hepatitis C and needle exchange

Part 1 of a major new series on needle exchange sizes up the challenge posed by hepatitis C and finds it huge. To come – how exchanges here and overseas have measured up.

About this document

Background text

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This and later articles are extracted from a review available on request from the author. The review was compiled with the assistance of Neil Hunt of the Kent Institute for Medicine and Health Sciences; Ali Judd of the Centre for Research on Drugs and Health Behaviour; Duncan Stewart of the National Addiction Centre; Anita Morrison of the Scottish Substance Misuse Effective Interventions Unit; Laurence Gruer of the Public Health Institute of Scotland; Jim Camp and Terry Shields of the National Needle Exchange Forum; Lawrie Elliott of the University of Dundee; Clare Sears of the University of California; Hilary Klee of Manchester Metropolitan University; Amina Lahrichi of the Addaction Harm Reduction Team in London; Shaun Speed of the University of Manchester; and Bobby Smyth. Though they have enriched it, they bear no responsibility for the final text.

To come ...

Case studies detailing how needle exchange can be thwarted by inadequate support and counterproductive regulation.

The British record including new light on the influential early evaluations.

What it will take for exchanges to curb spread of hepatitis C.

Needle exchange has a history of under two decades and in Britain about 15 years.[1] Rushed through to forestall replication of the HIV disasters in Edinburgh and Dundee,[2] exchanges in Britain had little to guide them. To this day there is neither a solid body of evidence nor an expert consensus on which practices work best. Trial and error, local reports, and an active network of exchange workers, have been the main vehicles for progress.

Recent studies from North America and continental Europe casting doubt on needle exchange's value are one reason to reconsider the British experience, but the more important reason is the challenge of hepatitis C. Continuing spread of this virus reveals weaknesses which HIV does not, exposing minimal HIV spread as a false reassurance.[3 4 5] Britain and other countries are only now coming to grips with this disturbing revelation.[6]

The consequences of failing to stem hepatitis C are severe. After 20 years about 1 in 6 infected patients develop serious chronic liver damage and may die of complications or require a liver transplant.[7 8] After another ten years nearly a quarter are likely to be at this stage.[9] In Australia it has been estimated that each hepatitis C infection will eventually cost the health service over £5000.[10] Plus social costs the bill is nearer £7000 or nearly £17,000 without discounting later expenditures.[11]

Though pharmacy exchange is important, this review focuses on standalone exchanges or those based in drug services. Greater investment and expertise mean the expectations are greater – they have more to prove.

Litmus test for infection control

What makes hepatitis C so hard to control is the degree of behaviour change needed to intercept its transmission. Reductions in risky sharing of injecting equipment can be enough to minimise the spread of HIV. For hepatitis C, the emphasis is less on reduction, more on elimination,[12] and this applies to all sorts of equipment, not just needles and syringes.[9 14 15] Across the world, what has worked tolerably well in curbing HIV spread has not worked for hepatitis C.[9 12 16 17 18 19 20 21 22 23 24 25] Nowhere has a public health system been able to hold levels of hepatitis C among injectors down to 5% or less, a level commonly bettered for HIV.[4]

The challenge posed by the virus arises from a combination of robustness, infectivity and prevalence.[12] Hepatitis C lasts much longer than HIV in blood and very little blood is needed to spread it.[19 26] As a result, it is more easily spread through sharing other injecting equipment ('paraphernalia') as well as needles and syringes.[9] An analysis of equipment used by hepatitis C-infected injectors (or groups including an infected person) revealed that the virus had contaminated about 7 in 10 syringes and swabs and from a quarter to 40% of filters, spoons and water samples.[27]

These properties contribute to a much higher prevalence of infection among injecting drug users than HIV[4 28] – across Britain, about 40%.[29 30] Especially in London, infection rates can be much higher: three-quarters or more in methadone[31] and needle exchange[32] samples. Hepatitis C reached these levels partly because the virus took hold before anyone knew it existed and well before anti-infection measures were implemented in response to HIV.[2 4 25] The upshot is that in Britain and similar countries, after ten or more years of injecting – sometimes far fewer[33] – infection is the norm.[7 34 35 36] Once someone is infected, typically they remain infected and infectious for decades.[20 21]

Prevalence, robustness and transmissibility interact to elevate risk.[17 26] On the basis of Australian infection rates (not very different from the UK), sharing injecting equipment is 150–800 times more likely to spread hepatitis C than it is to spread HIV.[19] As a result, hepatitis C spreads through an injecting population 10–100 times more rapidly.[21]

Why focus on needle exchange?

The argument that needle exchange is critical to containing hepatitis C rests partly on eliminating the alternatives. An effective vaccine is not on the horizon.[7 21] Post-infection treatment can reverse the disease in a substantial minority, but it's feared (probably mistakenly[37 38]) that drug injectors will not comply with the onerous regime[35] and will in any event become re-infected. For these reasons, UK guidelines say current injectors should normally not be offered the most effective of the treatments.[7] Sexual spread[8 39] and mother-child transmission[12] are rare. By default, the spotlight is left on preventing infection among injectors.

Among established services, only methadone maintenance and needle exchanges attract large numbers of injectors. Methadone has a convincing

record on HIV[40 41] but has yet to be shown to significantly curb hepatitis C.[12 13 14 23 25 42 43 44 45] Usually it is entered too late to prevent most patients already being infected[3 12 46] and has at best only a moderate impact on risk behaviour.[25 46 47 48 49 50 51]

Prescribing heroin for injection under supervision can rapidly reduce risk behaviour and cut (without eliminating) spread of hepatitis, but by the time this more radical treatment is resorted to, few patients are free of infection.[52] That leaves needle exchange. Exchanges cannot reverse the epidemic on their own or without support, and nor should they be expected to.[2 7 9 30] But, as the new English hepatitis C strategy acknowledges,[6] they are the key players.

The nature of the evidence

If hepatitis C is the challenge and needle exchange the main player, what do we know of how well it performs? Evidence can be found at three levels. The first two are the subjects of this article. First, if the virus is spreading rapidly, this constitutes proof that *something* is lacking in infection control practices ◤ *Virus spreading rapidly*. Second is the question of whether networks of harm reduction services featuring needle exchange have at least been able to restrain the spread ◤ *Harm reduction curbed spread*. At these levels we can use data on trends in whole populations of injectors on the assumption that needle exchange played its part. The third level – covered in later issues – relies on data directly from needle exchanges and their users. At this level the focus will be on *case studies of failures*.

Case studies because exchanges vary on many dimensions which interact between themselves and with the surrounding environment, processes best witnessed through a rounded picture of the few well-documented exchanges. *Failures* (or partial successes), because these throw into relief what makes most exchanges work. Also cited are all the studies which have directly evaluated the impact of needle exchange on hepatitis C. This meagre data is supplemented with data on HIV and hepatitis B (if these are spreading then almost certainly so too is hepatitis C) and with information on the behaviours known to spread viral infection.

No UK exchange has been documented in sufficient detail to be form a case study. Instead, all available scraps of evidence from Britain are brought together including evaluations of the first UK exchanges, still the most thorough studies.

Though relevant data was conscientiously sought, the extended review underlying this and later articles was not a comprehensive and systematic review of everything known about syringe exchange effectiveness. The focus was on hepatitis C and on studies which shed light on what sometimes makes needle exchange *not* work.

Virus spreading rapidly

Arguments that more needs to be done to combat hepatitis C rest on *incidence* data. Evidence that many injectors *are* infected (prevalence) could just be a historical legacy. What matters is whether today's services are preventing *new* infections (incidence).

The contrast with HIV is instructive. By the late '90s virtually no infections were recorded among newer injectors[28 54] or in blood submitted by injectors in Scotland,[55] yet hepatitis C was spreading rapidly. After up to three years' injecting about 1 in 10 injectors seen at drug services in England and Wales are infected[28] and by five years a quarter.[29] Over a similar period, in England's north west a third were infected[56] and in Glasgow 43% (but in Edinburgh 'just' 13%).[57] Demonstrating the potential for very rapid spread, in Glasgow in the first half of the 1990s, within two years 42% of injectors were infected.[58] Across the UK, in the 1990s the numbers of infections identified by laboratories rose by multiples of ten.[55 59 60]

Other countries have seen even more rapid spread, a warning of what can happen. Within a year it is not unusual to find a substantial minority[15 19 23 25 61 62 63 64] of injectors infected and sometimes, as at one stage in Vancouver,[65] the majority.[66] Most dramatically, in Belgium in 1995, within a month of starting to inject nearly half of a sample of heroin addicts had become infected; within a year, over three quarters.[44] Needles and syringes can freely be bought from Belgian pharmacies but even in the late '90s needle exchange provision remained patchy.[67]

In populations where new HIV infections have been effectively suppressed, hepatitis C can still be spreading rapidly.[65] An Australian HIV prevention service had its intended effect on HIV with just 0.17% of clients per year becoming infected, but 21% became infected with hepatitis C.[23]

However, as in the UK, there can remain a window several years wide when most new injectors are free of hepatitis C infection and could potentially be kept that way.[45 62 64 68] For example, in Australia, on average it takes about seven years to become infected.[25]

Broadband transmission aids spread

Some of the factors which influence the risk of hepatitis C infection (such as imprisonment[3 23 25 45 56 61 69]) are beyond the reach of needle exchanges, but others may need to be taken into account in service planning.

Sharing uncleaned syringes and needles is a well-known risk factor, but sharing other equipment or 'cleaned' syringes have also emerged as major transmission routes. Nearly 90% of infected patients at a London methadone service denied ever having shared a 'dirty' needle and syringe.[31] However, two-thirds had shared these after cleaning and 80% other injecting equipment, in both cases significantly more often than among those not infected. Similarly in North America,[4 65 69] Australia,[23] and Belgium,[44] sharing implements such as 'cookers' or filters has been

Preview of conclusions

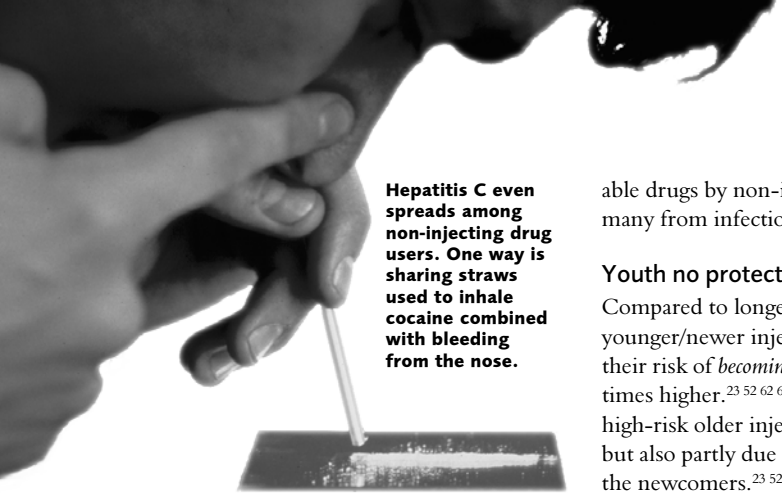
An advanced sketch map of where this multi-part series is heading will help readers assess signposts to the conclusions reached in subsequent issues.

