National Centre For HIV Epidemiology And Clinical Research, Drummond M, *Return On Investment In Needle & Syringe Programs In Australia*. Commonwealth Department of Health and Ageing, Canberra, 2002.

Heimer R. Can syringe exchange serve as a conduit to substance abuse treatment? *Journal of Substance Abuse and Treatment,* 1998;15(3):183-91.

Heimer R., Khoshnood K., Bigg D., Guydish J. and Jungue B. Syringe use and reuse: effects of syringe exchange programs in four cities. *Journal of Acquired Immune Deficiency Syndromes & Human Retrovirology* 1998; 18, S37.

Hocking J, Crofts N, Aitken CK, MacDonald M, Epidemiology among injecting drug users. In Crofts N, Dore G, Locarnini S (eds), *Hepatitis C: an Australian Perspective*. IP Communications, Melbourne, 2001.

Holmberg SD: The estimated prevalence and incidence of HIV in 96 large US metropolitan areas. *American Journal of Public Health* 1996; 86: 5: 643-654.

Holtgrave DR, Pinkerton SD, Jones TS, Lurie P, Vlahov D. 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, Effectiveness of needle-exchange programmes for prevention of HIV infection. *Lancet*, 1997; 349: 1797-1800.

Judson G. Prevalence of viral hepatitis amongst methadone attendees in Taranaki. Paper presented at *National Opioid Treatment Conference*, Christchurch, New Zealand, 1999

Kemp R, MacDonald M, Injecting drug users have high rates of hepatitis C, but HIV infection remains uncommon. *New Zealand Public Health Report*, 1999; 6(3):17-19.

Kemp R, Miller J, Lungley S, Baker M, Injecting behaviours and prevalence of hepatitis B, C and D markers in New Zealand injecting drug user populations. *New Zealand Medical Journal*, 1998; 111:50-53.

Kemp R, From a bang to a whimper: policy responses to injecting drug use and viral infection. In P. Davis (ed), *Intimate Details and Vital Statistics*, Auckland University Press, pp 150-168. 1996

Law MG on behalf of the Hepatitis C Virus Projections Working Group. Modelling the hepatitis C virus epidemic in Australia. *Journal of Gastroenterology and Hepatology,* 1999; 14:1100-1107.

Lim G, Brunton C, Bagshaw S. Hepatitis C in young injecting drug users attending a youth health centre. In: Proce*edings of the Second Australasian Conference on Hepatitis C*, Christchurch, 1999

Long J, Allwright S, Barry J, Reynolds SR, Thornton L, Bradley F, Parry JV. Prevalence of antibodies to hepatitis B, hepatitis C, and HIV and risk factors in entrants to Irish prisons: a national cross sectional survey. *British Medical Journal*, 2001; 323(7323):1209-13

Lungley S, Baker M, *The needle and syringe exchange scheme in operation: an evaluation of the first year*. New Zealand Department of Health, Wellington, 1990.

Lurie P, Invited commentary: le mystere de Montreal. *American Journal of Epidemiology,* 1997; 146(12):1003-6

Lurie P, Reingold AL, Bowser B, et al. The public health impact of needle exchange programs in the United States and abroad. Summary, conclusions and recommendations: School of Public Health, University of California, Berkeley. 1993

Marx MA, Crape B, Brookmeyer RS, Junge B, Latkin C, Vlahov D, and Strathdee SA. Trends in Crime and the Introduction of a Needle Exchange Program. *American Journal of Public Health,* 2000; 90(12):1933-36.

Moss AR. Epidemiology and the politics of needle exchange. *American Journal of Public Health,* 2000; 90(9):1385-7

National Centre in HIV Epidemiology and Clinical Research, *HIV/AIDS, viral Hepatitis and sexually transmissible infections in Australia: annual surveillance report, 2001*. National Centre in HIV Epidemiology and Clinical Research, The University of New South Wales, Sydney, 2001.

Nelles J, Harding T, Preventing HIV transmission in prison: a tale of medical disobedience and Swiss pragmatism. *Lancet* 1995; 346(8989):1507-8

NENZ website - http://www.needle.co.nz/

NENZ Trust, *Consumer Survey and Returns Audit 2000*. NENZ Trust, Auckland, 2000.

