NEEDLE EXCHANGES:

SERVICE DELIVERY, UPTAKE AND RISK BEHAVIOUR

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SUMMARY

Introduction

HIV among drug injectors had become a major problem in Scotland by the early 1990s. Of a total of 1,943 HIV infections reported in Scotland up to the end of 1991, 991 (51%) were related to injecting drug use (IDU). The threat of HIV spreading among drug injectors in Glasgow was intensified by a dramatic increase in the number of injectors in the early 1980s. This increase in injecting, together with the threat of HIV posed an enormous problem for existing drugs services in Glasgow.

In 1986, the World Health Organisation suggested that supplying sterile needle and syringes to drug injectors could contribute to HIV. The decision to set up needle exchanges in the UK was made by Government in 1986. The first three needle exchanges in Scotland were opened in Glasgow (Ruchill Hospital), Dundee and Edinburgh in 1987. By 1992 there were eight needle exchanges operating in Glasgow.

Research conducted up to 1991, (when the work for this thesis began), indicated that were eight key questions which should be answered in the course of an evaluation into needle exchanges. The answers to these questions were debated in the published literature. Four related to service delivery and four to service impact. These are central to this thesis.

Service delivery

1. Do needle exchanges reach drug injectors, especially those not in contact with other harm reduction services, and maintain regular and frequent contact with them?

2. What services do needle exchanges offer besides exchanging injecting equipment, and what is the level of uptake of these services?

3. Do needle exchanges refer attenders to other harm reduction or medical services, and if so, how frequently?

4. Are needle exchanges, and the services they provide, acceptable to injecting drug users?

Service impact

5. Do needle exchanges reduce the level of harm associated with drug injecting and sexual risk behaviour among drug injectors, including diseases such as HIV and Hepatitis-B and other physical problems such as abscesses?

6. Do needle exchanges reduce drug and sexual risk behaviours among injecting drug users including the level of injecting, sharing of injecting equipment and unsafe sex?

7. Do needle exchanges have a long-term impact on both harms and risk behaviours?

8. Do needle exchanges protect the wider public and are they acceptable to the public?

Methods

Service delivery

An information system was developed by the present author in collaboration with the needle exchange management and staff, and introduced to all Glasgow needle exchanges in April 1991. The aim of this system was to collect process data and these relate to questions 1-3. Data from 1991-1993 are used in this thesis.

Question 4, clients 'satisfaction' with the service, was measured using an anonymous self administered questionnaire (Appendix 4). This was completed by 243 attenders at all Glasgow exchanges in one week (14th to 20th February 1992).

Service impact

Access was negotiated to data collected by the MRC/WHO Glasgow HIV Behavioural and Prevalence Study (MRC/WHO Collaborative Study Group 1993). This study measured the drug and sexually related behaviours, and HIV prevalence of injecting drug users in Glasgow. A cross-sectional (city-wide) sample of 503 was drawn from the injector population during 1990 and 1991. The data were used to examine the extent to which needle exchange attenders (54%) and non-attenders (46%) differed in a wide range of attributes and to explore the implications of these findings for the needle and syringe exchange programmes in Glasgow. This helped address questions 5 and 6 which relate to service outcome. Question 7, which relates to the long-term impact of needle exchanges was addressed by an extensive review of the existing literature.

Questions concerning the public acceptability of needle exchanges and drug injecting were inserted into a lifestyle and health survey carried out by the Research Unit in Health and

Behavioural Change, at Edinburgh University. The questions were developed by the present author and commissioned by the HIV and Addictions Resource Centre. Data were collected by randomly selected telephone interviews in Glasgow (n=605) and Edinburgh (n=420) during June - October 1992. Data from Glasgow City Council were also used to illustrate the number of needles and syringes found in public areas throughout the city from 1989 - 1993. These were complemented by data from the Glasgow needle exchanges detailing the numbers of needles and syringes exchanged since 1989. These data provided evidence for the answer to the final question in this thesis relating to public acceptability and protection (question 8).

Results

Service delivery. (Questions 1-4)

1. Needle exchanges in Glasgow have been successful in reaching up to 2,600 injectors in the city. However, this represents only a minority (27% - 35%) of the estimated injecting population. Thus, they fail to make direct contact with the majority of drug injectors in the city.

2. There is evidence that those who remain out of contact with the service are at greater risk of encountering drug-related harms e.g. they share injecting equipment more.

3. Non-attendance may be related to the use of alternative and more accessible sources of supplies of injecting equipment e.g. pharmacies; not wishing to be identified as (or associated with) injecting; fear of notification; and imprisonment.

4. Retention rates are poor, with only a minority of clients making frequent and regular visits to an exchange. Approximately 54% of clients make more than three visits, and

33% make more than five visits per year. This may be related to factors which are similar to those which prevent drug injectors contacting exchanges in the first instance.

5. Needle exchanges are able to make contact with drug injectors who are not in contact with other health and social services. Approximately 46% of new attenders reported having no contact with these services. Exchanges also provide a wide range of services to approximately 64% of clients. These range from primary health care to help with social problems. Female attenders seem to make more use of these services compared with their male counterparts. On average, 35% of visits involving the uptake of services were made by women, yet women constituted only 24% of new clients. The majority of attenders (80%) express satisfaction with these services. Thus needle exchanges are providing a service that is valued by those who attend.

6. Although exchanges provide a range of services which are acceptable to clients, they are unable to provide adequate supplies of injecting equipment to meet the personal needs of most clients. Between 20% and 28% of attenders reported that they did not receive enough needles and syringes each visit to meet their needs.

7. Needle exchanges act as a bridge into other health and social services for some clients. However, it is uncertain whether clients actually make contact with these services. A direct referral mechanism is lacking in needle exchanges and as a result they are only able to refer a small proportion (11%) of clients for further care.

Service impact (Questions 5-8)

1.   Approximately 1% of needle exchange attenders and non-attenders were HIV positive. There is some evidence that needle exchanges have a contributory role in containing the spread of HIV among those who attend, mainly by supplying clean injecting equipment. This may help them maintain lower levels of sharing of injecting equipment compared with non-attenders. However, it is possible that needle exchanges have not made a significant impact on the spread of hepatitis B and C. It is estimated that 70% of injectors in Glasgow have been infected with hepatitis B and 80% with hepatitis C.

2.   It is uncertain what impact needle exchanges have on injecting-related injuries e.g. abscesses and other soft tissue damage. Recent work in Glasgow found that 72% of attenders at one exchange reported injecting-related damage and that this may have gone untreated by needle exchange staff. Service contacts at needle exchanges for safer injecting advice have reduced from 29% in 1991 to 11% in 1993. Needle exchange attenders also inject more frequently (mean of 127.5 times per month) than non-attenders (mean of 119.8 times per month). This may lead to a higher prevalence of injecting related injuries among attenders.

3.   Needle exchange attendance is associated with the use of fewer different drugs, but not less injecting. However, there is no evidence that they have led to an increase of injecting among the population of drug users in the city.

4.   There is some evidence that needle exchanges have a contributory effect in reducing the levels of sharing of used injecting equipment among those who attend. A total of 39% of attenders and 47% of non-attenders injected with used equipment. Approximately 57% of both groups passed on injecting equipment to others. However, needle exchange

attenders did so less frequently (2 times per month compared 2.3 times per month among non-attenders). A substantial number of attenders continue to share injecting equipment, and many (50%) do not use proper cleaning techniques to disinfect equipment before use. Further reductions in sharing are possible among attenders (and non-attenders) but may be limited by other factors including: the need for a hit; drug use rituals; friendships; sexual relationships and trust; and the places where drugs are consumed e.g. prison. Many of these relate to the social relationships in drug users' lives.

5. It is likely that needle exchanges in Glasgow have no or little impact on the sexual risk behaviours of those who attend. Both attenders and non-attenders have the same number of primary sexual partners (0.7), and casual sexual partners (0.9 and 0.8 respectively). Approximately 75% of both groups did not use a condom with their primary sexual partner and 52% did not use a condom with their casual sexual partners. However, needle exchange attenders used a condom more frequently with their casual partners. No other differences were apparent. Barriers to condom use include: inconvenience; dislike; the desire to conceive; negotiating condom use; drug use; low perceived risk of HIV; and trust and perceived promiscuity between sexual partners. As with sharing, most of these are relate to social norms and relationships in drug users' lives which may limit further changes in this type of risk behaviour.

6. It was out with the scope of the present study to determine the long-term effects of needle exchanges on drug related harms and behaviours. However, existing research suggests that needle exchanges have little long-term impact on HIV transmission, levels of injecting, drug use, sharing and sexual risks.

7.   Needle exchanges in Glasgow provide a valuable public health service by reducing the number of needles and syringes discarded in public areas. Return rates of over 100% are impressive, and suggest that needles and syringes secured from other sources (mainly pharmacies) are returned through the exchanges. They are also widely accepted by the general public. Approximately 90% of the general public agree with the provision of needle exchanges and 70% have no objections to them operating in their area. However, there is a minority (32%) of objectors who are likely to live close to a needle exchange and their opinions may be based on their perceptions of, or life experiences of, drug injectors. They constitute an 'small', but important body of opinion within the general population.

The thesis concludes with a number of recommendations based on these results and a comprehensive review of the literature.

FOREWORD

STRUCTURE AND GENERAL CONTENT

This thesis contains six chapters:

Chapter 1, 'Introduction and Literature', illustrates why needle exchanges became important in the 1980s and gives a brief outline of their history. The Public Health Model of evaluation used in this thesis is then introduced, highlighting the importance of structural, process and outcome measures. This is followed by a detailed review of research carried out in the field of needle exchange evaluation up to and including 1991, (when the present research began). In some instances references from 1992 onwards are used. These are either review articles or studies carried out during or before 1991. Research from 1992 - 1995 is used in the conclusion and discussion sections at the end of chapters 3-5. The review centres around eight key questions upon which most research is based. These questions relate mainly to the process (four questions) and outcomes (four questions) of needle exchange programmes. This is followed by some methodological considerations.

Chapter 2, 'The Structure of the Needle Exchange Programme in Glasgow - Building a city-wide network', describes the structure and history of needle exchanges in Glasgow. It details the number of exchanges, staffing levels and services offered and, thus, addresses the question of service structure in the city.

Chapter 3, 'Process Measures and Needle Exchange', addresses the four key questions introduced in Chapter 1 relating to process measures:

1.   Do needle exchanges reach drug injectors, especially those not in contact with other harm reduction services, and maintain regular and frequent contact with them?

2.   What services do needle exchanges offer besides exchanging injecting equipment, and what is the level of uptake of these services?

3.   Do needle exchanges refer attenders to other harm reduction or medical services, and if so, how frequently?

4.   Are needle exchanges, and the services they provide, acceptable to injecting drug users?

It also outlines the design of a computerised information system which was introduced to monitor needle exchange activity and record these measures in Glasgow. Conclusions and discussion then follow using updated literature, and summary recommendations are made.

Chapter 4, 'Outcome Measures and Needle Exchange' addresses three of the remaining four questions which relate to outcomes of needle exchange activity:

5.   Do needle exchanges reduce the level of harm associated with drug injecting and sexual risk behaviour among drug injectors, including diseases such as HIV and Hepatitis-B and other physical problems such as abscesses?

6.   Do needle exchanges reduce drug and sexual risk behaviours among injecting drug users including the level of injecting, sharing of injecting equipment and unsafe sex?

7.   Do needle exchanges have a long-term impact on both harms and risk behaviours?

The three are included in a single chapter because they deal mainly with the effects of needle exchanges on the clients who use them. Conclusions, discussion and summary recommendations then follow.

Chapter 5, 'Needle Exchanges as Public Health Interventions', addresses the remaining question relating to outcome:

8.   Do needle exchanges protect the wider public and are they acceptable to the public?

Summary recommendations are also made in this chapter.

Chapter 6, 'Conclusions and Recommendations', recaps on the main findings contained in this thesis and makes some recommendations for future of needle exchange development and future research in the area of needle exchange evaluation. Chapter 6 is followed by references and appendices.

Although data from other sources are used in the course of this thesis, the present author made a significant contribution to, or has been solely responsible for, the design of the data collection instruments, and/or the collation and analysis of the data. For instance, all needle exchange process data were recorded using a computerised information system designed by the author, (Chapter 3) which has also been used as a model for information systems introduced in other HIV and addiction services throughout Glasgow (see Chapter 6). The needle exchange 'satisfaction survey' (Chapter 3) was designed and analysed solely by the present author. Outcome data, (Chapter 4) although gathered through an ongoing survey of drug injectors in Glasgow, (MRC/WHO Glasgow HIV Behavioural and Prevalence Study, Ruchill Hospital), were analysed jointly by the present author and one researcher from the survey team. This has

led to a series of publications in academic journals and presentations at national and international conferences cited in Appendix 6. Data relating to the public attitudes towards needle exchanges, presented in Chapter 5, were gathered by the Research Unit in Heath and Behavioural Change, Edinburgh University, using questions developed by the present author who also carried out the full data analysis which was subsequently published in an academic journal and presented at national and international conferences (Appendix 6). Other reports, publications and conference presentations resulting from the data contained in this thesis appear in Appendix 6.

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

' ..drug-use-related HIV in Europe is the fastest growing risk and, in addition, is associated with substantial vertical and heterosexual transmission. Consequently, the reduction and control of drug related HIV can have a substantial impact not only on transmission amongst drug users but also on the heterosexual and vertical spread of HIV' (Brettle 1991).

The spread of HIV among injecting drug users

By the end of 1991 there were 446,681 reported AIDS cases in the world, of which 80,000 were in Europe (Incardi 1990; Pan European Symposium Report 1992). The number of HIV infections was estimated to be 10.6 million world-wide, with 0.5 million in Europe (Chin 1991). Between 5 - 7 million of those infected with HIV were male. The major method of spread varied from region to region, but globally the most common route of spread was through heterosexual intercourse. This was true for Sub Saharan Africa, but in North America and Western Europe, HIV spread mainly through unprotected penetrative intercourse between men, and among injecting drug users (IDUs) who shared contaminated injecting equipment.

Up to 1991, about 40% of newly diagnosed AIDS cases in the twelve EC countries were IDU related, giving a total estimated number of between 300,000 and 500,000 HIV positive IDUs in Europe (Resinger 1993). The proportion of IDU infections varied from country to country. For instance, in 1989, 50% of HIV infections in Spain were related to drug injecting compared with 2% in the England and Wales (Stimson 1990a). High levels were also reported in Italy, France and Switzerland. In 1991 in the UK, there were a total of 16,828 reported HIV infections, of which 2,224 (13%) were IDU related (CDS Weekly Report 1992a). Because AIDS usually develops several years after infection with HIV, there were correspondingly fewer reported AIDS

cases in the UK. A total of 5,451 were reported, of which 245 (5%) were IDU related. So for some European countries, HIV among drug injectors was already a major problem in the early 1990s.

Scotland shared this problem. Here, the HIV epidemic seemed to affect IDUs more than any other group. Of a total of 1,943 HIV infections reported up to the end of 1991, 991 (51%) were IDU related (CDS 1992a). In the same time period, a total of 285 AIDS cases were reported, of which 91 (32%) were IDU related (CDS Weekly Report 1992b). Prevalence studies carried out in the mid 80s in Edinburgh found that between 38% and 65% of injecting drug users tested were HIV positive (Peutherer, Edmond, Simmonds, et al 1985; Robertson, Bucknall, Welsby et al 1986; Brettle, Davidson, Gray et al 1986). A large number of cases was also identified in Dundee. An HIV epidemic among injecting drug users had clearly occurred in the east of Scotland. Although fewer cases of HIV were recorded in the west, the high level of Hepatitis B among IDUs in Glasgow suggested that HIV could spread just as rapidly there as it had in Edinburgh (Follet, McIntyre, O'Donnell et al 1986; Gruer, Peedle, Carrington et al 1991). Indeed there was no reason to believe that Glasgow would be any different.

The threat of HIV spreading among drug injectors in Glasgow was intensified by a dramatic increase in the number of injectors in the early 1980s, a pattern repeated else where in the UK. During 1981 there was a rapid rise in heroin use in Glasgow followed by the widespread use of other opiates and benzodiazepines. Typically these drugs were injected (Ditton, Speirits 1982; Sakol, Cameron, Sykes 1989; Hammersley, Lavelle, Forsyth 1990). The total estimated number of injectors in Glasgow in 1983 was around 5,000 (Haw 1985). In 1990, the estimate was 8,500 (Frischer, Leyland, Cormack et al 1993a). The increase in injecting, together with the threat of HIV posed an enormous problem for existing drugs services in Glasgow and elsewhere in the UK in the late 80s and early 90s.

Tackling the problem

During the 1980s, British drug services began to place less emphasis on abstinence based programmes and more on offering a wide range of services which aimed at tackling various forms of harm (Stimson 1990a). Harm associated with drug use is diverse, ranging from diseases like HIV and Hepatitis B to psychological or social problems. HIV was an important factor in shaping these new services, the basic aim of which was to reduce but not necessarily eliminate drug-related harm.

British drug services had traditionally tended to regulate drug use by attempting to stop or reduce consumption through counselling, rehabilitation and, to a lesser extent, methadone prescribing (MacGregor, Ettoree 1987). However, the success of abstinence based programmes in reducing drug use and injecting had been seriously questioned, especially in light of the rapid increase in injecting in the late 1970s and 80s. In addition, these programmes often fell short of their goal, achieving abstinence in a maximum of 40% of those receiving treatment (Stimson, Oppenhiemer 1982).

Abstinence was gradually replaced by the more achievable goal of harm reduction. This was a more pragmatic approach, focusing on maintaining or improving health rather than stopping drug use altogether. Not that abstinence was forgotten. Indeed, when successful, abstinence is probably the most effective means of reducing harm. However, in the 1980s a balance was increasingly struck between the two policies of reducing the harmful effects of continued drug use and reducing drug use itself (Strang, Farrell 1992).

Although new to the UK, this approach was already established in other countries, notably Holland (Buning 1989). The primary aim of AIDS related services in the Netherlands was to contact as many drug users as possible and provide them with safer sex and safer drug use

information. In addition, the means to achieve lower levels of risk behaviour were offered. These included condoms, drug-free treatment for those who wanted to stop using drugs, methadone and clean injecting equipment. Care for those with AIDS was also available. The first needle exchange programme was established in Amsterdam in 1984 by drug users through their 'union', the Junkiebond. Holland, therefore, provided a model for other countries and one which was adopted by many to a greater or lesser degree (Power, Stimson, Strang 1990).

The history of needle exchange

In 1986, the World Health Organisation suggested that supplying sterile needle and syringes to drug injectors could contribute to HIV prevention (World Health Organisation Regional Office for Europe 1986). Some countries took this advice and established needle exchanges as one way of tackling the problem of shortages of sterile injecting equipment among drug injectors, but this was not to happen in every country affected by HIV. In America, for instance, is it still illegal in many states to distribute needles and syringes to injecting drug users. Many other countries which now supply injecting drug users with injecting equipment had to overcome either adverse legislation or social norms in order to do so. Swedish laws, for instance, initially prevented the sale of injecting equipment to drug injectors; Australia had laws preventing the carrying of injecting equipment for the purpose of drug use; and in Scotland common laws regarding 'reckless conduct' could have been used against suppliers (Stimson, Donoghoe, Lart et al 1990b).

The availability of injecting equipment, therefore, varied between countries over time. Needle exchange programmes were generally introduced after supplies of injecting equipment were made available through pharmacies. In Holland, Denmark, Germany and the UK, needles and syringes were available to a greater or lesser extent in pharmacies prior to 1984. Exchanges were then set up in Holland in 1984, Denmark and Sweden in 1986, and in Germany and the UK in 1987 (Fig. 1.1).

Figure 1

Availability of syringes in the 12 E.C. countries
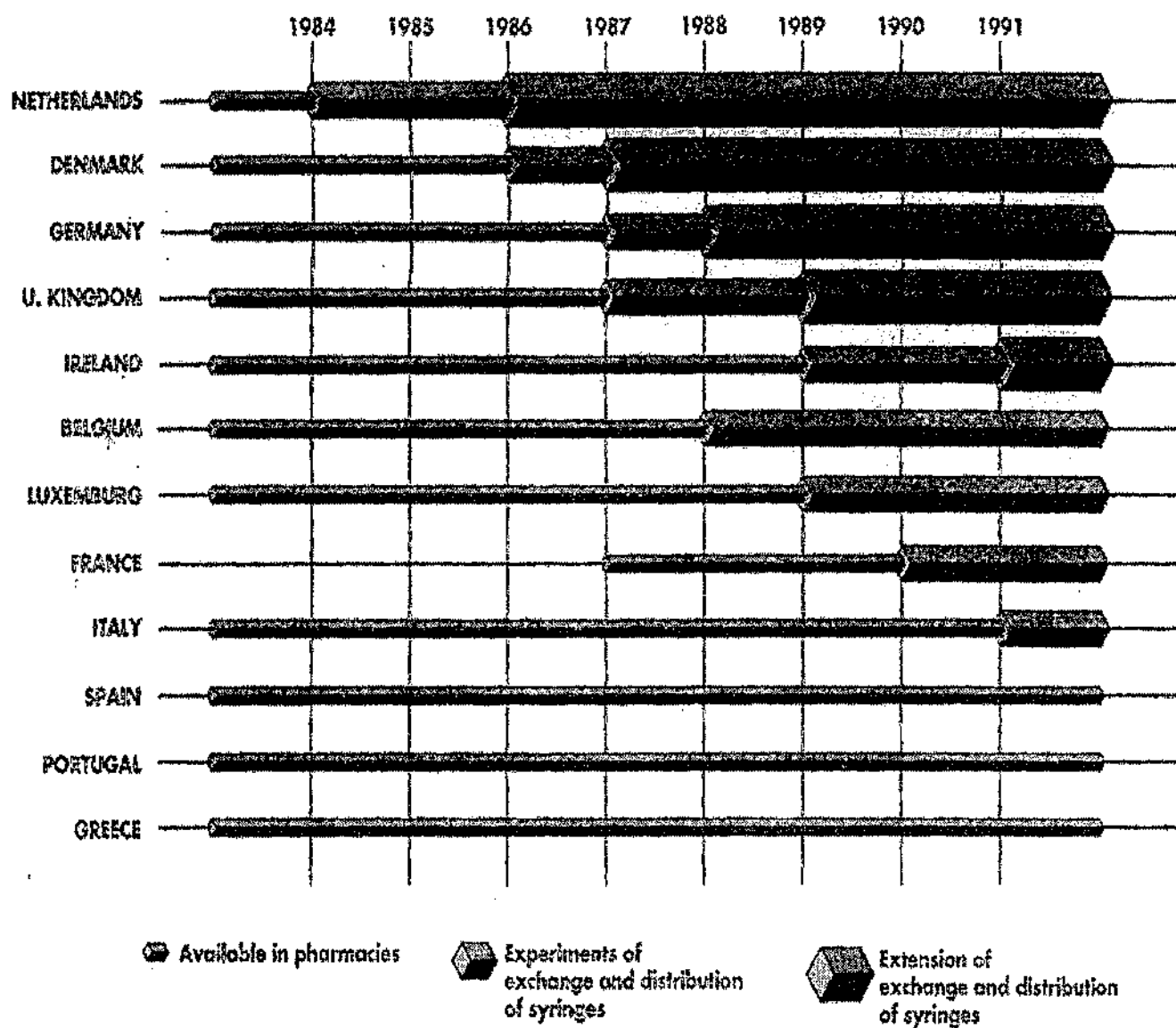
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In Australia and New Zealand the first needle exchanges were opened in 1987 (Stimson 1989b), in the USA 1988, and in Canada 1989 (Lurie, Reingold, Bowser et al 1993). It should be noted that, in the UK, officially sanctioned forms of syringe distribution had operated since the 1960s when injecting equipment was issued to drug users prescribed injectable drugs. However, it was in Amsterdam that syringe distribution schemes led the way in tackling the spread of HIV among IDUs (Stimson, Alldritt, Dolan et al 1989a). By the end of 1991 there were no reports of needle exchanges in Eastern Europe, Russia, Asia, Africa, South or Central America.

The decision to set up needle exchanges in the UK was made by Government in 1986. This was based on the findings from the McClelland Committee which investigated the problem of high HIV prevalence among Scottish IDUs. This committee recommended that sterile injecting equipment be provided to injectors unwilling or unable to stop injecting (SHHD McClelland Report 1986). These recommendations were subsequently taken up by the Scottish Home and Health Department and the Department of Health and Social Security in London which announced the provision of needle and syringe schemes throughout Scotland and England. By the end of 1989 there were 120 schemes in the UK (Stimson et al 1990b). The majority of these were in England. The first three needle exchanges in Scotland were opened in Glasgow (Ruchill Hospital), Dundee and Edinburgh in 1987.

The structure and operation of needle exchanges differed widely across the world according to local conditions, funding and staffing levels. For instance, in San Francisco a needle exchange was set up by volunteers in 1988 on a street corner using a baby perambulator to deliver supplies of injecting equipment (Watters, Estilo, Clark et al 1994), whilst in Paris in 1989 the first needle exchange operated out of medical centre staffed by a multi-disciplinary medical and social work team offering a wide range of services. This was later housed in a mobile van which toured the city (Lhomme, Edwige, Ilie et al 1992). Differences were also apparent among the first

programmes in the UK, although these tended to operate out of fixed sites either in medical centres or drugs projects (Stimson, Alldritt, Dolan et al 1988a). For instance, funding for the needle exchange in Peterborough covered only injecting equipment costs, whilst in Middlesex equipment was supplied and exchanged by two full-time staff. In Liverpool, the first exchange was run from a converted toilet in the Regional Drug Training and Information Centre, whilst in St. George's, London, they operated at three health centres. In Scotland needle exchanges were relatively well staffed. Four members of staff were employed at the Ruchill (Glasgow) exchange, including a doctor, two nurses and a receptionist and opened two days a week from 1.30pm to 4.00pm. The exchange in Leith Hospital (Edinburgh) had two staff members and opened one day a week from 2.00pm to 4.30pm. In Wishart (Dundee) the exchange was based in a drugs project, staffed by two nurses and opened five days a week from 9.00am to 5.00pm.

Although needle exchanges varied widely at a structural level, they could be easily be distinguished from the service provided by pharmacies. The most obvious difference was that needle exchanges generally offered a wide range of equipment and health services. The range of services differed at each exchange, but at a general level, the list of services was impressive. A survey carried out in 1990 in the UK found that exchanges offered: injecting equipment, swabs, condoms, spermicides, safe disposal containers, tourniquets, sterile water, bleach, cotton wool, dressings, primary health care, drugs advice, HIV/AIDS advice, HIV testing, safer sex advice, social problems advice, and financial and legal advice (Donoghoe 1991).

Public health programmes - an evaluation model

An important requirement of the needle exchanges throughout the world, including the UK, was evaluation (Stimson 1989a). The purpose of most evaluations of Public Health programmes is the collection of information which will provide the basis of future action (Abramson 1984). The evaluation of a community-based intervention usually attempts to assess the effectiveness of

a particular programme in tackling a health problem. For example, it may determine whether or not the programme is achieving its goals or objectives and, if it is not, suggest ways in which it can improve in order to meet those objectives. This may be a systematic and continuous process, with the results of the evaluation being continuously fed back to planners or policy makers (Puska 1991). The scope of the evaluation is obviously influenced by the predetermined aims and objectives of the programme. For instance, needle exchanges aim to reduce HIV risk behaviours in the injecting drug using population which, in turn, should lead to a decrease in the prevalence of HIV.

There are three essential components of evaluation which can applied to health care services (Donabedian 1985). The first is the structure of an organisation. This refers to the amount and nature of the resources allocated to the particular health programme, including the facilities and staffing. The second, process, refers to the mode of operation of a service e.g. the types of services offered and the application of those services to recipients, including uptake (Harley 1991). Process evaluation can also include other aspects of service delivery such as, ease of access and the acceptability of the service to clients (Puska 1991). The third concerns the measurement of outcomes and includes the effects of the programme on those using it, if possible in comparison with those who do not. The relationship between structure, process and outcome are difficult to assess. For instance, it is difficult to determine the amount of resources required to achieve a desired level of service provision which in turn results in an acceptable level of outcome. Nevertheless, all three types of measures can act as indicators of performance (Opit 1991). There are however a range of additional measures which, although not directly related to a specific health care programme, can be used in determining its overall effects. These include epidemiological data concerning a specific disease, or studies which examine attitudes or behaviours. For instance, if the incidence of HIV and related risk behaviours were to increase

dramatically among the IDU population after the introduction of a needle exchange programme, then the effectiveness of that programme would have to be questioned.

Thus, although the relationship between structure, process, outcome and other indicators are difficult to determine, they can provide valuable data upon which to assess the effectiveness of care. This range of measures should provide several different perspectives from which a programme can be viewed, giving a multi-dimensional picture (Hall, Masters 1986).

Despite the growing insistence from policy makers and managers, very little progress has been made in transferring this approach from academic research into more applied settings e.g. within the health service (Opit 1991). In addition, information systems designed for these settings are frequently chaotic, inadequately resourced, badly managed, unreliable in their information content, and ineffective in meeting their stated or apparent objectives (Knox 1991).

Evaluation should relate to the end-purposes of health care. It should involve the personnel providing that care and assist them in carrying out their work by feeding back information (Knox 1991). This holds true for community HIV/drugs services as well general health services (Power, Dale, Jones 1991; Stimson, Power 1992). In fact, a similar evaluative model has recently been applied to a community drug service. It utilised on-going evaluation and other surveys based on field work concerning drug patterns and local service provision (Power 1991). Research and evaluation were seen as a necessary part of service development, and information was continually fed back to service providers, allowing adjustments to policy and strategy. This involved close liaison between researchers and staff. It was therefore argued that both interaction and feedback could be successfully used in the evaluation of services in the drugs and HIV field (Power 1991).

In conclusion, the model of research posited here is one which considers structure, process, outcome and other measures in relation to service objectives and goals. It is essentially an interactive partnership between researchers and service providers. It is both short and long-term and may involve collaboration with other research teams working in related fields. The individual components of this model have been applied to needle exchange evaluation in various settings throughout the world, but are rarely used in combination in a single setting. For instance, evaluations are usually carried out by academic departments with limited funding and discontinue when funding stops. Emphasis is placed on one aspect of evaluation at the expense of another and in some instances few if any data are available concerning other indicators e.g. HIV prevalence and behavioural studies of the specific drug injecting population targeted by the needle exchange service.

Research and evaluation of needle and syringe programmes up to 1991

Research in this area has generally concentrated on answering important questions about needle exchanges and these form the structure for this thesis. These questions relate to the specific aims and objectives of the programmes which are stated both implicitly and explicitly in these studies. It may be worth considering the questions and the resulting answers before going on to explore the methodological problems encountered in the research literature.

The questions themselves relate to two main areas of needle exchange activity: service delivery and service impact. The first four are largely associated with process measures and the remainder, with outcome measures.

Service delivery

1. Do needle exchanges reach drug injectors, especially those not in contact with other harm reduction services, and maintain regular and frequent contact with them?

2. What services do needle exchanges offer besides exchanging injecting equipment, and what is the level of uptake of these services?