In this issue it's established that hepatitis C has already infected a substantial minority of British injectors and is spreading rapidly due to continued 'sharing' – shorthand for the various practices which risk blood-to-blood contact mediated by materials and equipment used to inject. Without harm reduction measures such as needle exchange, its spread might have been even worse,[7 20 28] but their impact has been nowhere near enough to prevent the hepatitis C epidemic. Given current services, progress has plateaued at a level which leaves HIV a potential threat[53] and hepatitis C leaking in volumes through the gaps.[22]

In later issues it's argued that rising above this level will require more intensive and extensive service provision and a determined strategic focus on eliminating risk behaviour. In this exchanges will be pivotal, but success is not guaranteed. Exchanges do not automatically reduce risk behaviour or eliminate the potential for epidemic viral spread;[1 18] it all depends on the volume and nature of the service. In Britain, evidence for effectiveness in reducing risk behaviour or curbing infection is extremely limited. Across the world, studies have generally yet to prove effectiveness against hepatitis C.

Rather than these findings casting doubt on continuing with needle exchange, the overriding conclusion is that we need far *more*. Exchanges should be the vanguard of a harm reduction effort of sufficient volume to safeguard the health of the vast majority of injectors (and their associates), not just those looking for ways out through treatment. More resources and support could also pave the way for a proactive working style which maximises the opportunities for intervention. With the core exchange function optimised, attention could be turned to extensions which harness drug user networks and take exchanges closer to a one-stop, comprehensive harm reduction service.

Not a pretty sight: the hepatitis C virus.



Hepatitis C even spreads among non-injecting drug users. One way is sharing straws used to inhale cocaine combined with bleeding from the nose.

implicated in infecting up to a third or more of injectors who denied syringe reuse. Sharing out drugs by 'backloading' (drawing up the solution from one syringe into another) is also an established risk factor.[68]

The more people you share with, the greater the chance of infection.[42 44] Polydrug use and especially injecting cocaine or cocaine/heroin mixtures ('speedballs') is commonly[52 62 65 68 69 70 71] but not universally[13 63] found to elevate risk of infection by hepatitis C, and the same has been found for HIV.[72 73]

This is partly because the short-acting cocaine is injected more often, but also because some patterns of drug use are markers of a disordered lifestyle which features risky injecting. In one British study, this seemed to apply to injecting cyclizine, benzodiazepines or pharmaceutical opiates;[56] in another, polydrug use generally and specifically injecting temazepam.[74] Elsewhere, injecting cocaine[62 71 75 76 77 78 79] is commonly implicated, but sometimes too supplementing your main injecting habit (usually heroin) with cocaine[139] or crack,[68] tranquillisers,[51] or heavy drinking.[139]

Dabbling still a risk

Much more so than for HIV, infrequent injectors are still at substantial risk of infection with hepatitis C.[44 45 62 65 68 70] For example, in Belgium over half the occasional injectors in a sample became infected and once other factors had been taken into account, injecting infrequently was no protection.[44]

This happens because occasional injectors are less likely to have their own equipment and more often reuse other people's. As a result, the protection afforded by fewer injections is counteracted[51] by the fact that each injection is more likely to involve a syringe, spoon or filter which might have become contaminated – in Dublin, six times more likely.[80]

Even among what seem (sometimes this is questionable[81]) to be *non*-injecting drug users, hepatitis C infection can be substantial. A possible mechanism applicable to 'snorting' cocaine is sharing straws used to inhale the drug combined with the common experience of bleeding from the nose.[82 83] However, the risk for non-injectors is far less than for injectors.[66 84] Opting to take injectable drugs by non-injecting routes saves many from infection.[14]

Youth no protection

Compared to longer-term injectors, fewer younger/newer injectors are infected[25 70] but their risk of *becoming* infected can be several times higher.[23 52 62 63] This is partly because high-risk older injectors are *already* infected, but also partly due to greater risktaking by the newcomers.[23 52]

Local British studies have found that injectors with shorter careers are the ones most likely to have recently shared injecting equipment.[56 85 86] Nationally, new injecting clients aged under 20 seen by drug services or GPs are most likely to have recently shared, those aged 30 or more least likely.[55 87] A similar pattern was apparent at Australian exchanges.[45] Newer and younger injectors are more likely to rely on older and potentially infected injectors for equipment or for help with injecting. In Baltimore, people initiated into injecting by someone at least five years older were most likely to become infected, a finding attributed to the greater chance that older injectors will themselves be infected.[63] Newcomers will also tend to be less aware of risks and how to avoid them.[88]

Harm reduction curbed spread

Rapid spread of hepatitis C signifies that anti-infection strategies have not been effective enough, not necessarily that they have been *in*effective. Without measures such as needle exchange and methadone maintenance, the virus might have spread yet more rapidly.[7 89] For this there is indeed some evidence,[20] but even where harm reduction measures are well established and widely accessed, they are not making sufficient impact.

Some of the evidence comes from the history of the hepatitis C epidemic in England and Wales. Data from a national sample composed mainly of injectors in treatment is consistent with a downturn in new infections from the mid-'80s when anti-HIV measures started to be implemented.[29] Other English studies tell a similar story for hepatitis C[56 90] or B.[31] Though the timings are different, data from Edinburgh and Glasgow (which account for most of Scotland's infections[30]) also suggests that new infections fell around the times when syringe exchange and methadone services became widely established.[57]

Drawing on data from 101 cities in five continents, the Australian health department has compared trends in hepatitis C in cities with and without needle exchanges.[91] On average needle exchange was associated with a reduction in prevalence in injectors of around about 2% year – worthwhile, but not as great as for HIV. When incidence was analysed it was indeed lower in cities with exchanges, but still high (16% versus 25% per year) and the difference made by exchanges was neither large nor statistically significant.

Services now making more impact?

Recent awareness of hepatitis C as a risk in its own right may have further dented its spread. In Britain this could be the message of reductions seen (in the late '90s) in the proportions of injectors who tested positive for hepatitis C.[28 30] Similarly, at a London methadone clinic, only among the most recent initiates to injecting in the late '90s was there a drop in the infection rate so steep that it could not be explained by differences in how long people had been injecting.[31]

In other countries, too, recent falls in what remains rapid spread may reflect intensified anti-infection measures. In Dublin in the 1990s, implementation of extensive harm reduction services coincided with a fall from nearly two-thirds to under 40% in the proportions of new (up to two years) injectors who became infected with hepatitis C.[92] The fall was seen mainly in the newest (up to a year) injectors. Among those injecting for one to two years, at 57% the infection rate approached pre-harm reduction levels, suggesting that the main effect of service provision was to delay infection.

In Australia the infection rate among newer injectors seen at syringe exchanges nearly halved in the two years from 1995, a period when harm reduction was adopted as national policy and hepatitis C became a recognised problem.[45] In contrast, earlier anti-HIV measures including syringe exchange seem to have curbed the spread of hepatitis B but not of hepatitis C.[15 25]

Risky injecting remains common

Underpinning continuing spread of hepatitis C is the continuation of behaviours capable of transmitting the virus. Most worrying is a recent rise in the proportion of injectors interviewed at drug services or genitourinary clinics in England and Wales who admit in the last month having passed on or received used needles and syringes.[28] Up to 1997 typically under 20%, in London this proportion doubled to over 40% in 1999 and 2000. Outside London it rose to about 30%. The increase remained when the focus was narrowed to newer and younger injectors.

This picture was replicated in assessments made in England[87] and Scotland[55] of new or returning clients seen at drug services or by GPs. There were substantial rises in the years leading up to 2000/01 in the numbers injecting and in the proportion of injectors who admit having recently shared – in England, from 12–13% to 20–21% over the '90s. The same type of statistics show that in England and Wales recent sharing of injecting equipment (not just needles and syringes) is the norm among new drug injecting clients.[28]

Britain is not alone in finding that relatively extensive harm reduction services can still leave high levels of risky injecting. The same was found in Dublin,[92] but there the extensions left the supply of sterile equip-

ment short of need and not sufficiently accessible.[80] After an initial reduction, in Amsterdam sharing has remained sufficient to spread HIV to 3–4% of injectors a year[51 93] and hepatitis C to many more.[13] In Europe's Maas-Rhein region, drug subcultures and insecure living conditions have limited the impact of service provision: though over 90% of injectors saw fresh equipment as easily available, nearly half usually shared syringes with a partner or friend.[94]

Official statistics underestimate sharing

Official British statistics are worrying enough but do not tell the whole story. In 1998, 1214 injectors not currently in treatment were interviewed in seven English cities.[90 95] Detailed questioning revealed higher sharing levels than the brief enquiries used to generate official statistics. In the last four weeks, 78% had injected in ways which might spread infection. Just over half had reused or passed on used needles and syringes. Three quarters had shared materials such as filters, spoons, water or bleach, which were also shared more often. The saving grace was that sharing was typically confined to two friends or partners rather than strangers.

It was a similar picture in the south west of England where in the past month 40% of a sample composed mainly of heroin injectors had shared syringes/needles and 85% other equipment.[96] On nearly 1 in 5 occasions the injecting partner was an 'acquaintance', not a friend. In London, 62% of heroin injectors interviewed in 1994 had in the past year shared equipment of some kind.[97] Syringe reuse tended to be restricted to close friends and partners, but about a quarter had reused spoons or water after (and nearly a third before) a casual acquaintance.

A US study has calculated that injectors who had reused both needles/syringes and other equipment had exposed themselves to infection 79 times in the past month, of which 51 were due to reusing cookers, filters or water.[98] Where, as in the UK, syringes are more easily available,[99] the balance of risk occasions is likely to be weighted even further towards injecting paraphernalia.

Some attempt to clean needles and syringes before reuse is the norm, but studies in London[85] and the north west of England[100] suggest that only rarely is this adequate to kill HIV, let alone hepatitis C. In the latter study the false reassurance generated by cleaning seemed to encourage syringe and needle sharing.