NENZ Trust, *Needle Exchange Programme Availability Report 2000*. NENZ Trust, Auckland, 2001.

Needle Exchange Services Trust, *Needle Exchange Programme Retailer Manual* (version 5.1), Christchurch, 2002.

Nesdale A, Baker M, Gane E, Kemp R, Brunton C, Law M, Garrett N, *Hepatitis C infection in New Zealand: estimating the current and future prevalence and impact*. Institute of Environmental Science and Research, 2000

New Zealand Ministry of Health, *Action on Hepatitis C Prevention - A discussion document*. Ministry of Health, Wellington, 2002.

New Zealand Ministry of Health, Progress on Health Target Outcomes, 1998.

Normand J, Vlahov D, Moses LE (eds) *Preventing HIV transmission: the role of sterile needles and bleach*. Washington: National Academy Press. 1995

Obadia Y, Feroni I, Perrin V, Vlahov D, Moatti JP. Syringe vending machines for injection drug users: an experiment in Marseille, France. *American Journal of Public Health,* 1999; 89(12):1852-4

Robinson GM, Reynolds JN, Robinson BJ. Hepatitis C prevalence and needle/syringe sharing behaviours in recent onset injecting drug users. *New Zealand Medical Journal,* 1995; 108(996):103-105.

Robinson GM, Thornton NJ, Rout J, Mackenzie N, AIDS--risk behaviours and AIDS knowledge in intravenous drug users. *New Zealand Medical Journal,* 1987; 100(821):209-11

Rotily M, Weilandt C, Bird SM, Kall K, Van Haastrecht HJ, Iandolo E, Rousseau S, Surveillance of HIV infection and related risk behaviour in European prisons: a multicentre pilot study. *European Journal of Public Health*. 2001; 11(3):243-50

Statistics New Zealand, http://www.stats.govt.nz/

Schechter MT, Strathdee SA, Cornelisse PG, et al. 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

Spaulding A, Stephenson B, Macalino G, Ruby W, Clarke JG, Flanigan TP. Human immunodeficiency virus in correctional facilities: a review. *Clinical Infectious Diseases*, 2002; 35(3):305-12.

Spaulding A, Greene C, Davidson K, Schneidermann M, Rich J, Hepatitis C in state correctional facilities. *Preventive Medicine,* 1999*;* 28: 92–100.

Stimson GV. AIDS and injecting drug use in the United Kingdom, 1987-1993 the policy response and the prevention of the epidemic. *Social Science and Medicine,* 1995; 41(5):699-716.

Stimson GV. Has the United Kingdom averted an epidemic of HIV among injection drug users? *Addiction* 1996; 91, 1085-88.

Strathdee SA, Celentano DD, Shah N, Lyles C, Macalino G, Nelson K, Vlahov D. Needle Exchange Attendance and Health Care Utilization Promote Entry into Detoxification. *J Urban Health,* 1999; 76(4):448-460.

Strathdee SA, Patrick DM, Currie SL, et al. Needle exchange is not enough: lessons from the Vancouver injecting drug use study. *AIDS,* 1997; 11(8):F59-65.

Strathdee SA, Vlahov D, The effectiveness of needle exchange programs: A review of the science and policy. *AIDScience*, 2001; 1(16):1-31.

Thorpe LE, Ouellet LJ, Hershow R, Bailey SL, Williams IT, Williamson J, Monterroso ER, Garfein RS. Risk of hepatitis C virus infection among young adult injection drug users who share injection equipment. *American Journal of Epidemiology*. 2002; 155(7):645-53.

UNAIDS Epidemiological Fact Sheets on HIV/AIDS, 2000 Update. http://www.unaids.org/hivaidsinfo/statistics/fact_sheets/index_en.htm

Valente T FR, Junge B and Vlahov D. Satellite exchange in the Baltimore needle exchange program. *Public Health Reports*, 1998; (Suppl 1):90-96.

van Ameijden E.J.C. and Coutinho R.A. Maximum impact of HIV prevention measures targeted at injecting drug users. *AIDS* 1998; 12, 625.

van Ameijden EJC, van den Hoek JAR, Coutinho RA, Injecting risk behaviour among drug users in Amsterdam 1986 to 1992, and its relationship to AIDS prevention programs. *American Journal of Public Health*, 1994; 84: 275.

van den Hoek JA, van Haastrecht HJ, Coutinho RA. Risk reduction among intravenous drug users in Amsterdam under the influence of AIDS. *American Journal of Public Health,* 1989; 79(10):1355-7.