3. Do needle exchanges refer attenders to other harm reduction or medical services, and if so, how frequently?

4. Are needle exchanges, and the services they provide, acceptable to injecting drug users?

Service impact

5. Do needle exchanges reduce the level of harm associated with drug injecting and sexual risk behaviour among drug injectors, including diseases such as HIV and Hepatitis-B and other physical problems such as abscesses?

6. Do needle exchanges reduce drug and sexual risk behaviours among injecting drug users including the level of injecting, sharing of injecting equipment and unsafe sex?

7. Do needle exchanges have a long-term impact on both harms and risk behaviours?

8. Do needle exchanges protect the wider public and are they acceptable to the public?

Service delivery

1.   Do needle exchanges reach drug injectors, especially those not in contact with other harm reduction services, and maintain regular and frequent contact with them?

Research up to and including 1991 showed that needle exchanges were capable of reaching many drug injectors (Stimson 1988a, 1989b; Hartgers, Buning, Van Santen et al 1989; Brettle 1991; Kaplan, O'Keefe, Heimer 1991; Ljungberg, Christensson, Tunving et al 1991; Guydish, Clark, Garcia et al 1992). However, quantifying the uptake rate among injectors was particularly difficult, because of the lack of good prevalence data especially at the local level. Thus, it was difficult to know exactly what proportion of the injecting population used the service (Stimson 1988a; Hart, Woodward, Carvell 1989a). Not all injectors were attracted to these services. Younger male drug users, ethnic drug users, those engaging in higher risk behaviours and female injectors appeared difficult to reach (Stimson 1988a; Stimson, Alldritt, Dolan et al 1988b; Hart 1989a; Hartgers 1989). There was some evidence to suggest that those attracted to the service had little or no contact with other drug treatment services. Approximately one third of those attending UK syringe exchanges had no previous contact with treatment agencies concerning their drug problem and yet another third were not currently receiving treatment (Stimson 1988a, 1989b). Another UK study reported that 19% of new clients had received no treatment for drug use, 42% had received treatment, but not recently, and 38% were currently in treatment (Carvell, Hart 1990). In Sweden, 58% of needle exchange participants reported having no contact with a drug treatment centre or any related programme (Ljungberg 1991). It is probably fair to conclude that needle exchanges attracted many drug injectors who had little or no previous contact with drug related services. However, it was generally unknown what proportion of the injecting population were attracted to the service.

Retaining clients was a problem. Study times varied, but the general conclusion did not. For instance, 55% of clients made an average of two visits per month (Carvell 1990), whilst over a

period of eight months, 38% made up to five visits (Kaplan 1993). Over a period of a year, only 33% of UK clients made 5 visits or more, (Stimson 1988a), but at an outreach exchange in Rotterdam, up to 90% made 5 visits or more in the same time period (Grund, Blanken, Adriaans et al 1992). So, retention was a problem, but appeared to be dependent upon time and type of exchange. This also raised the question of the type of clients who dropped out of the service, the answer to which was unknown (Klee, Faugier, Hayes et al 1991).

2.   **What services do needle exchanges offer besides exchanging injecting equipment, and what is the level of uptake of these services?**

Services offered by needle exchanges varied widely depending on location, funding and staffing levels. Many needle exchanges operated in different ways. Some were static, some operated from mobile units and others functioned on an outreach basis. The range of services offered, varied considerably. Whilst it is not possible to illustrate exactly what was offered at every needle exchange throughout the world, the following should serve as an example of some of the services available in some programmes.

The basic equipment available in exchanges typically consisted of: needles and syringes, swabs, condoms, sharps boxes, spermicides, tourniquets, sterile water, cotton wool, dressings, bleach and other medical supplies (Hart 1989a; Donoghoe 1991). In addition, HIV testing may have been available both to injectors and their partners, and information regarding risk reduction and drugs services was often given (Hart 1989a; Hartgers 1989; Bardsley, Turvey, Blatherwick 1990; Christensson, Ljungberg 1991; Ljungberg 1991; Whynot 1991). In some areas, primary medical and social care were offered (Stimson 1988a; Hart 1989a). Apart from distributing and returning injecting equipment, little was known of the uptake of these services within these programmes (Hart 1989a). Routine monitoring of the uptake of these services (apart from exchanged injecting equipment) was not usually carried out.

There was also uncertainty as to the effectiveness of these interventions in reducing risk behaviour (see questions 5, 6 and 7 below). Consequently, some studies suggested that needle exchanges should either offer more services or operate as part of a wider range of harm reduction programmes, for instance, increasing the supply of cleaning equipment to allow injectors to disinfect needles and syringes when sharing takes place (Strang, Hunt, Johns 1988; Van Ameijden, Van den Hoek, Haastrecht et al 1992), and offering intensive counselling and dissemination of harm reduction information (Hartgers 1989). Not all of this need have been done at needle exchanges. In fact, needle exchanges should not be judged in isolation. They must be seen as part of a system of harm reduction services. Thus, what was not offered on site could be offered by other more specialised services.

3.   Do needle exchanges refer attenders to other harm reduction or medical services, and if so, how frequently?

Some needle exchanges will refer clients to other services for more specialised help. One London study indicated that approximately 38% of clients were referred on for further treatment, and that 60% of total referrals were made to drug treatment agencies over a period of a year. Only 4.5% of referrals were made to General Practitioners. Approximately 37% of referrals were 'health orientated' and made to specialist drug services which offered medical treatment (Hart 1989a; Carvell 1990; Whynot 1990). In Vancouver, over a six month period, referrals were made at between 2% and 6% of all visits, mainly to detoxification programmes, residential treatment programmes, and medical and social services (Whynot 1991). There was some anecdotal evidence which suggested that those dropping out of needle exchanges either went into treatment or prison (Stimson 1988a). Apart from this, there was little reported evidence of the referral patterns from needle exchange schemes to other agencies, although there were some studies which suggested that needle exchange attenders were in contact with other services (Stimson

1988a; Van den Hoek, Van Haastrecht, Coutinho 1989; Hart 1990; Christensson 1991; Donoghoe 1991; Klee 1991; Ljungberg 1991; Merrill, Irizarry, Schensul 1991; Grund 1992; Hartgers, Van Ameijden, Van den Hoek et al 1992; Van Ameijden 1992).

4. Are needle exchanges, and the services they provide, acceptable to injecting drug users?

The success of needle and syringe programmes depends on their ability to attract clients, to meet their needs, and to deliver a service in a way that is attractive to them. In the UK there was a high level of satisfaction (80% - 90%) among attenders concerning locality, the number of syringes given, waiting times, confidentiality, the staff working there, rules and regulations, and even with advice given concerning drug use and safer sex (Stimson 1988a). However, approximately 30% were dissatisfied with opening times (Stimson 1988a). Among past attenders there were also concerns about waiting times, degree of confidentiality, questions asked and rules and regulations (Stimson 1988a). Thus, although there were high levels of satisfaction expressed among attenders, those dropping out of the service had reservations about some aspects of service delivery. Qualitative work from Glasgow also suggested that some injectors were reluctant to approach drug related services because of the stigma attached to drug injecting and the fear of being identified as a drug user (McKeganey 1989).

Service impact

5.   Do needle exchanges reduce the level of harm associated with drug injecting and sexual risk behaviour among injecting drug users, including diseases such as HIV and Hepatitis-B and other physical problems such as abscesses?

By 1991, there was no firm evidence to support this contention, mainly because of a lack of randomised controlled trials (RCTs). RCTs are difficult to carry out in this field because of ethical and methodological problems. It is thought unethical to withhold this service from the target population and therefore impractical to randomly allocate subjects to a control or experimental condition. In addition, there were problems in following groups of drug injectors over substantial periods of time, because of the mobility of this population and the difficulty of accessing 'hidden' groups. In one study, only 40% of clients were followed-up over a twelve month period (Hartgers 1989). Strong associative evidence of change in the level of harm was therefore utilised in debates concerning the question of impact (Hagan, Reid, Des Jarlais et al 1991b). This meant that other factors, such as educational programmes, which may influence injecting and sexually related harms, remained uncontrolled in needle exchange research, leaving the question of impact open to conjecture (Brettle 1991; Ljungberg 1991).

With these difficulties in mind, there were some studies which indicated that needle exchange had a positive impact on HIV and drug injecting related harms. For instance HIV was estimated to be low among needle exchange attenders (3% - 7%) when compared with non-attenders (8% - 11%) (Hart, Carvell, Woodward et al 1989b; Bley, Harris, Gordon et al 1991; Hagan 1991b; Kaplan 1993). The incidence of other drug related harms associated with injecting, for instance abscesses, decreased among needle exchange attenders over time (Hart 1989b). In London, 40% of those attending an exchange for the first time reported having abscesses, but only 13% did so some twelve months later (Hart 1989b). Some of these studies used single cross-sectional samples of needle exchange attenders (Hagan 1991b) whilst others used longitudinal designs,

(Hart 1989b) and comparisons with non-attenders (Bley 1991; Hagan, Des Jarlais, Purchase et al 1991a). Epidemiological studies found that the prevalence of HIV and HBV in areas where needle exchanges existed was low and stable (Buning 1991; Hagan 1991b; Ljungberg 1991). In Tacoma (USA), the number of injectors infected with HBV reduced from approximately 45 in 1986 to 5 in 1990. Needle exchanges opened in 1988 (Hagan 1991b). In Amsterdam, the number of injectors with acute hepatitis B reduced from 26 in 1984, when needle exchanges opened, to 5 in 1988 (Buning 1991). It should be stressed, however, that these findings were not conclusive. In fact, there were some indicators that participating in a needle and syringe programme had little or no effect on the rate of HIV seroconversion (Watters, Cheng 1991; Van Ameijden 1992). In Amsterdam the annual incidence rate of HIV infection, per 100 person years, among injecting drug users, fell from 9.5 in 1985 to 3.3 in 1991. However the reduction in incidence was equally apparent among non-needle exchange attenders (Van Ameijden 1992). In San Francisco, HIV testing and counselling was thought to have an equally important role in controlling the spread of HIV among injectors (Watters 1991).

Thus, although there was some evidence to suggest that needle exchange attendance was associated with lower levels of HIV infection and other levels of drug related harm, it was not conclusive. What evidence there was to support a positive impact remained weak.

6.   **Do needle exchanges reduce drug and sexual risk behaviours among injecting drug users including the level of injecting, sharing of injecting equipment and unsafe sex?**
There are three primary areas of concern. First the impact of needle exchanges on frequency of drug use and injecting. Second, their impact on the sharing of injecting equipment. Third, the impact on sexual risk behaviours.

The impact of needle exchanges on the frequency of drug use and injecting

There was some evidence which suggested that needle exchange attenders decreased their drug use over time. However, it was not clear if these were long-term trends and more longitudinal studies were required to answer this question (Hagan, Des Jarlais, Purchase et al 1989). One longitudinal study (UK) using comparison groups found that 13% of needle exchange attenders reduced their consumption of some drugs including heroin, whilst 24% of non-attenders increased their drug consumption (mainly cocaine) over period of a year (Stimson 1988a). In London, the median frequency of injecting reduced among a cohort of attenders from 56 injections per month to 48.5 injections per month (Hart 1989b). However, some studies showed stability in the frequency of injecting among attenders over time (Hartgers 1989), whilst others indicated an increase (Hagan 1991a). For instance, in Tacoma (USA), needle exchange attenders injected on average 96 times per month compared with 62 times per month among non-attenders (Hagan 1991a). It is also unclear whether needle exchanges had an impact on the prevalence of drug use and injecting in the wider injecting population. The lack of thorough prevalence studies meant that overall levels of drug use and injecting prior to and after establishing needle exchange programmes often unknown (Cook 1987; Stimson 1988a; Ljungberg 1991; Vester 1992). However there was some evidence which indicated that, despite an increase in needle exchange schemes, the overall level of drug use or injecting in Amsterdam had not increased, remaining at between 5,000 - 6,000 from 1983 - 1988 (Buning 1991).

Again there is no easy answer to this question, but it is generally argued that whilst there was no firm evidence that needle exchanges decreased the level of drug use or injecting they certainly did not lead to a large increase in either of these behaviours.

The impact of syringe exchange on the levels of sharing of injecting equipment

Again, because of the lack of prevalence studies, the overall impact on syringe sharing among the general injecting population was unknown. However, there was evidence to suggest that needle exchange programmes reduced the level of sharing of injecting equipment (Brettle 1991). For example, in areas where needles and syringes were freely available, 78% of IDUs shared injecting equipment compared with 98% in areas where equipment was difficult to obtain, or illegal to purchase (Calsyn, Saxon, Freeman et al 1991). Needle exchange attenders reported low levels of borrowing and lending of injecting equipment (Hart 1989b; Hagan, Des Jarlais, Purchase et al 1991c) when compared with non-attenders, (Watters 1991) over time (Oliver, Friedmann, Maynard et al 1988; Stimson 1988a; Donoghoe 1989b; Hartgers 1989; Hagan 1991a). In a national UK study conducted by Stimson et al, 19% of attenders reported using other people's injecting equipment and 25% passed on equipment to others compared with 50% and 46% respectively of non-attenders (Stimson 1988a). In London, 15% of needle exchange clients shared, but this fell to 11% after attending the programme for one year (Hart 1989b). In Tacoma, needle exchange clients shared on average 19 times per month compared with 46 times per month for non-attenders (Hagan 1991a). These findings were supported by one study which suggested that needle exchanges reduced the circulation time of injecting equipment of participants, and, therefore, reduced the likelihood of sharing of injecting equipment and consequently the risk of contracting HIV (Kaplan 1993). Not all available evidence supported these findings. Passing on of used equipment was found to be significantly higher among needle exchange attenders (59%) compared with non attenders (42%) in one UK study, (Klee 1991) and others found no significant relationship between needle exchange attendance and sharing per se (Van den Hoek 1989; Van Ameijen 1992). It was widely argued that social factors were largely responsible for continued levels of sharing, a point which will be discussed more fully later (Stimson 1989b). So, again there was conflicting evidence, but most studies showed lower levels of sharing among needle exchange attenders compared with non-attenders.

The impact on sexual risk behaviour

Only a few studies have addressed this question (Stimson 1989b). Needle exchange attenders have reported marginal changes in their sexual risk behaviours over time compared with non-attenders e.g. 5% of attenders reduced their number of sexual partners over one year compared with an increase of 12% among non-attenders (Donoghoe 1989b), although only a minority (30%) of both used condoms frequently (Donoghoe, Stimson, Dolan 1989a). The overriding concern shown in these, and other, studies was that sexual risk practices were prevalent among needle exchange attenders as well as non-attenders, especially low condom use with regular and casual sexual partners (Hankins, Lia-Tung, Gendron et al 1991). Non-injecting sexual partners were of particular concern and thought to be at risk of becoming infected with HIV (Donoghoe 1989a; Hart 1989b; Van Ameijden 1992). Thus, it is probably fair to conclude that, from the available evidence, needle exchanges had little impact on sexual risk practices of drug injectors, although further studies were required to confirm this finding.

7.   Do needle exchanges have a long-term impact on both harm and risk behaviours?

Evidence for this was extremely rare given the relatively short history of needle exchanges and lack of long-term research (Cook 1987; Hart 1990; Klee 1991). There was some evidence which suggested that drug related risk behaviours, particularly the sharing of injecting equipment was lower among needle exchange attenders compared with non-attenders up to one year. In one UK study, 28% of non-attenders shared injecting equipment in the four weeks before entering an exchange, and this reduced to 22% one year after entry (Stimson 1988a). In Amsterdam, sharing reduced from 10% to 0% among attenders over a one year period, compared with 23% and 10% respectively among non-attenders (Hartgers 1989). In London, only 1% of needle exchange attenders became HIV positive in the course of one year (Hart 1989b). However, these results may be explained by the types of injectors who were attracted to needle exchanges e.g., those already at relatively low risk of acquiring HIV (Stimson 1988a). One study suggested that

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needle exchange may have had more of an impact on these behaviours in the short term, but this effect may have diminished in the longer term (Van Ameijden 1992). The authors concluded; 'that this may be explained by an overall increased availability of needles, which enable non-exchangers to more easily obtain new needles'. This particular study was carried out in Holland where there were many alternative sources of needle and syringe supply. It was also thought that financial and social motives may determine whether a drug injector used a needle exchange or any one of these alternative sources, e.g. pharmacies, which meant that the overall impact of exchanges was difficult to measure in the long term.

8.   Do needle exchanges protect the wider public and are they acceptable to the public?

Needle exchanges should help reduce the number of discarded needles and syringes in public areas and thus reduce the likelihood of needle-stick injuries and possible risk of HIV infection to members of the public. They should also operate in such a way that they are acceptable to the public.

There was some evidence to show that needle exchanges were publicly acceptable. In Vancouver, extensive co-operation between service providers, the police, public officials and local communities led to practically no public controversy when needle exchanges were introduced in 1989 (Bardsley 1990). In Hartford USA, up to 67% of the public who were surveyed supported needle exchange as an HIV prevention programme for injecting drug users (Singer, Irizarry, Schensul 1991). However, opposition to needle exchanges has been expressed in a variety of settings, from local communities, public representatives and even medical personnel (Johns 1989; Christensson 1991; Firlik, Schreiber 1992; Kaplan 1993). Many needle exchanges have continued to operate despite these difficulties and have shown that they provide some protection to the public from the danger of discarded injecting equipment. A study from the United Sates showed that the number of discarded needles and syringes found in the vicinity

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of a needle exchange decreased after the exchange opened (Oliver, Friedmann, Maynard et al 1992a). The exchange mechanism is extremely important in achieving this. The reported return rate of needles and syringes at exchanges varied from 51% to 95% depending on locality and type of service e.g. static or mobile (Stimson 1988a, 1989b; Guydish, George, Garcia et al 1991). In one study, some (7%) equipment returned was HIV antibody positive (Guydish 1992). In Holland, however, there was an increase in the number of reported needle-stick injuries among the general public following the introduction of needle exchanges. However, there were no seroconversions as a result, and at its peak in 1990 only 31 injuries were reported (Vester 1992). Thus, although the evidence is patchy, it indicated a degree of public acceptability and protection from the problem of discarded injecting equipment.

Methodological considerations

Some of the methodological problems associated with research in this area have already been discussed. However, it is worth exploring these in more detail and illustrating ways in which existing studies have tackled these issues. This should help establish the gaps and give some indication of good research practice is this difficult area. There are five central questions concerning methodology. These questions are explicitly or implicitly stated in these studies and by no means represent a comprehensive list. They do, however, raise important issues. Each will be discussed in turn.

1.   **Have prevalence data on drug use, particularly injecting, and HIV/HBV been used to examine the impact of needle exchange and if not why not?**

2.   **If the use of Randomised Control Trials is impossible, what other methods have been used to study the impact of needle exchanges?**

3.   How is the prevalence of HIV and risk behaviours measured?

4.   Are data collected routinely from exchanges?

5.   Is the local impact of needle exchanges, including public acceptability, important?

1.   Have prevalence data on drug use, particularly injecting, and HIV or HBV, been
used to examine the impact of needle exchange studies and if not why not?

Some studies have used epidemiological data to monitor the impact of needle exchanges. For

instance studies have attempted to estimate the prevalence of drug injecting, HIV or HBV before

and after needle exchanges were established. In Amsterdam, the estimated number of drug users

between 1983, (one year before needle exchanges were set up) and 1988 remained fairly stable,

at between 5,000 - 6,000 (Buning 1991). The number of reported cases of HBV among drug

users decreased from 26 in 1984 to 5 in 1989, and the prevalence of HIV remained at around

30% since 1986 (Buning 1991). A cohort study of injectors was also carried out in the same city

between 1986 and 1991 and the incidence rate of HIV per 100 person years reduced from 9.5 in

the first year to 3.3 in the last year (Van Ameijden 1992). In Pearce County USA, the incidence

of HBV among an estimated population of 3,000 injectors was measured between 1985 (three

years prior to the opening of a needle exchange) and 1990. The incidence of HBV declined after

the exchange opened (Hagan 1991b). In Skane (Sweden) there were an estimated 3,000 injecting

drug users and the reported prevalence of HIV remained around 1% since 1985, one year before

the opening of an needle exchange. In 1990, no new cases of HIV were reported among drug

injectors (Ljungberg 1991). One English study measured the prevalence of HIV and HBV

among attenders at a drug dependency clinic during the year a needle exchange was opened

(1986 - 87) in the area. HIV prevalence was 4% and HBV 70% (Hart, Sonnex, Petherick et al

1989c).

The problem with using epidemiological data in this way is that arguments regarding impact of needle exchange rest on grounds of association rather than cause and effect. Nevertheless, it has been argued that accumulating evidence, such as that cited above, is probably the most expedient way of evaluating needle exchange programmes (Hagan 1991b). There are, however, other problems. Epidemiological data were often not available either before or after a needle exchange programme was established and when they were may not have related to the specific population under investigation e.g. the local drug injecting population served by a needle exchange programme (Stimson 1988a; Hart 1989a; Whynot 1991). In some studies, estimates of the number of drug users were unsubstantiated, which meant that prevalence rates were calculated using uncertain denominators (Buning 1991; Hagan 1991b; Ljungberg 1991; Van Ameijden 1992). Applying specific prevalence rates to the general injecting population in these circumstances was extremely difficult (Hagan 1991b; Ljungberg 1991). However, I would agree with other authors, that epidemiological data are important, especially when they relate to the population targeted by needle exchanges, and should be used in the evaluation of those exchanges (Hagan 1991b). If, for example, the prevalence of HIV among injectors was high despite the introduction of needle exchanges, then the efficacy of exchanges would have to be seriously questioned.

2. If the use of Randomised Control Trials is impossible, what other methods have been used to study the impact of needle exchanges?

Several non-randomised group studies have been carried out. Comparisons have been made between needle exchange attenders and injectors not in contact with needle exchange programmes, who are sampled from drug or HIV testing services (Oliver 1988; Van den Hoek 1989; Bley 1991; Calsyn 1991; Hagan 1991b; Ljungberg 1991; Grund 1992; Van Ameijden 1992) other sites (Donoghoe 1989b; Watters 1991), or both (Hartgers 1989; Hagan 1991a; Klee

1991; Vester 1992). They were used either as 'snap-shot' (Bley 1991; Calsyn 1991; Klee 1991; Vester 1992) or longitudinal comparisons, (Oliver 1988; Donoghoe 1989b; Hartgers 1989; Van den Hoek 1989; Hagan 1991a, 1991b; Ljungberg 1991; Grund 1992; Van Ameijden 1992) and in some instances were followed up as a cohort over time (Donoghoe 1989b; Hartgers 1989; Van den Hoek 1989; Ljungberg 1991; Van Ameijden 1992). Sampling methods varied and included ethnographic snowballing techniques (Donoghoe 1989b; Hagan 1991a; Klee 1991; Grund 1992) and systematic multi-site sampling (Hartgers 1989; Van den Hoek 1989; Bley 1991; Calsyn 1991; Guydish 1991; Hagan 1991b; Ljungberg 1991; Oliver, Friedmann, Maynard et al 1992b). None of these studies used a randomised selection procedure and participation was on a voluntary basis. However, there was an attempt to involve as many drug users as possible regardless of technique used. Sampling from a wide variety of both treatment and out of treatment sites is thought to be the most representative (Frischer, Bloor, Finlay et al 1991). Some studies, however, used no comparison groups, taking samples only from needle exchanges. These were either single cross-sectional (Kaplan 1991), or follow-up studies (Hagan 1989; Hart 1989b).

The main criticism against all of these studies is that it was practically impossible to argue cause and effect. Other factors such as educational programmes and media messages remained uncontrolled (Stimson 1988a; Stimson 1989b; Singer 1991; Firlik 1992; Vester 1992). This is especially the case where no comparison groups were used. The use of only limited sampling sites and the lack of randomised selection procedures may have led to sample bias and therefore unrepresentative data (Frischer 1991). In addition, follow-up was particularly difficult. Drop-out rates at needle exchanges were high and follow-up rates among cohort studies were as low as 40% (Hartgers 1989). It is therefore unclear exactly what impact needle exchanges had on risk behaviour especially among potentially hidden groups of injectors who may not have been sampled in the first instance and among those refusing to take part or dropping out of

longitudinal studies. Nevertheless, despite these difficulties, many studies endeavoured to compare the risk behaviours of those in contact with an exchange with those who were not. I would, therefore, conclude that this should carried out in future research and that every effort should made to recruit samples from a wide variety of settings (Frischer 1991). The question of follow-up is controversial given the high drop-out rates.

3. How are the prevalence of HIV and risk behaviours measured?

Another common criticism is that most behaviours were self reported and therefore subject to possible bias (Singer 1991; Firlik 1992) including memory loss and pressure to give socially desirable answers (Van den Hoek 1989), especially if the questions were asked by staff working at the exchanges (Donoghoe 1989b). Following injectors up over time may also influence responses, e.g.,.., the extent of reported sharing (Van den Hoek 1989). Therefore research may itself have an effect on the behaviours (or reported behaviours) that are being measured, leading to the risk of erroneous conclusions.

Measuring the prevalence of HIV or other diseases which act as markers of risk behaviours is one way of avoiding problems associated with self reported behaviour. The sampling techniques used in these studies have already been discussed, but the data collection methods have not. Various techniques were used to collect a variety of material which were tested for HIV antibodies, including blood (Ljungberg 1991), saliva (Hart 1989b) and used needles and syringes (Kaplan 1993). These samples were collected from needle exchange attenders and/or non attenders and were used in conjunction with self-reported risk behaviour assessments. If used with self reported data they can verify risk behaviour (Guydish 1991). Some studies have used these measures with out collecting corresponding self-reported data. This was particularly so in those which tested for HIV antibodies in blood residues in used needles and syringes. The main argument for doing so was that this was unobtrusive, samples were easily obtained, and yet acted

as fairly reliable indicators of risk. (Wodak 1987; Kaplan 1993). Marking needles also allowed exchange return rates to be calculated (Wodak 1987; Guydish 1991, 1992; Kaplan 1993). However, it was also argued that testing saliva was acceptable to most participants and should be used to monitor HIV prevalence (Hart 1989b). Relying on HIV testing, however, as a sole indicator of risk can be problematic. For instance, the degree of risk behaviour may not be known. It is impossible to tell how many times a needle is shared or with whom, nor can the number of sexual partners be calculated from a blood or saliva sample. In addition, syringes and needles may have been washed before being returned and therefore yield unreliable tests (Guydish 1992). I, therefore, argue that risk behaviour should be measured using self reports and that this is accompanied by HIV testing, particularly saliva testing since this is acceptable to respondents (Hart 1989b; Guydish 1990).

4.   Are data collected routinely from exchanges?

Routine data collection in the longer term is important if policy makers are to plan effective services. However, apart from the few long term epidemiological and outcome studies, routine data relating to needle exchanges have generally not been collected on a long term basis (Stimson 1988a; Hart 1989a; Bardsley 1990; Carvell 1990; Grund 1992; Mulleady, Green, Flanagan et al 1992). Data collection ceases when a research grant comes to an end. Only a few have sustained this over a substantial period of time (Ljungberg 1991). In some countries it is also thought inappropriate to collect routine data. In Holland, for instance, only minimal data is collected because of the low threshold nature of the service (Hartgers 1989; Grund 1992; Vester 1992). When these data are collected they are often kept to a minimum and include the number of visits, needles exchanged, and some behavioural measures (Purchase, Hagan, Des Jarlais et al 1989; Christensson 1991; Hagan 1991a; Whynot 1991).

One UK study has measured other activities such as help-seeking and referral patterns at needle exchanges (Carvell 1990), but apart from this there is little known of the nature, level, diversity and uptake of services offered at needle exchanges in the longer term (Hagan 1989). I, therefore, argue that routine process data should be collected in the evaluation of needle exchanges, including the uptake of services offered and referrals made.

5. Is the local impact of needle exchanges, including public acceptability, important ?

Although needle exchanges have been evaluated in many parts of the world, it would be wrong to apply these findings automatically to every needle exchange programme. The use of different designs, sampling, measurements and time frames may mean that findings cannot be generalised. In addition, each setting has its own local characteristics, including the way the service is implemented, the social and legal constraints within which it operates, and the injecting population which it serves (Hart 1989b; Hartgers 1989; Nucro 1989; Stimson 1989b; Hartgers, Van den Hoek, Coutinho et al 1990). The largest UK study for example, originally included six needle exchanges in Scotland, but ended up with only three in the final evaluation: Glasgow, Edinburgh and Dundee (Stimson 1988a). The exchange in Glasgow was picketed by local residents which deterred clients from attending, however remained opened. The needle exchanges in Aberdeen, Kilmarnock and Dundee closed shortly afterward entering the study. The remaining exchanges in Dundee (Wishart) and Edinburgh, although included in the evaluation, faced major operational difficulties (Stimson 1988a; Johns 1989; Nucro 1989). A total of only 84 clients were recruited in to the study from the three remaining exchanges, and only 38 completed a second interview. No other comparable study had been carried out in Scotland up to 1991. The Lord Advocate in Scotland also issued a statement making it clear that only three syringes could be issued per client per visit whereas no such restriction applied in England. There is a need, therefore, to study specific needle exchange programmes within their local context, and consider their operating philosophies and communication strategies, as well as

their impact on the local drug injecting populations (Hart 1989b). This of course includes public opinion, which has played an important part in the development of needle exchange not only in Glasgow but in other parts of the world (Ginzburg 1989; Christensson 1991; Firlik 1992; Oliver 1992a). Up until 1991 there were some public opinion surveys conducted in the USA (Singer 1991), but none in the UK relating to needle exchange.

Methodological conclusions

Despite the methodological problems discussed in this section, I would argue that needle exchange evaluation should include: the measurement of HIV and behavioural risk prevalence data at the population level; comparisons between extensively sampled needle exchange attenders and non-attenders, including the measurement of their HIV status and reported risk behaviours; the collection of routine process data; and the measurement of the local impact of needle exchanges, including public acceptability.

General conclusions

It was clear that by 1991 Glasgow, like other large cities in Europe, was confronted with two major public health issues. First, a dramatic increase in the amount of drug injecting, and, second, the threat of an HIV epidemic within that population. HIV had become an important factor in helping shape drugs services, the basic aim of which was to reduce drug related harm without necessarily reducing drug use itself. Needle exchanges, which first started in Holland in 1984, were established elsewhere, and by the end of 1989 there were 120 exchanges in the UK. It was hoped that, by increasing the supply of clean injecting equipment through these programmes, the level of sharing of used injecting equipment would decrease, thereby reducing the spread (or potential spread) of HIV. Glasgow's first needle exchange was opened in 1987 and by 1991 a further five were established.

An important requirement of these programmes is their evaluation, especially their delivery and impact, using if possible structural, process and outcome measures. Until 1991, very little research had been carried out on needle exchange provision in Scotland. World-wide research world-wide indicated that there were eight key questions which should be answered in the course of an evaluation; four of which related to service delivery and four to service impact.

This research, although extensive, was not conclusive and the answers to some of these questions remained unresolved. Research generally indicated that needle exchanges successfully reached injectors, including those not in contact with other harm reduction services. However, it was unclear what proportion of the injecting population was attracted to the service. In addition, only a minority of attenders remained in contact with the service. It was also uncertain exactly what impact needle exchanges had on HIV prevalence. The impact on risk behaviours was also debated. For instance, most studies indicated that needle exchanges reduced the levels of sharing or at least did not lead to an increase in sharing. However, evidence to the contrary also existed. In addition, needle exchanges had apparently no effect on the sexual risk behaviours of injectors. There was also some evidence to suggest that they protected the general population by reducing the amount of used injecting equipment in public places, but in some areas they were subjected to public criticism. There was also no clear evidence that needle exchanges had a long-term impact on HIV and related risk behaviours.