Why sharing persists

Scarcity remains a major reason why syringes are shared, but in legislatures such as the UK, often this is scarcity at the *micro*-level – a new set not being to hand at the time and place when immediate use is prompted by withdrawal symptoms, the desire or opportunity to take drugs, or the need to consume quickly to avoid detection.[102] The strength of these urges may be why some British studies have found that the greater their dependence on drugs, the more likely injectors are to share syringes.[74 96 101]

It's a friendship thing

As significant as equipment shortages are the social interactions through which risks are recognised, given weight, and accepted or avoided. Even when fresh supplies can be had, personal closeness may be seen as mandating closeness in the form of sharing a syringe.[2 103] Where less intimate sharing has given way to anti-HIV messages, intimate sharing persists. In the UK[32 95 101 104] and other countries with developed harm reduction services,[80 94] most injectors now share syringes only with one or two partners and friends and tend not see this as an infection risk.[101 105 106] British studies have found injecting with friends closely related to sharing.[74] Where young injectors have grown up or initiated drug use together, perception of risk may be low ('I know where you've been') and sharing levels high.[74 88]

Given these ties, challenging sharing may be interpreted as a challenge to the relationship itself. What from the outside is 'risk behaviour', for the participants serves to symbolise and maintain the social ties on which they depend.[105] Social relationships are also power relationships, most evident in male-female sexual partnerships (within which resisting sharing can risk violent repercussion)[103] but also in the initiation of younger by older and more experienced injectors. Some British studies have found that the more an injector allows another injector to take the lead in the acquisition, preparation and administration (as in injecting them) of drugs, the more likely they were to have reused injecting equipment.[96 100]

Such ties circumscribe each individual's freedom to take or not to take risks. As a result, networks of drug users tend to jointly develop risky practices[88] and also to reduce risk together through example, influence and changing social norms.[107] What is seen as a risk is itself socially defined, not just in terms of the people with whom sharing is considered too risky, but also the risk practices which the network and its opinion leaders dismiss or see as beyond the pale.[105]

Partners in adversity

The process of obtaining drugs can itself generate sharing liaisons – business partnerships but with the emotional closeness lent

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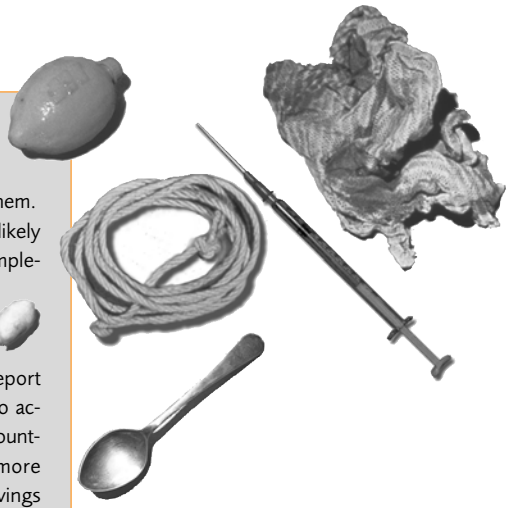
Platform to build on

The weight of international evidence is that exchanges have reduced behaviours which spread blood-borne disease and reduced HIV spread without increasing the number of injectors or the frequency with which they inject.[121 122 123 124 125 126] This evidence is sufficiently persuasive to be acknowledged by major international[127] and national[128 129 130] authorities, even in the USA[8 17 120 131] where federal opposition to funding needle exchange remains unyielding. In Britain, an early harm reduction-oriented public health response to HIV, in which needle exchange was important both as a symbol[74] and a contributor,[2] is credited with helping to avert the epidemics seen in legislatures which denied sterile injecting equipment to drug injectors.[2]

The most recent evaluation published late in 2002 is from the Australian health department.[91] It replicated and extended an earlier study[124] comparing trends in HIV prevalence in cities with and without needle exchange programmes. The conclusion was that on average HIV prevalence decreased 18% each year with exchanges but increased 8% without them. The advantage was so great that it was very unlikely to have been due entirely to other services implemented alongside needle exchange.

North American[132 133 134] and Australian[91 135] analyses based on the health care costs of treating HIV infection (and a New Zealand report which also took hepatitis C treatment costs into account[136]) suggest that even with this limited accounting of benefits, needle exchanges save far more money than they cost. In one analysis cost-savings continued to accrue until nearly 90% of injectors' syringe needs were met by a combination of needle exchange and pharmacy distribution.[137] In some scenarios, HIV would best be prevented by allocating the bulk of anti-HIV funding to syringe exchange.[138]



After an injecting episode involving an infected person, hepatitis C contaminated 7 in 10 syringes and swabs and a large minority of filters, spoons and water samples.

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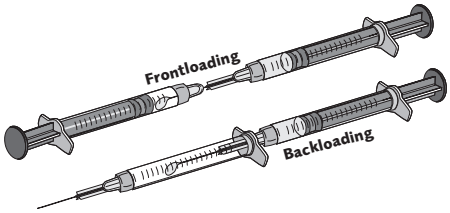
by sharing the threats posed by illegality, a closeness which spills over into other forms of sharing.[108] On the margins of society, under attack and despised, lacking material resources, and subject to the fluctuations of the illicit market and official suppression, addicts close in on themselves and develop mutual support mechanisms.[88]

Social etiquette, reciprocation and the display of trust may demand that sharing extends to drugs and injecting equipment.[103] Reciprocity seems apparent in the very strong tendency for injectors who reuse used syringes also to pass on their own syringes within their social circle.[51 77] More directly, poor injectors commonly pool money to buy drugs and sometimes jointly commit the crimes which fund those purchases.[88] Group-based purchase encourages group-based use and the sharing of injecting equipment.



The most convenient and 'fairest' ways of sharing out drugs also share out hepatitis C if the virus is present.

Adversity not shared can also precipitate risk. In open drug markets subject to intense police pressure, addicts are reluctant to carry syringes and anxious to consume drugs rapidly. Many resort to using whatever equipment is to hand and to other practices (eg, mouth-to-mouth transfer of drugs) which could spread infection.[88 109 110]

In the USA,[75 76 111 112] Canada,[113] Ireland,[80] the UK,[104] and the Netherlands,[71] indicators of social exclusion and deprivation such as homelessness, poor education, parental unemployment, and poverty are linked to unsafe injecting. Lack of a secure home base may be partly why in the north west of England, heroin/polydrug injectors who injected in the street or in public were more likely to reuse other people's syringes and needles and to pass on their own.[100] Deprivation and high levels of dependence, psychiatric problems and depression also obstruct risk reduction efforts.[114] It is, for example, very difficult to follow hygiene guidelines when injecting in public or in abandoned buildings with no water supply.[88]

The risk of becoming infected must also be placed in the context of a lifestyle imbued with risks such as fatal overdose, which to the drug user may seem more immediate, more probable and more serious.[105]

Incentive to share paraphernalia

Paraphernalia sharing often continues even when normally a new syringe is used for each injection. Social norms and reciprocation play their part, as in the donation of used filters (from which drug residues can be extracted) to occupants who allow their premises to be used for injecting, and many injectors are unaware of the risks from sharing spoons, filters and water.[88 115 116 117]

There is also a practical incentive. Reused syringes clog and reused needles lose their edge, making injecting painful and difficult. Purely in terms of getting a problem-free and rapid hit, the incentive is to use a new set.[102 118] No such incentive promotes avoidance of reusing spoons, filters and water. Instead, the incentive can be to share.

The risk arises especially when injectors share jointly purchased drugs.[88] In some cases, too, business cooperation in drug dealing is remunerated by drugs which the partners divide up and inject together. The most reliable, the quickest, and what may also be seen as the fairest ways to prepare and parcel out the drug involve collective use of equipment, risking contamination of each injector's syringe and needle.[88 102 117 118] Among these are drawing up quantities from a common pool or using one syringe to squirt measured amounts into the others. Filters too will be shared and may later be recycled to extract drug particles.

Except in the (for hepatitis C) unlikely event of a stable, infection-free injecting network,[119] eliminating viral spread might virtually demand that injectors inject in isolation, no matter how close their relationships, a socially and practically difficult objective.

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hepatitis C and needle exchange

Six case studies show how the complex balance of needle exchange services can be disrupted, leaving hepatitis C and HIV spreading rapidly. Common themes are resource starvation, local hostility, counterproductive restrictions and a non-interventionist ethos.

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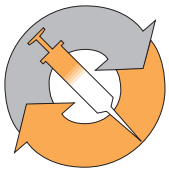


In the last issue of FINDINGS we established that hepatitis C is still spreading rapidly due to continued sharing of injecting equipment and that needle exchange is the key to curbing the epidemic. This issue investigates what it will take for exchanges to match up to the challenge. The focus is on *case studies of failures*: *case studies* because these best portray the interacting variables which combine to affect infection control; *failures* because these throw into relief the conditions for success. That there can be success even against hepatitis C is shown by the Tacoma case study.

Though we hope you will, there is no need to read all the studies – each is a self-contained story. Use the clipboarded 'case notes' to pick and choose, but, we suggest, don't miss out on Vancouver.

In later issues we'll draw together the themes from these and other studies and from UK work, but one theme should be mentioned up front – the 'magnet effect' p. 28. Perversely, needle exchanges which attract high-risk injectors risk being seen as actually having *caused* them to be at greater risk. Exchanges in the case studies often suffered from this illusion, but rarely was it the whole story. The deeper cause of poor results is that exchanges often operate under crippling "restrictions that condemn the programmes to fall far short of the needs of the persons for whom they were designed".[129] By under-resourcing and under-valuing this work, sceptical authorities create the conditions which seem to justify their misgivings.

Trickle-feed exchange no match for hepatitis

Malmö

- ✓ One-for-one exchange allied with capped quantities and infrequent visits leave hepatitis B and C spreading rapidly.
- ✓ But there were no pre-exchange measures nor a comparison group of non-attenders, so the exchange may still have reduced risk.
- ✓ First example of the 'magnet effect' – high risk injectors drawn to the exchange.

Our Swedish case study directly confirmed fears that syringe exchanges may not adequately prevent hepatitis C infection.[61] For two years the Malmö exchange tracked new HIV and hepatitis infections among 515 callers who initially tested negative for one or more of the viruses and were re-tested at least six months later. Over a typical follow-up period of 31 months, there were no new cases of HIV but a quarter previously free of hepatitis B became infected (about 1 in 8 per year) and over half with hepatitis C (about 1 in 4 per year).

Whether these rates were less than they would have been without needle exchange is impossible to say, but they are worryingly high. Since the exchange virtually eliminated the local illicit market in injecting equipment, sharing injecting paraphernalia and/or sharing the exchange's own needles and syringes must have caused hepatitis to spread. The same high-risk practices might also have spread HIV were it not that the few infected injectors in the city were known to other users.

Constricted equipment supply seems the most likely explanation. Shortfalls should have been eased by the fact that the great majority of attenders were amphetamine rather then heroin users. Still, the deficit must have been substantial. Typically attenders visited about once every six weeks but could collect at most three syringes and six needles, all to be returned next time. Shortfalls could not be made up from elsewhere since the exchange was the sole legitimate source of injecting equipment.

Other features of the exchange may have contributed to sporadic attendance and disease spread. It was open only during working hours and sought a potentially off-putting amount of information from callers at their first visit. Strict one-for-one exchange meant that in order to be re-supplied, injectors had to hang on to used equipment until their next visit. Yet they may also have been deterred from making frequent visits because carrying syringes in the street risks detection. The net result could have been to extend the interval used equipment was kept in circulation, just what the exchange should have been avoiding.