Vertefeuille J, Marx MA, Tun W, Huettner S, Strathdee SA, Vlahov D. Decline in Self-Reported High Risk Injection-Related Behaviors Among HIV Seropositive Participants in the Baltimore Needle Exchange Program. *AIDS and Behavior*, 2000;4(4): 381-388.

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

Vlahov D, Junge B, Brookmeyer R, et al. Reductions in high-risk drug use behaviors among participants in the Baltimore needle exchange program. *Journal of Acquired Immune Deficiency Syndrome & Human Retrovirology* 1997; 16(5):400-406.

Weild AR, Gill ON, Bennett D, Livingstone SJM, Paryy JV, Curran L, Prevalence of HIV, hepatitis B and hepatitis C antibodies in prisoners in England and Wales: a national survey. *Communicable Diseases and Public Health*, 2000; 3(2):121-126

Woodfield DG, Harness M, Rix-Trott K, Tsuda F, Okamoto H, Mayumi M. Identification and genotyping of hepatitis C virus in injectable and oral drug users in New Zealand. *Aust N Z J Med*. 1994; 24(1):47-50.

Appendix 1 - Terms of Reference for the Review

(see overleaf)

Terms of reference for the review of the Needle and Syringe Exchange Programme.

1. Introduction

These terms of reference describe the review of the needle and syringe exchange programme (NSEP) review.

2. Aim of the review

To ensure the NSEP is working in the most effective and efficient way possible within available resources.

3. Background

Needle exchange was legalised in New Zealand through the introduction of the Health (Needles and Syringes) Regulations 1987 which allowed the sale of needles and syringes to injecting drug users provided their sale is part of the NSEP. The regulations also create a legal defence to the charge of possession of injection equipment, which remains an offence under the Misuse of Drugs Act [section 13(1)(aa) of the Act refers].

The programme allows pharmacists, medical practitioners and other authorised representatives to provide clean needles and syringes. When the initial programme was established, needles and syringes were sold for a price set by the Director-General of Health at that time $1 (inclusive of GST) per needle and syringe. These regulations were subsequently amended in 1998 removing the requirement for the Director-General to set the price for needles and syringes and these can now be sold at any price.

The strategies of the programme are:

- The sale and distribution of new, and therefore clean, injection equipment.
- Safe disposal of used needles and syringes.
- Free distribution of safer sex equipment to NSEP clients.
- Provision of clear simple messages about the transmission of diseases and safer drug use techniques to every person using the NSEP.

The NSEP is based on a philosophy of harm reduction rather than abstention; that is to minimise the potential harm from injecting drug use rather than attempting to

curtail this activity. This is consistent with the National Drug Policy's emphasis on harm minimisation.

The harm reduction model aims to modify behaviour to minimise the spread of HIV and other blood-borne diseases. The NSEP, while not condoning the use of illegal drugs, accepts that drug use continues to occur despite its legal prohibition.

4. Review focus

Regulatory Issues

Including:

- Offence of self administration
- Decriminalisation of possession of injection equipment Sharps disposal bins in public areas (e.g. toilets)
- One for one exchange
- Simplified outlet approval processes

Economic sustainability and programme structure

Including:

- Staff retention and use of "volunteers"
- Methods of staff payment and reimbursement
- Implication of employment relation act
- Price efficiency/ equity /fairness/sustainability

Service Delivery Issues

Including:

- Levels of health education and promotion content
- Safety in pharmacies and exchanges
- Service availability
- Other community generated sharps waste, for example diabetic sharps

Quality issues

Including:

- Service benchmaking or minimum levels of service
- Training for pharmacy and exchange staff

Programme development

Including:

- Voluntary hepatitis A and B vaccination
- Mobile services'
- Primary care health clinics
- Social services for IDU

Prison issues

Including:

- Harm minimisation in prisons; methadone maintenance
- Prevention issues; bleach, condoms, needle exchange availability
- Health promotion for both staff and inmates.