Some of these questions remain unresolved because of the different methods employed in needle exchange research. For instance, randomised control trials were impossible to conduct in this field. In addition, many studies addressed specific questions and did not have access to other data which would help support or refute their findings e.g. HIV prevalence and incidence rates, diversity of services offered at exchanges and their uptake in the short and longer term. It was also difficult to make generalisations because of differences in service delivery, and the social

and legal context in which each programme operated. Finally, there was no research in Scotland which could address these issues up until 1991 when the work for this thesis began.

The scope for research in Glasgow

Glasgow offered the unique opportunity to address all of these issues. First, service managers allowed almost unlimited access to needle exchanges for research, both in the short and long term, especially to collect routine process data. Second, because of close collaboration with existing research programmes, access to other sources of outcome data was possible. For instance, the Medical Research Council/World Health Organisation in collaboration with the Communicable Disease Surveillance Unit (Scotland) began a major behavioural and HIV seroprevalence study of drug injectors at the time when needle exchanges were being established throughout the city. Local authority data on the numbers of needles and syringes found in public places were also available. It was also possible to monitor public attitudes toward exchanges through a survey conducted by the Research Unit in Health and Behavioural Change at Edinburgh University. In addition, many other research programmes were in progress which, although not primarily concerned with needle exchange, provided valuable qualitative data on social norms and behaviours of drug injectors in the city (McKeganey 1989; Barnard 1993). Theoretically, at least, it was possible to address practically all of the service delivery and impact questions relating to needle exchange provision in Glasgow using widely recognised methodological techniques at a time when other prevalence and research data were also available which would expand and inform the evaluation.

The eight key questions were used as a basis upon which service performance was monitored. The model of evaluation used in this thesis is based upon that used in other public health programmes. It attempts to evaluate the key questions using structural, process, outcome and other research data. Emphasis is placed on the interactive nature of the research i.e.

collaboration between the researchers and service providers. This includes flow and use of information. The research is both short and long-term and conducted in collaboration with academic departments or other researchers. This approach has not been applied in its entirety to research and evaluation of needle exchanges in a defined geographical area, and certainly not in Scotland. In short, is hoped that by evaluating needle exchange provision using a range of measures, a multi-dimensional picture of needle exchange provision will be developed. The following chapters describe how this was carried out.

CHAPTER 2

THE STRUCTURE OF NEEDLE EXCHANGE PROGRAMMES IN GLASGOW -

'BUILDING A CITY-WIDE NETWORK'

'The idea behind syringe-exchange is that people are provided both with the knowledge about risky behaviours, and also the means to change them. They are provided with information about the changes that need to be made, and with the means to change - sterile needles, syringes and condoms' (Stimson 1989b).

A Governmental Committee was set up in 1986 to investigate HIV prevalence in Scotland, determine the reasons for this prevalence and consider what could be done to contain it (SHHD McClelland Report 1986). Attention was given to the extent of HIV infection among injecting drug users and containing the spread among this population. An important factor affecting further spread was the sharing of injecting equipment. It was thought that if some drug users could not be persuaded to stop injecting then they must be persuaded to use clean injecting equipment and adopt hygienic injecting practices. One requirement in achieving this aim was to provide sterile injecting equipment through needle and syringe exchange programmes. The committee also recommended that a comprehensive range of services be offered such as information and advice on safer drug use and safer sex practices, social, financial, legal and medical assistance, including prescribing. Emphasis was placed on support and assistance rather than the sole objective of stopping drug misuse: 'On balance, the prevention of spread (of HIV) should take priority over any perceived risk of increased drug misuse' (SHHD McClelland Report 1986). Local Health Boards were requested to provide such services with additional support from general practitioners and non-statutory agencies. The Greater Glasgow Health Board responded to these recommendations by setting up the first needle exchange in the city in June 1987.

Glasgow is a sprawling industrial city with a population of approximately 850,000. Drug injecting is common in many areas and is particularly prevalent in both deprived inner city and peripheral housing estates. In 1990 an estimated 8,500 people were injecting drugs, representing 1.4% of the population between 15 and 55 (Frischer 1993a). A pilot needle exchange was established in June 1987 at Ruchill Hospital in the north of the city. The exchange opened twice weekly from 1.30 to 4.00pm, and in line with Scottish Office guidelines, offered three needles and syringes at each visit. For the first six months the exchange was picketed by local residents, many of whom thought it would worsen the drug problem and increase the number of discarded needles in public areas. They also felt that the exchange was being 'dumped' in their area (Stimson 1988a). Only a few drug injectors attended the programme, which by December 1988 saw an average of between 20 - 30 clients per week. It was therefore necessary to modify the service to make it more acceptable to both drug misusers and the general public.

The development of the needle exchange service

In January 1989 a second needle exchange was established at a drug project in Easterhouse, a large peripheral housing estate. It opened twice weekly in the evenings from 6.30pm to 10.30pm. Within a few weeks, 50 clients were attending each evening. The exchange was moved to a local health centre and by May 1989 attendances reached 100 per evening. The opportunity to establish a network of similar exchanges within health centres and clinics throughout the city clearly existed. Evening opening for exchanges seemed more acceptable to drug injectors and this meant that the buildings could be used at times when they were normally closed to the public. There was, thus, no need to secure additional fixed capital for new premises. It was therefore possible to extend the service to areas where they were needed at minimal cost. This set the pattern for future development and expansion of the service.

It was judged that eight exchanges would ensure accessibility to drug misusers in the most seriously affected parts of the city. Once a site was selected, extensive consultation was undertaken with management and staff in the premises, community organisations, local police, and social services. In most areas public meetings were held to explain the proposals and deal with anxieties and hostility, which were often deeply felt. In two areas, a monitoring group of local residents was set up to examine the impact of the exchange on the community. Once local consent for an exchange had been achieved, the necessary approval was sought from the Minister of Health at the Scottish Office.

From February 1991 health promotion officers were assigned to each operating or proposed exchange to develop community liaison. In April 1991, a leaflet designed to answer questions commonly raised about needle exchanges was published and widely distributed. The media were also used to publicise the opening of the needle exchanges and highlight certain aspects of their operation. By the end of 1992 there were eight needle and syringe programmes operating throughout Glasgow, situated in areas of high drug injecting prevalence (Table 2.1 and Fig 2).

Table 2.1
The development of Glasgow needle exchanges*

Number	Site	Opened
1	Ruchill	June 1987
2	Easterhouse	January 1989
3	Castlemilk	January 1990
4	Milton	October 1990
5	Drumchapel	May 1991
6	Gorbals	April 1992
7	Parkhead	May 1992
8	Pollok	September 1992

*Excludes the Drop-in Centre for Street Sex Workers which started operating a needle exchange in 1991.

Figure 2

Needle Exchanges in Glasgow

Each exchange requires a waiting area, a needle exchange room, and two or more rooms for health care and counselling. It is staffed by three nurses, one of whom is a locally based health visitor, one or more local drug workers, and two or three security staff. The health visitor works during the day in the area served by the exchange. The drugs workers are attached to local drugs services.

New clients are given three needles and syringes at their first visit. If these are returned at the next visit, six are offered, and if these are returned a maximum of ten are issued, in line with revised Scottish Office guidelines. If not all used equipment is returned, less than the maximum is issued, but the client never leaves empty handed. Needles and syringes are available in various sizes. Antiseptic swabs and condoms are also freely available. Clients are encouraged to take a specially designed small black plastic container with a transparent end in which to return their used equipment. All used equipment is taken for incineration as soon as possible after the clinic closes for the evening. The nurses offer advice on safer injecting and safer sex, first aid, and simple primary health care; the drugs workers provide drug counselling and direct access to local drugs services.

It is important to note that needle exchanges do not operate in isolation. They are part of a wide network of drugs and HIV services throughout the city (Elliott, Gruer, Scott et al 1994). These include the Drop-in Centre which provides a wide range of social and medical services (including needle exchange) to street working prostitutes, ten pharmacy exchanges operating within arrangements set by the Scottish Home and Health Department, and pharmacies which sell needles and syringes to drug injectors. The Women's Reproductive Health Service also provides a wide range of services to pregnant drug users and there are a number of specialist drugs projects offering counselling, social and medical services to injectors throughout the city. Residential care is also available to drug users through statutory and voluntary agencies both in

and outside of Glasgow. In 1992 steps were also taken by the Greater Glasgow Health Board to address the question of substitute prescribing and plans were drawn up for the introduction of a city-wide service. This began in 1994.

Conclusion

The aim of this chapter was to give some insight into the structure of the needle exchange network in Glasgow. A network of needle exchanges was established in Glasgow between 1987 and 1992 following the recommendations of the Mclelland Report. They were introduced in areas where drug injecting was prevalent and operated mainly from health centres, thereby keeping capital costs to a minimum. They also sought to meet both client and public needs. By 1992 there were eight needle exchanges operating in the city and these complemented a number of existing drugs and HIV services.

CHAPTER 3

PROCESS MEASURES AND NEEDLE EXCHANGE

'The use to which such measures are put obviously depends upon the type of decisions which they are to inform, which in turn are dependent upon the organisational level at which the decision is to be made, and the policy objectives of the service to which they relate' (Scrivens, Cunningham, Charlton et al 1985).

Glasgow needle exchange data 1987 - 1991

Only a minimal amount of operational data were collected when the first needle exchange was set up at Ruchill Hospital in Glasgow in 1987. Each visit made to the service was recorded manually, as was the number of needles and syringes exchanged. Statistical reports were written on a monthly basis using only these data. Computers were not utilised.

A new data recording system was introduced by a team of researchers at Glasgow University in collaboration with needle exchange managers when a second needle exchange opened in July 1989 (Gruer, Ditton, Nair 1990a). This system was based on instruments used by Stimson et al in their national UK evaluation of needle exchanges (Stimson 1988a). At the first visit, a client was asked to complete a short questionnaire known as an Intake Sheet. This was used to record socio-demographic details, drug and injecting history, reasons for contacting the exchange and other drug and service related data (Appendix 1a). Subsequent visits were recorded on a separate instrument called a Daily Log which recorded the client's date of birth, first and last initial, sex, and the number of needles and syringes exchanged (Appendix 1b). This system was used until January 1990. These data were computerised and reports were written by the research and managerial team (Gruer 1990a; Gruer, Ditton, Nair et al 1990b; Gruer, Ditton, Nair et al

1990c). Funding for this project was, however, discontinued and the system reverted to manual collection and analysis although the same instruments were used.

Designing a new data system 1991

An updated information system was developed by the present author in collaboration with the needle exchange management and staff, and introduced to all Glasgow needle exchanges in April 1991. This was accompanied by a new reporting system. The new information system was based on the older instruments, but important amendments were made. Some of the data previously collected by the intake sheet were retained, but more detailed questions regarding the help received for drug related problems were added (Appendix 2a). More radical changes were made to the daily log sheet (Appendix 2b). These included a new personal identifier which consisted of the client's first name; recording the number of services received and all referrals made at each visit. All revisions were negotiated with service providers and managers in a series of meetings which took place between January and April 1991. The system was introduced only when all participants involved in these proceedings were satisfied with the format.

Data were still collected manually by needle exchange staff, but these were computerised and analysed centrally at the HIV and Addictions Resource Centre, Ruchill Hospital. Data screens were designed to assist administrative staff with data entry. The customised software was designed to run on standardised PC hardware - 286 and later a 486 processor, with 8/200MB hard drive, using Paradox and SPSS PC+. Files were regularly backed up onto a Syquest 40/80 DR SCSI data-drive system. Quarterly and annual reports were prepared from this data and issued to all needle exchange staff and a wide range of other interested agencies in the public and voluntary sectors. The system is still in use today.

There were a number of factors which influenced the design of the new system. These formed a set of criteria which had to be satisfied before the system started. Some of these criteria related to service requirements and others to the research questions posed in Chapter One. These are as follows:

1.   Harm reduction and needle exchange

The system was designed to help determine whether or not needle exchanges were playing a role in reducing drug related harm. It is important for instance that needle exchanges contact as many drug injectors as possible and provide them with a range of services which assist in reducing or minimising drug related harm. They should also act as a gateway to further treatment by providing a link with other health and drug services. It is difficult to assess these functions if basic process data are not collected. These data, however, are not generally collected from needle exchanges, especially in the long term, which means that little is known about the nature, level, or diversity and uptake of services offered (Hartgers 1989; Van den Hoek 1989; Millson, Myres, Rankin et al 1992; Sandham 1992; Van Venn 1992; Schwartz 1993b; Des Jarlais, Friedmann, Sotheran et al 1994a; Schepp-Beelen, De Jongh-Weith, De Wildt et al 1994; Van Ameijden, Anneke, Van den Hoek et al 1994; Vlahov, Ryan, Solomon et al 1994). The intake and daily log sheets were therefore utilised to monitor these activities. The log sheet recorded each visit made to an exchange and the types of services received during that visit. In addition, if any referrals to other agencies were made these were also logged. The characteristics of those using the service are also important. This gave a profile of the service user which was used in conjunction with other research data e.g. prevalence data, to determine the efficiency of the service in targeting the desired target population (Davaid 1987). The intake sheet was utilised to this end. Both the intake and log sheets therefore provided continuous data and monitored changes in the use of the service which was preferable to a static or snapshot view (Davaid, Hartnoll, Power et al 1987).

2. Service objectives

Whatever the purpose to which the information is put, it is essential that it relates to the specific policy objectives of the service. These relate to reducing harms associated with drug injecting. Thus, the system automatically addressed the service objectives relating to service delivery and stated in Chapter 1, namely:

i) **To reach drug injectors, especially those not in contact with other harm reduction services, and maintain regular and frequent contact with them.** (Data recorded using the intake and log sheets)

ii) **To offer other services besides exchanging injecting equipment and maximise the uptake of these services.** (Data recorded using the log sheet)

iii) **To refer attenders to other harm reduction or medical services as often as necessary.** (Data recorded using the log sheet)

3. Service providers and policy makers

The information produced by a service information system should be relevant to the needs of service providers and policy makers. If not, then very few of the findings will be utilised, being of little use in planning future services (Williamson 1992). Full co-operation was sought with service providers and planners when designing the information system. This meant that the final product suited their requirements. It also meant that the system was not imposed upon them by an 'anonymous' third party. A vital component of the system was its reliance on needle exchange staff to collect data. This would have been difficult if they were not consulted. For these reasons, it was important that service providers and policy makers were involved in

designing the system. They were also consulted about the format of the needle exchange reports and the type of information contained in these reports (Appendix 3). In 1991, a survey of all personnel receiving the reports was carried out and the format changed in line with their requests. In short, the research process was conducted with an eye to, and directly responsive to, the organisational and managerial context of the needle exchange service in the hope that it would assist the implementation of relevant findings (Williamson 1992).

4.   Data collection in a busy needle and syringe programme

The data collection process should not interfere with the day to day running of a service. Needle exchanges are there to provide a service not act as data banks for researchers or managers. A typical visit to a needle exchange is usually brief and relatively anonymous and it is not unusual to have up to one hundred clients visiting in any one evening. This meant that only a minimal amount of information could be collected per visit. The confidentiality and anonymity of the client should also be respected. The daily log and intake sheet met these requirements (Appendix 2a and 2b). Only one line of data was collected per client visit on the daily log, and the only personal questions asked were the first name, last initial, date of birth and number of needles and syringes returned. The personal identifier information was necessary to identify individual attendances but could not be used to trace a person's address. The use of first name in this identifier helped with a computerised head count but also acted to make the visits more friendly. The rest of the information regarding services received and referrals was given by the needle exchange worker. Recording this information took only a few seconds. The intake sheet, although more detailed, is relatively brief and no obligation was placed on the client to provide this information. The use of computer terminals or hand-held computers at the exchanges was ruled out on the basis that these may have deterred drug injectors from attending. Data were therefore collected manually and processed at a unit which was geographically removed from the

service. The sole aim of doing so was to minimise possible interference with the operation of the service.

## 5.	System costs

Collecting a minimal amount of data meant that administrative and data management costs were kept to a minimum. Only one part time administrator was required to up-date the data base, working approximately six hours per week. Computer errors were also reduced because only one individual was dedicated to this task. The computer software and hardware were widely available, user-friendly and inexpensive. It was possible to utilise the skills of a computer programmer to help design the data input screens and assist with data storage problems including archiving. This added only a minimal amount to the final costs. Reports were written Word for Windows, with more appealing results achieved through desk top publishing. It took approximately five working days to produce an annual report (Appendix 3). The only other requirement was a data back up system. The 1993 log sheet file was approximately 8 MB and was too large to store on a single floppy disk. A system like Syquest was therefore necessary to store these data without the risk of losing information. System costs therefore were kept to a minimum, but not at the expense of losing important information (Smith 1990). The total cost of the system including hardware and software was approximately £4,000.

## 6.	Compatibility with existing research data

The system was designed to complement existing needle exchange research data. Stimson et al had already collated operational data from needle exchanges throughout the UK (Stimson 1988a). Even though these data relate to an earlier time period, and are somewhat limited in their range, they are nevertheless valuable and allowed comparisons to be made. In addition, the Glasgow needle exchanges had collected operational information since 1987. This allowed trend analysis to be carried out on an annual basis. It was therefore important that the new system

utilised information which was common to both these data sources. The data were also available for use by other researchers including epidemiologists and sociologists (Hser 1993). For instance, data from the system were used in conjunction with other information sources to estimate the prevalence of injecting drug use in Glasgow (Frischer 1993). With a routine data collection system in place, it was also possible to concentrate on designing other studies which investigated other aspects of needle exchange including outcome (See Chapter 4).

In conclusion, six factors influenced the design of the information system. Each was addressed before the new system was implemented in 1991. The overriding aim of the system was to provide data which related to the operational aspects of the Glasgow needle exchange programme. However, as discussed, consideration was given to the general framework in which needle exchanges operated eg reducing harm; the service objectives; managers and policy makers needs; collecting data in a way which was unobtrusive to the service; costs; and compatibility with existing needle exchange programme information systems as well as existing and future research studies.

Results - Glasgow needle exchanges 1991 - 1993

The following data relate to the period 1991 - 1993 i.e. the first three years of the new system. During that time, the number of needle exchanges rose from 4 in January 1991 to 8 in December 1992 and remained at that level throughout 1993 (Table 2.1 Chapter 2). This represents a time of rapid growth of the exchange network in Glasgow. At the time of writing there are eight needle exchanges in Glasgow.

Intake sheet data: new attender profile 1991 - 1993

New attenders

A total of 1720 new clients were attracted to the service between 1991 and 1993. The number of new clients attending needle exchanges rose by 69% from 472 in 1991 to 798 in 1992. However, this number declined by 44% to 450 in 1993. Throughout this three year period, males accounted for approximately 76% of new attenders, and the mean age of all new attenders was 26.9 years (Table 3.1). Approximately 86% of new clients travelled less than 4kms to use an exchange (Table 3.2).

Table 3.1
The numbers of new clients attending 1991 - 1993

Year	Number of Exchanges	Total New Clients	Completed Intake Sheets	Male (%)	Female (%)	Age Mean (SD)	
1991	5	472	423	76%	24%	27.8	(4.6)
1992	8	798	727	75%	25%	26.2	(5.1)
1993	8	450	405	77%	23%	26.6	(5.4)

Table 3.2
Distance travelled to an exchange 1991 - 1993

Distance Travelled	1991 n=423		1992 n=727		1993 n=405	
up to 2kms	279	(66%)	479	(66%)	287	(71%)
up to 4kms	364	(86%)	625	(86%)	348	(86%)
over 4kms	59	(14%)	102	(14%)	57	(14%)

Source of injecting equipment prior to entry

All new attenders obtained injecting equipment from other sources prior to attending a needle exchange, mainly pharmacies. This was an important source of equipment for approximately 78% of new attenders throughout the three year period (Table 3.3).

Table 3.3
Most common source of injecting equipment 1991 - 1993*

Source	1991 n=423		1992 n=727		1993 n=405	
Chemist	326	(77%)	572	(79%)	310	(77%)
Friend	149	(35%)	173	(24%)	117	(29%)
Dealer	14	(3%)	59	(8%)	4	(1%)
Hospital	14	(3%)	50	(7%)	7	(2%)
Other Exchange	14	(3%)	55	(8%)	5	(1%)
Out-reach	8	(2%)	39	(5%)	1	(0.2%)

* Some clients received injecting equipment from more than one source.

% = numbers using each source.
      number of new clients.

Contact with other services before first attendance at a needle exchange

On average, approximately 54% of new clients were in contact with other services before entry to a needle exchange in the period 1991 to 1993 (35% in contact in the last four weeks) (Table 3.4).

Of the new clients attending a needle exchange in 1991, 269 (64%) had no contact with other drug related services in the four weeks prior to entry. A total of 204 (48%) had never made contact with any drug related services. Of the 154 in contact with services four weeks prior to entry, 90 (58%) were in touch with only one service, usually a drugs project. Of the 219 who had ever contacted services, 70 (32%) were in touch with one service, again mainly a drugs project (Table 3.5).

In 1992, the proportion of new clients who were not in touch with drug related services prior to attending an exchange remained similar to that in 1991. Of the 281 in contact with services four weeks prior to entry, 152 (54%) were in touch with only one service, mainly a GP. Of the 418 ever in contact with services, 143 (20%) were in touch with one service, again mainly a GP (Table 3.5).

In 1993, the proportion of those attending needle exchanges for the first time who were out of contact with services was similar to that of 1991 and 1992. Of the 127 in contact with services four weeks prior to entry, 78 (61%) were in contact with only one service, mainly a GP. Of the 216 ever in contact with services, 95 (41%) were in touch with one service, again mainly a GP (Table 3.5).

Table 3.4
Contact with other services before first attendance 1991 - 1993

	1991 n=423		1992 n=727		1993 n=405	
Contact in last 4 weeks	154	(36%)	281	(39%)	127	(31%)
Contact ever	219	(52%)	418	(57%)	216	(53%)

Table 3.5
Type of services contacted before first attendance 1991 - 1993

Services	1991 n=423		1992 n=727		1993 n=405	
	last 4 weeks	ever	last 4 weeks	ever	last 4 weeks	ever
Drugs Project	77	135	129	230	58	124
GP	75	117	158	257	79	145
Social Work	33	64	53	112	23	40
Hospital	25	78	29	125	14	59
Rehab	16	69	25	105	12	43

Drug use

The mean age of first drug use for those entering needle exchanges in 1991 - 1993 was 15.5 years. The most common drug used at this age was cannabis. The average age at first injection was 18.6 years, with many injecting heroin. The average period of injecting before first attendance was 8.2 years. The most commonly used drugs in the four week period prior to entry were temazepam, heroin and Temgesic (buprenorphine). Temgesic was most commonly used in 1991 and heroin in 1992 and 1993 (Table 3.6).

The mean age at first drug use of those attending in 1991 was 15.5 (sd 3.5) years, and the mean age at first injection was 18.2 (sd 3.9) years. The main drug first used was cannabis and the main drug first injected was heroin. Up to eight drugs were used during the four weeks before the first attendance with 55% using only two. The most common drug used and injected was temgesic. The average period of injecting before first attendance was 9.6 years.

In 1992 the mean age at first drug use among new attenders was 15.5 (sd 3.3) years, and the mean age at first injection was 18.5 (sd 3.8) years. The main drug first used was cannabis and injected was heroin. Up to ten drugs were used four weeks prior to entry with 62% using only two. The most common drug injected was heroin. The average period of injecting before first attendance was 7.7 years.

In 1993 the mean age at first drug use among new attenders was 15.4 (sd 3.8) years, and the mean age at first injection was 19.3 (sd 4.1) years. The main drug first used was cannabis and the main drug first injected was heroin. Up to 9 drugs were used in the four weeks before the first attendance with 70% using up to two drugs. The most common drug injected was heroin. The average period of injecting before first attendance was 7.3 years.

Table 3.6
Five most commonly used drugs during four weeks before first attendance 1991 - 1993

Drug	1991 Used	1992 Used	1993 Used
	n=423 (%)	n=727 (%)	n=405 (%)
Temgesic	290(69%)	322(44%)	144(36%)
Temazepam	201(48%)	307(42%)	146(36%)
Heroin	179(42%)	444(61%)	289(71%)
DF118	118(28%)	157(22%)	77(19%)
Amphetamine	58(14%)	68 (9%)	26(6%)

Sharing injecting equipment

Seventy six (18%) new attenders reported both lending and borrowing injecting equipment in the four weeks before their first visit in 1991. In 1992, the number lending used equipment four weeks before entry was 100 (14%). Of these, 96 (13% of total) had borrowed used injecting equipment in that time. In 1993, the number lending used equipment four weeks prior to entry was 64 (16%). Of these 53 (13% of total) had borrowed used injecting equipment in that time.

The majority of people sharing, both lent and borrowed injecting equipment. However, there was a small proportion of new attenders who lent but did not borrow injecting equipment. Thus, in 1991 all 76 (18%) both lent and borrowed injecting equipment. In 1992, 13% lent and borrowed equipment, and further 1% lent, but did not borrow equipment. In 1993, 13% both lent and borrowed used equipment and a further 3% lent, but did not borrow equipment.

Prison experience prior to entry

In the period 1991 - 1993, an average of 65% of new attenders reported having been in prison before the first attendance at a needle exchange (Table 3.7). Approximately 50% of this group reported using drugs in prison, and of these, 20% reported injecting drugs whilst in prison. Of those injecting drugs 53% reported sharing injecting equipment in prison. Approximately 71% of those serving a term in prison did so in either the year before, or during the year of, attending an exchange for the first time.

Table 3.7
Prison experience 1991 - 1993

	1991 n=423		1992 n=727		1993 n=405	
Ever been in prison	275	(65%)	480	(66%)	254	(63%)
Taken drugs in prison	147	(35%)	229	(31%)	128	(32%)
Injected in prison	34	(8%)	48	(7%)	20	(5%)
Shared injecting equipment in prison	19	(4%)	26	(4%)	10	(3%)

HIV testing

An average of 48% of new attenders had been tested for HIV before entry to an needle exchange in 1991 - 1993 (Table 3.8). The majority of those tested had undergone testing in either the year before, or during the year of, entry to an needle exchange. For instance, in 1991 65% of those

tested had undergone testing in 1990 or 1991. In 1992 68% had been tested in 1991 or 1992 and

in 1993 58% had been tested in 1992 or 1993. Clients were not asked to reveal their test results.

Table 3.8
Numbers tested for HIV before first attendance

	1991		1992		1993	
	n	%	n	%	n	%
Numbers tested	205	(48%)	367	(51%)	184	(45%)

Daily log sheet data: attendance data 1991 - 1993

Total number of attenders and attendances

Identifier information makes it possible to estimate the numbers of injectors attending exchanges in any given year. The numbers attending in 1991 were 2000. This increased by 32% to 2640 in 1992, but decreased by 13% to 2300 in 1993. Between 1991 and 1993, approximately four existing clients attended for every new client (Table 3.9). Males accounted for 70% of attendances between 1991 and 1993 (Table 3.10).

Table 3.9
New and total numbers attending 1991 - 1993

	New Attenders	Total Attenders	Old: New Attenders
1991	472	2000	3.3
1992	798	2640	2.4
1993	450	2300	4.3

Table 3.10
Numbers of attenders by sex 1991 - 1993

Sex	1991		1992		1993	
	n	(%)	n	(%)	n	(%)
Male	1440	(72%)	1848	(70%)	1564	(68%)
Female	560	(28%)	792	(30%)	736	(32%)
Total	**2000**		**2640**		**2300**	

Attendances generally increased between 1991 and 1993, rising by 33% between 1991 and 1992 and by 15% between 1992 and 1993 (Table 3.11). The average number of attendances made to a needle exchange by an individual injector was 11.7 per year, with between 1 and 151 visits made in any one year (Table 3.12, Table 3.12a). Since each needle exchange opens twice weekly, visits of greater than 104 per year suggest that clients are visiting more than one exchange during that time period. However, the number of visits made by the majority of clients

was low. Only 54% of clients made more than three, and 38% made more than five visits per year (Table 3.12a). Retention rates were slightly higher than those reported by Stimson et al in their UK evaluation of needle exchanges (Stimson 1988a). Approximately 47% of UK clients made more than three visits, and 33% made more than five visits per year (Table 3.12a). There is also some evidence that the retention rates increased in the Glasgow exchanges in 1993 compared with 1992 and 1991. The average number of visits increased to 14.1 in 1993 from 10.6 in 1992 and 10.5 in 1991. The range of visits made in 1993 was 1 - 151, compared with 1 - 62 in 1992 and 1 - 75 in 1991 (Table 3.12). In addition 30% of clients made more than six visits in 1993 compared with 19% in 1992 and 24% in 1991 (Table 3.12a).

A mini-bus was introduced to two needle exchanges in 1991 to encourage injectors from outlying areas to attend. This service was extended to four needle exchanges in 1992 and maintained at three in 1993. Although accounting for only 7.6% of all visits made over the three year period, these buses were extremely successful in attracting injectors to particular needle exchanges (Table 3.13). For instance at one exchange (Drumchapel) 40% visits were made by mini-bus during 1992.

Table 3.11
Number of attendances 1991 - 1993

Sex	1991		1992		1993	
	n	(%)	n	(%)	n	(%)
Male	14700	(70%)	19040	(68%)	21318	(66%)
Female	6300	(30%)	8960	(32%)	10982	(34%)
Total	21000		28000		32300	

Table 3.12
Average visits made by individuals 1991 - 1993

	No of Attenders	No of Visits	Average Attendances	Range of Visits
1991	2000	21000	10.5	1 - 75
1992	2640	28000	10.6	1 - 62
1993	2300	32300	14.1	1 - 151

Table 3.12a
Client return rates 1991 - 1993
(Comparisons with Stimson 1988a)

Visit number	Clients	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6-10 (%)	11-20 (%)	21-30 (%)	31-40 (%)	41+ (%)
1991	2000	100	71	57	48	42	24	9	4	2	2
1992	2640	100	70	54	44	36	19	7	3	1	1
1993	2300	100	66	51	42	35	30	14	7	3	3
Total	6940	100	69	54	45	38	24	10	5	2	2
Stimson one year (1988a)	2257	100	61	47	39	33	17	6	3	1	1

Table 3.13
Visits made by mini-bus

Year	Number of Visits	% of Total Visits
1991	1622	8%
1992	1530	6%
1993	2882	9%

Injecting equipment exchanged

The number of needles and syringes issued increased by 20% between 1991 and 1992, and by 14% in 1993. Approximately 700,500 sets of injecting equipment were issued and 806,000 were returned in the three year period (Table 3.14). The number returned was greater than the number issued probably because attenders were handing in equipment secured from other sources e.g. pharmacies. The most frequent number of sets of injecting equipment issued and returned per visit was 10.

Table 3.14
Number of needles and syringes exchanged 1991 - 1993

	1991	1992	1993
Issued	190 000	238 500	272 000
Returned	235 600	273 000	297 500
Return Rate	124%	115%	109%

Variation in attendances across the eight needle exchanges

Some needle exchanges are busier than others. For instance visits to Parkhead and Easterhouse accounted for 50% of all visits made to exchanges during 1993, whilst Drumchapel and Pollock accounted for only 8% of all visits (Table 13.14a). Thus, there is considerable variation in attendance patterns across the eight needle exchanges in Glasgow.