Malmö is also our first example of the magnet effect. Counter-intuitively, relatively frequent

exchange attenders were slightly but significantly *more* likely to become infected with hepatitis B or C. Rather than regular attendance increasing risk, this was almost certainly because those at higher risk in the first place tried to mitigate this by attending regularly. They tended more often to be primary heroin users for whom even twice the typical attendance rate would not come close to satisfying their needs.

First hard evidence that needle exchange can work against hepatitis C

From Malmö we know that (highly restricted) needle exchange can leave hepatitis spreading rapidly, but not whether the spread was *less* rapid than it would otherwise have been. US teams led by the same researcher directly addressed this issue with conflicting results: at best zero impact in Seattle, but a large positive impact in Tacoma.

Tacoma's exchange was the first in the USA to gain public funding. From a shoestring operation it grew into a well-resourced HIV prevention centre offering a comprehensive service.[120] Activist leadership and the fact that it started with a 'clean slate' and local support meant that 'Point Defiance' was free to offer a user-centred service untrammelled by the concerns and restrictions which tied the hands of other schemes.[194] At the time of the study little else was available to help the city's injectors avoid infection, so if the exchange worked, there should have been clear benefits from attending. For both HIV and hepatitis C, exactly what was found.

Point Defiance operated from three fixed sites and also ran a mobile exchange available by phoning to arrange a time and place to meet. Apart from the pharmacy site, which accounted for relatively little business, there was no limit on supplies at any one time and exchange on behalf of others was encouraged. There was, however, a strict one-for-one policy. Staff spent considerable time educating and counselling callers and delivering on-site health and welfare services. Callers were turned into long-term clients via the case management service which organised housing and health care. The exchange also became the largest local recruiting agent for methadone treatment.

Studies strongly suggest that opening the exchange reversed an epidemic of hepatitis B among injectors, and helped hold HIV down by roughly halving risky sharing among attenders compared both to non-attenders and to their own pre-exchange behaviour. However, risk remained high. Before attending, customers had averaged 56 injections a month with a syringe used by someone else, after attending this dropped to 30; from 58%, the proportion injecting in ways which could spread disease fell to a third.

Benefits extend to hepatitis C

The chance to test whether these behaviour changes also curbed hepatitis C arose because the surrounding county was one of four designated nationally to monitor new infections. The system depended on patients showing symptoms and only a minority do, but there was no reason to believe that this fraction would differ between exchange attenders and non-attenders.

If the exchange had reduced the spread of hepatitis C, then newly infected injectors should include relatively few exchange attenders. To assess this, researchers compared them with injectors who had *not* become infected.[141] After adjusting for other influences, an injector was seven times more likely to become infected with hepatitis C if they had not used the exchange, for hepatitis B, nearly six times.

The study was far from ideal. It relied on data collected for other purposes, did not establish new infections by re-testing injectors, and used a comparison group unrepresentative of the local injecting population. However, the benefits of exchange attendance were so clear cut that only unrealistic assumptions would have rendered them insignificant. For experts convened by the US National Academy of Sciences, it constituted evidence of a "powerful retardant effect of needle exchange program attendance on infection with [hepatitis B and C]".[120]

Tacoma

- ✓ Convincing demonstration that needle exchange can curb the spread of hepatitis C.
- ✓ Important factors probably include local support enabling comprehensive services, and the lack of 'competing' outlets.
- ✓ Shows that one-for-one exchange need not be counter-productive if quantities are uncapped and supplies taken to the customers.
- ✓ Still high level of sharing.

Pharmacy sales dilute impact

Just north of Tacoma on the USA's north west coast lies Seattle, where the fixed-site exchange was located near the city's main drug market. If current provision is a guide, it operated on a strict one-for-one basis[142] and was open for just a few hours daily and not every day.[143] It seems to have done little to stem the spread of hepatitis B or C.

Researchers tracked what happened to injectors seen at local treatment and other agencies in 1994–1996 who at first tested negative for the viruses.[63] Thousands were tested, but the sample was small because 86% were already infected with hepatitis C. Continuing injectors were re-tested a year later when 39 out of 187 had become infected with hepatitis C, 19 of whom had sourced at least half their new needles/syringes from the exchange. After accounting for some prior risk factors, these regular customers were no more protected from the virus than people who had never used the exchange or had used it only as a minor source of equipment. Though not statistically significant, all the differences (with respect to hepatitis B as well as C) were in the wrong direction, linking *increased* risk with exchange use.

Again the magnet effect was implicated. Unmeasured risk variables found in greater abundance among regular attenders might account for the findings. Higher risk injectors certainly tended to be the ones who both started to use Seattle's exchange and who continued to attend.[144] Unlike Tacoma, alternative sources of sterile equipment such as pharmacies also meant that risky sharing could be avoided without attending the exchange, diluting its impact.[145]

Such considerations probably mean that the impression of increased risk is unreliable. But equally there is no evidence that attending the exchange *decreased* risk, and regular attenders exhibited high levels of risk behaviour. Over the follow-up year, nearly half had shared syringes and half of these had done so with two or more people. Some sharing of other equipment was the norm as was measuring out drugs by backloading. Attending the exchange may (we don't know – there were no pre-exchange measures) have reduced these risk behaviours, but in the context of a heavily infected local injector population, any continued sharing was likely to transmit hepatitis C – and did.

Seattle

- ✓ No evidence that a limited service with one-for-one exchange did anything to stem the spread of hepatitis B or C.
- ✓ Half the attenders were still sharing needles and syringes and most were sharing other equipment.
- ✓ Key difference from Tacoma may be that there were alternative sources of sterile equipment in the city, diluting the impact of the exchange.

Cocaine and housing crisis overwhelm North America's largest exchange

Gravitation of high-risk injectors to exchanges also partly accounted for negative findings in two Canadian cities – but only partly. Studies of exchanges in Vancouver and Montreal also revealed a disturbing inability to counter the spread of HIV and hepatitis C as an upsurge in cocaine injecting overwhelmed constricted services.[63]

Only in Vancouver was hepatitis C recorded,[65] an offshoot of a series of studies prompted by an outbreak of HIV. This work provides the most graphic account yet of how good intentions can be derailed by a restricted service and a bleak, risk-generating environment. Because these are the findings which did most to undermine confidence in needle exchange, we examine them in depth.

HIV rings the alarm

Alarms had rung when Vancouver's low HIV rate among injectors more than tripled over 18 months to reach 7% in 1995. The outbreak was a shock because the city hosted the largest-volume needle exchange on the North American continent. In 1997, it exchanged over 2.5 million needles.[146]

Vancouver's main needle exchange operated from a fixed site in Downtown Eastside, the city's drug injecting centre and the poorest district in Canada.[113] Though the office closed at 8pm, vans operated from one in the morning until after it re-opened at 8 am.[146 147] Exchange was strictly one-for-one and the number of syringes handed at any one time was at times tightly capped.[148] Locally, cocaine was the main injected drug.[113]

Working in the same district, in May 1996 the Vancouver Injection Drug User Study started to investigate the HIV outbreak. Their earliest finding (of which more below) was that attending the exchange was associated with a much *higher* risk of HIV infection. Later the project set out to discover if this applied also to hepatitis C.

Hepatitis C also alarming

The study recruited injectors who were interviewed and tested for HIV and hepatitis C and then re-contacted every six months to undergo the same investigations.[148] By late 1999, 1345 had been interviewed of whom initially over 8 in 10 were infected with hepatitis C and a fifth with HIV.

Of the 155 injectors who were negative for hepatitis C and returned to be re-tested, 62 – exactly 4 in 10 – had become infected over on average 16 months; 93 had so far avoided it.[65] Over the previous six months, activities significantly related to infection included prostitution, having multiple sexual partners, needle sharing, daily injecting, injecting cocaine or cocaine/heroin 'speedballs', and addiction treatment other than in a methadone programme. Disturbingly, infection was also more common in injectors who had attended an exchange at least weekly: over half had become newly infected but only a quarter of less frequent attenders.

Some of these behaviours may have been linked to infection simply because they were associated with other behaviours. For example, non-methadone treatment was unlikely to have *caused* infection. Probably it was just that frequent cocaine injectors were more likely to enter this treatment *and* more likely to become infected. The same might be true of weekly needle exchange attendance. But even after taking other factors into account, frequent attenders remained two to three times more likely to become infected.

Was it the magnet effect?

Still the researchers cautioned against concluding that frequent attendance *caused* more infections. The same kind of result had previously been found for HIV and on closer inspection had proved a red herring.[148] However, HIV had been different: once other risk factors had been taken into account, there was no case left for needle exchange to answer; for hepatitis C, excess risk remained substantial.

Still there remained the possibility that a basket of *un*measured or imperfectly measured risk factors were more common in frequent attenders, making it look as if attendance itself was a risk – the magnet effect.

Unmeasured behaviours such as sharing equipment other than needles and syringes might have greatly increased the risk of hepatitis C infection but not HIV, helping to explain the disparity. Others behaviours were represented only by broad yes/no categories. For example, injection frequency was divided into either at least once a day or not, yet *very* frequent injectors were far more likely to regularly attend exchanges, and probably also to become infected.[148] Especially for women, markers of a highly risky and unstable lifestyle (frequent injecting, crime, prostitution, resort to shooting galleries) were more common in weekly attenders,[149] an array not fully captured by the hepatitis C analysis.

The likelihood was that, rather than needle exchange, it was this inadequately measured risk which caused the infections. One report directly confirmed that injectors who primarily sourced equipment from the exchange engaged more often in more risky behaviours than pharmacy users.[150]

Exchange did not cause HIV outbreak

Vancouver's hepatitis C study was a continuation of the study which documented a similar picture with respect to HIV. Despite the seemingly damning findings of the first HIV report,[113] a later study[148] confirmed what had been hinted at earlier: that needle exchange looked like a risk factor because the most infection-prone injectors regularly sourced their equipment from the exchange. New infections were linked to unstable housing, occupying hotel rooms in the deprived Downtown Eastside neighbourhood, injecting cocaine four or more times a day, and needing help from others to inject. Once these factors had been taken into account, infections were no more likely to occur in frequent than infrequent attenders. Years earlier a different kind of study had reached a similar conclusion.[151]

Among these ifs and buts, there was one unpalatable certainty. Even if attending the exchange at least weekly did not heighten viral risk, neither did it do anything noticeable to prevent risk continuing and culminating in infection. Each year probably about 40% of frequent visitors became infected with hepatitis C[65] and nearly 12% with HIV.

Vancouver

- ✓ Findings from this city did most to undermine confidence in needle exchange provision.
- ✓ Local hostility led the service to adopt a defensive posture.
- ✓ Strict one-for-one exchange and capped quantities were adhered to in the face of a cocaine injecting epidemic.
- ✓ Net result – despite handing out millions of syringes, major HIV and hepatitis C epidemics.
- ✓ Lack of decent affordable housing was a key factor.