5. Review methodology

The reviewer / review team will undertake a detailed analysis of the programme. This analysis will include consultation with and information gathering from the stakeholders of the NSEP, that is, the Ministry of Health, Needle Exchange New Zealand, the Pharmacy Guild, and the Pharmaceutical Society.

6. Publication of results

A written report will be presented to the Ministry of Health on 30 June 2002. This will subsequently be distributed to the stakeholders in the NSEP.

7. Timeframe

Start date: As soon as the reviewer is appointed
End date: 30 June 2002

Appendix 2 - NE user's questionnaire

(see overleaf)

This survey is part of an independent review of Needle and Syringe Exchange in New Zealand. We want your views on the exchange programme and how it might be improved.

Participation is voluntary and anonymous.

Please write a response where indicated, or tick the most appropriate box.

1. What is your **age** in years? _____

2. What is your **gender?** ☐ Male ☐ Female ☐ Transsexual

3. What is your **ethnicity?** ☐ Maori ☐ NZ / European ☐ Pacific Islander
☐ Asian ☐ Other _____

4. On average, how many times **per week** have you injected drugs recently?

☐ 1 or less ☐ 2-3 ☐ 4-7 ☐ 8-13 ☐ 14 or more

4a. How many times do you usually **re-use** a fit? _____

4b. How many times have you used **someone else's** *used* fit in the past month? _____

4c. Which drug have you injected **most often** in the past month?
☐ Morphine / MST ☐ Methadone
☐ Speed ☐ Homebake
☐ Benzos (eg.Temazepam) ☐ Ritalin
☐ Other _____

5. How many times have you got fits from an **exchange** in the past month? _____

☐ 1-2 ☐ 3-4 ☐ 5-8 ☐ 9-12 ☐ 13 or more

6. How many times have you bought fits from a **pharmacy** in the past month? _____

☐ 1-2 ☐ 3-4 ☐ 5-8 ☐ 9-12 ☐ 13 or more

7. Do you ever find it **hard to get** fits when you want them? ☐ Yes ☐ No

7a. (*If YES above*) **How often** have you found it hard to get fits over the past month?

☐ never ☐ sometimes ☐ half the time ☐ most times ☐ always

7b. **Why** do you find it hard to get fits? *(You can tick more than one)*

☐ Exchange's hours don't always suit me
☐ Nearest pharmacy's hours don't suit me
☐ I don't like being seen at outlets
☐ I live a long way from any outlets
☐ prices of injecting equipment are too high
☐ other _____

7c. If you find it hard to get new fits, does this mean you have to **re-use or share** fits more often? ☐ Yes ☐ No

8. If you don't **return all** your fits, why not? *(You can tick more than one)*

☐ fear of arrest ☐ child safety
☐ discounts too small ☐ it's a hassle
☐ Other _____

9. How do you rate your **local exchange's** service?

☐ Very poor ☐ Poor ☐ Middling ☐ Good ☐ Very good

9a. What would **most improve** the exchange's service **for you**? *(Please tick up to **four** options)*

☐ a lower price for fits
☐ lower prices for other injecting equipment
☐ out-of-hours fit vending machines
☐ more information about hepatitis C & HIV
☐ more or better general healthcare info
☐ on-site hepatitis A & B vaccinations
☐ more time for staff to advise & refer
☐ better staff attitudes
☐ a greater range of injecting equipment
☐ free one-for-one (new for used) exchange
☐ longer opening hours
☐ on-site hepatitis C and HIV testing
☐ more or better harm reduction info
☐ on-site counselling services
☐ better-trained staff
☐ other _____

10. How do you rate your **nearest pharmacy's** exchange service?

☐ Very poor ☐ Poor ☐ Middling ☐ Good ☐ Very good

10a. What would **most improve** pharmacies' exchange services **for you**? *(Please tick up to **two** options)*

☐ lower prices for fits and other equipment
☐ a greater range of injecting equipment
☐ better-trained staff
☐ more anonymity / privacy
☐ better discounts when old fits are returned
☐ provision of safer using information
☐ better staff attitudes
☐ other _____

11. **Finally**, if you have any other ideas about how needle exchange in New Zealand (through NEs *or* pharmacies) could help drug users use more safely, please tell us.