Table 13.14a
Attendances at each exchange 1993

Year Total	Ruchill	Easter/ House	Castle/ milk	Milton	Drum/ chapel	Gorbals	Park/ head	Pollock
32318	2708	7031	2917	2778	1017	5062	9189	1616

Uptake of other services offered at needle exchanges

A number of services were offered at needle exchanges ranging from primary health care to HIV testing. The most frequently used service in the period 1991 - 1993 was primary health care which included abscess care, wound dressings, dietary advice and pregnancy testing (Table 3.15). Services were received during 31% of all visits in 1991, 55% of all visits in 1992, and 56% of all visits in 1993. Approximately 64% of all clients had at least one service contact in each year. On average 35% of visits involving the uptake of these services were made by women. Condoms were taken by clients during 15% of all visits in 1991, 1992 and 1993. The most notable decline was in safer injecting advice which accounted for 29% of services received in 1991 to 11% in 1993. The reasons for this are unknown. However, there is evidence to suggest that needle exchange attenders inject more often than non-attenders (Chapter 4), and that injecting related injuries e.g. abscesses, are common among attenders. Many of these injuries may go untreated (Morrison 1995). Thus, the decline in the use of this particular service is worrying.

Table 3.15
Visits where other health services were received 1991 - 1993

Services	1991***		1992		1993	
	n	(%)	n	(%)	n	(%)
Primary Health Care	2637	(40%)	8337	(54%)	9977	(55%)
Safer Sex Advice	1218	(18%)	3356	(22%)	3652	(20%)
Safer Injecting Advice	1899	(29%)	2160	(14%)	1932	(11%)
Drugs Advice	306	(5%)	576	(4%)	1122	(6%)
Social Problems/ Welfare Advice*	144	(2%)	354	(2%)	416	(2%)
HIV/AIDS Advice	219	(3%)	227	(1%)	128	(1%)
HIV Test	33	(0.5%)	38	(0.2%)	33	(1%)
Other**	109	(2%)	360	(2%)	714	(4%)
Total	**6565**		**15480**		**17974**	

* Includes Welfare and Social Security Services and Housing

** Includes general counselling, child care e.g. accident prevention and information about other harm reduction services.

*** Only includes April-Dec 1991

Referrals made to other services

Referrals were made to a wide range of other services, but most commonly to either GPs or to drugs projects (Table 3.16). Referrals were made during 3% of visits in 1991, 4% of visits in 1992, and 5% of visits in 1993. The most notable increase in referrals were those made to drugs projects. These accounted for 19% of referrals in 1991, and 53% of referrals in 1993. Some drugs projects second drugs workers to the exchanges, thus creating direct links between these organisations and the exchanges. On the other hand the decrease in referrals made to social services and housing, from 15% in 1991 to 1% in 1993, may relate to the lack of direct referral mechanisms between exchanges and these departments.

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Table 3.16
Visits where referrals were made 1991 - 1993

</div>

	1991***		1992		1993	
	n	(%)	n	(%)	n	(%)
GP	166	(28%)	372	(34%)	398	(23%)
Drugs Project	111	(19%)	297	(27%)	915	(53%)
Social Services/ Housing*	88	(15%)	16	(2%)	15	(1%)
HIV Clinic	54	(9%)	59	(5%)	48	(3%)
Hospital	47	(8%)	76	(7%)	111	(6%)
Social Work	27	(4%)	13	(1%)	28	(2%)
STD Clinic	11	(2%)	9	(1%)	7	(1%)
Other**	91	(15%)	252	(23%)	192	(11%)
Total	**595**		**1094**		**1714**	

* Includes Welfare and Social Security Services and Housing

** Includes, Rehabilitation, Women's' Reproductive Service, child care services, Family Planning, Child Psychologist.

*** Only includes April-Dec 1991

Attender satisfaction survey

The success of a needle and syringe programme depends ultimately on its ability to attract clients and to meet their needs. It was decided to carry out a client survey of needle exchange clients to assess their perception of the service and levels of satisfaction with it. Although these data are not routinely collected as part of the computerised information system, the question of client satisfaction is closely related to service delivery and therefore part of the process measures used in this thesis. For these reasons the results of this small, but important study, are included in this chapter.

Methods

An anonymous self-administered questionnaire (Appendix 4) was issued to attenders at all exchanges during the course of one week (14th to 20th February 1992). The questionnaire was designed in collaboration with service managers and contained a number of satisfaction and health related questions. The questionnaire was piloted and amended before being used in the full study. Distribution was by means of a researcher who asked all clients volunteering to participate in the survey to complete the questionnaire in private before leaving the exchange. The researcher was also able to offer assistance to those who had difficulty in understanding the content of the questionnaire. All questionnaires were returned to this person in sealed envelopes. At the time of the survey, five exchanges were operating in the city, namely: Ruchill, Easterhouse, Castlemilk, Milton and Drumchapel.

Results

Two hundred and forty-eight clients attending all exchanges in the city were invited to participate in the study. A total of 243 (98%) agreed to do so. Of the 243, 71 (29%) were female and 172 (71%) were male. This reflects the attendance ratio of males and females at the exchanges in 1992.

Site and opening times

Two hundred and two (83%) and 215 (88%) clients, respectively, were satisfied with the current site and opening times of their local needle exchange. Even though generally satisfied with opening times, a significant minority, 52 (21%), suggested that needle exchanges should open longer hours. Of the 52, 13 (25%) thought that their exchange should open seven days a week and a further 25%, thought that it should open at weekends, including Fridays. Thirty-five actually gave specific times of the day in which the exchanges should open, namely the afternoons, evenings and pm hours.

Services received at needle exchanges

The maximum number of needles and syringes offered at each visit, and set by the Lord Advocate (Scotland) at the time of the survey was 10. It is not surprising, therefore, that the most frequent number of needles and syringes issued during this period was 10. Clients were asked if they received enough needles and syringes to meet their personal needs each time they visited. A total of 175 (72%) said they did. This leaves a sizeable minority (28%) who said that they did not receive enough clean injecting equipment. When they were asked how many needles and syringes they should receive at each visit, 37 (73%) said between 11 and 20 sets, and a further 8 (16%) said that they should be supplied on demand.

Approximately 151 (62%) attenders said they had received services other than needles and syringes from an exchange. A total of 136 (56%) reported receiving health care and 84 (35%) reported receiving assistance from a drugs worker. When asked how helpful these services were, 109 (80%) said that the health care services helped alot, and 51 (61%) said that the drugs worker helped a lot.

Further improvements to the service

A total of 27 clients suggested further improvements to the service. Of these, 6 (22%) suggested extending the evening opening hours, 5 (19%) requested more needles, 4 (15%) thought that needle exchanges should be based more locally, 3 (11%) requested more health workers, 3 (11%) more substitute prescribing, 2 (7%) generally more information and 4 (15%) a mixture of items including travel expenses and less police involvement in exchanges. When asked if they required any specific advice and information, 134 (55%) said 'yes'. Of these, 54 (40%) requested more information on safer drug use, 51 (38%) safer injecting advice, 48 (36%) preventing weight loss, 31 (23%) exercise, 27 (20%) better dietary advice, and 11 (8%) safer sex advice.

Conclusions and discussion

Using these process data it is now possible to answer the four questions relating to the operational aspects of the Glasgow needle exchange network, namely:

1.   Do needle exchanges reach drug injectors, especially those not in contact with other harm reduction services, and maintain regular and frequent contact with them?

2.   What services do needle exchanges offer other besides exchanging injecting equipment and what is the level of uptake of these services?

3.   Do needle exchanges refer attenders to other harm reduction or medical services, and if so, how frequently?

4.   Are needle exchanges, and the services they provide, acceptable to injecting drug users?

1.   **Do needle exchanges reach drug injectors, especially those not in contact with other harm reduction services, and maintain regular and frequent contact with them?**

In many respects the Glasgow needle exchanges have been successful in reaching a large number of drug injectors. In the three year period 1991 - 1993, 1720 new clients were attracted to the service which was used by up to 2,640 injectors in any one year. The largest number of new clients (46%) were attracted to the service during 1992 when three new exchanges were opened.

However, 2,640 injectors only represents between 27% and 35% of the estimated injecting population in Glasgow (Frischer 1993). Estimates of the uptake of needle exchange by injectors in other cities in the world, vary between 1% and 80% of the injecting population. Some estimates are not based upon injector prevalence data (Lurie 1993). For instance, studies recruiting injectors from treatment sites will calculate their estimates on the proportion of drug injectors recruited to the study who use needle exchanges (Hartgers 1989; Lurie 1993; Bruneau, Lamothe, Lachance et al 1994a; Des Jarlais 1994a; Van Ameijden 1994; Watters 1994). These studies tend to give higher uptake rates, usually between 40% to 80% injectors. However, in those studies where population injecting prevalence estimates have been calculated, uptake rates are generally lower and close to that of Glasgow. For instance three American studies suggest that approximately 20% of the injecting population used local needle exchanges (Hagan 1991b, 1993; Oliver 1992b; Guydish, Bucardo, Young et al 1993). Thus, the ability of Glasgow needle exchanges to attract injectors appears to compare favourably with other exchange programmes. Even so, the service is only able to attract a minority the city's drug injectors.

The average age of attenders is 26.9 years. Most are male (approximately 70%), with long injecting careers (8.2 years before attending), and inject drugs such as, heroin, temazepam and buprenorphine. Recent prevalence and multi-sampling studies suggest that drug injectors in Glasgow have a mean age of approximately 26 years, (60% in the 20 - 29 age range), are male

(63%), have a mean injecting career of 7.8 years and inject mainly heroin, buprenorphine and temazepam (Frischer 1994). Needle exchange attenders are also similar to injectors attending other treatment agencies in the city (Frischer 1994). Studies from other areas in the world also suggest that needle exchanges attract similar types of clients. Typically, they tend to be older (mean 27 - 41 years), male (54% - 85%), have long injecting careers (mean 3.5 - 11.3 years) and are poly-drug users (Stimson 1988a; Hart 1989a; Hartgers 1989; Carvell 1990; Hankins 1991; Ljungberg 1991; Hankins, Gendron, Bruneau et al 1992; Hartgers 1992; Lhomme 1992; Milson 1992; Elnitsky, Abernathy 1993; Hagan 1993; Heimer, Kaplan, Khoshnood et al 1993; Keene, Stimson, Jones et al 1993; Lurie 1993; Heimer, Kaplan, O'Keefe et al 1994; Johnson, O'Connor, Pomeroy et al 1994; Kaplan, Heimer 1994b).

Needle exchange attenders may share similar socio-demographic characteristics with other injectors in Glasgow but their attendance at an exchange distinguishes them from other injectors in the city. Each needle exchange, although situated in an area of high injecting prevalence, effectively serves a geographical area of approximately 4kms around it. However, other sources of supply exist and these will affect the uptake of the service (Keene 1993; Watters 1994). For instance, there are ten community pharmacies participating in the pharmacy needle exchange system introduced by the Scottish Home and Health Department in 1992. There are also other pharmacies who sell injecting equipment. Data from the MRC/WHO study, showed that 42% of injectors in Glasgow obtained their injecting equipment from a pharmacy in the city during 1991 - 1993 (Table 5.7 Chapter 5). Approximately 77% of new needle exchange clients obtained their injecting equipment from pharmacies prior to first attendance during 1991 - 1993 (Table 3.3). These outlets may be more convenient to use, being situated closer to home or opened at times when the needle exchanges are closed (Stimson 1988a; Barnard 1993; Keene 1993; Lurie 1993; Schwartz 1993a; Watters 1994). In addition, although unable to provide the wide range of services available at needle exchanges, these pharmacies may also be attractive to drug injectors

who do not want to be associated with drug injector services (McKeganey, Barnard 1992a; Lurie 1993). This may be particularly so for drug injectors who are younger, female and those who are hard to reach e.g. homeless (McKeganey, Barnard, Watson 1989; Hartgers 1992; Hagan 1993). Indeed, recent research carried out in Glasgow suggests that young drug users are hesitant to approach drug related services (McKeganey 1989). Likewise, some female injectors may feel particularly stigmatised because of their drug use, and may be wary of being identified as a drug user (McKeganey 1989; Barnard 1993). Other studies have suggested that some injectors fear official notification of their drug use and will avoid using drug services as a result (Barnard 1993; Lurie 1993). Thus, suitable alternatives to needle exchanges will be used should these exist. Some injectors will also obtain injecting equipment from friends (Klee 1991; Keene 1993). Alternative sources of supply are clearly more suitable or attractive to some drug injectors and are chosen for these reasons.

Of course, there are other reasons why injectors do not use needle exchanges, some of which are not based on choice or perceptions of the service. Many drug injectors engage in illegal activity and imprisonment is fairly common. Approximately 65% of new needle exchange clients in Glasgow had been in prison prior to first attendance (Table 3.7). A recent study carried out in the Glasgow needle exchanges found that 69% of existing clients had recently been in prison (Kennedy, Nair, Elliott et al 1991). This will have an detrimental effect on attendance.

In a sense, there would be no need for concern about poor uptake of needle exchanges if those not attending engaged in very low risk behaviours. However, the evidence derived from work carried out for this thesis and other studies, indicate that those not using needle exchanges actually engage in higher risk behaviours. They tend to share injecting equipment more and use drugs more frequently than attenders (Stimson 1988a; Kennedy 1991; Hartgers 1992; Keene 1993; Schwartz 1993b; Saxon, Calsyn, Jackson 1994; Watters 1994; Taylor, Goldberg, Emslie

et al 1995). Thus, there is a clear need to attract other injectors to the service. This will be discussed in detail in Chapter 4.

Although emphasising the needs of non-attenders, attention should also be given to the needs of those who actually use the service. Many attenders continue to engage in HIV risk behaviours (Chapter 4) and will have drug associated health problems e.g., abscesses and weight loss (McCombie, Elliott, Farrow et al 1995; Morrison, Elliott, Gruer et al 1995). For some, a needle exchange may represent an important contact with health related services. In the present study, only 54% of new clients reported ever having contact with health and harm reduction services prior to entering an exchange (35% in the last four weeks). The main services used were either a general practitioner or drugs project. This is supported by other studies throughout the world. For instance in the UK, 60% of new needle exchange attenders will have received treatment at some time in the past for their drug use but 74% are not in contact with services upon entry to a needle exchange (Stimson 1988a). In London, 19% had not received treatment at all prior to entry, and only 38% were in contact with other services whilst using the exchange (Carvell 1990). In Wales, 20% of attenders had not previously received help for their drug problems (Keene 1993). In Lund (Sweden), 50% of new attenders were not contact with services at entry to a needle exchange (Ljunberg 1991). In Paris, 52% of attenders were not in treatment when first attending an exchange (Lhomme 1992). In general, in the USA between 33% and 50% of needle exchange attenders have never been in drug treatment (Lurie 1993). For some, most care settings are inaccessible and not only for reasons of cost (Heimer 1994). Thus the Glasgow needle exchange service, like most other needle exchanges, succeeds in making contact with drug injectors who otherwise make little or no use of relevant services.

This may be so, but are needle exchanges able to maintain contact with those who are attracted to the service? In Glasgow, although the average number of attendances per client rose from

10.5 in 1991 to 14.1 in 1993, and the range of visits from 1 - 62 to 1 - 151 respectively, regular and frequent visits do not seem to be the norm. Only 54% of clients made three or more visits, and 38% made five or more visits on average each year (Table 3.12a). Retention rates were slightly higher than those reported by Stimson et al in their UK evaluation of needle exchanges (Stimson 1988a). Approximately 47% of UK clients made three or more visits, and 33% made five or more visits per year (Table 3.12a). Retention rates in other exchanges vary throughout the world, but generally regular and frequent contact is uncommon. In a more recent study carried out in Wales, clients attended 5.7 times in a 44 week period (Keene 1993). In Sweden, 52% of needle exchange clients attended only six times in a three year period (Ljungberg 1991). In San Francisco (Prevention Point), 28% of attenders used the exchange more than 25 times per year (Watters 1994). In New Haven (USA), 15% of clients made two visits per month (Heimer 1994). The highest rates of attendance seems to be in Holland. Hartgers reported that most drug injectors in Amsterdam receive 90% of their injecting equipment from needle exchanges (Hartgers 1992). At an outreach exchange run by volunteers in Rotterdam, Grund found that clients attended an average of 26.4 times per year, compared with 9 times at a non-outreach exchange run by the local health authority. Approximately 52% of clients visited the outreach exchange 25 times or more throughout the year (Grund 1992). However, these are exceptional cases, and needle exchanges generally seem to maintain regular contact with only a minority of drug injectors. In this respect the Glasgow exchanges are no different from other exchanges in the world.

Poor retention rates may be related to a number of factors, some of which are also associated with the failure of needle exchanges to attract injectors to the service in the first instance e.g., alternative sources of supply, convenience, not wishing to be identified as (or associated with) injecting, fear of notification, legal constraints including imprisonment, and stopping injecting (Stimson 1988a; Kennedy 1991; McKeganey 1992a; Barnard 1993; Keene 1993; Lurie 1993; Schwartz 1993a, 1993b; Anderson, Flynn, Clancy et al 1994; Watters 1994).

It seems likely that some of these factors will affect retention rates at the Glasgow needle exchanges. For instance, it is probably fair to suggest that needle exchanges may, at least for some injectors, be inconvenient to use. Although 86% of attenders travel up to 4kms to reach an exchange this does not necessarily mean that they are convenient for all injectors. Many injectors live outwith the 4km zone, and even for those attending the exchange access could be problematic. The success of the mini-bus service in some areas suggests that travel to and from an exchange may be difficult for some, including those who live relatively close to the exchange. In the absence of a suitable alternative source of injecting equipment, some injectors may have no choice but to attend a needle exchange. However, many will use an alternative supply should it exist. Opening times may also affect attendance rates. Most needle exchanges in Glasgow are opened in the evenings on week days, but are closed at weekends. In January 1994, the Ruchill exchange extended its opening hours to include Sunday afternoons. By June of that year Sundays were just as busy as any other day on which the exchange opened (HIV & Addictions Directorate 1994). Changing opening hours may suit the needs of at least some clients, a point raised by 21% of clients in the satisfaction survey.

There are a number of alternatives to static site based needle exchanges e.g., outreach exchanges, which may be more suitable for those who continue to inject but are unwilling to use existing needle exchange services. These are discussed later in this thesis (Chapter 6) and may be appropriate for those who do not wish to be associated with existing drug injecting services, or fear official notification.

In conclusion, Glasgow needle exchanges are successful in reaching only a minority (27% - 35%) of IDUs in the city. This could be related to a number of factors which include alternative sources of supply, inconvenience, reluctance to contact an injector related service, perceptions of

the service, stopping injecting, and, in some instances, imprisonment. Those not in contact may engage in higher HIV risk behaviours. However, needle exchanges are successful in reaching a number of injecting drug users who have no contact with other health services. Maintaining contact with these injectors, though, is a problem. Only a minority make frequent and regular contact with an exchange. This is probably related factors which are similar to those associated with attracting injectors to needle exchanges in the first instance.

2.   What services do needle exchanges offer besides exchanging injecting equipment, and what is level of uptake of these services?

I have already presented evidence that many of those attending the Glasgow needle exchanges are not in contact with any other health or harm reduction services. Needle exchanges in the city are situated in health centres and staffed by nurses and drugs workers and are therefore able to provide a wide range of services to those who attend. These services range from primary health care to advice and counselling. Referrals to other services are also made.

Many needle exchanges throughout the world offer a similar range of services, but others do not. The range of services offered will depend largely on the structure and size of an exchange. Larger static services, like those in Glasgow, may be staffed by a number of health care personnel and are relatively well equipped, whilst mobile and outreach exchanges, by their very nature are limited in what they can offer (Stimson 1989b; Hartgers 1992; Hagan 1993; Lurie 1993; Schwartz 1993a). However, if taken as a whole, the range and diversity of services offered by needle exchanges in various parts of the world is impressive. Included in the types of equipment offered besides needles and syringes are: bleach, sterile water, alcohol wipes, injecting paraphernalia (cookers, filters), gloves, safe return containers, tourniquets, sterile dressings, non-prescribed medicines, condoms, lubricant, and spermicides (Hart 1989a; Christensson 1991; Donoghoe 1991; Grund 1992; Hankins 1992; Lhomme 1992; McKeganey 1992a; Hagan 1993;

Heimer 1993; Keene 1993; Lurie 1993; Schwartz 1993b; Watters 1994). Other services offered include: Education and counselling for HIV including perinatal transmission; drugs advice and counselling; HIV testing; TB, pneumonia and influenza screening; tetanus inoculation; abscess and wound care; social, financial and legal advice; and bible study classes (Hart 1989a; Donoghoe 1991; Hagan 1993; Heimer 1993, 1994; Keene 1993; Lurie 1993; Schwartz 1993b; Des Jarlais 1994a).

Although the range is impressive, little is known about the uptake of these services. Many studies only describe the services offered (Stimson 1988a; Hart 1989a; Christensson 1991; Donoghoe 1991; Grund 1992; McKeganey 1992a; Milson 1992; Posen, Turvey, Goldstone 1992; Elnitsky 1993; Hagan 1993; Keene 1993; Lurie 1993; Des Jarlais 1994a; Watters 1994). Some recent work in the USA (New Haven), however, suggested that 70% of attenders received at least one of the additional medical services at the needle exchange (Heimer 1993). This is supported by the Glasgow data which suggest that approximately 64% of all attenders received at least one of the services at a needle exchange in any one year. Throughout the three year period 1991 - 1993, approximately 49% of all visits were associated with uptake of at least one of these services. A total of 40,000 service contacts were made during 1991 - 1993, mainly for primary health care and safer sex advice. Women were involved in 35% of these visits, yet constituted only 24% of new clients at the exchanges. Female attenders at the New Haven exchange also seemed to make more use of the medical services than males, with 40% of medical care involving women, who accounted for only 20% of attenders (Heimer 1993). Thus the uptake of services offered by exchanges is encouraging especially among females attenders. One cautionary note: although research supports the argument that these services may help reduce injecting related problems e.g. abscesses (Hart 1989b), there is evidence that a number of problems may go untreated. For instance, research carried out as a result of this thesis in 1994, found that 70% of attenders at one exchange in Glasgow reported injecting related injuries e.g.

abscesses, and that many of these problems were not treated by needle exchange staff (Morrison 1995). It is therefore worrying that contacts for safer injecting advice at needle exchanges declined between 1991(29%) and 1993 (11%). This of course raises the question of the effects of needle exchanges on drug related harms and risk behaviours; a question which is discussed more fully in Chapter 4.

Although there seems to be a lack of published data concerning the uptake of other services at needle exchanges, surveys have been conducted which assess the level of satisfaction with services offered at exchanges. In the Glasgow needle exchange satisfaction study, 62% of respondents reported receiving services other than exchanging injecting equipment and 80% said that these services were 'helpful'. In the UK national survey of needle exchanges 84% of respondents said that the level of service provision at needle exchanges was 'about right' (Stimson 1988a). High levels of satisfaction with other services offered are reported in other needle exchanges. In Montreal, for instance, 98% of respondents reported to be satisfied with services requested and the general delivery of these services (Hankins 1992). However as reported in our survey of needle exchange attenders and elsewhere, requests for additional services are made, particularly for more health care and health information (Stimson 1988a; Hankins 1992; Keene 1993).

In conclusion, Glasgow needle exchanges offer a wide range of services in addition to exchanging injecting equipment. These range from primary health care to advice and counselling. The uptake of these services is encouraging, especially among females, with 64% of attenders receiving at least one service. Approximately 80% of clients using the services said that they were helpful. Needle exchanges provide a range of services to drug users who may not be in contact with other services. However, it is uncertain what impact these services have on drug related harms and risks e.g. injecting related damage and sexual risks (see Chapter 4).

3. Do needle exchanges refer attenders to other harm reduction services or medical services, and if so, how frequently?

It is generally maintained that needle exchanges refer clients to other services (Mulleady 1988; Stimson 1988a; Christensson 1991; Singer 1991; Firlik 1992; Lurie 1993; Schwartz 1993a, 1993b; Wartenberg 1994). However, evidence of referrals from needle exchanges to other services is sparse, due again to the lack of published data.

There is only a small number of studies which have examined referrals from exchanges to other services in some detail. One London exchange made a total of 510 referrals involving 227 (38%) of clients over a 16 month period. Approximately 60% of referrals were for drug treatment and 38% for medical and health services. Referrals were made during approximately 4% of all visits (Hart 1989a). In Vancouver, over a six month period, referrals were made at between 2% and 6% of all visits, mainly to detox programmes, residential treatment, and medical and social work services (Whynot 1991). In New Haven (USA) 15% of attenders were referred on to other services in a 7.5 month period mainly for drug treatment. This rose to 19% of clients in a further eight month period (Heimer 1993). The findings from the Glasgow exchanges are similar. For instance in 1991, 11% of clients were referred on to other services. Over the three year period (1991 - 1993) a total of 3,403 referrals were made at approximately 4% of all visits. Of these, 36% were to medical services (GPs, hospitals and STD clinics), 33% to drugs projects, 8% to social and welfare services, and 6% to a HIV testing clinic. There was a notable increase in the proportion of referrals made to drugs projects between 1991 (19%) and 1993 (53%) whilst there was a decrease from 15% to 1% respectively in those made to social and housing services. The increase in drug project referrals could be related to the close links which have been established between needle exchanges and drugs workers in the city. Conversely the decrease in referrals made to social and housing departments may be related to the lack of a direct referral mechanism

to these two organisations. Referrals from the Glasgow exchanges typically take the form of strong advice to seek additional help and it is usually unknown whether the clients actually make contact with the recommended service.

It is also uncertain what proportion of clients might benefit from referral to other services but, for one reason or another, are not referred. For instance, many injectors who have never been in treatment or attended needle exchanges are unlikely to be aware of their HIV status (Donoghoe, Rhodes, Hunter et al 1993; Elnitsky 1993). There is evidence to suggest that there is a large overlap in the populations of the HIV testing register, drugs agencies and needle exchanges in Glasgow (Frischer 1993). Although approximately 46% of new needle exchange attenders (Glasgow) reported having no contact with services and 52% reported not having an HIV test before first attendance at an exchange, only a small number of referrals (6%) are made for HIV testing. Thus, although referrals are being made, it may be that some attenders would benefit from additional help (Keene 1993). There is also some evidence that even when a referral is made, a large number of clients will not attend the service. In New Haven for example, about 57% of clients referred from a needle exchange to a drug treatment facility actually made contact with the service (Heimer 1993). Reasons for failed appointments included: incarceration, lack of available places, and not keeping the appointment.

In conclusion, data from this thesis and other studies support the notion that needle exchanges act as a bridge into other health care and harm reduction services, at least for a minority of clients. Part of the problem with referrals in Glasgow, however, is that there are few direct links with other services, apart from drugs projects. Many of the needle exchange staff are employed on a sessional basis and are only able to make contact with other services whilst the needle exchanges are opened. Since most needle exchanges operate out of normal working hours, when other services are closed, contacting an agency on a client's behalf would be extremely difficult.

4.   Are needle exchanges, and the services they provide, acceptable to injecting drug users?

Part of this question has been answered in the forgoing discussion, but it is worth looking at some of the issues relating to satisfaction in more detail as they touch on important operational aspects of the needle exchange programme. From the satisfaction survey included as part of this thesis, and others, it can be concluded that satisfaction with the service is generally high among those who attend (Stimson 1988a; Hankins 1992; Keene 1993). However there are some operational aspects of needle exchanges which are not acceptable to some attenders. Among these are: locality and opening times; additional services; and the amount of needles and syringes offered.

Approximately 11% of respondents in the UK survey, 3% in Glasgow and 32% in Montreal are dissatisfied with the location of their needle exchange (Stimson 1988a; Hankins 1992). Furthermore, 30% of respondents in the UK survey were dissatisfied with opening times, and 22% of those in Montreal and 21% of those in Glasgow suggested additional opening times. Approximately 15% of UK respondents were dissatisfied with the level of drugs advice they received and 22% were dissatisfied with the safer sex advice they received. Approximately 20% of Glasgow attenders thought that the health and social services received from needle exchanges were less than helpful. When asked what services should be offered, clients in the UK, Glasgow and Montreal mentioned other health care and health advice including detox programmes, medical examinations, safer drugs and sex advice, preventing weight loss. A substantial minority (28%) of Glasgow respondents said they did not receive enough needles and syringes at each visit. When asked how much more they should receive, most suggested between 11 and 20 sets. In contrast, only 4% of respondents in the UK survey were dissatisfied with the number of

syringes given at each visit. However, in England and Wales there are no legal restrictions on the number of needles and syringes that can be issued at each attendance.

The adequate supply of injecting equipment is, of course, a fundamental issue for needle exchanges. The fact that a substantial minority of Glasgow needle exchange attenders reported that they were not issued with enough equipment is extremely worrying. The upper limit issued each visit and set by the Lord Advocate (Scotland) at the time of this survey was 10, (the most frequent number exchanged). Needle exchange attenders report injecting on average 128 times per month (Chapter 4). If each injector were to use a clean needle and syringe for every injection, then the weekly number required would be approximately 32. Should needle exchange attenders make between three and four visits to an exchange per week (highly improbable since the average annual attendance = 11.7) they would have enough injecting equipment to meet their needs. If not, then the alternative is to re-use injecting equipment or obtain clean equipment from another source. In the event of failure of this secondary strategy, sharing may take place. It therefore seems reasonable to conclude from this calculation, and evidence from the satisfaction survey, that the Glasgow needle exchanges are not able to supply many injectors with enough clean injecting equipment to meet their daily injecting needs.

In January 1995, the Lord Advocate for Scotland raised the maximum number of needles and syringes to 15 per visit (The Scottish Office 1994b). This was recommended by the Ministerial Task Force 1994 who had been given the results of the satisfaction survey carried out in this thesis (The Scottish Office 1994a). The effects of this decision have yet to be studied. However, evidence from another satisfaction survey carried out at needle exchanges in Glasgow this year suggests that the proportion of clients who are dissatisfied with the number of needles and syringes they receive at each visit (20%) has not greatly reduced (Morrison, Elliott, Watson 1995a). Other effects are unknown. For instance, increasing supply may attract new clients to

the service and help retain contact with existing clients, by circumventing the need to obtain equipment from other sources. On the other hand, clients may not visit so frequently and thus the average number of visits may decrease. It will be interesting to monitor the future uptake of the needle exchange service among both new and existing clients and the possible impact on return visits.