Preview of conclusions

In later articles studies from Britain will be examined and found to provide limited evidence for the effectiveness of exchanges in reducing risk behaviour or curbing infection. The early pilot studies were flawed and since then there has been no comparable investigation. Rather than casting doubt on needle exchange, the overriding conclusion will be that we need far *more* – more exchanges, more syringes, better resourced services. More resources could also pave the way for a proactive working style which maximises opportunities for intervention. Attention could then be turned to extensions which harness drug user networks and take exchanges closer to the model of a one-stop, comprehensive harm reduction service.

Downtown Eastside was a sink into which the city's poor single population descended

Four in 10 had recently injected in shooting galleries and probably a similar proportion had re-used someone else's needle.[113 148] Over the course of attending, risk profiles changed little and not in ways which could be attributed to the influence of the exchange.[148]

Why so little impact?

Why Vancouver's exchanges failed to prevent the epidemics is one of the most contested topics in the addictions field.[152] One possible explanation[149] can be discounted. Local sharing networks were fluid and new sharing partners were commonly acquired – but not by meeting at the exchange.[148]

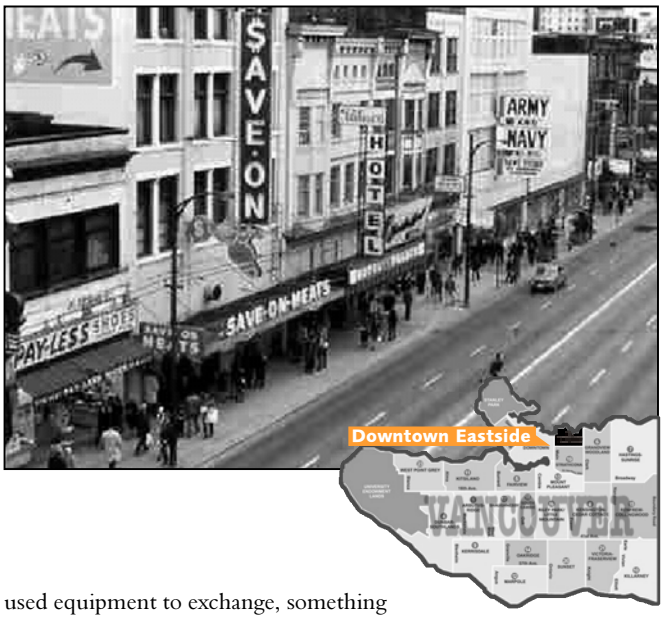
Another possible explanation lies in the methodology of the studies. Essentially they rested on comparisons between frequent and less frequent attenders. These differed by definition in how often they used the exchange, but not necessarily in how adequately it met their needs for injecting equipment, perhaps the more important variable.[76] Infrequent attenders probably collected fewer syringes per week but also needed fewer because they injected far less often and topped up from pharmacies.[148] If anything, weekly attenders were more likely to experience difficulty in obtaining sterile syringes.[149 153] Equality of ease in obtaining equipment translated into equality of risk.

Inadequate distribution

Despite having North America's most prolific exchange on their doorsteps, for both frequent and infrequent attenders, infection risk remained extraordinarily high. The exchange, it seems, was not prolific enough. It handed out two million needle/syringe sets a year, but up to ten million were needed to give each injector a fresh set each time.[113]

Frequent (especially cocaine) injecting and 'bingeing' created difficulty in obtaining sufficient sterile syringes.[153] Experiencing this difficulty was in turn linked to a tripling in the chances of someone sharing needles or syringes.[79] The upshot was that injectors who injected over four times a day were three times more likely to risk infection by using needles after other people.[154] Sharing was also associated with multiple re-use of one's own needles,[113 148] confirming the impression that it arose due to demand outstripping supply.

Quantity caps and one-for-one exchange could not have helped. On average just six syringes/needles were handed out at each visit.[155 156] Even a typical customer would have to visit at least three times a week, but a quarter injected over six times a day.[113] Their weekly needs will often have exceeded the exchange's quantity limit,[146] requiring several visits to the office carrying a basket full of used equipment to exchange, something most Vancouver injectors would wish to avoid.[157] Most had been stopped by the police and had needles confiscated.[154]



"I think that with a stable house, if the person was on some kind of opiate therapy, if we gave them some real things to do that gave them some kind of life, that they would buy into it in a second. We're not animals. This isn't a party down here. It's a very shitty life ... they'd change it if they could. Some innovative programming could really change things down here."[193]

'Sid', a 40-year-old drug user from Downtown Eastside

Users who needed the most equipment (frequent cocaine injectors) tended to rely on the vans, the source least able to supply in bulk[146] and one easily missed as they parked a short time in each location. As a result, van users had the greatest difficulty in meeting their needs.[150 153] Still, some may have preferred the vans to the office, where they feared police surveillance.[153 154] The police presence had been stepped up in response to the area's drug problem; personal experience of this pressure was linked to a near doubling in the odds of sharing needles.[50]

Risk-generating environment

Inadequate distribution was not the whole story. For example, 1 in 5 local injectors shared needles even when they had no problems getting fresh supplies[50] and though daily cocaine injecting and 'bingeing' did exacerbate equipment shortages, these behaviours also seemed to directly contribute to needle sharing.[79 158] The exchange in Downtown Eastside failed to prevent the epidemics not just because of its restricted service, but also because this became no match for the risks generated by the advent of cocaine injecting in a troubled population poorly served by welfare, housing and economic systems.

Some risk-generating factors were personal. Experiences such as sexual abuse, suicide attempts, and depression were associated with continued resort to other people's injecting equipment despite the exchange.[154] Such histories were common among local injectors,[113 149 151 154] as was mental illness.[50] This vulnerable population also endured depressing living conditions and unenviable lifestyles featuring prison, crime and prostitution.[65 113 148] Exchange attenders were generally poorly educated[50 113] and very poorly housed, mostly in 'welfare' hotels.[50 113 148] To extricate themselves from equipment sharing and a drug-centred lifestyle, a third had to overcome the pull of a sexual relationship with another injector.[113 154]

At the heart of the problem was the loss of affordable and social housing in the city.[148] In the small Downtown area, thousands of tiny but relatively cheap, single-occupancy hotel rooms filled the housing gap, a sink into which the city's poor single population descended – "people who have few other choices", said a housing director.[159] In 1994, the year HIV took off, into this environment came an upsurge in cocaine injection.[148] Local drug users often injected it several times a day for days at a time,[155 153] an experience likely to disrupt rational decision-making in the most balanced of people. Not surprisingly, the cocaine roller-coaster was associated with high-risk sharing.[79]

A peculiarity of the area's housing set the seal on the epidemics. Commonly hotel managers locked buildings at night and charged for re-entry, encouraging residents to stay inside. Communal binge injecting developed, especially when the injectors (the same day for them all) received their welfare cheques.[123] The tiny rooms were transformed into ad-hoc shooting galleries.[113 151] Sterile needle/syringe stocks would have become rapidly depleted at a time when access to fresh supplies was obstructed.[123 148] In any event, often the only source would have been the exchange's vans, whose schedules may not have coincided with need and which would not normally have dispensed enough equipment to keep the 'party' going safely. The ill-serviced rooms with no bathrooms or cooking facilities[159] also made hygienic injecting difficult. Augmented by the effects of the drugs, they also lent themselves to confusion over whose syringe was whose.[157]

Supported housing for substance misusers and replacing single-occupancy hotel accommodation with low-cost social housing are now firmly on Vancouver council's agenda. Progress is being made, but slowly and resources remain tight.[159 160]

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Counterproductive exchange restrictions leave HIV spreading

Across the other side of Canada, however they analysed the figures, studies in the mid-90s found that attending Montreal's needle exchange was linked to much *higher* levels of HIV infection and to an *increased* chance of becoming infected. Rather than an indictment of needle exchange, Montreal is another example of what can go wrong when equipment supplies are limited and the trickle allowed out from an exchange feeds rather than floods high-risk sharing networks. It also confirms that simply making syringes and needles available does not transform high risk injectors into low-risk.

More exchange, more infection

The key study was based on a sample of injectors recruited mainly through their own social networks.[174] Nearly 1000 were at first HIV negative. At issue was whether those who used the exchange would be protected from becoming HIV positive over follow-up periods ranging from three months to five years. The opposite seemed the case. However, in statistically evening out all other risk factors, the first analysis also eliminated some of the mechanisms through which exchanges might have had a beneficial effect.

A later analysis[175] fixed this problem but still the outcome was alarming: the more someone relied on the exchange for injecting equipment, the more likely they were to become infected. At the apex, injectors who consistently attended the exchange were six times more likely to become infected than those who had never attended.

Technical problems might partly explain the results.[120 175] Foremost was a possible failure to fully adjust for the fact that the exchange attracted very high risk injectors. The vital missing ingredient was the infection rate among attenders *before* they started attending. Conceivably this was much higher than among non-attenders and then began to fall under the exchange's influence, but at first not down to the level of non-attenders.[176] The fact that by the last year of the study attenders were no longer at higher risk of HIV infection hints at such a process.[174]

A further analysis reinforced this impression.[123] It was based on the observation that the exchange's night-time opening hours[120] and the profiles of its attenders indicated that they formed a social network distinct from that of non-attenders, and one at far greater risk of HIV infection. Over the course of the study this should have resulted in five times more seroconversions than in the less risk-prone non-attenders. In fact, the figure was half this, suggesting that the exchange *had* reduced risk – not by reducing sharing, but by cutting the time infected needles and syringes remained in circulation.

Montreal

- ✓ No hepatitis C data but for HIV same story as Vancouver: more exchange use linked to more infection.
- ✓ Magnet effect at work – risk may have been reduced but not to the level of non-attenders.
- ✓ Shows again what can happen when cocaine injecting takes off but exchanges maintain equipment supply restrictions, in this case partly to encourage frequent visits.

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Poor treatment access

Recurrent themes in the Vancouver reports are the need to connect the city's injectors to addiction treatment and the failure to do so.[113 148 149] Though willing to refer, the area's main needle exchange soon found itself blocked by two-month waiting lists and by the lack of programmes suitable for young people or for cocaine users.[161] Ten years and more later the "woefully inadequate"[148] access to treatment had improved little.[146 162]

But even had there been a cocaine clinic on every corner, the exchange may not have made the most of them. Management[161] and funders[146] saw its role as expediting "requests" for help "when a client is ready", not prompting them. While waiting for this change of heart, injectors became infected with life-threatening diseases. In retrospect, it seems clear that these depressed, mentally ill, often suicidal cocaine injectors, trapped in a destructive environment, were in no position to prompt their own recovery.

At first medical and treatment referrals were made very rarely[161] and though these later picked up,[156] only a small proportion resulted in treatment entry[162] or HIV test-

The 'magnet' effect

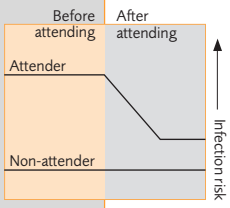
Perversely, if an exchange succeeds in attracting people at high risk of contracting disease, this desirable feature can make it look as if it is responsible for their heightened risk – the 'magnet effect'.[120] In fact, attending the exchange may have reduced their risk of infection but not yet down to the level of injectors who do not attend chart.