_____

_____

_____

Appendix 3 - Call for public submissions

National Drug Policy
A Policy for New Zealand 1998–2003

NZ Needle and Syringe Exchange Programme Review

The Centre for Harm Reduction (part of the Burnet Institute, Australia) is reviewing New Zealand's Needle and Syringe Exchange Programme (NSEP). The review's aim is to ensure the NSEP is working in the most effective and efficient way possible within available resources.

Submissions which address the review's aim and terms of reference (available at www.chr.asn.au, or from the address below) must be sent by COB Friday 7th June 2002 to:

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c/o Brendon Baker
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Appendix 5 – Data tables

1. HIV/AIDS cases and deaths in IDUs per annum prevented by NSEP introduction.
2. HIV/AIDS cases per annum by disease stage prevented due to NSEP introduction.
3. HCV cases in IDUs per annum prevented by NSEP introduction.
4. HCV cases per annum prevented due to NSEP introduction by disease stage.
5. Estimated public expenditure on New Zealand's NSEP ($).
6. Annual treatment costs per HIV infection by disease stage ($).
7. Annual treatment costs per HCV infection by disease stage ($).
8. Estimated annual and cumulative cost/benefits of the NSEP ($).

1. HIV/AIDS cases and deaths in IDUs per annum prevented by NSEP introduction.

	HIV/AIDS			Deaths		
Year	**Upper bound**	**Estimate**	**Lower bound**	**Upper bound**	**Estimate**	**Lower bound**
1981	0	0	0	0	0	0
1982	0	0	0	0	0	0
1983	0	0	0	0	0	0
1984	0	0	0	0	0	0
1985	0	0	0	0	0	0
1986	0	0	0	0	0	0
1987	0	0	0	0	0	0
1988	0	0	0	*0*	*0*	*0*
1989	4	2	1	0	0	0
1990	13	7	2	0	0	0
1991	28	16	4	0	0	0
1992	52	30	8	0	0	0
1993	87	50	13	1	0	0
1994	139	80	21	1	1	0
1995	212	122	32	3	2	0
1996	315	181	47	6	3	1
1997	459	264	69	9	5	1
1998	660	379	99	14	8	2
1999	934	537	140	20	11	3
2000	1304	750	195	27	15	4
2001	**1793**	**1031**	**268**	**35**	**20**	**5**

2. HIV/AIDS cases per annum prevented due to NSEP introduction by disease stage.
(Note that due to rounding, figures for the disease stages do not always add to the HIV/AIDS total.)

Year	HIV/AIDS	HIV CD4 >500	HIV CD4 <500	AIDS	Total deaths
1981	0	0	0	0	0
1982	0	0	0	0	0
1983	0	0	0	0	0
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	2	2	0	0	0
1990	7	7	0	0	0
1991	16	15	1	0	0
1992	30	27	2	0	0
1993	50	45	5	1	0
1994	80	69	9	2	1
1995	122	102	17	3	2
1996	181	148	28	5	3
1997	264	211	45	8	5
1998	379	298	70	11	8
1999	537	414	107	16	11
2000	750	568	160	22	15
2001	**1031**	**767**	**235**	**29**	**20**

3. HCV cases prevented due to NSEP introduction.

Year	Upper bound	HCV	Lower bound
1981	0	0	0
1982	0	0	0
1983	0	0	0
1984	0	0	0
1985	0	0	0
1986	0	0	0
1987	0	0	0
1988	0	0	0
1989	123	70	18
1990	293	168	44
1991	462	265	69
1992	632	363	95
1993	806	464	121
1994	986	567	147
1995	1,173	674	175
1996	1,368	786	204
1997	1,573	904	235
1998	1,791	1,029	268
1999	2,022	1,162	302
2000	2,268	1,303	339
2001	2,531	**1,454**	378

4. HCV cases per annum prevented due to NSEP introduction by disease stage.
(Note that due to rounding, figures for disease stages do not always add to the chronic HCV total.)