It is also possible that increasing supply will influence the equipment return rate. At present the return rate in Glasgow is extremely high and suggests that injecting equipment obtained elsewhere is being returned safely through the needle exchanges. Reported return rates at other exchanges range from 26% to 100%, with the norm lying somewhere between 60% - 90% (Stimson 1988a; Hart 1989a; Hartgers 1989; Guydish 1991; Ljungberg 1991; Hankins 1992; Grund 1992; Lhomme 1992; Posen 1992; Heimer 1993; Keene 1993; Lurie 1993; Schwartz 1993a; Kaplan 1994b). The exchange mechanism is extremely important in preventing used equipment from circulating among injectors thereby reducing the likelihood of transmission of blood borne diseases, including HIV (Kaplan, Brandeau 1993c). In addition, it also reduces the likelihood used injecting equipment being discarded in public places (Oliver 1992a). Issuing more injecting equipment may reduce the number of visits made by a client and this may lead to a reduction in the needle exchange rate. However, fears regarding a negative impact on return visits and equipment exchange rates may be unjustified. At Prevention Point (San Francisco, USA) there was no effect on the visit or exchange rates after raising the number of syringes issued form 10 to 20 in 1990, and eventually abandoning a ceiling after 1990 (Watters 1994).

The final, and probably most important question relating to satisfaction is that of the views of those who do not use needle exchanges. This question was not answered by field work in the course of this thesis, partially because of time, but also because of the difficulty in contacting those who dropped out of the service or were not attracted to it in the first place. However,

evidence from other research carried out in Glasgow and elsewhere suggests that those not in contact have very definite views on needle exchange programmes. I have already discussed why some injectors do not use needle exchanges. Some of these reasons may be related to perceptions of the service. For instance, female and younger injectors may not wish to be identified as drug injectors and will disassociate themselves from a drug injector service like an needle exchange (Lurie 1992, McKeganey 1992a, Barnard 1993). Issues of confidentiality and possible fear of notification are also important and were expressed by approximately 30% of non-attenders in the UK survey of needle exchanges in 1987/8. In addition, 29% thought that there were too many rules and regulations (Stimson 1988a). Many injectors may also be unaware of the service. In the UK study, 20% of non-attenders were unaware of the existence of an needle exchange, and Montreal, 18% of non-attenders were unaware of the range of services offered at exchanges (Stimson 1988a; Hankins 1992). As discussed, non-attenders will also use alternative sources of supply, finding travelling to the exchanges, or opening times, inconvenient.

In conclusion, most clients surveyed in 1992 were satisfied with the services provided at the Glasgow needle exchanges. However, a substantial minority said that they did not receive enough injecting equipment to meet their personal requirements. Although this was partially addressed when the maximum number of needles and syringes issued at each visit was raised from 10 to 15 in January 1995, a further survey carried out this year suggests that a substantial minority (20%) of attenders still do not receive enough needles and syringes to meet their personal requirements. Raising or abandoning the limit to the number of needles and syringes issued each visit should be considered. In addition, the views of those either dropping out of, or not in contact with, the service should be sought, particularly in light of the poor uptake and retention rates.

General conclusions

Glasgow needle exchanges are successful in reaching only a minority (27% - 35%) of the drug injecting population in the city. Many of those reached (46%) are not in contact with other harm reduction services and for these injectors the needle exchange programme represents an important contact with service provision. 1992 was a period of intense growth when three additional exchanges opened in the city attracting approximately 800 new clients compared with 472 in 1991. However in 1993 the number of new attenders attracted to the service decreased by 44% to 450. Attendances rose by 33% from 21,000 in 1991 to 28,000 in 1992, and increased again by 15% to 32,300 in 1993. However the total number of clients attending the exchanges decreased from 2,600 in 1992 to 2,300 in 1993. Retention rates in 1993, although slightly higher than 1991 and 1992, (and higher still than those in the UK), remained low. For instance in 1993, clients made an average of 14 visits (range 1 - 151) with only 51% making more than three visits and 35% making more than five visits. Thus in 1993, after a period of growth there were clear signs that the Glasgow needle exchange programme, in its present form, had reached its full potential in attracting and retaining drug injectors in the service. Many of those who remain out of reach may engage in higher risk behaviours (Chapter 4). It could be argued, of course, that during this period the number of injecting drug users in Glasgow declined. However there is no statistical evidence to support this argument (Chapter 1).

Nevertheless, the needle exchanges still offered a wide range of services to those in contact with the service. Approximately 64% of attenders received at least one service mainly primary health care. The uptake of these services by women is particularly encouraging. However, it is uncertain what impact these services have on injecting related harms and risk behaviours (Chapter 4). Referrals were also made to other services for more specialist help. However, only 11% of clients were referred on to other services. This may be due to a lack of a direct referral mechanisms between exchanges and other services. Client satisfaction with the service is high,

but a substantial minority of clients reported not receiving enough injecting equipment to meet their personal needs.

It is therefore recommended that needle exchanges in Glasgow seek to attract other injectors, especially those with higher risk behaviours. This may require radical structural change. For instance the most successful needle exchange programmes are in Holland especially in Rotterdam where reported retention rates are among the highest in the world (Grund 1992). This particular programme operates on an outreach basis which is different from that of the Glasgow needle exchanges. A referral mechanism between the Glasgow needle exchanges and other harm reduction services should be introduced. Finally, consideration should be given to either raising or abandoning the ceiling on the number of needles and syringes issued each visit. These recommendations will be discussed more fully in Chapter 6.

CHAPTER 4

OUTCOME MEASURES AND NEEDLE EXCHANGE

'Although the stereotype of an IDU might suggest an irresponsible individual with no interest in reducing the risk to self or others, the reality is usually more complicated. The overwhelming majority of IDUs strongly want to reduce their risk of HIV infection. For many, abstinence from drug use is not, at least in the short term, an option, so services faced with this situation need to provide a range of other options. Increasing the availability of sterile needles and syringes is generally recognised to be a critical strategy in the control of HIV infection among IDUs... '
(Wodak & Des Jarlais 1993).

Introduction

Studies conducted up to 1991, suggested that the prevalence of HIV was relatively low among needle exchange attenders (Wodak 1987; Hart 1989b; Bley 1991; Hagan 1991b; Kaplan 1993). There was also evidence that needle exchange attenders reduced their consumption of drugs and frequency of injecting (Stimson 1988a; Donoghoe 1989b) and that needle exchanges did not increase the prevalence of injecting (Cook 1987; Stimson 1988a; Ljungberg 1991; Vester 1992). In addition, needle exchange participants shared injecting equipment less frequently compared with non-attenders (Oliver 1988; Stimson 1988a; Donoghoe 1989b; Hartgers 1989; Hagan 1991a). Reduction in sharing could be related to the reduced circulation time of injecting equipment (Kaplan 1993). It was however uncertain whether reduced HIV prevalence, consumption of drugs, frequency of injecting and lower rates of sharing were sustained over a long period of time (Cook 1987; Stimson 1988a; Hart 1990; Klee 1991; Van Ameijden 1992).

Not all studies concurred. Some suggested that participation in a needle exchange programme had little or no effect on the rate of HIV seroconversion (Walters 1991; Van Ameijden 1992).

There was also evidence of increased frequency of injecting among attenders (Hagan 1991a). Needle exchange attenders also passed on injecting equipment more than non-attenders (Klee 1991) and one study found no significant relationship between attenders and the level of sharing of injecting equipment (Van den Hoek 1989; Van Ameijden 1992). Sexual risk behaviour among needle exchange attenders was similar to that of non-attenders, and the risk of HIV transmission to non-injecting partners was of particular concern (Donoghoe 1989b; Hart 1989b; Hankins 1991; Van Ameijden 1992). It was therefore uncertain what impact needle exchanges had on HIV prevalence, risk and injecting behaviour.

It is extremely difficult to generalise these conflicting findings across all needle exchange programmes. These studies used different methods to sample injectors recruited from different cultures and geographical areas, and attending services which were designed to meet particular local needs and requirements. The resulting data are therefore unlikely to be comparable. A variety of methods were used because of the difficulty in conducting randomised control trials in this field of research. Ethical considerations, accessibility, and difficulty in following-up 'hard to reach' populations of injecting drug users excluded the use of more rigorous designs. These designs included comparisons between injectors recruited from needle exchanges and those from other services (Oliver 1988; Donoghoe 1989b; Hartgers 1989; Van den Hoek 1989; Bley 1991; Calsyn 1991; Hagan 1991a; Klee 1991; Ljungberg 1991; Watters 1991; Grund 1992; Van Ameijden 1992; Vester 1992). Samples were also compared at a single point in time, (Klee 1991; Vester 1992) or compared in a series of longitudinal cross-sectional studies (Oliver 1988; Hagan 1991a, 1991b; Ljungberg 1991). In some instances the initial samples were followed up over time. However, the follow-up period rarely exceeded one year and drop out rates were high (Donoghoe 1989b; Hartgers 1989; Van den Hoek 1989; Van Ameijden 1992). Sampling methods included ethnographic snowballing techniques (Donoghoe 1989b; Hagan 1991a; Klee 1991; Grund 1992) and systematic multi-site sampling (Oliver 1988; Hartgers 1989; Van den

Hoek 1989; Bley 1991; Calsyn 1991; Guydish 1991; Hagan 1991b; Ljungberg 1991). Sampling from a wide variety of treatment and non-treatment sites was thought to be the most representative (Frischer 1991). Some studies only used samples recruited from needle exchanges. These are either single cross-sectional (Kaplan 1991; Mulleady 1992) or follow-up (Hagan 1989; Hart 1989b). Some relied only on self reported risk behaviour without HIV testing (Stimson 1988a; Klee 1991; Grund 1992) whilst others carried out HIV tests without corresponding reported risk behaviours (Wodak 1987; Kaplan 1993). Others used both techniques (Hart 1989a). The use of both helped identify risk behaviours more clearly (Guydish 1991). In addition, less obtrusive methods of HIV testing other than blood samples were used including saliva testing, which is thought to be acceptable to most study participants and can easily be carried out by non-medical personnel (Hart 1989b). Finally, some studies used routine HIV prevalence data to refute or support the effectiveness of needle exchanges in reducing HIV transmission (Buning 1991; Hagan 1991b; Ljungberg 1991; Van Ameijden 1992).

Despite the methodological difficulties and variations, the data from these studies go some way to providing answers to the following questions. These remain controversial issues. They relate to outcome and are therefore central to this thesis.

1.   **Do needle exchanges reduce the level of harm associated with drug injecting, and sexual risk behaviour among injecting drug users, including diseases such as HIV and Hep-B and other physical problems such as abscesses?**

2.   **Do needle exchanges reduce drug and sexual risk behaviours among drug users including the level of injecting, sharing of injecting equipment and unsafe sex?**

3.   **Do needle exchanges have a long-term impact on both harms and risk behaviours?**

It was impossible within the confines of this thesis to design and carry out studies which address all these issues in detail in relation to the Glasgow needle exchanges. For instance, conducting epidemiological studies to determine the prevalence of HIV and Hep-B are clearly outwith the scope of this study. Following samples of injecting drug users who are both in and out of contact with needle exchanges over a period time e.g. over one year, would also have involved an unrealistic amount of work. In fact, the original design of this part of the thesis involved following new attenders at needle exchanges through a period of one year. However, a feasibility study was carried out and this proved impracticable. Of the twenty clients approached and asked to take part in the study in 1991, only one agreed to follow-up.

Instead, data from other research carried out in Glasgow will be used to address these questions. In 1991, access was negotiated to data collected by the MRC/WHO Glasgow HIV Behavioural and Prevalence Study (MRC/WHO Collaborative Study Group 1993). This study measures drug related behaviours and HIV prevalence of injecting drug users in Glasgow who are both in and out of treatment. Cross-sectional samples have been drawn from the injector population on an annual basis since 1990/91. It was therefore possible to compare the behaviour and HIV prevalence of needle exchange attenders and non-attenders (Frischer 1993a; Frischer & Elliott 1993b). Data collected up to 1991 will be used in this chapter. In addition, data from other studies carried out in Glasgow which give valuable indicators of needle exchange performance, e.g. HIV prevalence and ethnographic research, will also be used. These are considered in the discussion.

Method

An opportunity to surmount the limitations of the proposed follow-up study was afforded by the first phase of a large scale cross-national study of injecting drug use carried out in Glasgow. Of the 503 injectors recruited to the study in 1990/91, 54% had made use of exchanges in the last 6 months while 46% had not. The aim was to examine the extent to which these groups differed in a wide range of attributes and to explore the implications of these findings for the needle and syringe exchange programmes in Glasgow.

Sample

As part of a cross-national study sponsored by the World Health Organisation, a sample of current Glasgow injectors was recruited using a multi-site and city-wide sampling strategy. Injectors were eligible for participation in the study if they: (a) had injected drugs in the 2 months prior to interview and (b) had not already been interviewed for the study in the current calendar year. In addition, those recruited from 'in-treatment' sites were only eligible if their current episode of treatment began within the previous 4 weeks. (For the purposes of this study 'in-treatment' sites were defined as agencies whose principal aim is to modify drug taking behaviour). One hundred and seventy injectors were recruited to the 'in-treatment' subset from 13 different agencies, representing most of the drug treatment capacity in Glasgow. A further 165 interviews were obtained with injectors recruited from needle and syringe exchanges, while the remaining 168 injectors were recruited from settings selected both to provide geographical spread and to maximise the likelihood that a proportion of the subset would include drug injectors who had no contact with drug treatment or harm reduction agencies. Thus, the sampling strategy resulted in a three way split of almost equal proportions, between in-treatment, needle exchange and out of treatment groups.

Procedure

Injectors were interviewed using a schedule containing detailed questions about HIV risk behaviour (Appendix 5). The majority of interviews (340/503) were conducted on-site in private interview rooms; 134 interviews with injectors recruited from shopping centres and via a chemist shop were conducted on a mobile interview bus, where two interviewers were always present. The final 29 personal-contact interviews were conducted in a variety of settings such as cafes, homes, etc. On average the schedule took about half an hour to administer. HIV testing was also carried out using saliva specimens collected at the end of each interview. These specimens were tested using immunoglobulin-G anti-body capture enzyme-linked immunosorbent assay (GACELISA). Positive specimens were confirmed by supplementary testing including Western blot analysis.

The design, sampling and measuring techniques are those recommended in other studies. Firstly it was carried out with consideration of local constraints and service operations (Hart 1989b; Hartgers 1989; Stimson 1989a; Hartgers 1990). Second, it was cross-sectional and comparative in design and used multi-site sampling (Oliver 1988; Donoghoe 1989b; Van Den Hoek 1989; Bley 1991; Calsyn 1991; Frischer 1991; Guydish 1991; Hagan 1991b; Klee 1991; Ljungberg 1991; Watters 1991; Grund 1992; Van Ameijden 1992). Third, it used self reported behaviours in conjunction with HIV testing (Hart 1989b; Guydish 1991). Fourth, data from other epidemiological studies were used to support or refute the findings (Buning 1991; Hagan 1991b; Ljungberg 1991; Van Ameijden 1992). Finally, other research, mainly from ethnographic studies carried out in Glasgow about the same time period were also utilised to inform these results (Barnard 1993; Barnard & Frischer 1995).

Analysis

Discriminant analysis was used to predict group membership, i.e. the 54% of the sample using needle exchanges in the last 6 months (group 1) and the 46% who did not (group 2). The analysis was conducted using SPSS/PC+. Variables were entered into the analysis using a stepwise selection procedure. The criteria for variable selection was minimisation of Wilk's Lambda (the within-groups sum of squares divided by the total sum of squares). For entering and removing variables, Wilk's Lambda was evaluated from the F distribution, with a minimum F to enter of 1.0 and a maximum F to remove of 1.0. The relative importance of each variable in the discriminant function may be assessed from the standardised discriminant function coefficients. As in multiple regression analysis, standardised coefficients are obtained when all independent variables are standardised to have a mean of zero and a standard deviation of 1. It must be remembered that the value of a coefficient for a particular variable depends on the other variables in the function.

Variables in the analysis

The dependent variable in the analysis was obtained by classifying cases in terms of whether they had received new injecting equipment from a needle and syringe exchange in the last 6 months. Two hundred and seventy two respondents out of the total sample of 503 (54%) reported using the/an exchange (group 1) while the remaining 231 (46%) reported never using an exchange (group 2). Twenty-seven independent variables were considered as potential predictors of group membership (Table 4.1). All behavioural variables refer to the 6 month period prior to interview (variables 19 - 23 have been calculated for an average month).

Table 4.1
Predictor variables used to discriminate needle exchange attenders from non-attenders

	Variable	Parameters
1	Age	Range: 16-41 years
2	Gender	Male 71% Female 29%
3	Marital status	Married 6% Not married 94%
4	Cohabit with sexual partner	No 64% yes 36%
5	Education	Range 2-16 years
6	Length of injecting drug use	Range 0.3-21.7 years
7	Ever received treatment for drug use	No 53% yes 47%
8	Lifetime number of types of treatment	Range 0-6
9	Lifetime number of episodes of treatment	Range 0-24
10	Number of drugs injected	Range 1-11
11	Number of primary sexual partners	Range 0-21
12	Number of casual sex partners	Range 0-21
13	Number of routes of infection mentioned	Range 0-11
14	Number of harm reduction changes made	Range 0-7
15	Number of harm reduction changes maintained	Range 0-5
16	Number of times in prison since first inject	Range 0-81
17	Number of nights in prison	Range 0-82
18	Number of times injected in prison	Range 0-44
19	Number of injections per month	Range 1-300
20	Number of injections with used equipment	Range 0-150
21	Number of times passed on used equipment	Range 0-150
22	Episodes of sexual intercourse with primary partners	Range 0-75
23	Episodes of sexual intercourse with casual partners	Range 0-75
24	Proportion of income from illegal sources	1:0%-5%:100
25	Condom use with primary partners	1:0%-5%:100
26	Condom use with casual partners	1:0%-5%:100
27	Frequency of cleaning for those sharing	1:0%-5%:100

Results

Both needle exchange attenders and non-attenders had a mean age of 24.4 years. Non-attenders were likely to be male (80%) compared with attenders (70%). HIV prevalence rates were low for both attenders (1.4%) and non-attenders (1%) and there was no significant difference between the two groups.

After 19 iterations, 14 variables were found to have made a significant contribution to the discriminant function, ($F=13.6$ $p< 0.001$) (Table 4.2).

Of the 14 variables which discriminated between attenders (group 1) and non-attenders (group 2), those relating to drug use were prominent; the best discriminator was the number of drugs injected, with group 1 reporting injecting fewer drugs than group 2, although, on average, the former injected more often than the latter. The second most efficient predictor was knowledge of HIV transmission routes, with group 1 having greater knowledge than group 2. Group 1 were also more likely both to make and maintain greater reductions in risk behaviour than group 2. Group 1 were more likely to engage in safer practices than group 2, i.e. less frequent injecting with (and passing on of) used equipment and greater use of condoms with casual partners. A total of 105 (39%) attenders and 108 (47%) non-attenders injected with used (borrowed) equipment at least once in the last six months. However, the proportion of each group who passed on (lending) injecting equipment in the last six months was similar; 157 (58%) of attenders and 131 (57%) of non-attenders. Even though there is no difference in the proportion in each group who passed on injecting equipment, the mean number of times this was done by attenders was lower (4.5 per month compared with 9.2). The reasons given by both groups for using borrowed equipment were similar. More than one response was given: most, 138 (64%), said that syringes were unavailable at the time of injecting; 73 (34%) said that they were careful

who they shared with; 62 (29%) said that they had cleaned the equipment and it was safe to use; and 40 (19%) said that needles and syringes were hard to come by. The majority (97%) of those who shared in both groups made some effort to clean their injecting equipment. However, about half used boiling water or bleach and the rest only hot or cold water.

The differences between the groups in relation to sexual behaviour were not as marked as with injecting. Both groups exhibited considerable sexual risk. Almost all, 493 (98%), in both groups reported that they were heterosexual. A total of 412 (82%) were sexually active in the last six months. Of those who were sexually active, 288 (70%) had a regular sexual partner. However, 216 (75%) did not use condoms with this partner. Of the 124 (30%) with at least one casual partner, only 20 (16%) had used a condom every time they had sex with that partner and 64 (52%) had never used condoms in this situation. Needle exchange attenders were marginally more likely to use a condom with a casual sexual partner than non-attenders (just over 25% of the time compared with less than 25% of the time). Approximately 173 (42%) had drug injecting partners. A total of 14% of females engaged in prostitution.

On average, group 1 reported receiving more education than group 2; were more likely to be female (although women were still in a minority) and were more likely to be cohabiting with their sexual partner. With regard to treatment, group 1 were less likely ever to have received treatment for drug use and had received fewer episodes of treatment than group 2.

Table 4.2
Standardised discriminant function coefficients and means discriminating between injectors using exchanges and not using exchanges

Variable	Standardised coefficient	Mean scores Attenders	Mean scores Non-Attenders
Number of drugs injected *	0.54	3.5	4.5
Number of routes of HIV mentioned *	0.45	6.4	5.7
Number of injections per month	0.42	127.5	119.8
Number of harm reduction changes mentioned*	0.41	1.5	0.9
Years of full time education *	0.34	10.4	9.9
Number of harm reduction changes made*	0.28	1.9	1.5
Number of injections with used equipment per month*	0.25	4.5	9.2
Ever received treatment (1: no 2: yes)	0.21	1.4	1.6
Lifetime number of episodes of treatment*	0.21	1.4	2.5
Cohabit with sexual partner (1: no 2: yes)	0.20	1.4	1.3
Gender (1: male 2: female) *	0.19	1.3	1.2
Number of times passed on used equipment per month	0.14	5.4	5.9
Condom use with casual partners	0.13	2.3	2.0
Length of injecting drug use	0.13	6.9	6.8

* Significant difference in the univariate F-ratio between the two groups ($p < 0.05$)

It is important to note that not all of these variables were univariately significant; i.e. the predictive power of these variables depends on their association with the other variables in the model. Conversely, Table 4.3 shows that 'lifetime number of types of treatment' was excluded from the model because the combination of other variables describing treatment was more efficient in explaining group differences.

Table 4.3
Variables which did not enter the discriminant function differentiating attenders from non-attenders

Variable	Mean scores Attenders	Non-Attenders
Age	24.4	24.4
Marital status	1.9	1.9
Proportion of income from illegal sources	2.2	2.3
Lifetime number of types of treatment *	0.9	1.3
Number of primary sexual partners	0.7	0.7
Episodes of sex with primary partners	4.3	4.1
Condom use with primary partners	1.5	1.7
Number of casual sexual partners	0.9	0.8
Episodes of sex with casual partners	0.7	0.6
Frequency of cleaning for those sharing	4.8	4.8
Number of times in prison since began injecting	6.3	7.1
Number of nights in prison in last 6 months	8.9	9.8
Number of times injected in prison in last 6 months	0.7	0.7

* Significant difference in the univariate F-ratio between the two groups

The overall contribution made by the set of variables included in the model to discriminating between the two groups may be assessed from the canonical correlation. This is a measure of how well the function discriminates between the two groups on a scale of 0.0 - 1.0. The canonical correlation in the present analysis was 0.42. As with a normal correlation coefficient, the square of the canonical coefficient represents the proportion of the total variance attributable to differences between the two groups. Thus 17.3% of the total variance is explicable in terms of between-group differences. The success of the analysis in discriminating between the groups can be gauged by comparing the efficiency of the model to randomly assigned group membership. With two groups, random assignment would result in a 50% success rate. If the discriminant function is applied to all cases in the analysis, 68.8% of cases are correctly assigned group

membership. The proportion of errors due to chance is therefore 50%, compared to 31.2% if the model is applied. Thus, using the model to predict group membership decreases, by 37.6% (50% - 31.2% / 50%), the proportion of errors that would occur if cases were classified randomly.

Discussion and conclusions

Using these data it is now possible to attempt to answer the three questions relating to the outcome of needle exchanges in Glasgow:

1.   **Do needle exchanges reduce the level of harm associated with drug injecting, and sexual risk behaviour among injecting drug users, including diseases such as HIV and Hepatitis-B and other physical problems such as abscesses?**

2.   **Do needle exchanges reduce drug and sexual risk behaviours among drug users including the level of injecting, sharing of injecting equipment and unsafe sex?**

3.   **Do needle exchanges have a long-term impact on both harms and risk behaviours?**

Before doing so it should be pointed out that any evidence used in this discussion is essentially associative. The data described in this chapter cannot be used to support or refute arguments relating to cause and effect. Because of its design, the study carried out for this thesis, at best, acts as an indicator of performance. Thus, although the questions are framed within the context of impact, data from this (and indeed other studies cited) in this chapter can only indicate possible effects of needle exchanges in these areas. As Alex Wodak elegantly points out 'HIV prevention policies are widely regarded as having successfully prevented the spread of HIV among IDUs, although rigorous scientific proof of their effectiveness is unavailable and wisely

not regarded as a prerequisite for adoption and expansion of prevention programmes. Attributing benefit to any single intervention is impossible when multiple strategies have been implemented at about the same time. The intensity of implementation is difficult if not impossible to measure and the effect of interventions is in all likelihood synergistic. In a categorical sense, these methodological problems cannot be resolved without a controlled trial of communities randomly allocated to a single intervention or no intervention. The ethical, logistical, financial and public health problems of attempting such a study are such that there is no alternative, especially in the urgency of the epidemic, to making a judgement on the grounds of plausibility, feasibility, cost and international experience. At issue is whether authorities in a particular country prefer to be roughly right or precisely wrong' (Wodak 1995).

Another important point which must be considered is self selection. Sample characteristics may explain the differences reported in this, and many of the studies cited in this chapter. This should be borne in mind when interpreting differences not only in rates of HIV infection between attenders and non-attenders, but also differences in risk behaviour between the two groups (Hankins 1992). For instance, researchers frequently report that needle exchange attenders exhibit lower levels of HIV infection and risk behaviours compared with non-attenders (Stimson 1988a, 1989a; Hartgers 1989; Buning 1991a; Watters 1991; Bley 1992; Hagan, Des Jarlais, Friedman et al 1992, 1993; Keene 1993; Dickson, Austin, Paul et al 1994; Paone, Des Jarlais, Caloir et al 1994; Van Ameijden 1994). However, since RCTs are not generally carried out in this field of research it may be possible that sampling bias has affected the results. Needle exchange attenders may be a lower risk group. Thus, to conclude that lower HIV infection and risk behaviours are attributable to needle exchange activity would be erroneous. Conversely, when HIV and risk behaviours are higher among attenders, as in Montreal, it may suggest that the needle exchanges are attracting higher risk groups of injectors (Bruneau, Lamothe, Lachance et al 1995).

In the present study there were a higher proportion of females (30%) attending exchanges than not (20%). However, there were important differences between attenders and non-attenders in Glasgow which indicate that the former are possibly a lower risk group(Table 4.2). Attenders injected on average fewer drugs compared with non-attenders and they shared less injecting equipment. There is also evidence of a greater awareness of HIV transmission among attenders. They were able to state on average 6.4 possible routes of HIV infection compared with 5.7 stated by non-attenders. These included sharing injecting equipment, unprotected sex, mother to child and blood contact. They also reported making on average more harm reduction changes in their life (1.9 compared with 1.5), mainly by reducing sharing. They were also less likely to have received drug treatment compared with non-attenders (an average of 1.4 lifetime contacts compared with 2.5). In addition they had received more full time education (10.4 years on average compared with 9.9). 'Self-selection', therefore, may account for the relative differences in sharing behaviour, and other behaviours, which were found in the present study.

1.   **Do needle exchanges reduce the level of harm associated with drug injecting, and sexual risk behaviour among injecting drug users, including diseases such as HIV and Hepatitis-B and other physical problems such as abscesses?**

There was no difference in the prevalence of HIV between needle exchange attenders and non-attenders in this study. Approximately 1% in each group were HIV positive. Although there are no prevalence data for the period prior to the opening of needle exchanges in 1987, recent studies indicate that HIV prevalence among injectors in Glasgow has remained low (1%) and stable since 1991 (Taylor, Frischer, Green et al 1994).

Evidence has emerged from other studies to support the argument that needle exchanges have a protective effect against HIV. An earlier study from Montreal reported that 20% of non-attenders were HIV positive compared with 8% of attenders (Hankins 1992). Similar findings relating to lower HIV prevalence rates among attenders are reported by other studies. In Tacoma (USA), 3% of needle exchange attenders were HIV positive compared with 8% of non-attenders (Hagan 1992) and in Seattle, 5% of attenders were HIV positive compared with 11% of non-attenders (Bley 1992). Low sero-conversion rates have also been reported among samples of needle exchange attenders. For instance, in New York, where approximately 52% of injectors are estimated to be HIV positive (Des Jarlais 1994a), there have been no reported sero-conversions among attenders between 1992 - 1993 (Paone 1994). In London, there was a low rate of seroconversion among attenders over a one year period. (Hart 1989b). On entry to the study 6% of attenders were HIV positive. This rose to only 7% at the end of the year. In New Haven (USA) the prevalence of HIV in syringes returned to needle exchanges decreased from 65% in 1990 to 40% in 1992 (Heimer 1993; Heimer 1994; Kaplan, Heimer 1994; Kaplan 1994b). The authors argue that needle exchanges reduced the number of infected needles circulating among injectors and therefore the likelihood of infection. The removal of infected

injecting equipment through needle exchanges is also supported by other studies. In San Francisco, 7% of syringes returned to an exchange were HIV positive (Guydish 1992) and in Sydney between 1% and 3% of returned syringes were HIV positive (Wodak 1987; Wolk, Wodak, Morlet et al 1988). In Amsterdam needle exchanges were introduced in 1984 and the prevalence of HIV since 1985 has remained stable (30%), whilst the annual incidence rate has fallen from 9.5 per 100 person years to 3.3 in 1991 (Buning 1991). It is therefore argued that needle exchanges are not associated with higher rates of HIV infections among injectors (Lurie 1993).

However, not all studies concur. More recent evidence suggests that needle exchanges may not always protect against HIV. In Montreal, HIV prevalence among attenders between 1989 and 1993 was 18% compared with 6% among non-attenders and the annual incidence of new infections was 11.6 and 3.5 infections per 100 person years respectively. Sero-conversion was strongly related to needle exchange attendance (Bruneau, Lamothe, Lachance et al 1994b; Lamothe, Bruneau, Soto et al 1994; Bruneau 1995). In another cohort study, carried out in Chicago, long term exchange attenders exhibited slightly higher but non significant seroincidence rates of HIV infection (O'Brien, Murry, Ouellet 1995). Cohorts of attenders and non attenders were followed-up from 1992 - 1994. The annual incidence rate of new infections for attenders was 3 per 100 person years compared with 0.75 among non-attenders. Unlike other research both of these are longitudinal cohort studies using multi-site sampling.

The present thesis is one of several studies which, although providing some evidence that needle exchange has a contributory role in reducing or containing the spread of HIV infection, remains inconclusive. HIV sero-prevalence among drug injectors in New York has remained fairly stable between 1984 (56%) and 1992 (52%) (Des Jarlais 1994a). In Amsterdam, injectors who seroconverted between 1985 and 1991 were compared with those who remained HIV negative.

The annual incidence rate per 100 person years fell from 9.5 in 1985 to 3.3 in 1991. Needle exchange attendance had a protective role earlier in the study but not in the longer term (Van Ameijden 1992). Other studies report similarities in the prevalence rates of attenders and non-attenders. In San Francisco, 14% of attenders were HIV positive compared with 19% of non-attenders, a non-significant difference (Watters 1991). In New Zealand, the prevalence of HIV among injectors, including needle exchange attenders, is approximately 0.5% (Dickson 1994). The authors are therefore unable to comment on the exclusive role of needle exchange in reducing or stabilising HIV infection.