Studies consistently find that higher risk injectors are drawn to exchanges.[32 63 76 120 126 140 144] When statistical techniques are used to counter this bias, generally exchange use is found to have had a positive impact. For example, in a multi-site US study exchange attendance was typically sporadic, yet despite this and and despite the magnet effect, attendance was linked to a reduction in the use of previously used syringes, in turn linked to a reduction in the incidence of HIV.[126] In New York, injectors who were increasing their injection rate tended to visit exchanges more regularly, but regular attenders were three times less likely to become infected with HIV than non-attenders.[191]

The definitive confirmation of the magnet effect came from San Francisco. Here at last was the missing ingredient – evidence that *even before they attended*, injectors who later went on to use the newly opened exchanges were ten times more likely to become HIV positive than those who did not.[178] They injected more frequently and were more chaotic and destitute than non-attenders. High risk carried through to exchange attendance would have made it look as if the exchange was exacerbating the situation, even if the opposite was the case.[176] This is exactly what happened.[120] After attending, at most 3% a year became infected with HIV compared to under 1% of non-attenders, but *before* they had attended, 8% a year became infected.

Once other risk factors had been accounted for, another study confirmed that compared to non-attenders, San Francisco's exchange users were much less likely to have recently shared needles[75] and when they did, they shared with fewer people.[179] They were also less likely to re-use their own syringes and more likely to have a stock of fresh equipment.[180 181] As elsewhere, risk-reducing behaviour change had been masked by the magnet effect; also as elsewhere, it was still not enough to prevent the spread of HIV, let alone hepatitis C.[76 178 64 179]

There is another reason why exchanges may wrongly seem ineffective. A study in Baltimore found that people who say they attend when they do not are very likely to become infected. They will wrongly be counted as needle exchange 'failures'. The reverse deception (denying attendance) was far less common.[192] The net result was an 18% underestimation of the degree to which attending an exchange protected injectors against becoming infected with HIV.



Exchange attendance can reduce risk but still leave it higher than among non-attenders

Misguided attempt to increase visits

Whether Montreal's exchanges increased or decreased risk – and the latter is the more probable – they did not reduce it enough to prevent rapid spread of HIV. Potential explanations echo findings elsewhere.

At the time Canadian pharmacists were reluctant to sell syringes to addicts.[129] In 1994 the total supply from Montreal's exchanges and pharmacies would have provided fresh equipment for just three out of every 100 injections.[177] The exchange was not geared up to addressing this shortfall: cocaine was the dominant drug among its visitors and a quarter injected over 100 times a month, yet it set a limit of 15 syringes at any one time in a one-for-one exchange. The limit was an attempt to induce frequent attendance but in 1995 was recognised as counterproductive and abandoned.[174]

One-for-one exchange may also have impeded equipment supply because it meant users had to risk frequently carrying needles to and from the exchange in order to get sufficient new supplies.[140 157 175] As in Vancouver, extended availability of used syringes, more sharing, and more infections, were the likely and unwelcome results.

Early impact fades in Amsterdam

Amsterdam is the cradle of needle exchange, started there in 1984 to combat hepatitis B.[1] Yet the city's extensive methadone and needle exchange provision has not prevented high levels of infection with hepatitis C, and any beneficial impact at all on infection transmission has been hard to pin down.

'Low threshold' was and remains the ethos of Amsterdam's drug services including its exchanges.[182 183] The concept means not only easy access but also that care is taken not to deter attenders by making demands (for information, service engagement or commitment to change) or intervening in ways which might be interpreted as 'pressure'.

The exchange programme rapidly grew until by 1988 perhaps two-thirds of the city's injectors exclusively sourced their equipment from exchanges.[184] By 1990 these were giving out a million syringes from 14 sites. Large amounts could be supplied at each visit.[183] By 1997 the outflow had halved, but only because the number of injectors and injections also had fallen. The supply from exchanges alone remained enough to provide a fresh needle/syringe for every injection.[93 182]

Amsterdam

- ✓ In the cradle of needle exchange, only when the infant was new born was there any evidence of benefit.
- ✓ Inadequate syringe supply was not the reason.
- ✓ Possible explanations are: 'normalisation' of exchange use as the years went by; accessible pharmacy supplies; a non-interventionist ethos.

Hepatitis C spread sounds a warning

From 1985 the Amsterdam Cohort Study tracked developments in disease transmission and risk behaviour among drug users, each year recruiting subjects from methadone clinics, an STD clinic for drug using prostitutes, and by word of mouth, an unusually long-term data series. Each recruit was asked to return every four months to be re-interviewed and retested for infection.

The study first threw up warning signs in

ing.[50] Relatively few dependent drug users – cocaine users in particular – follow through on referral unless access to treatment is rapid and easy:[163 164 165 166] in Vancouver, it was neither. They can be supported and shepherded to the door,[167 168 169] but this was a role the exchange was neither resourced for nor inclined towards.

Defensive posture limits risk reduction

The exchange might have done more, but was itself tied by funding constraints and by rules which left it unable to meet its customers' needs. To appease hostility, effectively it prioritised community concerns and the very distant prospect of needle stick infection over the lives of injectors. Perhaps this was the only way to stay open. Perhaps, too, its 'light touch' was ill-suited to a situation which cried out for energetic intervention.

The emphasis was on attracting customers and gaining trust by being "accepting" and "non-intrusive" and by creating a "milieu in which the [injector] can feel free to function as he would".[161] It was hoped that customers would respond by becoming more responsible in their drug use. 'Responsibility' was, it seems, unachievable by this subtle route.

Very soon, even if the exchange had wanted to do more, it would have been held back by the combination of escalating client numbers and resource constraints.[161] Budgets and staff were stretched and client contacts were "cursory and on-the-run".[170] The vans saw in some ways the most needy injectors yet were least able to respond. Drivers spent barely more than a minute with each contact in an exchange centring on the negotiation of the one-for-one rule, concluded by a well-meaning (but clearly often ineffective) injunction not to share.[155]

Budget restrictions limited opening hours,[153] forced cutbacks in the mobile service, and partly accounted for the cap on supplies.[148] The effect was to impede access to equipment and to prevent visitors passing on sterile syringes.[149] Under-resourcing reflected public and political opposition to the service but it was not the only problem. Limited hours were also a response to community concerns about drug users converging on the site late at night. Through these mechanisms, hostility to the exchange helped clear the way for the viruses.

The exchange sought to deflect hostility (of which it was acutely aware[161]) by actively choosing to restrict its service. As often the case in Britain, it was pressured into operating on the basis of worst case scenarios.[171] A "constant concern" was that users would resell its equipment, so at first usually just two syringes were handed out at each visit. The limit was later raised but not abandoned for many years. The one-for-one rule was at first flexibly implemented but later hardened, partly due to concerns over syringes being left in public.[146] There were also worries that supplying lots of free equipment would enable more frequent injecting.

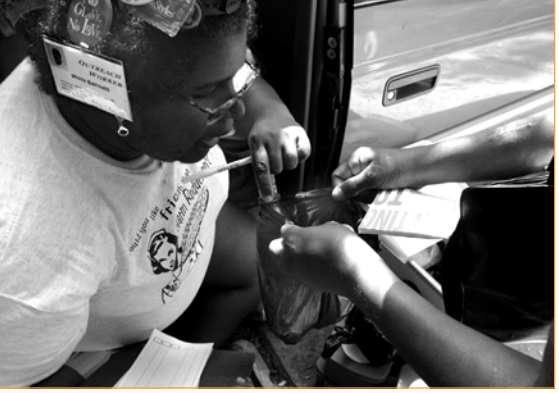
Lessons could have been learnt earlier

Perhaps the most dispiriting thing about Vancouver is that the lessons could have been learnt much earlier by just talking in depth to a few representative local injectors.

This is exactly what the researchers did before starting work in earnest.[172] Factors found later to elevate risk clearly emerged from the interviews. Oppressed, depressed, fatalistic and trapped in a skid-row environment, the 16 injectors were not well placed to value their lives and health sufficiently to prioritise these over immediate relief, and lacked the material and social supports to actualise health improvement.

High-volume, right-time, right-place equipment supplies flooding rather than trickling into their hotel rooms and alleyways might have made a difference, and beyond this a concerted attempt to improve housing and to address medical, psychiatric, welfare and addiction treatment needs. Two at a time one-for-one exchange completed in a minute or two was never going to be enough. By the time this lesson had sunk in, many young people were heading for an untimely death.

Given the limitations of needle exchange in this environment, local experts have called for supervised injection rooms. In these Vancouver's addicts could receive not just needle exchange but also counselling, health care, drug treatment and practical services such as showers and laundry, promoting sustained contact with staff.[50 170] Just before Christmas 2002 local drug users and Vancouver's newly elected mayor met national health officials to plan such a facility, but political opposition remains strong.[173]



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A worker carefully counts returned needles. Insisting on strict one-for-one return is one way exchanges deflect community hostility but it can also mean supplies fall short.

1990 when the new test for hepatitis C revealed that it had been infecting about 1 in 10 "hard" drug users (70% of them injectors) each year from 1986 to 1989.[13 14] HIV and hepatitis B too were spreading at rates consistent with high levels of risk behaviour.

Analyses to establish the causes found that, unlike HIV, acquiring hepatitis C was not related to the number of times injectors had borrowed used needles or syringes.[14] As elsewhere, perhaps ease of transmission through occasional needle sharing and through sharing paraphernalia masked any extra impact of more frequent sharing.[13 23 45 56 65 66 69] The implication was that even if Amsterdam's exchanges *had* cut re-use of other people's needles and syringes, this might not have stopped the virus spreading. In fact, there were doubts over whether sharing had been reduced. If it had, the effect should have been to reduce the incidence of HIV among exchange attenders; in most years there was not even a hint of this happening.

The evidence came from 31 injectors who had become HIV positive between 1985 and 1991.[183] They were compared with randomly selected injectors who had remained HIV negative. Over 4 in 10 of the seroconverters had been relying on exchanges for all their needles and syringes, a reliance associated with a slightly *higher* chance of becoming infected. The margin for error was great and the results were not statistically significant, but certainly there was no indication that reliance on exchanges *reduced* risk.

However, this average hid a significant trend for the impact of exchanges to change over the years. In the early years (1986–1987), exclusively sourcing your needles from an exchange *was* associated with a reduced chance of becoming infected with HIV. Only in later years did this reverse into increased risk among exchange attenders.

Early infection impact fades

A later analysis using more sophisticated statistical techniques confirmed that needle exchange attendance had become less protective over the years.[51] The main advance was an adjustment for the effect of repeated interviews which made it possible to use data from all relevant subjects, not just those new to the study – 879 injectors, most of whom mainly injected heroin/cocaine speedballs.