Year	Total living with HCV	Total chronic	Stage 0/1	Stage 2/3	Cirrhosis	HCC incidence	Liver failure incidence
1981	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0
1989	70	53	52	1	0	0	0
1990	168	126	123	3	0	0	0
1991	265	199	192	7	0	0	0
1992	363	273	260	12	0	0	0
1993	464	348	328	19	1	0	0
1994	567	425	398	26	1	0	0
1995	674	505	469	35	2	0	0
1996	786	590	543	44	2	0	0
1997	904	678	619	55	3	0	0
1998	1,029	772	700	68	4	0	0
1999	1,162	871	784	81	6	0	0
2000	1,303	978	874	96	8	0	0
2001	**1,454**	**1,091**	**969**	**112**	**10**	**0**	**0**

5. Estimated public expenditure on New Zealand's NSEP ($).

Year	Annual expenditure	Cumulative expenditure
1981	0	
1982	0	0
1983	0	0
1984	0	0
1985	0	0
1986	0	0
1987	0	0
1988	350,830	350,830
1989	389,811	740,641
1990	433,123	1,173,764
1991	481,248	1,655,012
1992	534,720	2,189,732
1993	594,133	2,783,865
1994	660,148	3,444,013
1995	733,498	4,177,511
1996	814,998	4,992,508
1997	905,553	5,898,061
1998	1,006,170	6,904,231
1999	1,117,967	8,022,197
2000	1,242,185	9,264,382
2001	**1,380,206**	**10,644,588**

6. Annual treatment costs per HIV infection by disease stage ($).

Year	HIV CD4 >500	HIV CD4 <500	AIDS
1981	1,164	1,565	1,565
1982	1,164	1,565	1,565
1983	1,164	1,565	1,565
1984	1,164	1,565	1,565
1985	1,164	1,565	1,565
1986	1,164	1,565	1,565
1987	1,164	1,565	1,565
1988	1,164	1,565	1,565
1989	1,164	1,565	1,565
1990	3,084	4,925	88,310
1991	3,084	4,925	88,310
1992	3,084	4,925	88,310
1993	3,084	4,925	88,310
1994	3,084	4,925	88,310
1995	3,084	4,925	88,310
1996	3,084	4,925	88,310
1997	9,180	10,385	54,118
1998	9,180	10,385	54,118
1999	9,180	10,385	54,118
2000	9,180	10,385	54,118
2001	9,180	10,385	54,118

7. Annual treatment costs per HCV diagnosis by disease stage ($).

Stage 0/1	Stage 2/3	Cirrhosis	HCC	Liver Failure
244	244	456	120,924	200,531

8. Estimated annual and cumulative cost/benefits of the NSEP ($)

Lower bound estimates

1988	0	0	0	0	0	-350,830	-350,830
1989	2,023	2,023	705	705	2,728	-387,083	-737,913
1990	4,837	6,860	6,858	7,562	14,422	-421,429	-1,159,342
1991	7,646	14,506	16,813	24,376	38,882	-456,788	-1,616,130
1992	10,509	25,015	33,782	58,158	83,173	-490,429	-2,106,559
1993	13,440	38,455	62,131	120,289	158,744	-518,562	-2,625,121
1994	16,484	54,939	107,619	227,908	282,846	-536,045	-3,161,166
1995	19,658	74,597	174,985	402,893	477,489	-538,855	-3,700,021
1996	26,642	101,238	274,698	677,590	778,828	-513,658	-4,213,680
1997	32,370	133,608	733,847	1,411,437	1,545,045	-139,336	-4,353,016
1998	39,764	173,372	1,057,454	2,468,891	2,642,262	91,048	-4,261,968
1999	47,404	220,776	1,499,161	3,968,052	4,188,828	428,599	-3,833,369
2000	55,333	276,109	2,092,732	6,060,785	6,336,893	905,880	-2,927,489
2001	**65,742**	**341,851**	**2,873,779**	**8,934,564**	**9,276,414**	**1,559,315**	**-1,368,174**