The prevalence of Hepatitis B or C among needle exchange attenders and non-attenders in Glasgow was not measured in the present study. An effective saliva test does exist and blood samples would have had to have been taken. The latter was not feasible. However, there is evidence that hepatitis B and C infection is prevalent among injectors in the city (Gruer et al 1991; Follett 1995). In Glasgow 70% of drug injectors tested were HBV positive and 80% HCV positive. Studies from other areas of the world also indicate high rates of hepatitis B and C infection among injectors. In Montreal, evidence of hepatitis B infection was present in 60% of attenders and 44% of non-attenders (Bruneau 1994b, 1995). In North California, 71% of injectors were HBV positive and 72% HCV positive (Zeldis, Jain, Kuramoto et al 1992). In Australia and New Zealand, between 50% and 73% of injectors are HCV positive (Crofts, Hopper, Scott et al 1993; Woodfield & Harness 1993; Crofts, Hopper, Milner et al 1994; Van Beek, Buckley, Stewart et al 1994) and between 30% and 94% are HBV positive (Crofts 1994; Crofts & Wodak 1995). Like Glasgow, HIV infection among Australian IDUs remains low (between 2% - 7%) (Crofts 1995). Incidence rates for HBV and HCV among prison Australian inmates who injected drugs were recently reported as 21 and 41 per 100 person years respectively (Crofts 1995). There is some evidence that needle exchanges have a partial effect on the incidence of hepatitis B, although this is weak. For instance, in Tacoma (USA) the

number of drug injectors newly infected with HBV reduced from approximately 45 in 1986 to 5 in 1990. Needle exchanges were opened 1988 (Hagan 1991b) In Amsterdam, the number of injectors with acute hepatitis B reduced from 26 in 1984 to 5 in 1988. Needle exchanges began in 1984 (Buning 1991). However, most of the evidence relating to the effect of needle exchange on hepatitis B and C infection remains anecdotal (Lurie 1993). It is therefore possible that needle exchanges (including those in Glasgow) may not make a significant impact on these infections (Crofts 1995) and alternative methods may have to be used to reduce the spread e.g. encourage non-injecting methods of drug administration (Crofts 1995).

HIV and Hepatitis are not the only harms related to injecting. Abscesses and other tissue damage are fairly common among injectors. Approximately 31% of drug injectors attending a casualty department in Glasgow in 1986 had soft tissue sepsis, in and around injecting sites (Stone, Stone, Helen 1990). There is little evidence to suggest that needle exchanges reduce these forms of injecting related harms. Only one study has reported a reduction in the number of reported abscesses among needle exchange attenders in a one year period (Hart 1989b). Approximately 40% of attenders reported having abscesses at first attendance, but only 13% had abscesses 12 months later. However, recent research carried out in Glasgow as a result of this thesis found that 72% of attenders had injecting related problems e.g. abscesses and tissue damage, and that these may go untreated (Morrison 1995). Data from the present study indicate higher levels of injecting among attenders and this may also lead to a higher prevalence of soft tissue and injecting related injuries. However, in the absence of satisfactory data comparing cohorts of attenders and non-attenders, this proposition remains open to speculation. Thus, the effect of Glasgow needle exchanges on other injecting related health problems remains uncertain.

In conclusion, the data from the present study suggest that needle exchanges in Glasgow may have a protective effect against HIV, but since the HIV prevalence among non-attenders is also

low this proposition remains open to debate. It is also possible that needle exchanges do not protect against HBV and HCV, and that their effect on other injecting related health problems e.g. abscesses, remains uncertain.

2. **Do needle exchanges reduce drug and sexual risk behaviours among drug users including the level of injecting, sharing of injecting equipment and practising unsafe sex?**

There are three primary areas of concern. First the impact of needle exchanges on frequency of drug use and injecting. Second, their impact on the sharing of injecting equipment. Third, the impact on sexual risk behaviours.

The impact of needle exchanges on the frequency of drug use and injecting.

In the present study, needle exchange attenders used fewer drugs compared with non-attenders, on average 3.5 drugs per month compared with 4.5 respectively. The most common drugs used by both groups were buprenorphine, heroin, temazepam and amphetamine. However, attenders injected more frequently than non-attenders. The mean number of injections per month among attenders was 128 compared with 120 among non-attenders. Based on the intake data described in chapter 3, new clients injected mainly three drugs and carried out an average of 147 injections in the four weeks prior to entry. Thus the frequency of injecting among all needle exchange attenders is lower than that of new clients, suggesting a relative decrease after attending the programme. However, although there is evidence of a decrease in injecting after entry to the programme, it can be concluded that needle exchange attendance in Glasgow is associated with higher levels of injecting.

There is evidence from several studies which suggest that needle exchanges are associated with increased levels of injecting and drug use among those who use them. In a cohort study of

injectors carried out in Chicago form 1992 - 1994, attenders reported higher levels of injecting and spent more money on drugs compared with non-attenders (O'Brien 1995). Attenders injected on average 16.6 times a week compared with 9.2 times a week among non-attenders, and spent $254 on drugs per week compared with $200 by non-attenders. As with Glasgow, attenders injected more frequently prior to entry to the programme. In Chicago, however, attenders received more needles than they personally required (on average 24.4 extra needles per week). These were sold to buy drugs. In addition, there was also a positive association between injecting and the number of extra needles obtained at an exchange. The authors argue that needle exchange attendance is associated with increased injecting and drug use, and more specifically that extra free needles increased injecting and drug use. There was also no effect on the number of times a needle was used by an attender. Needles and syringes were kept on average 7.1 days both by exchangers and non-exchangers, and thus no evidence was found to support the argument that needle exchanges reduced the likelihood of reusing injecting equipment. Evidence that needle exchange attendance is associated with higher levels of injecting is supported by another cross-sectional study. Attenders at the Tacoma exchange (USA) injected on average 96 times per month compared with 62 times per month among non-attenders. The former also exhibited higher pre-entry injection rates (112 times per month) (Hagan 1991a, 1992). A further study from Tacoma, however, reported no difference in the frequency of injecting among attenders after entry (Hagan 1993). Evidence from a cohort study in Montreal suggests that attenders use more drugs than non-attenders (Bruneau 1994a). Approximately 86% of both groups used alcohol, 40% heroin, and 94% cocaine. However, 11% of attenders used other opiates compared with 3% of non-attenders; 73% of attenders used cannabis compared with 63% of non-attenders; and 27% of attenders used LSD compared with 15% of non-attenders. These studies are not consistent with the argument that needle exchanges are associated with lower levels of injecting and drug use.

On the other hand, several studies suggest that needle exchanges are associated with <u>lower</u> rates of injecting <u>and</u> drug use. Three longitudinal studies, from the UK and New York, reported a decline in injecting among needle exchange attenders (Stimson 1988a; Hart 1989a; Paone 1994). In the UK, the average number of injections reduced among attenders from 53 to 45 per month over a one year period (Stimson 1988a). In London, the median frequency of injecting reduced among a cohort of attenders from 56 to 48.5 injections per month, over one year (Hart 1989b). In New York, the average number of injections reduced from 97 to 88 per month among new attenders over a year (Paone 1994). Studies also report a reduction in drug use among attenders compared with non-attenders (Stimson 1989a; Buning 1991). In the UK, 13% of needle exchange attenders stopped using heroin, 8% stopped using methadone, and 8% stopped using tranquillisers over a one year period, whilst the only change among non-attenders was an increase in cocaine use (18% to 32%) (Stimson 1989a). In Amsterdam, 38% of needle exchange attenders reported a decrease in their drug use over a one year period (Buning 1991). It is also argued that needle exchanges reduce the circulation time of injecting equipment and thus the number of times a syringe is used (Heimer 1993). In 1990, 64% of syringes issued to clients at the exchange in New Haven (USA) were returned within a month, and in 1991 this rose to 70%. This is supported by a cohort study from Amsterdam where needle exchange attenders re-used their needle less often than non-attenders (Van Ameijden 1994).

Finally, some studies suggest that there are <u>no differences</u> in the levels of injecting <u>and</u> drug use between attenders and non-attenders. In a cohort study of drug users carried out in Amsterdam between 1985 and 1988, the proportion of those injecting (72%) did not increase and there were no reports of drug users starting to inject as a result of the availability of clean injecting equipment (Van den Hoek 1989). In another follow-up study in Amsterdam there were no differences between attenders and non-attenders in the range of drugs used (most commonly heroin, methadone, marijuana, tranquillisers and alcohol) or the frequency of injecting (78%

injecting daily in the previous month). Injecting did not increase over time (Hartgers 1989). In Lund, the frequency of injecting did not vary between two samples of attenders over a three year period (Christensson 1991). In Wales, there was no difference between attenders and non-attenders in the type of drug used (mainly amphetamine, heroin and temazepam) or the levels of injecting (82% injecting up to 5 days a week) over one year (Keene 1993). Using this evidence, it could be argued that needle exchange attendance is not associated with either raised or lowered frequencies of injecting or drug use.

The results from the present study are mixed. They support the contention that needle exchange attendance is associated with the use of a smaller number of drugs, but not a lower frequency of injecting. Although clients may on average inject more often than non-attenders, the former may reduce the frequency of injecting after attending an exchange.

The impact of syringe exchange on the levels of sharing of injecting equipment

This is probably the most important and contentious issue relating to needle exchange. In the present study, needle exchange attenders were less likely to inject with used (borrowed) injecting equipment than non-attenders. A total of 39% of attenders compared with 47% of non-attenders injected with used equipment on average 4.5 and 9.2 times a month respectively. However, approximately 57% in both groups passed on used injecting equipment although attenders did so less frequently than non-attenders (2.3 times per month compared with 2 times per month). Most of those who shared stated that they did so because of the unavailability of equipment at the time of injecting. The majority who shared (97%) attempted to clean injecting equipment, but only half used an effective method, usually bleach or boiling water.

The availability of equipment through exchanges should reduce the necessity to share equipment (Kaplan 1994b). Theoretically, needle exchanges supply injecting equipment, but through the

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exchange mechanism, reduce the amount of used equipment circulating in the injecting population and thus decrease the likelihood of sharing (Kaplan 1994b). In 1990, 64% of syringes issued to clients at the exchange in Tacoma (USA) were returned within a month, and in 1991 this rose to 70% (Heimer 1993). Circulation times of injecting equipment therefore were effectively reduced. Evidence from other studies support the argument that supplying clean injecting equipment reduces the necessity to share. For instance, the proportion of injectors who share in areas where clean injecting equipment is available is lower (78%) than areas where there is restricted access to sterile equipment (98%) (Calsyn 1991). In New York, it has been argued that the introduction of needle exchanges has been associated with a reduction in sharing from 51% of injectors to 7% between 1984 and 1992, although this is open to some speculation as needle exchanges were only introduced in 1990 (Des Jarlais 1994a). More detailed studies involving needle exchange attenders lend weight to the argument that needle exchange attendance is associated with a reduction in sharing. Longitudinal comparative research from the UK and Holland suggest that needle exchange attenders will reduce sharing more than non-attenders. In Amsterdam in 1987, 10% of exchangers borrowed used injecting equipment compared with 23% of non-exchangers in the four week prior to interview. In 1988, this reduced to 0% and 10% respectively. There was no difference in the proportion in both groups (36%) who lent injecting equipment, nor was their a change in this behaviour over time (Hartgers 1989). In the UK, the proportion of needle exchange attenders sharing injecting decreased from 28% in 1987, to 22% in 1988, whilst among non-attenders it fell from 52% to 49%. Approximately 25% of attenders borrowed equipment and 30% lent used equipment in 1987, compared with 19% and 25% respectively in 1988. Approximately 50% of non-attenders both borrowed and lent used injecting equipment in each year (Donoghoe 1989b). In Wales, 10% of attenders shared injecting equipment compared with 40% of non-attenders over a one year period (Keene 1993). It is important to note that in each of these studies, needle exchange attenders have lower baseline sharing levels, and in the Amsterdam and UK studies lending was higher than

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borrowing. However, there is no evidence that needle exchange attenders passed on injecting equipment more than non-attenders. One other cross-sectional study which compared attenders with non-attenders reaches similar conclusions. Needle exchange attenders at the Tacoma exchange (USA) injected on average 19 times per month with borrowed injecting equipment compared with 46 times per month for non-attenders (Hagan 1991). Finally, studies involving samples of needle exchange attenders where baseline and post-entry measures are taken also support the argument that needle exchange attendance is associated with reduced levels of both borrowing and lending. Approximately 30% of new attenders at a New York exchange borrowed used equipment in the 30 day period prior to their first visit. This fell to 11% after a year (Paone 1994). At the Tacoma needle exchange participants were asked about sharing in the four week period prior to their first visit and a 'typical' four week period since attending the exchange. The average number of injections with borrowed used equipment prior to their first visit was 56 and after their first visit 30. The average number of times a syringe was lent prior to their first visit was 100 and after their first visit 62 (Hagan 1993). In London 15% of attenders had shared injecting equipment upon entry to the exchange and 11% did so after one years attendance (Hart 1989b). Only one study commented on other sharing practices e.g. back-loading and even this reduced over time among needle exchange attenders (Paone 1994). Back-loading is a common method of sharing drugs. It involves the preparation of drugs in one syringe and then injecting this mixture into another drug user's syringe, in this instance at the rear of the barrel. Front-loading involves injecting the mixture into the front of another's syringe. Obviously, if the injecting equipment has been used before this is carried out, the risk of transmission of HIV and other blood borne diseases exists (Power 1994).

Not all research studies reach the same conclusion. Work from two cross-sectional studies in Manchester and Montreal report that needle exchange attenders pass on injecting equipment more frequently than non-attenders. In Manchester, 59% of needle of exchange attenders lent

used needles compared with 42% of non-attenders in the two weeks prior to interview (Klee 1991). It is not possible to give statistical details of the Montreal study because only an odds ratio is quoted for this behaviour (Hankins, Gendron, Tran 1994). One reason for passing on used injecting equipment was pressure from non-attending friends (Klee 1991). Different groups attending exchanges are also more likely to share equipment e.g. amphetamine users (Klee & Morris 1994).

A substantial number of papers found little or no association between needle exchange attendance and sharing injecting equipment. A large cohort study carried out in Amsterdam between 1985 and 1991 concluded that the effect of needle exchange on sharing may diminish over a long period of time (five years) with only some effect during earlier contacts. (Van Ameijden 1992). Up-dated reports from the same study reported a reduction in borrowing and lending in the injector population as a whole. For instance, in 1986 51% of injectors borrowed used equipment and in 1992 only 20% did so, and in 1986 46% lent used equipment compared with 10% in 1992. However, the reduction in sharing was not strongly associated with needle exchange attendance (Van Ameijden 1994). It is not possible to give a detailed statistical break-down of these data because of the logistic regression analysis used in this study. A recent cohort study carried out in Chicago from 1992 - 1994 found that needle exchanges had no observable effect on sharing (O'Brien 1995). In this study, sharing included front and back-loading and borrowing used injecting equipment or paraphernalia. Sharing levels stayed the same throughout the study period and there was no difference between attenders and non-attenders. Approximately 68% of attenders and 66% of non-attenders shared injecting equipment or paraphernalia. There was also no difference in sharing levels between attenders and non-attenders in another cohort study conducted in Montreal between 1989 - 1993. Sharing injecting equipment was reported by 90% of attenders and 88% of non-attenders in the six month period prior to interview (Bruneau 1994a, 1995). A cohort study from San Francisco did report

significant reductions in sharing in areas were needle exchanges operated. For instance, in 1987 36.5% of injectors shared compared with 25% in 1992. However this trend was already noted before needle exchanges began in 1988 (Guydish 1993). In a longitudinal study from San Francisco which used two cross-sectional comparisons, there was a reduction in sharing from 66% of injectors in 1987 to 35.5% in 1992. Only those who used an exchange more than 20 times a year were less likely to share. However only 28% of attenders made more than 20 visits a year. A single cross-section longitudinal survey of needle exchange attenders in Sweden also reported steady levels of sharing in the two samples (Ljungberg 1991).

In conclusion, the data from the present study support the argument that needle exchange attenders inject less with used (borrowed) injecting equipment compared with non-attenders. There was no difference in proportion of attenders passing on (lending) used injecting equipment to others, although there was evidence that they did so less frequently than non-attenders. These results indicate that needle exchange attendance in Glasgow is associated with reduced levels of sharing of used injecting equipment and are inconsistent with those studies which found increased or little difference in this behaviour between attenders and non-attenders.

Cleaning used injecting equipment

In the present study, the majority of needle exchange attenders and non-attenders cleaned used equipment before use. However, only half used an effective method e.g. bleach or boiling water. There was also no difference in the frequency of cleaning between the two groups. Ineffective methods, or not cleaning at all, have been reported by other studies. For instance, 55% of attenders at an exchange in Calgary cleaned used equipment, and 69% of these used bleach (Elnitsky 1993). One study has reported an increase in the use of effective cleaning methods with needle exchange attendance. In Tacoma, attenders used bleach to disinfect injecting equipment on average 69 times a month before attending, compared with 105 times per month whilst attending the exchange (Hagan 1993). However, another study reported lower levels, and ineffective methods, of cleaning among attenders compared with non-attenders (Hankins 1994). (No univariate statistics are available as logistic regression analysis was used). Studies carried out among various populations of drug injectors indicate that a substantial proportion who share injecting equipment do not clean their injecting equipment, or use ineffective methods of cleaning. In New York, 38% of those sharing equipment used ineffective cleaning methods e.g. water (Des Jarlais 1994a). In Toronto, 47% of those who shared used soap and water to clean injecting equipment (Coates 1992) In Dallas (USA), 22% of those sharing used bleach to clean their equipment (Krepcho, Fernandez-Esquer, Freeman et al 1993). Finally in London, 31% of injectors who shared used bleach to clean equipment, with the rest using either hot or cold water (Rhodes 1993a). Bleach is not distributed, and instruction regarding cleaning techniques not given in the Glasgow needle exchanges. It can therefore be assumed that needle exchanges in the city have had no impact on this behaviour.

The impact on sexual risk behaviour

Approximately 80% of attenders and non-attenders in Glasgow were sexually active. There were no significant differences between attenders and non-attenders in the number of primary and casual sexual partners, and the episodes of sex with those partners (Table 4.2). Attenders and non-attenders both had on average 0.7 primary partners, and 0.9 and 0.8 casual, sexual partners respectively in the six months prior to interview. Attenders and non-attenders had sex with their primary partner on average 4.3 times and 4.1 times per month respectively. Sex with primary partners was more frequent in both groups compared with casual partners. Attenders and non-attenders had sex with a casual sexual partner on average 0.7 and 0.6 times respectively per month. Approximately 75% of both groups did not use condoms with their primary partner, and 52% did not use condoms with their casual sexual partners. However, needle exchange attenders used condoms more frequently with their casual sexual partners compared with non-attenders. Most (99%) of male injectors in Glasgow (including attenders) define their sexual orientation as heterosexual (WHO Collaborative Study 1993). Approximately 14% of females in both groups engaged in prostitution.

The evidence that needle exchange reduces sexual risk behaviour is extremely weak and very scarce. Some studies do not include sexual risks when monitoring outcome, concentrating instead on drug related behaviour (Guydish 1993; Hagan 1993; Heimer 1994). Only small reductions in sexual risk behaviours have been noted in one study. Approximately 26% of needle exchange attenders who were sexually active had multiple partners upon entering the study and 21% at second interview, one year later. This compares with 32% and 44% of non-attenders in the same time period. Approximately 30% of attenders and non-attenders used condoms. Condom use did not change over time (Donoghoe 1989a).

The majority of studies suggest that needle exchanges have little or no impact on sexual risk behaviours (Lurie 1993). Single sample studies of needle exchange attenders report that between 42% and 83% do not always use condoms with their regular sexual partner (Hankins 1991; Elnitsky 1993; Johnson 1994; Bruce, Philip, Shucksmith 1995). In Montreal, condom use with regular partners and casual partners was reported by 58% and 60% of attenders respectively. Women were less likely than men to use a condom with their regular and casual partners (Hankins 1991). In Toronto, only 42% of attenders used condoms for vaginal sex, and 52% had multiple sexual partners (Elnitsky 1993). In Aberdeen, 35% of attenders had more than one sexual partner and 61% of these never used condoms with that partner (Bruce 1995). Long term comparative studies show little difference in the sexual risk behaviour of attenders and non-attenders. For instance, in Amsterdam, needle exchanges had no apparent protective effect against sexually transmitted HIV. A total of 31 injectors in the study seroconverted between 1985 - 1991. Of these, 13 (42%) used needle exchanges as a source of supply for all their injecting equipment. There was no significant difference in the seroconversion rates, nor in the frequency of sharing, between attenders and non-attenders. Thirteen seroconverters did not report sharing needles, but all reported having sexual contact prior to becoming HIV positive. This implies that the sexual risk of HIV is evenly spread between attenders and non-attenders (Van Ameijden 1992). In another cohort study from Chicago there was also no difference between attenders and non-attenders in the number of partners and condom use. Approximately 43% of attenders and 40% of non-attenders had multiple sexual partners and did not always use condoms with these partners (O'Brien 1995).

The results from the present study are similar to those which find little or no impact of needle exchanges on the sexual risk behaviours of those who attend. Both attenders and non-attenders in Glasgow exhibit similar patterns of sexual risk behaviour. Thus, the Glasgow needle exchanges have relatively no influence on this type of risk.

3. Do needle exchanges have a long-term impact on both harm and risk behaviours?

It is outwith the scope of the present study to determine whether or not needle exchanges in Glasgow have long term effects on harm or risk behaviours. Using a comparative non-longitudinal design, it can only provide a snap-shot of behaviour and HIV prevalence at a given point in time and relates only to possible impacts during that period. However, existing research has provided some insight into the effects of needle exchanges in the longer term. All longitudinal research relating to needle exchanges has been cited in the preceding sections and is given in Table 4.4. Study times vary from 1 - 7 years (Table 4.4).

Table 4.4 Longitudinal studies

Study Reference	Place	Study Period	Study Design
Paone 1994	New York	1 year	Exchange cohort sample
Hart 1989b	London	1 year	Exchange cohort sample
Donoghoe 1989a Stimson 1988a	UK	1 year	Exchange and non-exchange cohort samples
Hartgers 1989	Amsterdam	1 year	Exchange and non-exchange cohort samples
Keene 1993	Wales	1 year	Exchange and non-exchange cross-sectional samples (baseline and one year)
Hagan 1993	Tacoma (USA)	1 year	Exchange cohort sample
Heimer 1993	New Haven (USA)	2 years	Samples of needles from exchanges
O'Brien 1995	Chicago	2 years	Exchange and non-exchange cohort samples
Bruneau 1994a, b, 1995	Montreal	4 years	Exchange and non-exchange cohort samples
Hagan 1991b	Tacoma	5 years	Hep-B incidence data
Buning 1991	Amsterdam	5 years	Hep-B incidence data and reports from other studies
Guydish 1993	San Francisco	5 years	Exchange and non-exchange cross-sectional samples (baseline and five years).
Watters 1993	San Francisco	5 years	Exchange and non-exchange cross-sectional samples (baseline and five years)
Van Ameijden 1992	Amsterdam	6 years	Exchange and non-exchange cohort samples
Van Ameijden 1994	Amsterdam	7 years	Exchange and non-exchange cohort samples
Des Jarlais 1994a	New York	7 years	Exchange and non-exchange cross-sectional samples (baseline and seven years)

Longitudinal cohort studies, especially those which compare needle exchange attenders with non-attenders, are probably the most rigorously designed research in this field. The first comparative cohort studies were carried out by Stimson (UK) in 1987/8, Hartgers (Amsterdam) in 1987/8, and Van Amiejden (Amsterdam) 1985/91. Both Stimson and Hartgers followed samples up over one year, whilst Van Amiejden followed cohorts over six years (Table 4.4). Since then, three additional large cohort studies have been carried out. Van Amiejden extended the original study to seven years; O'Brien (Chicago) has recently completed a two year follow-up from 1992 - 1994; and Bruneau (Montreal) has reported on a four year follow-up carried out between 1989 - 1994.

Earlier, shorter term, cohort studies tend to report more positive impacts of needle exchange, especially on risk behaviours (Stimson 1988a; Donoghoe 1989a; Hartgers 1989), whilst more recent and longer term studies report more negative impacts (Bruneau 1994a, 1994b, 1995; Van Ameijden 1992, 1994; O'Brien 1995). For instance, Stimson reported greater reductions in drug use, sharing and sexual risks among attenders compared with non-attenders over time (Stimson 1988a; Donoghoe 1989a). Hartgers also reported a greater reduction in sharing among attenders compared with non-attenders over time (Hartgers 1989). However, more recent and longer term studies reported little or no impact of exchanges on HIV prevalence of attenders compared with non-attenders (Van Ameijden 1992; Bruneau 1994a, 1994b, 1995; O'Brien 1995). Two studies also reported an increase in injecting and drug use among attenders compared with non-attenders (Bruneau 1994a; O'Brien 1995). All three show an increase or similarities in sharing among attenders compared with non-attenders (Bruneau 1994a, 1995; Van Ameijden 1994; O'Brien 1995). Finally, two of these studies reported little difference in sexual risk behaviours of attenders and non-attenders over time (Van Ameijden 1992; O'Brien 1995). It is probably fair to conclude, using the findings from the more recent and more extensive studies, that needle

exchanges have no or little impact on the transmission of HIV, levels of injecting, drug use, sharing and sexual risks of attenders <u>in the longer term</u>, e.g. a period of two years or more.

Of course this does not automatically discount the findings of other single sample attender cohort, and needle tracking, surveys, many of which report positive impacts of needle exchanges. For instance, two single sample cohort studies from New York and London report a protective effect of needle exchanges against the transmission of HIV (Hart 1989b; Paone 1994). The needle tracking study carried out in New Haven also supports this finding (Heimer 1993). There is also evidence of a protective effect of needle exchanges on hepatitis B and abscesses based on epidemiological evidence and one single sample cohort study (Hart 1989b; Hagan 1991b). Single sample cohort studies have also found a reduction in injecting and sharing among attenders (Hart 1989b; Hagan 1993; Paone 1994).

There are, however, limitations to these studies. First, they do not use comparison samples (Hart 1989b; Hagan 1993; Heimer 1993; Paone 1994). Second, they are generally limited to 1 year follow-up (Table 4.4). In addition, their findings are contradicted by those of other longitudinal comparative cross-sectional studies. For instance, three longitudinal comparative cross-sectional studies found only a partial effect of needle exchanges in protecting against HIV and reducing sharing over time (Guiydish 1993; Watters 1993; Des Jarlais 1994a). Thus, given the methodological limitations of these surveys, the weight of evidence rests with more recent and longer term comparative cohort research which suggests that needle exchanges have little long term impact on HIV transmission, levels of injecting, drug use, sharing and sexual risks. This may also apply to needle exchanges in Glasgow.

In conclusion, the results of the present thesis suggest that needle exchanges in Glasgow may protect against HIV. However since the HIV prevalence among non-attenders was low, this leaves this proposition open to debate. It is also possible that needle exchanges do not protect against HBV and HCV, and that their effect on other injecting related health problems e.g. abscesses, remains open to speculation. Attendance in Glasgow was also associated with higher levels of injecting, and a high proportion of attenders and non-attenders did not clean used injecting equipment effectively. Thus the effect of needle exchanges on both these behaviours remains minimal. Both attenders and non-attenders exhibited similar patterns of sexual risk behaviours which suggests that the Glasgow needle exchanges have relatively no influence on sexual risk. On the other hand, attenders used fewer drugs and shared less injecting equipment than non-attenders, and thus needle exchanges may have had some impact on these behaviours, particularly sharing.

Thus, the effects of needle exchanges in Glasgow are mixed and open to conjecture. The most notable 'positive' impact is that of a possible reduction of sharing of injecting equipment among those who attend. However, this is seemingly outweighed by others which suggest a minimal impact on other related harms and sexually related risks. How can these findings be explained?

There are other factors which could account for the lack of spread of HIV among injectors in the city. These include the cessation of injecting or death of those already infected with HIV (Bloor, Frischer, Taylor et al 1994); the impact of other drugs services which tackle various drug related harms, including needle exchange pharmacies, and those which provide HIV related information (Elliott 1994; Watters 1994). There is also evidence of a general reduction in risk behaviours in the drug injecting population which may be determined by social factors (Frischer, Bloor, Green et al 1992; Bloor 1994). For instance, the proportion of injectors using borrowed equipment decreased from 43% in 1990/1 to 29% in 1991/2, and the average number of people from whom

this equipment was borrowed reduced from 3.7 to 2.6 (Frischer 1992). As a result, it extremely difficult to determine exactly what contribution needle exchanges have made to containing the spread of HIV among this population. Given the marginal differences in risk behaviour between needle exchange attenders and non-attenders in this study the effect may only be partial.

Perhaps the key to understanding these relatively marginal impacts of needle exchanges on drug related harms is that these are underpinned by only marginal changes in risk behaviour. Even although sharing has reduced in recent years and needle exchange attenders share less than non-attenders, sharing still continues. These behaviours may be governed by factors which are largely outwith the control of services like needle exchanges and may be strongly related to social norms.

Social influences can change within a drug user's life thereby affecting behaviour over time. There is strong evidence to support this notion. For instance amphetamine, cocaine and temazepam users are more likely to inject and share more frequently than other injecting drug users (Klee 1991, 1994; Bruneau 1995). This need not be related to the necessity to inject more frequently, but also to social factors including poor social support, social networks and poverty (Hartgers 1992; Bruneau 1994a). The method of drug taking can also change over time. Between 1984 and 1992 in New York there was a reduction in injecting which was related to an increase in snorting heroin, and in Edinburgh a reported decrease in injecting was associated with an increase in oral drug use (Haw & Taylor 1993; Des Jarlais 1994a). Changes in the method of drug taking have also been noted by other authors (Guydish 1993; Bloor 1994; Watters 1994; Strang, Griffiths, Powis et al 1995) and may be influenced by various factors including drug availability, drug market knowledge, contacts with drug using groups, and concern about AIDS (Power 1989; Watters 1994; Power, Green, Foster et al 1995a). Sexually related risks are also particularly common among injectors with many reporting a low use of condoms with regular

sexual partners especially among females, and unprotected sex with multiple partners (McKeganey 1989; Hartgers 1990; Calsyn 1991; Milson 1992; Ross, Wodak, Gould et al 1992; Rhodes 1993a; White, Phillips, Mullcady et al 1993; WHO Collaborative Study 1993; Des Jarlais 1994a; Rhodes, Donoghoe, Hunter et al 1994b; Lewis, Watters 1994). Thus changes or transitions in behaviour which include injecting, sharing and sexual behaviour may be shaped, not only by contact with a needle exchange, but also by extraneous factors which are associated with social or cultural norms.