An initial steep drop in HIV incidence over the first three years of the needle exchange era was followed by a stabilisation at about 4% a year, still too high. There was a parallel trend in the proportion of injectors who had recently shared syringes. Among new recruits to the study, unaffected by being repeatedly tested, counselled and interviewed, the proportion who had recently borrowed levelled out at 30%.

When these trends were averaged out over the full period of the study, using an exchange was not associated with less borrowing or lending of syringes. In fact, the relatively rare practice of sourcing some but not all of your equipment from an exchange was linked to a significant *increase* in both. The more meaningful comparison was between people who only sourced their equipment from exchanges (the majority) and those who never did. This too was not reassuring. Exchange devotees borrowed and lent just as much as the rest.

Again, this relationship changed significantly over time. At first far fewer exchangers shared, but over the years they made no further improvements, while among non-attenders syringe borrowing fell. By 1992 almost exactly the same proportions were borrowing in each group.

Impact on risk behaviours also fades

Other Cohort study reports confirmed that, after the first few years, using exchanges did not reduce needle/syringe sharing. Between 1985 and 1988 exchanges came to dominate syringe supply in the city yet the proportion of injectors who had recently borrowed used equipment remained static.[184] Data from 1989 and 1990 also indicated that injectors who relied on exchanges were now no less likely to re-use used needles and syringes than those who relied on other sources.[71] Where exchange users did seem to benefit is in not having to re-use their *own* syringes.

This too was the conclusion reached by a study outside the Cohort series.[185] In 1987, heavy exchange users among a sample of injectors were compared to the remainder, most of whom barely used exchanges. Exchangers were clearly more adequately supplied. Compared to 29% of the rest, during the previous six months over 80% could afford to use a needle only once. Just 3% daily found themselves with drugs but without clean needles, 27% of the remainder.

During this early period, enhanced supply also seemed to feed through to reduced borrowing of used equipment. In the past month, 10% of the injectors who relied on exchanges had borrowed compared to 23% of the rest. Still the possibility remained that, rather than exchanges fostering risk avoidance, people who were *already* more careful tended to be the early visitors to the exchanges, a possibility supported by an analysis which took into account other risk factors.

Risks knowingly taken

In 1992 to 1993 the Cohort study probed the reasons for risk behaviour among injectors who agreed to this extended interrogation.[93] Attention focused on the 96 who were HIV negative so could still become infected. Many were at substantial risk. Over the past five months at least a quarter and perhaps nearly 40% had re-used a syringe after someone else, each on average 19 times. Often they had done so without knowing that the donor was HIV-negative and without (though most tried) adequately cleaning the equipment.

Once other factors had been taken into account, how much they used needle exchanges made no difference to how often they knowingly borrowed used needles and syringes. There was one finding exchanges could cheer: sourcing all one's equipment from exchanges was associated with a greatly reduced risk of *accidental* re-use. This could simply mean that more organised injectors both planned their equipment supply better and were better at avoiding mishaps. Even if it was a real benefit of exchange attendance, the impact on infection would have been minimal. 48 injectors became HIV positive

Case studies not isolated examples

The case studies are atypical only in the degree of investigatation. Across the world, needle exchange services leave a residue of needle and syringe sharing and more frequent sharing of other equipment.[32 42 45 58 63 68 74 80 86 104 111 115 116 117 120 123 186 187 188 189 190] This residue is sufficient to form a perfectly adequate transmission route for viruses such as hepatitis C which are prevalent in the injecting population.

One of the the few studies to directly relate hepatitis C to needle exchange was conducted in Chicago in the late 1990s.[68] Injectors were tested for hepatitis C and asked about risk behaviour in the past six months. Half had begun injecting in the last two years and a third within the last year, so for many their recent behaviour was relevant to their infection status. The minority who had attended needle exchanges were significantly *more* likely to be infected. When other risk factors were taken into account, the tendency remained but was no longer statistically significant – the mark of the magnet effect, in this case perhaps due to frequent injectors being more likely to use the exchange and more likely to be infected.[120] However, as in some of the case studies, there is no indication that attending exchanges *reduced* the chances of hepatitis C infection.

during the study. Most admitted risky injecting with someone they *knew* to be infected. Accidental sharing was at best a minor factor.

Few injectors had re-used equipment while experiencing serious withdrawal symptoms. Perhaps related to the dominance of cocaine/heroin mixtures in this sample, a more common prompt was the urgent desire to experience the next hit. At the time they re-used over 70% were within 30 minutes of an exchange. Sharing often occurred during office hours so at least some of the services must have been operating at the time.

So what *does* work?

Though it was unable to show that needle exchanges curbed syringe sharing, by chance the Cohort study threw up an idea about what might – its own research interviews.

The finding emerged from analyses of the progress made by Cohort subjects who had returned for two or three follow-up interviews.[184] Effectively these were a thorough HIV risk assessment coupled with HIV testing and counselling.[71]

Before their first interview, half had borrowed used needles or syringes. After being interviewed once, this fell to a quarter, after two interviews, to 16%. Some of these falls may have been due to increasing reluctance to admit to 'misbehaviour',[183] but this could not account for the entire effect: a substantial drop in borrowing still seems to have occurred as research assessments were repeated.[51] Similarly, passing on syringes fell far more steeply among returning interviewees than among new recruits to the study, from 44% to just 8% after two interviews. This early data was confirmed by an analysis covering over a decade from 1986 to 1997.[51]

Why the diminishing impact?

What happened in Amsterdam will be familiar to the marketing experts of Intel and Microsoft. Like the 'early adopters' of any new technology, injectors who sought out the exchanges in the early years were an atypical minority particularly motivated to reduce risk. Later a pincer movement narrowed the gap between exchange users and non-users. As exchanging became commonplace, attenders came to differ little from other injectors in their desire or (given good supplies from pharmacies) their ability to reduce risk.[184] Exchanges became just another source of needles and syringes.[183] Simultaneously, the anti-sharing ethos spread to people who did not use exchanges, bringing them up to speed up with the vanguard who had sought out the first services.[51]

As a result, the exchanges came to have no noticeable extra impact on risk behaviour or infection rates. After 1991, whether someone re-used used equipment seemed related to factors other than their source of new needles and syringes. Sourcing adequate supplies from exchanges eliminated some reasons for borrowing (shortage of equipment or shortage of money to buy equipment) but left enduring factors such as personality, housing and drug use patterns to be tackled.[71]

Neither the pharmacies (they could not) nor the exchanges (energetic intervention was not their style) did much to address these influences. Equality of non-intervention led to equality of risk. What neither routinely provided – intensive and repeated risk assessment and HIV counselling – came instead from the Cohort study, and did seem to create added risk-reduction value.

Equality of supply in relation to need

Exchange and pharmacy users may also have differed little in the adequacy of their equipment supply. Pharmacy users injected less often so were more able to buy enough needles and syringes for their needs, matching the adequacy of the supplies given to more frequent injectors by the exchanges.

The context here is vital. As in the UK, in Amsterdam pharmacies were willing to sell syringes to injectors, providing a high background availability which exchanges were hard put to improve on. Elsewhere the mere fact of making syringes available through an exchange could have had an impact, regardless of whether more deep-seated influences were also addressed.[140]

In later years, the very ubiquity of exchanges could have masked their benefits. Non-attenders may have profited from their supplies in the form of sterile needles passed on by attenders. With the main load of heavy injectors diverted to exchanges, pharmacists were probably more willing and able to meet the remaining demand. Exchanges probably also contributed to a general awareness of HIV risk and how to avoid it. In these ways they could have reduced the risk profile of non-attenders as well as attenders, contributing to the 'no-difference' findings when the two were compared.

It is also worth speculating what might have happened without the exchanges. In this scenario heavy injectors (not universally welcome in retail premises) may not have been willing or able to pay for their supplies from pharmacies, and pharmacists may not have been willing to serve them, leading to even more sharing and more infections. The same speculation may also be applicable to Vancouver and other areas where, by relieving pressure on pharmacies, exchanges make themselves look ineffective in comparison.

But the bottom line is that Amsterdam's exchanges could not be shown to create extra benefit where it should have been most apparent – among the injectors who used them. Before accepting this verdict, we should acknowledge one limitation to all the studies: methadone programmes were their prime recruiting grounds. In Amsterdam this is less of a limitation than probably anywhere else on earth because such a high proportion of opiate injectors are in methadone treatment. Still, the samples must have been skewed away from stimulant-only injectors, from foreigners (who have limited access to Dutch methadone services), from younger and newer initiates to opiate use, and from injectors who did not wish to cross even the low threshold of the city's services.

Hostility to exchanges limits effectiveness by denying resources and forcing a defensive response. These nuns will not be doing much outreach.

LESSONS FROM THE CASE STUDIES: IT'S THE SYSTEM THAT COUNTS

What can we take from these six case studies? The most important lesson is to appreciate that needle exchange is a *system*, no one element of which is good or bad in itself. It all depends on how it relates to the other elements of the service and to the environment within which it operates.[140]

For example, strict one-for-one exchange can constrict supplies and counterproductively extend the circulation time of used syringes, but is less of a problem if large amounts can be handed out, and if the exchange is taken to the customer rather than the customer having to risk frequent return visits carrying used equipment. Long inter-visit intervals are not necessarily indicative of a poor service if enough supplies are given to bridge the gap and if injectors securely dispose of used equipment.

How these internal procedures relate to the customers and to the locality is also critical. In a city where opiate injecting dominates and injectors have stable accommodation, a 24-hour exchange located close to the drug use epicentre would be an ideal intervention; in another, it might fail to tempt cocaine injectors out of their locked hotels. Motivated, risk-conscious injectors will make good use of services which confine themselves to the simple exchange function, but much more intervention will be needed to stop others simply feeding the exchange's supplies into continued high-risk injecting. An upsurge in cocaine injecting can overwhelm exchange provision, demanding a rapid upgrade to much more active and

extensive distribution. Where supplies cannot be had from elsewhere, an exchange which does nothing more than hand out large quantities can make a substantial difference, but if the reverse is the case it will need to do more to justify its existence.

The availability of treatment services to refer to can also be a make or break issue. Similarly, where multiple deprivation obstructs positive behaviour change, the exchange will need housing, psychiatry, medicine and vocational rehabilitation all to pull their weight. On its own it may prove too little to make a difference.

In turn these considerations dictate that exchanges have systems which enable them to closely monitor what is happening in the locality and that they forge good links with treatment and other support services. Forming good relationships is, of course, a two-way responsibility. It will not help if exchanges are denigrated as supportive of continued drug abuse.

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OFFCUTS

Recently published British studies linking release from inpatient **detoxification** and **prison** to **overdose deaths** will come as no surprise to FINDINGS readers – these were among the risk factors highlighted in our review Links. What they have in common is that abstinence and loss of tolerance occur in a protected environment which leaves the user vulnerable to overdose if they resume drug use on re-entry into their normal environment. The implication of both is that intensive follow-up care is needed in the aftermath of more or less 'enforced' tolerance reduction.