Year	Annual HCV saving	Cumulative HCV saving	Annual HIV saving	Cumulative HIV saving	Cumulative combined saving	Total saving	Cumulative total saving
1987							
1988	0	0	0	0	0	-350,830	-350,830
1989	7,780	7,780	2,710	2,710	10,491	-379,320	-730,150
1990	18,603	26,383	26,376	29,086	55,469	-388,145	-1,118,294
1991	29,408	55,791	64,667	93,753	149,544	-387,173	-1,505,467
1992	40,420	96,211	129,931	223,684	319,895	-364,369	-1,869,836
1993	51,692	147,903	238,965	462,649	610,552	-303,476	-2,173,312
1994	63,399	211,302	413,919	876,568	1,087,871	-182,830	-2,356,142
1995	75,607	286,910	673,020	1,549,588	1,836,497	15,129	-2,341,013
1996	102,468	389,377	1,056,529	2,606,117	2,995,494	343,999	-1,997,014
1997	124,498	513,875	2,822,489	5,428,605	5,942,481	2,041,434	44,420
1998	152,938	666,814	4,067,129	9,495,734	10,162,548	3,213,897	3,258,317
1999	182,324	849,138	5,766,005	15,261,739	16,110,877	4,830,363	8,088,680
2000	212,819	1,061,957	8,048,971	23,310,710	24,372,667	7,019,605	15,108,285
2001	**252,853**	**1,314,810**	**11,052,996**	**34,363,706**	**35,678,516**	**9,925,643**	**25,033,928**

Upper bound estimates

1988	0	0	0	0	0	-350,830	-350,830
1989	13,538	13,538	4,716	4,716	18,254	-371,557	-722,387
1990	32,369	45,907	45,894	50,610	96,517	-354,860	-1,077,247
1991	51,170	97,077	112,521	163,131	260,207	-317,557	-1,394,804
1992	70,330	167,407	226,080	389,211	556,618	-238,309	-1,633,114
1993	89,944	257,352	415,799	805,010	1,062,361	-88,390	-1,721,504
1994	110,315	367,666	720,219	1,525,228	1,892,895	170,385	-1,551,118
1995	131,556	499,223	1,171,054	2,696,283	3,195,505	569,113	-982,005
1996	178,294	677,517	1,838,360	4,534,643	5,212,160	1,201,657	219,651
1997	216,627	894,143	4,911,130	9,445,773	10,339,916	4,222,204	4,441,855
1998	266,113	1,160,256	7,076,805	16,522,578	17,682,833	6,336,747	10,778,603
1999	317,244	1,477,500	10,032,849	26,555,426	28,032,926	9,232,126	20,010,729
2000	370,305	1,847,805	14,005,210	40,560,636	42,408,441	13,133,330	33,144,058
2001	**439,964**	**2,287,769**	**19,232,213**	**59,792,849**	**62,080,618**	**18,291,972**	**51,436,030**

Appendix 6 - Glossary of terms and abbreviations

BBV	blood-borne virus (eg. HIV, hepatitis B, hepatitis C)
Fit	colloquial Australian and New Zealand term for a needle and syringe
Harm Reduction	Harm reduction is a public health approach that focuses on reducing the harm associated with certain behaviours (in this context, injecting illicit drugs). The rationale is that injecting drug use is impossible to prevent, but potential consequences such as HIV transmission can be avoided or reduced in scale (by, for example, needle exchange programmes).
Harm Minimisation	While often used interchangeably with harm reduction, harm minimisation is in fact a much broader term that describes an approach to illicit drug use which encompasses supply reduction, demand reduction and harm reduction (in New Zealand, the term 'problem limitation' is used instead of harm reduction). Harm minimisation is the official policy of the Australian and New Zealand governments on illicit drug use.
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
IDU	injecting drug user
Incidence	the rate of acquisition of a characteristic (eg. HIV infection) in a population over time. May be expressed as cases per 100 person-years of observation, or per cent per annum
NE	Needle Exchange – one of 12 peer-based organisations which provides injecting equipment and associated services to people who inject drugs in New Zealand.
NSEP	Needle and Syringe Exchange Programme – the entire system of provision and collection of injecting equipment, which operates in New Zealand through NEs and pharmacies.
NSP	Needle and Syringe Program - an Australian term, used to refer to the entire system as well as individual 'exchanges'.
Peer	Used throughout the report to refer to an individual who is a current or past IDU, typically working or volunteering in an NE
Prevalence	the proportion or percentage of a population having a particular characteristic (eg. HIV infection, ever using a shared needle and syringe) measured at one point in time.
Problem limitation	One of the three arms of New Zealand's harm minimisation policy (alongside supply reduction and demand reduction), corresponding to the internationally-used term 'harm reduction'.
Returns	used needles and syringes returned to an NE or pharmacy

Seroprevalence	prevalence of virus exposure, as measured by presence of viral antibodies in blood samples
STD	sexually transmitted disease