I would argue that these factors have had a major contribution in preventing further behavioural change among needle exchange attenders and non-attenders. The influence of social and cultural norms on sharing has been well documented in a number of other ethnographic studies. Many of the attenders in the present study claimed that they shared because of the unavailability of injecting equipment. However, it would be erroneous to assume that they did not have access to adequate supplies of clean injecting equipment. Sharing will occur despite the general levels of supply. Of particular interest is sharing which takes place between sexual partners; a situation where women may rely on their male partners for injecting equipment (Bloor 1994). As a result, female injectors may be more exposed to sharing situations (Barnard 1993). Female sexual partners of drug injectors are thought to be at additional risk of HIV infection (Rhodes 1993a; McDonald, Loxley, Marsh 1994). At an individual level, drug injectors may also be prepared to lend rather than borrow used injecting equipment because of the lack of perceived personal risk (McKeganey 1989). Thus, although in some instances sharing practices result from a lack of clean injecting equipment e.g. prison and areas where supplies are restricted (Bloor 1989; Kennedy 1991; Coates, Rankin, Lamothe et al 1992) other situational and social factors are clearly important. The mere fact that 39% of Glasgow needle exchange attenders used borrowed injecting equipment supports this argument. In addition, other common sharing practices must also be considered, including front and back-loading, and sharing other injecting paraphernalia,

which although not proven as vectors of HIV infection may theoretically act as mechanisms for infection (Power, Hunter, Jones 1994).

Achieving change in the sexual risk behaviour of attenders is perhaps the most difficult task facing services such as needle exchanges. One possible reason for the limited effects of needle exchanges on sexual risk is that visits made to exchanges are brief and therefore time to engage in sexual counselling is limited (O'Brien 1995). Evidence from the attendance data gathered at needle exchanges in Glasgow would support this argument. Condoms are only taken by clients during 15% of visits to an exchange and safer sex advice accounts for only 20% of visits where other services are received (Chapter 3).

Sexual risk behaviours are prevalent among the general population of injecting drug users. Many authors report the low use of condoms with regular and multiple partners (McKeganey 1989; McKeganey & Barnard 1992c; Hartgers 1990; Calsyn 1991; Milson 1992; Ross, Wodak, Gould et al 1992; Rhodes 1993a; White, Phillips, Mulleady et al 1993; WHO Collaborative Study 1993; Des Jarlais 1994a; Rhodes, Donoghoe, Hunter et al 1994b; Lewis, Watters 1994). There are a number of social barriers to condom use. These include: inconvenience, dislike, the desire to conceive, negotiating condom use, drug use, low perceived risk of HIV, and trust and perceived promiscuity between sexual partners; the more trust in a relationship the less likely it is that a condom will be used. (McKeganey 1989; Hartgers 1990; Klee 1990, 1993; White 1993; McDonald 1994).

It should also be stressed that sexual risks are not spread evenly between males and females. In the general population, heterosexual females are more at risk from HIV infection than heterosexual males (Feucht, Stephens, Roman 1990), and inequalities between men and women may make women particularly vulnerable to infection e.g. male masculinity which acts as a

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barrier to negotiation of condom use and safer sexual practices (Aggleton & Gilmore 1994). Drug injecting women may be at additional risk. For instance, some believe themselves to be infertile and have a desire to conceive (White 1993). Female injectors are less likely to use condoms than males, and low condom use is associated with regular sexual partners. This is important since female injectors are more likely to have an injecting male partner (Donoghoe 1989a; Klee 1993; Rhodes 1993a; Taylor 1993; White 1993; McDonald 1994). Having a sexual partner who also injects drugs is associated with higher risk behaviours including sharing injecting equipment (Barnard 1993; Saxon 1994). In addition there is some evidence to suggest that low levels of condom use are also associated with higher levels of sharing (Watters 1994). All these factors are related to sexual and social relationships. Thus, although both male and female drug injectors exhibit sexual and drug related risk behaviours, gender related risks are also apparent. Higher sexual risk behaviour among female injectors also make them particularly vulnerable to diseases such as HIV and hepatitis B.

Thus, I would argue that needle exchanges in Glasgow have made only some impact on sharing, and even less impact on sexually related risks, and that strong cultural and social influences may prevent further change from taking place. As a consequence, needle exchanges have only a marginal impact on changing risk behaviours over time. This is supported by long-term research which suggests that needle exchanges have no or little impact on the transmission of HIV, levels of injecting, drug use, sharing and sexual risks in the longer term.

In Amsterdam, needle exchanges were found to decrease the likelihood of becoming infected with HIV during earlier contacts with drug injectors, but this effect diminished over time (six year period) (Van Ameijden 1992). The authors argue that attenders may have had a greater desire to reduce their risk behaviours when first contacting an exchange, but later viewed the exchange as only one way of obtaining clean needles. Thus only marginal changes in behaviour occurred as

length of contact with an exchange increased. In Chicago, it is argued that the relatively low impact of needle exchanges may be related to economic motives among attenders. In other words, attenders chose to go to needle exchanges, not out of a concern about AIDS or the need to change their risk behaviours, but to obtain injecting equipment which can be sold for drugs (O'Brien 1995). The authors of the Montreal study have not given any explanation of their results, so it is difficult to comment on the low impact of exchanges in this city. However, there is the possibility that those attending the exchanges belong to a relatively high risk cohort, and may be influenced by social factors which place them at greater risk of becoming infected with HIV and possibly hepatitis.

Indeed, the solution to reducing these risks will depend upon bringing about further behavioural change which is determined by social or cultural factors. For instance, the containment and reduction of hepatitis in Glasgow may necessitate a shift away from injecting to other methods of administration, or cessation, of drug use. Reduced levels of sharing and increased levels of condom use should also be tackled with a view to some of the social constraints which prevent behavioural change.

It is perhaps in this respect that needle exchanges have failed to make any significant impact, especially in the longer term. Arguably they have gone some way towards achieving and maintaining some behavioural change, but because they are based upon a model which is individual centred they may have failed to make significant headway in motivating social change (Bloor 1992; Rhodes 1993b). Working with communities of drug users rather than individual drug users would perhaps tackle the social norms and influences which lead to continued risks (Rhodes 1993b). Needle exchange has a role to play in this approach. This would require structural change to the service in Glasgow which would mean a shift in emphasis from a 'needle exchange centred service' to one which included outreach work and possibly peer education. If

carried out in conjunction with other outreach initiatives in the city, then greater collaboration with other drugs services in Glasgow could be achieved (Rhodes 1994a; Stimson 1994; Power 1995). This would improve working relationships and communications between drug agencies which are lacking in the city (Shewan 1993, 1994; Elliott 1994). In addition, the other problems outlined in Chapter 3 including contacting hard to reach injectors, improved retention and referral rates would also be tackled. Finally, services such as methadone prescribing should also be considered which would offer drug injectors an alternative to injecting. In 1994 a new methadone prescribing service was set up in Glasgow, (Glasgow Drug Problem Service), which should help achieve this goal.

Despite these apparent failures, the possible successes of needle exchanges should not go unrecognised. Even if Glasgow needle exchange attenders are a self-selected lower risk group, then at least for them needle exchange offers the opportunity to maintain lower levels of drug related risk, despite the social factors which make further change more problematic. At the very least, the implementation of exchanges has not been associated with an increase in HIV infection nor sharing among those who attend. The number of drugs used by attenders is lower than non-attenders and although the frequency of injecting is higher there is no evidence that this has led to an increase in injecting among the wider drug using population. In 1985 Glasgow had an estimated 5,000 injectors (Haw 1985). In 1992 the estimated number was 8,500 (Frischer 1993a). Although these estimates suggest a sharp increase in the injecting population, it would be wrong to attribute this solely to the introduction of needle exchanges during that time. Firstly, needle exchanges were introduced as part of the response to injecting which had clearly become increasingly prevalent in the early 80's (Ditton 1982; Sakol 1989; Hammersley 1990). Secondly, the two estimates are based on different statistical techniques and cannot therefore be compared. It is, therefore, uncertain how much the injecting population increased during the expansion of the needle exchange programme and secondly how much of this, if any, was

attributed to needle exchanges. Thus, although it is tempting to conclude that needle exchanges are related to changes in the general level of injecting among the IDU population, evidence from prevalence studies suggest that other factors will influence these trends. There is certainly no evidence that needle exchanges have led to an increase in injecting among the general IDU population in Glasgow. It is also impossible to tell what the consequences would have been if needle exchanges had not been introduced in Glasgow. Inaction would have been unthinkable especially in the light of research form the UK and abroad at that time which indicated the success of needle exchanges in reducing HIV risk behaviours among injecting drug users (Stimson 1988a; Hart 1989b; Hartgers 1989).

Research

The number of research studies relating to the outcome of needle exchanges has grown considerably since 1991. Methodological and moral constraints prevent the use of randomised control trials in this area and as a result there are a wide range of study designs. A wide range of analytical techniques are also used ranging from summary statistics e.g. mean and median, to multivariate analyses e.g. logistic regression. It was therefore difficult to summarise the results of these studies and comparisons were often impossible to carry out. In addition, because each used non-random sampling procedures, the results may be subject to sampling bias. This meant that interpretation was even more difficult. However, it was possible to draw <u>general</u> conclusions from the research and these have been used in the preceding section of this chapter.

It is also clear that more sophisticated studies have been carried out, or at least reported, since 1991. These include large cohort studies which have followed needle exchange attenders and non-attenders over long periods of time (Van Ameijden 1992; Bruneau 1995; O'Brien 1995). Longitudinal cross-sectional comparative, and possibly cohort studies, are needed if the long term effects of needle exchange programmes are to be successfully evaluated. These are the most sophisticated studies carried out in this field of research. The research carried out in Glasgow and presented in this thesis was comparative but did not have a longitudinal component. This should be now be carried out, perhaps using further cross-sectional samples of attenders and non-attenders recruited by the Glasgow HIV Behavioural and Prevalence Study. However, it could be argued that quantitative research has dominated this field, possibly at the expense of qualitative work. Some of the findings of the research carried out in Glasgow, and from the large cohort studies, are left open to speculation and qualitative research is required to explain and understand some of the differences found between those attending exchanges and those who did not.

Quantitative techniques can identify relationships between a complex number of behavioural, attitudinal, cognitive and social factors but do not constitute an explanation of these relationships. Qualitative data on the other hand can provide contextualisation, and further interpretation and should lead to a greater understanding of the determinants behind these relationships (Barnard 1995). For instance, identifying the complex social relationships which determine sexually related risks among injectors. Qualitative research may, in these instances, be of value in explaining and understanding the complex relationships between behavioural change, service provision, uptake and impact. Ideally qualitative and quantitative techniques should be combined in these research studies. This is surely an argument for developing both techniques in the field of service evaluation, including needle exchange, which until now has been largely dominated by quantitative research methods.

CHAPTER 5

NEEDLE EXCHANGES AS PUBLIC HEALTH INTERVENTIONS

'Policy-makers need to be aware that while Scotland needs to be targeted for programmes aimed at reducing HIV transmission in drug injectors, they must consider negative public attitudes towards drug injecting. Such attitudes may be more negative in Scotland because of the public response toward the syringe-exchange schemes. These circumstances may make it more difficult to alleviate this regional social problem' (Nuero 1989).

Introduction

Needle exchanges should provide a public health service by removing discarded syringes from the environment, thereby reducing the likelihood of needle-stick injuries and the risk of HIV and other infections (Hartgers 1989; Buning 1991). A study from the United Sates showed that the number of discarded needles and syringes found in the vicinity of a needle exchange decreased after the exchange opened (Oliver 1992b). This could be related to the exchange mechanism. For instance, up to 1991 the exchange rate of needles and syringes at exchanges varied from 51% to 95% depending on locality and type of service e.g. static or mobile (Stimson 1988a, 1989b; Hart 1989a; Hartgers 1989; Guydish 1991; Ljunberg 1991). Some equipment returned was likely to be HIV antibody positive (Wodak 1987; Wolk 1988; Guydish 1992; Heimer 1993). In Amsterdam, however, there was an increase in the number of reported needle-stick injuries among the general public between 1984 and 1988, following the introduction of needle exchanges (Buning 1991). However, there were no known HIV seroconversions as a result, and it must be pointed out that, at its peak in 1990, only 31 injuries were reported by the general public in the city (Vester 1992). Thus, although the evidence up to 1991 was patchy, it indicated a degree of public protection from the problem of discarded injecting equipment.

AIDS related services have often been the focus of public attention. Needle and syringe exchange schemes, for example, have been the subject of heated public debate and in some instances public pressure has prevented them from operating or placed restrictions on their

operations (Ginzburg 1989; Stimson 1989b; Anderson 1991; Christensson 1991; O'Keefe 1991; Singer 1991). Public opinion is therefore an important factor in their development.

In some countries, public opposition to needle exchanges has been intense. In many states in the USA there are laws prohibiting the supply and possession of injecting equipment (O'Keefe 1991). Political opposition to needle exchanges has come from both federal and state politicians as well as ethnic community leaders, especially those in black and Hispanic areas (O'Keefe 1991; Singer 1991). Opponents often base their arguments on the possible negative consequences of needle exchange, especially an increase in drug use. They also see it as being ineffective in tackling the fundamental issues associated with drug use, including poverty and racism. Of course, there are a number of countries where legal restrictions and community opposition have been successfully tackled. In these countries, community and political opposition was less of a problem for service providers than in the USA. In Canada, for instance, there was some concern about the number of needles and syringes found in public areas. Needle exchanges were then promoted as a means of tackling this issue and started operating in 1989 (Bardsley 1990). In Australia, possession and supply laws were repealed in 1987, allowing the distribution of injecting equipment. In Europe, clean injecting equipment was available from pharmacies in most countries before 1984 and from needle exchanges throughout the 1980s (Chapter 1, Fig 1). There were, however, European countries where public opposition was more vocal. In Sweden, laws restricted the supply of injecting equipment to medical prescription, and although there was support for needle exchanges among medical workers, local authorities and the media, resistance was evident among politicians and social workers when they were set up in 1986 (Christensson 1991). In Scotland, although legislation did not prohibit the distribution and possession of needles and syringes, and support for needle exchanges existed in medical and non-medical drugs services, the first needle exchange in Glasgow was picketed by people from the local community in 1987 (Stimson 1988a; Johns 1989; Nucro 1989). This may have been related to the choice of the needle exchange site and a feeling among local residents that the service was being 'dumped on them' (Stimson 1988a). Although Glasgow cannot be compared with some cities in the United States where political and community opposition was (and still is) intense, it was one of

the few places in Europe which experienced resistance from local residents, or at least where the resistance was well documented, when needle exchanges began operating in the late 1980s.

It was not clear, however, what proportion of the general population in Glasgow held these adverse views. Reports from the UK and other countries up to 1991 concerning public attitudes to needle exchanges were largely descriptive and dealt with unrepresentative sub-groups of the population e.g. police, political groups, social workers and some members of the public who objected (Stimson 1988a; Blatherwick 1989; Ginzburg 1989; Christensson 1991). Such reports, although useful in highlighting opposition or support among powerful or interested parties, did not indicate how widely these views are held in society. Some unpublished studies from the USA reported that between 50% and 67% of the population supported needle exchanges (Singer 1991; Lurie 1993). However, there were practically no published representative quantitative data concerning public attitudes towards exchanges, especially in Britain, and little indication of what types of people in the general population were opposed to them.

The present study addresses the two issues of public acceptability and protection using quantitative data. Data presented in this chapter are drawn from a survey which measured the extent of support for and opposition to needle exchanges among random samples selected from the general population of Glasgow and Edinburgh. Data from Glasgow City Council are also used to illustrate the number of needles an syringes found in public areas throughout the city from 1989 - 1993. This is complemented by data from the Glasgow needle exchanges detailing the numbers of needles and syringes exchanged since 1989. These should provide an answer to the final question posed in this thesis namely:

4.   **Are needle exchanges acceptable to the general public and do they protect the public?**

The public attitude survey

Method

Three questions concerning needle exchanges and drug injecting were inserted into a lifestyle and health survey carried out by the Research Unit in Health and Behavioural Change, at Edinburgh University. This is essentially a longitudinal health survey, but three additional questions were included for a single sweep. The questions were developed by the present author and commissioned by the HIV and Addictions Resource Centre. Data were collected by telephone interviews in Glasgow and Edinburgh during June - October 1992.

Respondents were selected using a two stage procedure. First, a household was selected using a random digit dialling procedure covering Glasgow and Edinburgh telephone numbers, including unlisted numbers. Second, once contact was established, an inventory of all adults aged 18 - 60 in the household was taken and a second random procedure used to select a respondent. The sample and data were weighted to take account of the slightly lower proportion of phone owners in socially deprived areas (Robertson, Uitenbroek, Hay 1994). This novel sampling method is thought to be effective in producing representative samples from the general population (McQueen 1989).

Data were collected on age, sex, occupation, age when leaving full-time education, city of residence and whether the respondent agreed or disagreed with the following statements: 'It is important for those who inject drugs to use sterile needles'; 'Needle exchange schemes should be available for those who inject drugs'; 'I would have no objection to a needle exchange scheme operating in my neighbourhood'. A total of 1025 cases were analysed, 609 from Glasgow and 416 from Edinburgh. These data were analysed by the present author using SPSS PC+ software.

Discriminant analysis was used to analyse the difference between those who supported needle exchanges and those who did not. A second discriminant analysis was carried out to determine the differences among objectors. Variables were entered into both analyses using a stepwise

selection procedure. The criterion for variable selection in this procedure was minimisation of Wilk's Lambda. For entering and removing variables, Wilk's Lambda was evaluated from the F distribution, with a minimum F to enter of 1.0 and a maximum F to remove of 1.0. Variable selection terminates when no more variables meet the entry or removal criterion, (after the final iteration). The relative importance of each variable included in the final model can be assessed by its standardised discriminant function coefficient, and the resulting model(s) can be assessed using the canonical correlation (scale 0 to 1), the total explained variance between the two groups in the model(s), and the models' ability to predict group membership (Norusis 1990).

Results

All 1025 responses to the three statements are given in Table 5.1. Substantially more respondents disagreed with the proposition that needle exchange should operate in their own neighbourhood compared with the general statement that needle exchanges should be available.

Table 5.1
Responses to needle exchange and drug injecting questions

	Statement	Disagreeing n = 1025	n (%)
1	It is important for those who inject drugs to use sterile needles.	20	(2%)
2	Needle exchange schemes should be available for those who inject drugs.	92	(9%)
3	I would have no objection to a needle exchange scheme operating in my neighbourhood.	311	(30%)

Clearly, the question of having a needle exchange in one's neighbourhood caused the most concern among respondents, with 30% objecting. It was this response which was used as the dependent variable in the initial discriminant analysis.

Discriminant analysis

The dependent variable therefore classified cases according to whether they objected to needle exchanges in their neighbourhood. A total of 311 (30%) did and 714 (70%) did not. Seven variables were considered as potential predictors of group membership (Table 5.2).

Table 5.2
Variables used in both discriminant analyses

	Variable	Parameter	Codes
1	City	Edinburgh 41% Glasgow 59%	0 = Edinburgh 1 = Glasgow
2	Gender	Male 47% Female 53%	1 = Male 2 = Female
3	Age	Mean 37.7 sd 10.7	
4	Occupation	Non-Manual 66% Manual 34%	1 = Non-Manual 2 = Manual
5	Age when leaving full-time education	Mean 18.0 sd 3.98	
6	Important for drug injectors to use sterile needles	Agree 98% Disagree 2%	1 = Agree 2 = Disagree
7	Needle exchanges should be available	Agree 91% Disagree 9%	1 = Agree 2 = Disagree

These variables were entered into the analysis using a stepwise selection procedure. After five iterations, five variables were found to have made a significant contribution to the discriminant function table (F =36.7 p<0.001) (Table 5.3).

Table 5.3
Discriminant Analysis 1
(objectors and non-objectors to needle exchanges in their neighbourhood)

	Variable	Standardised Coefficient	Non-Adjusted Means	
			Non-Objectors	Objectors
1	Needle exchanges should be available	0.88	1.02	1.25
2	City	0.32	0.55	0.69
3	Important for injectors to use sterile needles*	0.13	1.00	1.05
4	Age*	0.13	37.2	38.8
5	Age leaving full-time education	0.11	18.25	17.5

(* = univariately significant, F ratio, $(p<0.05)$

Objectors were more likely to live in Glasgow, were slightly older and received less full-time education in comparison to non-objectors. Objectors were also more likely to disagree with needle exchanges being generally available and not think it important that injectors use sterile equipment. It should be noted that the predictive power of these variables depends upon their association with other variables in the model. Thus, whilst only 20 (2%) of 1025 subjects did not think it important that injectors use sterile equipment, 14 (70%) of these did not think that needle exchanges should be available and 16 (80%) objected to needle exchanges in their area. In other words they tend to belong to the objector rather than non-objector group.

The overall contribution made by the set of variables included in the model in discriminating between the two groups can be assessed from the canonical correlation. This is a measure of how well the function discriminates between the two groups on a scale of 0 to 1. The canonical correlation in this analysis was 0.4. The total variance explained by the model was 15.2%. Another indicator of the effectiveness of the model in discriminating between the groups is its ability to predict group membership. With two groups, random assignment would result in a 50% success rate. When the discriminant function was applied to all cases, 75% were correctly

assigned group membership. However, 644 (93%) non-objectors were correctly classified compared with only 100 (32%) objectors.

This particular model produced a fairly low canonical correlation, explained only 15.2% of the variance between the two groups and correctly classified only 32% of objectors. However, examination of the discriminant scores indicated that there were two different groups of objectors; the correctly classified objectors (n = 100) who had relatively high discriminant scores, and misclassified objectors (n = 211) who had relatively low discriminant scores. The average discriminant score among the correctly assigned group was 2.6, and 76% had a score of 2 or more, compared with the incorrectly assigned group which had an average of -.272 and 76% had a score lower than 0. Thus, a second discriminant analysis was carried out to determine the differences between these two groups of objectors using the same predictor variables (Table 5.4).

Table 5.4
Groups used in both discriminant analyses

TOTAL
SAMPLE
n = 1025

Analysis 1   Not Objecting to exchange   Objecting to exchange in
              in neighbourhood   neighbourhood
              n = 714 (70%)   n = 311 (30%)

Analysis 2   Correctly Classified   Incorrectly Classified
                                    (Group 1)   (Group 2)
                                    n=100 (32%)   n=211 (68%)
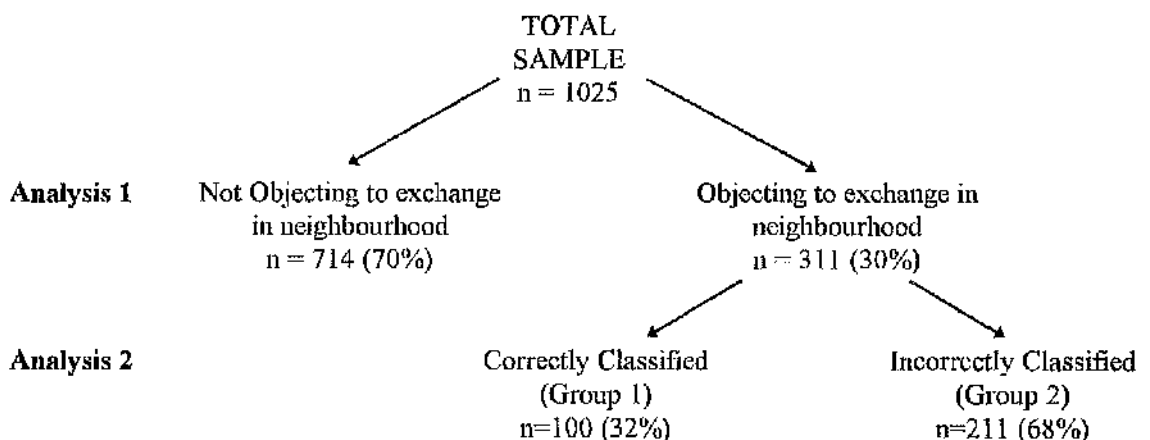
Discriminant analysis 2

The dependent variable, in the second analysis, assigned cases according to whether they were correctly classified as objectors. A total of 100 (32%) (group 1) were correctly classified and 211 (68%) were not (group 2). All seven variables were included in the analysis (Table 5.2).

The same stepwise procedure was applied. After six iterations, six variables were found to have made a significant contribution to the discriminant function table (F= 179 p< 0.001) (Table 5.5).

Table 5.5
Discriminant Analysis 2
(classified (group 1) and misclassified (group 2) objectors)

	Variable	Standardised Coefficient	Non-Adjusted Means Group 1	Group 2
1	Needle exchanges should be available*	1.04	1.8	1.0
2	Age*	0.52	42.9	36.9
3	Important for injectors to use sterile needles*	0.28	1.16	1.0
4	City	0.18	0.73	0.67
5	Age leaving full-time education*	0.18	16.3	18.0
6	Occupation	0.17	1.5	1.3

(*univariately significant, F-ratio, (p<0.01)

This analysis suggested that the two groups of objectors differed in a number of ways. Group 1 (originally the correctly classified objectors) were more likely to disagree with the general availability of needle exchanges, and did not think it important that drug injectors use sterile needles. They were also more likely to be older, lived in Glasgow, worked in manual jobs and received less education than Group 2. Group 2 tended to agree with the general availability of needle exchanges and thought it important for drug injectors to use sterile needles. They were generally younger, lived in Edinburgh, worked in non-manual jobs and received more education.

The canonical correlation in this analysis was 0.88 and 78% of the variance between the two groups was explained by the model. In addition, 94% of all cases were correctly classified, (80% of group 1 and 100% of group 2). This model, therefore, suggested that there were two distinct groups of objectors, differing significantly across the model variables and that these variables could be used to predict group membership with considerable confidence.

The number of needles and syringes found in public areas in Glasgow

In 1989 the Department of Environmental Health, Glasgow City Council, started a 24 hour emergency service which responded to calls from the public concerning needles and syringes found in public areas (Kennedy 1995). Trained personnel travel to the site, pick up the needles and syringes using specially designed hand-held lifting equipment, and deposit them in sharps containers for safe disposal. The service is advertised throughout the public transport system and on bill posters in the city. Other council personnel will also collect needles and syringes using the same specially designed pickup and disposal equipment. These staff belong mainly to the Council's Parks and Recreation, Cleansing, and Buildings and Works Departments.

The following figures show the numbers injecting equipment retrieved from public areas by the Environmental Health Department and other Council personnel from 1989 - 1993 (Fig 5.6). There were increases in the number of needles and syringes found in public areas of 43% between 1989 and 1990, 66% between 1990 and 1991, and 33% between 1991 and 1992. This was followed by a decrease of 6% between 1992 and 1993. It should be pointed out that these figures represent only those needles and syringes retrieved by the Council. The actual number found by the public and disposed of in other ways is unknown. In addition, the apparent increase in the numbers retrieved could be due to a greater awareness of this service among the public. Nor are the figures complete for 1989 and 1990 (Table 5.6). Nevertheless, it does suggest that there is a 'leakage' of used injecting equipment into the public domain.

During the period 1989 to 1993, there was an increase in the number of needle and syringe programmes from one to seven (Table 2.1 Chapter 2). In addition, there were some pharmacies in the city selling injecting equipment to injectors. Ten needle exchange pharmacies also joined the new pharmacy needle exchange scheme set up by the Scottish Office in 1992. There was an increase in number of needles and syringes issued by needle exchanges each year during the period 1989 - 1993 (Table 5.7). They increased by 110% from 1989 to 1990, 39% between 1990 and 1991, 26% between 1991 and 1992, and 14% between 1992 and 1993. The return rate of used injecting equipment for needle exchanges for the period 1989 - 1993 was

approximately 109%. Comprehensive figures of the needles distributed and returned through pharmacy needle exchanges were not available for the period 1992 - 1993, nor were they available for pharmacies who sold needles and syringes. However, in 1995, a new information system was designed by the present author to monitor the pharmacy exchanges. Data from the first two months of operation (April - May 1995) showed that the average exchange rate for the pharmacy schemes was very high (183%). A total of 1,409 needles and syringes were issued, and 2,585 were returned, during the period. Thus, although there was an increase in the number of needles and syringes distributed in Glasgow between 1989 and 1993, the available evidence suggests that needle exchanges and needle exchange pharmacies were receiving more injecting equipment than they distributed.

Table 5.6
Numbers of needles and syringes retrieved from public areas by Glasgow City Council 1989 - 1993*

Council Department	1989	1990	1991	1992	1993	Total
Environmental Health	2210	3165	2132	1925	3533	**12965**
Other Council Departments	no records	no records	3141	5080	3066	**11287**
Total	**2210**	**3165**	**5273**	**7005**	**6599**	**24252**

*Reproduced with the kind permission of Ian Muir, Environmental Health Department, Glasgow City Council.

Table 5.7
Number of needles and syringes exchanged - Glasgow Needle Exchanges 1989 - 1993

	1989	1990	1991	1992	1993	Total
Issued	65 100	136 900	190 000	238 500	272 000	**90 2500**
Returned	60 500	143 700	235 600	273 000	297 500	**1 010 300**
Return Rate	93%	105%	124%	115%	109%	**109%**

It is not possible to determine from the geographical information supplied by the council whether the discarded injecting equipment was found in the close vicinity of a needle exchange or a pharmacy. Nor is it possible to determine whether the original equipment was supplied from a needle exchange, a needle exchange pharmacy, or a pharmacy selling injecting equipment. However, data from the MRC/WHO study, suggests that most injectors obtained their injecting equipment from either a needle exchange (58%), or pharmacy (32%), in the city during 1991 - 1993 (Table 5.8). Approximately 10% of injectors also received injecting equipment from friends or relatives. Since needle exchanges and pharmacies are the main suppliers of injecting equipment, it could be argued that discarded injecting equipment came from either of these sources. Needle exchanges and needle exchange pharmacies receive more injecting equipment than they supply, thus, it is likely that most of the additional discarded injecting equipment originated from other pharmacies who sold injecting equipment. These pharmacies are sources to which drug injectors cannot return equipment for safe disposal.

Table 5.8
Most important sources of clean injecting equipment among injectors in Glasgow*

Most important source of clean injecting equipment	1991 (n=535)	1992 (n = 515)	1993 (n = 505)
Needle Exchange	55%	57%	62%
Pharmacies	35%	33%	28%
Other (including friends, partners, relatives)	10%	10%	10%

* Reproduced by kind permission of Linda Cusick, MRC/WHO Glasgow HIV Behavioural and Prevalence Study 1995.

Discussion and conclusions

It is probably reasonable to assume that there will inevitably be some leakage of used injecting equipment into the public domain. However, are needle exchanges failing in their role to protect the public from the harm caused by discarded needles and syringes? I would suggest not. Firstly, the number of needles and syringes retrieved by Glasgow City Council (24,252) is small in comparison to the amount of needles distributed in the period 1989 - 1993. For instance the number retrieved represents only 3% of the 902,500 needles and syringes distributed by needle exchanges in the same time period. This of course does not include those distributed by pharmacies. Secondly, return rates at the Glasgow needle exchanges and needle exchange pharmacies generally exceed 100%. This is extremely high and compares with the highest return rate reported elsewhere in the world of approximately 100% reported by the New Haven exchange in the USA (Kaplan 1994a, 1994b; Heimer 1993). Return rates vary around the world with the lowest, 18%, reported in France (Lhomme, Edwige, Ilie et al 1992). The range in Europe is generally between 60% - 90% (Schwartz 1993a). In the rest of the UK reported rates vary between 62% and 80% (Stimson 1988a; Hart 1989a; Keene 1993). Rates of over 100% in Glasgow suggest that equipment distributed through pharmacies who sell injecting equipment, or through friends and relatives of drug injectors, is returned to the needle exchanges or needle exchange pharmacies for safe disposal. Thus, Glasgow needle exchanges play an important role in removing used needles and syringes from the public domain.

It is extremely important that injecting equipment is removed from the environment and that needle exchanges have a high return rate. Removing used needles and syringes from circulation should theoretically reduce the likelihood of exposure to blood borne infections including HIV and hepatitis (Heimer 1994). If carried out expediently, then the incidence of these diseases should reduce (Heimer 1994). The 'circulation theory of needle exchange', as it has now become known, can be described using the analogy of infected mosquitoes (Kaplan 1994c). Reduce the number of infected syringes in circulation and this will reduce the likelihood of transmission of blood borne viruses. Needle exchanges have an important role to play in the process and those in

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Glasgow seem to fulfil that role as far as the public are concerned. So far, there have been no reported infections of HIV, Hepatitis B or C, among the public that have been related to needle-stick injuries from equipment found in public areas. Glasgow needle exchanges, therefore, provide a very important and effective public health service.

Perhaps the most important findings of the public attitude survey are, first, the substantial support for needle exchanges among the general population and, second, the degree of heterogeneity among objectors. Of those questioned, 91% agreed with the generally availability of needle exchanges and 70% had no objections to them operating in their neighbourhood. Thus, the objections and concerns highlighted in recent papers (Ginzburg 1989; Christensson 1991; Blatherwick 1989; Heimer 1994; Kaplan 1994c; Lurie 1993; Valhov 1994; Anderson 1991) may well be those of minorities whose attitudes are not reflected by the majority of the wider population. However, the views of minorities are important and can influence policy makers (Clark, Corbett 1993; Thomas, Quinn 1993). In Glasgow, for instance, needle exchanges almost failed because of public opposition, most notably from local residents in areas where needle exchanges were planned (Gruer, Cameron, Elliott 1993).

This seems to support the notion that most people's concerns about needle exchanges centre on the question of their location in residential areas. This tended to be the case with the group 2 objectors who really only objected to needle exchanges at this level. However, to argue that this is the basis of all opposition would be simplistic. It is clear from the analysis that group 1 (approximately a third of all objectors) were also more likely to disagree with needle exchanges being generally available and did not think it important that drug injectors used sterile needles. Their grounds for objection, therefore, were more diverse. The sociodemographic characteristics of this group are interesting. They tended to live in Glasgow which, compared with Edinburgh, has a large injecting population and more needle exchanges (Frischer 1993a; Haw 1993). (Glasgow has eight needle exchanges and Edinburgh has two). They also worked in manual jobs and had less full-time education. In short, they were more likely to live in areas of high drug injecting prevalence where needle exchanges are typically placed. Being more likely to encounter

the service may explain their particular reaction to it. On the other hand it may not, and their objections may be based on more deeply rooted beliefs or attitudes regarding injecting drug users.

This has been noted in a number of American and European reports where strong cultural influences determine how drug use and therefore drug users are perceived by various sections of the population. In the USA, many black politicians and community leaders see drug use as part of the race issue, whereby many young black people are positively encouraged to take drugs by the dominant white population which reinforces their secondary status in society (Clark 1993; Thomas 1993). In Sweden, resistance to more liberal drugs policies is influenced by an underlying cultural emphasis on temperance (Gould 1993). It has also been argued that these pre-existing beliefs or attitudes can influence public perception of AIDS or drugs programmes (Moatti, Manesse, Le Gales et al 1988; Dab, Moatti, Bastitde 1989; Donelan 1992; Clark 1993; Thomas 1993). Group 1 objectors seem to fit this scenario. They were more likely to live in areas of high drug injecting prevalence, so their objections to needle exchanges may not originate solely from dislike of the service, but could be based on perceptions of injecting drug users which are linked to life experience and cultural norms.

Whatever the reasons, the differences between the two groups of objectors have important implications for public awareness initiatives. If attitudes are to be changed, then each group may have to be approached in a different way. In fact, it may even be more cost-effective to invest most resources in tackling group 1 objectors. It is they who are more likely to live with the service and because of pre-existing beliefs or attitudes about drug injectors, may be more resistant to change. Of course, this does not mean confrontation. An attempt should be made to understand the beliefs and cultural factors underpinning their arguments and work in collaboration towards a solution when introducing a new service like a needle exchange (Thomas 1993). On the other hand, if the main objective of a campaign is to stimulate public awareness and increase general acceptability, then the second group of objectors should also be included, but perhaps using advertising media.

Consulting the public whilst planning needle exchanges is important (Nucro 1989) and may be helpful in establishing the service. In fact, consultations with local communities has become standard practice in Glasgow before setting up an exchange, and, as in other parts of the world, has eased the introduction of the service (Firlik 1992; Gruer 1993; Kirp 1993; Schwartz 1993b; Kaplan 1994c). Public opinion therefore continues to play an important role in needle exchange services. The present survey suggests that needle exchanges are publicly acceptable in Glasgow although maintaining this level of acceptability should always be present in service providers' minds.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

'Of course humans have some capacity for self-control, but are extremely limited by prevailing conditions in which they grow up and survive. Self-control and self-steering exist at best only partially' (Cohen 1994).

This chapter is divided into two parts. The first part deals with the conclusions of the research in relation to needle exchange provision in Glasgow and ends with recommendations for the future of the service in the city. Part 2, concentrates on other conclusions drawn from the research, particularly the research process and methodology, and ends with recommendations for future research in the field.

Part 1 Needle Exchanges in Glasgow

The main conclusions drawn from this thesis are as follows:

Operational aspects of the service.

1. Needle exchanges in Glasgow are successful in reaching up to 2,600 injectors in the city. However, this represents only a minority (27% - 35%) of the estimated injecting population. Thus, they fail to make direct contact with the majority of drug injectors in the city.

2. There is evidence that those who remain out of contact with the service are at greater risk of encountering drug related-harms e.g. they share injecting equipment more. These may include younger and female drug injectors.

3.　Non-attendance may be related to the use of alternative and more accessible sources of supplies of injecting equipment e.g. pharmacies. Other factors related to non-attendance include: not wishing to be identified as (or associated with) injecting; fear of notification; and imprisonment.

4.　Retention rates are poor, with only a minority of clients making frequent and regular visits to an exchange. Approximately 54% of clients make more than three visits, and 33% make more than five visits per year. This may be related to factors which are similar to those which prevent drug injectors contacting exchanges in the first instance, namely: the use of alternative sources of supply; not wishing to be identified as (or associated with) injecting; fear of notification; stopping injecting; and imprisonment. Imprisonment is an important factor in Glasgow. Approximately 69% of needle attenders reported recent imprisonment.

5.　Needle exchanges are able to make contact with drug injectors who are not in contact with other health and social services. Approximately 46% of new attenders reported having no contact with these services. Exchanges are also able to provide a wide range of services to approximately 64% of clients. Female attenders seem to make more use of these services compared with their male counterparts. On average 35% of visits involving the uptake of services were made by women, yet women constituted 24% of new clients. The majority of attenders (80%) express satisfaction with these services. Thus needle exchanges are providing a valuable service to those who attend.

6.　Although exchanges provide a range of services which are acceptable to clients, they are unable to provide adequate supplies of injecting equipment to meet the personal needs of most clients. Between 20% and 28% of attenders reported that they did not receive

enough needles and syringes each visit to meet their needs. If every attender were to use a clean needle and syringe for every injection, then the average weekly number required would be approximately 32. Should they make two visits per week and obtain the current maximum of 15 needles and syringes, then this would just cover the amount required. However, this is unlikely since the annual average attendance is only 11.7 visits. Thus, for many, supply is not fully meeting their requirements.

7.   Needle exchanges act as a bridge into other health and social services for some clients. However, it is uncertain whether clients actually make contact with these services. A direct referral mechanism is lacking in needle exchanges and as a result they are only able to refer a small proportion (11%) of clients for further care.

Service impact

1.   Approximately 1% of needle exchange attenders and non-attenders were HIV positive. There is some evidence that needle exchanges have a contributory role in containing the spread of HIV among those who attend, mainly by supplying clean injecting equipment. This may help them maintain lower levels of sharing of injecting equipment compared with non-attenders. However, it is possible that needle exchanges have not made a significant impact on the spread of hepatitis B and C. It is estimated that 70% of injectors in Glasgow have been infected with hepatitis B and 80% with hepatitis C.

2.   It is uncertain what impact needle exchanges have on injecting-related injuries e.g. abscesses and other soft tissue damage. Recent work in Glasgow found that 72% of attenders at one exchange reported injecting-related damage and that this may have gone untreated by needle exchange staff. Service contacts at needle exchanges for safer injecting advice have reduced from 29% in 1991 to 11% in 1993. Needle exchange

attenders also inject more frequently (mean of 127.5 times per month) than non-attenders (mean of 119.8 times per month). This may lead to a higher prevalence of injecting related injuries among attenders. However, comparative cohort studies are required to explore this question in more detail.

3. Needle exchange attendance is associated with the use of fewer different drugs, but not less injecting. However, there is no evidence that they have led to an increase of injecting among the population of drug users in the city.

4. There is some evidence that needle exchanges have a contributory effect in reducing the levels of sharing of used injecting equipment among those who attend. A total of 39% of attenders and 47% of non-attenders injected with used equipment. Approximately 57% of both groups passed on injecting equipment to others. However, needle exchange attenders did so less frequently (2 times per month compared 2.3 times per month among non-attenders). A substantial number of attenders continue to share injecting equipment, and many (50%) do not use proper cleaning techniques to disinfect equipment before use. Further reductions in sharing are possible among attenders (and non-attenders) but may be limited by other factors including: the need for a hit; drug use rituals; friendships; sexual relationships and trust; and the places where drugs are consumed e.g. prison. Many of these relate to the social relationships in drug users' lives.

5. It is likely that needle exchanges in Glasgow have no or little impact on the sexual risk behaviours of those who attend. Both attenders and non-attenders have the same number of primary sexual partners (0.7), and casual sexual partners (0.9 and 0.8 respectively). Approximately 75% of both groups did not use a condom with their primary sexual partner and 52% did not use a condom with their casual sexual partners. However,

needle exchange attenders used a condom more frequently with their casual partners. No other differences were apparent. Barriers to condom use include: inconvenience; dislike; the desire to conceive; negotiating condom use; drug use; low perceived risk of HIV; and trust and perceived promiscuity between sexual partners. As with sharing, most of these are relate to social norms and relationships in drug users' lives which may limit further changes in this type of risk behaviour.

6.   It was outwith the scope of the present study to determine the long-term effects of needle exchanges on drug related harms and behaviours. However, existing research suggests that needle exchanges have little long-term impact on HIV transmission, levels of injecting, drug use, sharing and sexual risks. It is possible that needle exchanges have some effect on risk behaviours during earlier contacts. However, they do little to change the social factors which lead to continued risk behaviour (see sharing and sexual behaviours above). It is also possible that other services make some contribution to the reductions in risk behaviours. This may be the case since visits to needle exchanges are relatively brief and the possibility for achieving change is, therefore, limited. Thus, the impact of needle exchanges can only be seen in the context of other health inputs.

7.   Needle exchanges in Glasgow provide a valuable public health service by reducing the number of needles and syringes discarded in public areas. Return rates of over 100% are impressive, and suggest that needles and syringes secured from other sources (mainly pharmacies) are returned through the exchanges. They are also widely accepted by the general public. Approximately 90% of the general public agree with the provision of needle exchanges and 70% have no objections to them operating in their area. However, there is a minority (32%) of objectors who are likely to live close to a needle exchange and their opinions may be based on their perceptions of, or life experiences of, drug

injectors. They constitute an 'small', but important body of opinion within the general population.

Recommendations

The Glasgow needle exchange programme is structured upon two basic principles. First, it is based upon a model of health intervention which is essentially individual centred and not one which deals with groups or communities of injecting drug users. Second, although situated in areas of high injecting prevalence each exchange is static, and therefore relies upon clients making contact with it rather than taking the service to the client. Of course the application of this model of intervention has not been without its successes. A substantial number of drug injectors have been attracted to the service and have been provided with a range of health services which could not be offered by a mobile or outreach exchange. This has been helped by the introduction of mini-bus in some areas to encourage injectors to attend. The service has also made some contribution to continued low spread of HIV among the injecting population in Glasgow, and has probably helped those who attend to maintain low levels of risk behaviour, most notably reduced levels of sharing of used injecting equipment. Close liaison with the public has also meant that needle exchanges are widely accepted, and because they reduce the level of used injecting equipment in circulation, they provide a very important and effective public health service.

However, they have failed to attract the majority of drug injectors in Glasgow, and do not maintain regular and frequent contact with the many of those who do attend. Supplies of needles and syringes fail to meet demand, or at least potential demand. In addition, the spread of Hepatitis B and C among injectors is likely to be a major problem in the city, and one which needle exchanges have probably not been successful in addressing. Sexually related risk

behaviours are also not successfully tackled. Finally, and most importantly, needle exchanges in Glasgow may fail to have any significant long term impact on these risk behaviours which are largely determined by social factors associated with social norms and relationships between injectors.

If needle exchanges are to improve they must address all of these issues. This may require a change to their present structure. Outreach needle exchange, based upon a peer group model of intervention, could be introduced. Outreach can be carried out by trained workers who routinely visit places where drug injectors gather or socialise. Injecting equipment can then be distributed and returned through these points. In addition, these workers can deliver health advice and make referrals to existing health and social services. However, using drug injectors to distribute and collect injecting equipment from friends and acquaintances would extend this model to one of peer education. In this instance, direct contact is made with a peer group of drug injectors through a member that particular group(Friedman 1994). The person recruited, and even paid, to carry out this function should be a significant and influential member the group (leader). This leader, or others in the group, may also have contact with other drug injecting networks. Thus, it is hoped that the commitment of these leaders to less risky behaviours will lead to a change in the risk behaviour of others, and that this will spread beyond the immediate circle of friends to drug injecting networks. If social norms and therefore socially determined relationships and behaviours are to change, then this may depend upon such interventions. Although needle exchange outreach with peer education may not in itself achieve this, it could be seen as part of, or integrated with, other outreach peer group initiatives (Rhodes 1993b). In terms of sexual practices this would mean encouraging existing behaviours such as condom use (however low) and establishing 'new' cultural norms (Rhodes 1994a; Stimson 1994; Power 1995). This would also apply to the sharing of injecting equipment, by establishing new cultural norms which do not encourage sharing. For example, recent work from Glasgow suggests that female drug users

have a great deal of control over other areas of their lives, despite opposition from their male partners (Taylor 1993). Female drug users, are at particular risk of HIV and possibly Hepatitis B and C because they are sometimes exposed more to sharing and sexual risk situations. It is therefore possible that peer group education could foster and build upon the existing norms within the female drug using culture. Using this model of intervention means moving away from solely individual centred behavioural interventions, typified by existing needle exchanges in Glasgow, to ones which tackle behavioural change at a community or social level (Bloor, McKeganey, Finlay et al 1992; Rhodes 1993b). Outreach needle exchanges, organised by drug injectors, have been used in Holland with considerable success. In Rotterdam, an outreach exchange succeeded in attracting a number of drug injectors who did not use a more static exchange run by the local health authority (Grund 1992). Retention rates were almost three times higher than the local health authority exchange. Thus, it is likely that needle exchange based on an outreach peer education model would help tackle some of the operational and outcome difficulties faced by exchanges in Glasgow. However, it is not recommended that this model of exchange replaces the existing needle exchanges in Glasgow. The present exchanges are capable of offering a wide range of health and social services and are also able to refer clients on to other more specialist services. Rather, both should work together to tackle the existing problems of risk behaviour and injecting related harms. Thus, by adding a peer-led outreach component to the existing model of exchanges it may be possible to achieve the following objectives:

1. **To help reach injectors who are not in contact with the existing needle exchange programmes.**

Being 'peer led', this outreach may be more appealing to those injectors who do not wish to be associated with existing 'injector related services', especially women. It may also influence those injectors who are at greater risk of incurring drug related harms.

2. Help maintain more regular and frequent contact with these drug injectors.

3. Tackle the social norms which lead to continued risk behaviours, namely the sharing of injecting equipment and low condom use.

Although not proven as successful, this form of intervention should theoretically succeed in tackling and changing social norms which lead to continued risk behaviours (Bloor, McKeganey, Finlay et al 1992; Rhodes 1993b).

4. Encourage those who are not in contact with existing health and social services to attend if appropriate.

If contact is made with injectors who remain largely out of the reach of existing services, then referrals could be made to the existing needle exchange programmes for more specialist treatment and possibly referral to other relevant services.

In addition, existing needle exchanges may also have to improve the level of health and social services offered:

1. Needle and syringe programmes should increase the supplies of injecting equipment to drug injectors.

The present limit of 15 needles and syringes issued each visit issued should be lifted completely and needles and syringes should be issued on demand, **if politically acceptable.** This has been achieved in the San Francisco with no negative effects on the exchange rate or frequency of visits (Watters 1994). However, the exchange mechanism should maintained. This is extremely important in reducing the circulation of used injecting equipment and thus the likelihood of HIV, and Hepatitis B and C, infections among injectors and the wider public (Heimer 1993).

Increasing the supply of injecting equipment may also be preferable to increasing supplies of bleach to disinfect used needles. If used improperly, bleach may ineffective in decontaminating injecting equipment (Titus 1994; Watters 1994). One study from Atlanta (USA) found that about half of the injectors using bleach did not use an effective cleaning technique (Gleghorn, Doherty, Vlahov et al 1994). Thus, providing cleaning materials should be seen as a secondary strategy to that of issuing adequate supplies of clean injecting equipment (Titus 1994; Watters 1994). Glasgow needle exchanges do not routinely issue bleach or instructions to disinfect injecting equipment, and thus have no impact on that behaviour. However, should an increase in the supply of clean injecting equipment prove problematic, then bleach and detailed instructions should be given to those in contact with the service.

2.   Hepatitis B and C counselling and information should be offered to clients.

This should be based on information which explains how these viruses are spread and what can be done to prevent transmission. If done through peer educators, then this may have more impact and appeal. In the light of the high prevalence rates of both diseases among injectors, there may also be some justification for encouraging drug injectors to switch from injecting to other methods of drug use e.g., smoking and snorting (Crofts 1995). Indeed service planners have already begun to address this question by introducing a methadone prescribing programme in the city (Glasgow Drug Problem Service and GP Drug Misuse Clinic Scheme) which aims to reduce injecting. Drug injectors in Glasgow are now offered oral methadone in a reduction or maintenance basis at a service which is geographically removed from needle exchanges, but one to which needle exchange clients can be referred. Peer education may also be an important factor in achieving changes in the method of drug administration.

3.   Encourage the uptake of services within exchanges.

The present uptake of services in needle exchanges is encouraging. However, 20% of attenders thought that the health and social services were less than helpful. Most requested health advice, medical examinations, safer drugs and sex advice and how to prevent weight loss. There is evidence that some needle exchange attenders suffer from injecting related problems such as abscesses, tissue damage and weight loss (McCombie 1995; Morrison 1995). In addition, they also inject more frequently than non-attenders and may be more susceptible to some injecting related harms. The present research also suggests that sexual and drug-related risk behaviours are also common among attenders. Thus, the uptake of services addressing these issues should be encouraged. It may also be appropriate to encourage the sexual partners of attenders to use the service. Female partners are at particular risk of HIV and hepatitis infection, and if injecting, should be encouraged to secure their own supply of injecting equipment. As discussed, female injectors may benefit form an outreach service.

4.   Improve the referral mechanism from exchanges to other health and social services.

Although the present level of referral is encouraging, more could be done to improve contact between needle exchanges and other health and social services in the city. Although needle exchanges are generally open when other services are closed, responsibility for referrals could be given to an appropriate member of staff who would make contact during the day on a client's behalf. They could also ensure that the client contacts the service, and in some instances provide an escort to that service. This liaison worker would not only increase the number of referrals from needle exchanges, but also ensure that the client kept the appointment. It may also improve communications between needle exchanges and other services in the city, which, in some instances, is lacking (Elliott 1994; Shewan 1994).
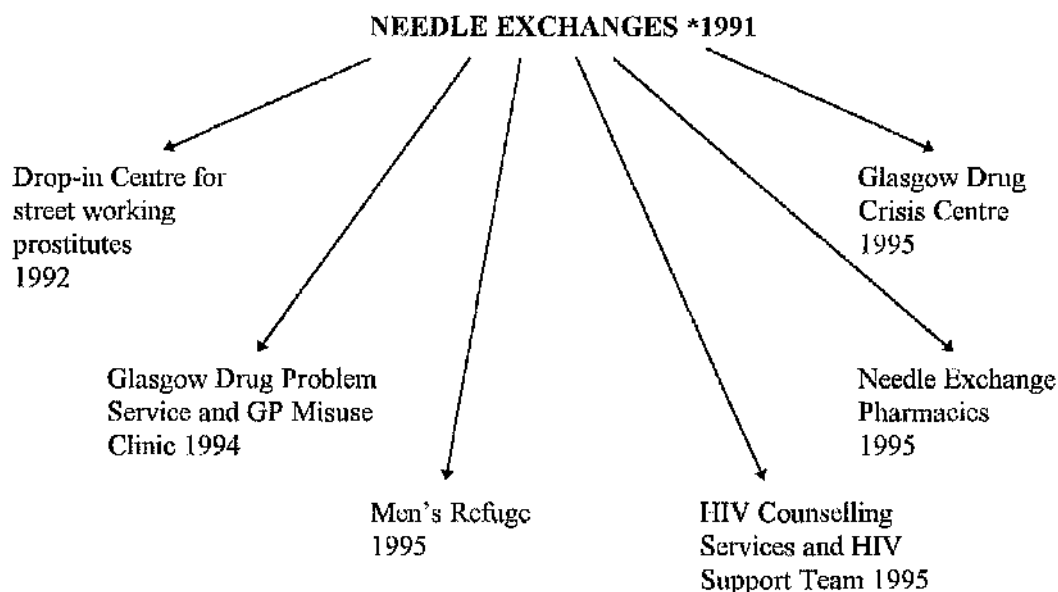
Part 2 Research

The main purpose of this research was to provide information which would form the basis of future action and possible change to the needle exchange programme in Glasgow (Chapter 1). On the basis of the information provided in the preceding section, I would strongly argue that this aim has been achieved. Most of the findings of this research have already been communicated to service providers and policy makers in the form of routine reports or academic publications and presentations (Appendix 6). More importantly, the research contained in this thesis was planned in conjunction with both groups and so they were informed of these findings as soon as they were available. Thus, research was seen as a necessary and integral part of service development (Chapter 3). Adjustments have already taken place to the service in Glasgow and some of the findings of the research contained in this thesis have already been used to inform policy at the national level. For instance, when it was found that needle exchanges were not issuing enough needles and syringes to clients, this was communicated to the Scottish Office, and the decision was then made to raise the ceiling to its present level of 15 needles and syringes at each visit in all exchanges throughout Scotland (The Scottish Office 1994b). Policy makers in Glasgow are also considering the possibility of maintaining the current number of static exchanges in the city and investing extra resources in outreach needle exchange programmes. In addition, a large methadone programme (GDPS) was started in 1994 in an effort to offer an alternative to injectable opiates for those who continued inject. These are extremely encouraging signs and show that the information from this research has been used to adjust service provision to meet drug injectors needs.

There have also been other important decisions made as a result of this research. Routine data collection in the longer term is necessary if policy makers are to plan effective services in the future. It was noted in Chapter 1 that routine data relating to needle exchanges have generally not been collected on a long term basis (Stimson 1988a; Hart 1989a; Bardsley 1990; Carvell

1990; Grund 1992; Mulleady 1992). One author also argued that when information systems were designed for health care settings they were frequently chaotic, inadequately resourced, badly managed, unreliable in their content, and ineffective in meeting their stated or apparent objectives (Knox 1991). There have been recent attempts to surmount these problems in relation to drugs services most notably the North Western Regional Health Authority Data Base in England and the Scottish Drug Misuse Database (Information Statistics Division 1991; Crabbe 1995). Both these systems collect data at the regional level and represent the first systematic attempts to monitor the extent and nature of presenting drug problems in the UK. However they do not reflect the scale of agency caseloads, nor the nature of their work (Crabbe 1995). Thus, there was a need to design information systems which monitored the work of drug agencies at this level (Crabbe 1995). This was exactly what the Glasgow needle exchange data base was designed to do.

The computerised system introduced into needle exchanges in Glasgow, has now been used as a model for other systems which have been designed by the present author, and other members of the research team at the HIV and Addictions Resource Centre, for a number of drug and HIV services in the city (Fig 6.1). The same design process, outlined in Chapter 2, was followed for every agency. In each instance, consideration was given to: the theoretical framework in which the service operated; the service objectives; managers and policy makers' needs; collecting data in a way which was unobtrusive to the service; costs; and compatibility with existing information systems. Thus, the work carried out as part of this thesis proved invaluable and has far-reaching consequences for other services in the city.

Figure 6.1   Information systems in drugs and HIV services in Glasgow

NEEDLE EXCHANGES *1991

Drop-in Centre for
street working
prostitutes
1992

Glasgow Drug
Crisis Centre
1995

Glasgow Drug Problem
Service and GP Misuse
Clinic 1994

Needle Exchange
Pharmacies
1995

Men's Refuge
1995

HIV Counselling
Services and HIV
Support Team 1995

* Date data base commenced

Of course these information systems relate only to process data and do not deal with the question of outcome. The research carried out in this thesis has gone some way towards establishing whether needle exchanges in Glasgow have had any effect on the clients who used them. It used widely recognised techniques (Chapter 1). Epidemiological data relating to the population targeted by the Glasgow needle exchanges were available at the time of this research and helped establish the effectiveness of needle exchanges in tackling HIV, hepatitis B and C, and their success in reaching drug injectors (Gruer 1991; Frischer 1993; Taylor 1994; Follet 1995). Needle exchanges attenders were also compared with non-attenders, and samples were recruited from a wide variety of settings throughout Glasgow (Chapter 4). Self reported behaviours were accompanied by HIV saliva testing. Finally, all of these data related to the local geographical area in which the needle exchanges operated, including public attitude data presented in Chapter 5. Many other studies conducted in Glasgow provided addtional perspectives and insights into

the impact of needle exchanges in the city, particularly ethnographic research (McKeganey 1989; Barnard 1993; Bloor 1992). In, short by using a wide range of data, a multi-dimensional picture of needle exchange provision and impact was developed.

However, there were methodological problems. Outcomes were assessed using a comparative non-longitudinal study (Chapter 4), and therefore could only provide a snap-shot of behaviour and HIV prevalence at a given point in time. These related to possible impacts of needle exchanges during that period. A randomised control trial would have been preferable, but this was not possible because of ethical and methodological problems. It was thought unethical to withhold the service from the target population and therefore impractical to randomly allocate subjects to a control or experimental condition. Researchers conducting longitudinal studies before 1991 experienced problems in following drug injectors over substantial periods of time (Hartgers 1989), and attempts to recruit subjects to a longitudinal research study planned for this thesis failed (Chapter 4). Thus, although the questions relating to outcome were framed within the context of impact, data from this (and indeed other studies cited) in this thesis can only indicate possible effects of needle exchanges on HIV and related risk behaviours. This means that other factors which could explain the results remained uncontrolled. These include social influences on behaviour and the impact of other services and educational programmes (Bloor 1994; Van Ameijden 1994; Watters 1994; Power 1995a).

It is also possible that needle exchange attenders are a self-selected low-risk group. Thus, sample characteristics may explain the differences between attenders and non-attenders reported in this thesis. At best, the differences in behaviour between needle exchange attenders and non-attenders can only be interpreted as possible indicators of needle exchange performance and not directly caused by needle exchanges. However, as Alex Wodak points out: 'In a categorical sense, these methodological problems cannot be resolved without a controlled trial of

communities randomly allocated to a single intervention or no intervention. The ethical, logistical, financial and public health problems of attempting such a study are such that there is no alternative, especially in the urgency of the epidemic, to making a judgement on the grounds of plausibility, feasibility, cost and international experience. At issue is whether authorities in a particular country prefer to be roughly right or precisely wrong' (Wodak 1995).

Nevertheless, there is therefore scope for improvement and future research concerning needle exchanges in Glasgow. Longitudinal comparative research could be carried out to determine the long-term impact of needle exchanges in the city. The longitudinal cohort studies, especially those which compare needle exchange attenders with non-attenders, and cited in Chapter 4 (Table 4.4), are probably the most rigorously designed research in this field, especially those conducted by Van Amiejden (Amsterdam) between 1985 and 1992, O'Brien (Chicago) between 1992 and 1994, and Bruneau (Montreal) between 1989 and 1994 (Van Ameijden 1994; O'Brien 1995; Bruneau 1994a, 1994, 1995). If long term cohort studies are impossible to conduct in Glasgow, then perhaps further cross-sectional samples of attenders and non-attenders recruited by the Glasgow HIV Behavioural and Prevalence Study (GHBPS) could be studied. This would also be particularly useful in evaluating the impact of peer education programmes which aim to influence not only cohorts of drug injectors, but whole communities of drug injectors. This would be possible to carry out. For instance, the HIV and Addictions Resource Centre and the Scottish Centre for Infection and Environmental Health (now responsible for continuing the GHBPS) are about to embark upon a joint study of methadone prescribing in Glasgow, part of which will depend upon data provided by the on-going injector study (GHBPS). Thus, close collaboration between both units still exists.

It could be argued that quantitative research has dominated this field, possibly at the expense of qualitative work. Some of the findings of the research carried out in Glasgow, and from the

large cohort studies, are left open to speculation and qualitative research is required to explain and understand some of the differences found between those attending exchanges and those who did not.

Quantitative techniques can identify relationships between a complex number of behavioural, attitudinal, cognitive and social factors but do not constitute an explanation of these relationships. Qualitative data on the other hand can provide contextualisation, and further interpretation, and should lead to a greater understanding of the determinants behind these relationships (Barnard 1995). Qualitative research may, in these instances, be of value in explaining and understanding the complex relationships between behavioural change, service provision, uptake and impact. For example, it may provide additional insights into the cultural aspects of drug injectors lives which may help planners develop and evaluate innovative programmes such as outreach peer education (Friedman 1995). Ideally, qualitative and quantitative techniques should be combined in these research studies. These are surely arguments for developing both techniques in the field of needle exchange research which until now has been largely dominated by quantitative research methods.

Finally, by way of recommendations, future studies should also consider the following areas of research which remain open to question:

1.   Possible reasons for non-attendance and low retention at a needle exchanges in Glasgow. This should involve a 'satisfaction survey' of non-attenders, but should also be accompanied by an injector prevalence study to establish more recent estimates of the size of the injecting population.

2. Measure completed referrals from needle exchanges to other services to determine the uptake of these services and if possible establish reasons for failure to attend.

3. The measurement of hepatitis B and C among attenders and non-attenders to determine the relative prevalence among each. Also determine drug injectors' awareness and use of strategies to protect themselves from such diseases.

4. The measurement of injecting related injuries among attenders and non-attenders to determine the relative prevalence of these in both groups and whether treatment is received in respect of these injuries.

5. An investigation of why needle exchange attenders inject more frequently compared with non-attenders..

6. Inclusion of other types of sharing in future surveys e.g. sharing injecting paraphernalia.

7. An investigation into the sexual risk practices of drug injectors and identification of possible factors which prevent the adoption of safer sex behaviours.

8. An assessment of the impact of new methods of working e.g. peer-education and outreach, especially in relation to sexual risk behaviour.

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