LINKS *Overdosing on opiates part I: causes*, issue 4

The first study followed up 137 opiate detoxification patients released from the Bethlem's inpatient unit. All three overdose deaths in the following four months were among the 37 who had 'successfully' detoxified; none occurred among patients whose 'unsuccessful' detoxifications meant they had maintained a degree of tolerance.[1]

The second study estimated that 1 in 200 young adult injectors released after at least a fortnight in Scottish prisons died from drug-related causes within the following two weeks.[2] The estimate derived from a study of 20,000 releases which showed that drug-related deaths were seven times more likely in the two weeks after leaving prison than at later times. The startling 1 in 200 estimate assumes that all these deaths were of injectors – perhaps a slight overestimate, but not so great as to vitiate the conclusion that leaving prison is a highly risky period for previously drug dependent inmates.

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hepatitis C and needle exchange

Britain embraced needle exchange more warmly than some other countries but here too resource shortfalls and counterproductive restrictions have prevented services from achieving their full potential. We examine the evidence from the pilot studies of the late '80s to the present day.

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See parts 1 and 2 in issues 8 and 9 for acknowledgements. Thanks also to Professor Avril Taylor of the University of Paisley, Professor Richard Velleman of the University of Bath, and John Witton of the National Addiction Centre.

The first part of this series (issue 8) established that hepatitis C is still spreading rapidly due to continued sharing of injecting equipment. A process of elimination left needle exchange as the main service modality with the potential to significantly curb the epidemics. A series of case studies (part 2, issue 9) established that this potential *can* be realised, but also that exchanges in cities in North America and Europe have usually been unable to demonstrate their effectiveness against the virus. Service restrictions forced by or intended to deflect official and public hostility seemed the major underlying reason for the deficiencies which allowed the virus to spread.

In this issue we'll examine the British record. Here needle exchange[i] is so accepted that many will be surprised to hear there is no hard evidence that exchanges help attenders reduce risk behaviour or avoid infection with HIV or hepatitis C.

This may simply be because the studies have not been done. Britain's greatest research effort dates back to the late 1980s when government-backed pilot exchange schemes were investigated by a team led by Professor Gerry Stimson, later to head the Centre for Research on Drugs and Health Behaviour. We know little about what happens in today's exchanges and less about their impact[99] – all the more serious because the early years can be a poor guide to what will happen later.[51 74]

In what has been done we can see the resource and service restrictions which limited the success of needle exchange in the case study cities. Given these limitations, British work has generally been unable to establish added benefits from needle exchange in an environment where equipment can readily be sourced from pharmacies.

Unexpected attendance pattern undermines national pilot study

April 1987 was the launch date for the 15 pilot schemes in England and Scotland. From the start it was realised that supplying needles and syringes was might not be enough to change behaviour, and schemes were mandated to provide advice and counselling on drug misuse, HIV risk and safer sex. Gerry Stimson's team was commissioned to see if the experiment had worked. Based on injectors attending the schemes to the end of March 1988, their most influential findings[1] were released as a project report[189] before being published in the journal *AIDS*.[193] The report declared the findings inconclusive, but the *AIDS* article found "small but encouraging" reductions in the risk behaviour of attenders. It was enough to legitimate the nationwide expansion of needle exchange already under way. However, the study as a whole, and especially the more upbeat *AIDS* report, were seriously flawed.

Few attenders followed up

The first problem was that the sample of attenders was a tiny and unrepresentative fraction of all the people who used the exchanges. Even if they had reduced their risk behaviour, it would be impossible to say whether the same could be expected of exchange users as a whole. This happened because the researchers had assumed that the regularity of injecting would be matched by regular exchange attendance. Given this assumption, it would matter little if instead of collecting baseline HIV risk data at the first visit[ii] (considered too intrusive) they waited until the injector returned sometime within the first month. Results could then be compared against a repeated interview about three months later. Change to less risky behaviour (especially if this exceeded change among non-attenders) would be a sign that the exchanges were having their intended effect.

But just 142 injectors completed both interviews – 6% of the 2449 seen by the schemes. The primary reason was that only a small fraction repeatedly returned. So unexpected was this that no provision had been made to follow up the drop-outs, leaving a question mark over the schemes' impact on 94% of their visitors, and on why they had dropped out. Moreover, the 142 differed from the typical visitor. On average they had been injecting for nearly 11 years, the remainder for five. There were fewer women and heroin injectors but many more injecting amphetamine. Also, they had stuck with the exchanges when the vast majority had not. They may not even have been representative of regular attenders, many of whom were not interviewed by the exchange staff who collected the baseline data.

Shifting benchmark

The second problem concerned the comparison samples. To be sure that risk reductions in attenders were due to the exchanges (and not, for instance, to the media campaigns running at the time), these were to be benchmarked against trends over a similar period among injectors who had *not* attended exchanges. The researchers started with a baseline sample of 220 non-attenders but just 69 could be reinterviewed three months later. However, at this time they did interview a *different* set of 114 non-attending injectors.

This left a choice of benchmarks. The first was behaviour change among the 69 reinterviewed non-attenders, or at least the 53 who had continued to inject ◤ chart, benchmark ❶. The second was the difference between the behaviour of the two *different* sets of non-attenders ◤ chart, benchmark ❷ – the choice made when the results were published in *AIDS*. It created a benchmark of "no substantial reductions in risk behaviour" for the exchanges to better, and they did. In contrast, exchange attenders had made "small but encouraging" reductions in their risk behaviour: fewer were now sharing (down from 34% to 27%), they shared with fewer people, and fewer re-used used equipment. Though the reductions were not statistically significant, this was the key piece of evidence; attending needle exchanges had led to a reduction in HIV risk not evident among non-attenders.

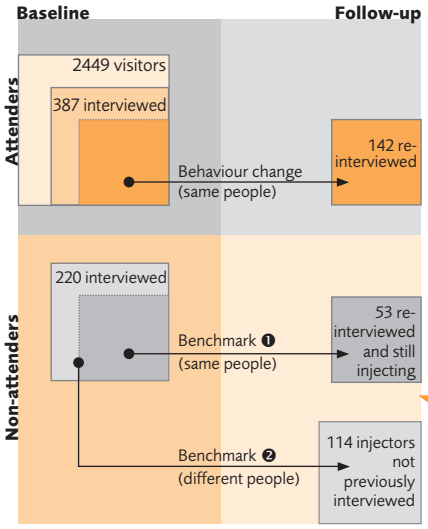
But like was not being compared with like. Attenders were the *same* people interviewed twice, non-attenders two *different* sets of people. The very experience of being interviewed may have led the attenders to change their behaviour[194] or to give different answers the second time around. Also, the two sets of non-attenders had not been randomly selected from the same pool. Trends (or non-trends) in their behaviour could simply be due to differences in the people interviewed.

For these reasons, the project report had instead used benchmark ❶ – behaviour change in reinterviewed non-attenders. This time the comparison with attenders was *not* encouraging. Non-attenders had actually made *greater* reductions in their risk behaviour: 30% had stopped sharing needles and syringes compared to 20% of attenders, another 20% still shared but with fewer people compared to 6%, and slightly fewer had increased their level of risk.[iii]

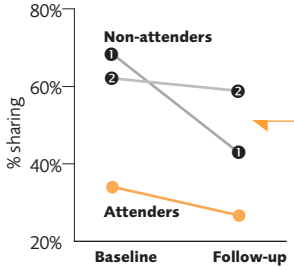
The project report dismissed both comparisons, arguing that the non-attenders were not comparable to the attenders because their risk behaviour was so much higher. As a result, the researchers declared themselves unable to reach a "conclusive answer to the question about the specific impact of syringe-exchange on risk behaviour."[189]

Higher risk levels among non-attenders also signified that the exchanges were not attracting the people at greatest risk. Instead it seemed that they attracted injectors who in response to AIDS had already reduced their sharing (75% said they had) to an unusual degree. Whilst at the exchanges, they continued on the same trajectory.

In sum, the pilot exchanges neither attracted high risk injectors not could it be shown that they reduced risk. The impression that they had was based on a comparison group which was in fact not comparable and on a tiny proportion of exchange attenders.



Depending on which benchmark was chosen, attenders at pilot exchanges either made greater risk reductions than non-attenders ❷ or actually improved less ❶. The more favourable benchmark was chosen when the results were published.



Different routes to equivalent risk reduction in the South

With an improved methodology, Gerry Stimson's team generated similar findings over the next two years in a study of four schemes, one in the south west of England and three in London.[104 190] They interviewed effectively a random sample of attenders, attempted to follow them all up a year later, and tried to follow up a comparison sample of injectors who at the first interview had not attended exchanges for at least three months. Both samples were tested for HIV at both time points, enabling a comparison of the rate of new infections – the bottom-line measure of whether the exchanges were working.

Barely more than half the injectors were actually reinterviewed but on the available measures they seemed representative. At the start of the study, most attenders had already been going to the schemes for over six months. All but a few returned after their first interview, attending on average about weekly. Between interviews, most 'non'-attenders gave exchanges a try, but on average just once every three to four weeks. The comparison then was between fairly frequent exchange users and non- or less frequent users, most of whom sourced their equipment from pharmacies.

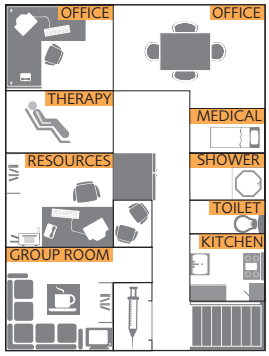
Findings from the first interview were consistent with a protective effect of exchange attendance. Fewer attenders had recently shared syringes or needles (34% versus 38%), re-used a used syringe (24% versus 32%), or shared with two or more people (13% versus 19%) – all the more significant since they injected more often and had greater medical and psychological problems.

Over the following year, about the same proportions of both groups had stopped sharing, but twice as many non-attenders had done so by stopping injecting, while exchange users more often continued to inject but stopped sharing. The finding is reminiscent of one from the pilot exchanges.[189] In these early years it seemed that exchanges attracted injectors who, compared to non-attenders, were more often committed to injecting, but also more often committed to reducing the HIV risk this entailed.

Despite the continued sharing of a substantial minority, none of the injectors became HIV positive over the year. The saving grace was the low starting level of infection –

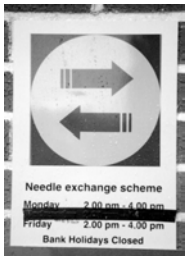
In the next issue

The final part of this series will draw together the threads in the form of the limitations which threaten viral control and the strategies which hold promise for the future. They form a revitalised agenda for needle exchange commensurate with the challenge of hepatitis C. Meeting this challenge will require funding authorities to give needle exchange the priority it deserves and needle exchanges to build on their unique relationship with injectors in ways which greatly extend the reach of anti-infection initiatives.



BASED ON THE HEALTHY OPTIONS TEAM NEEDLE EXCHANGE IN NEWHAM. THANKS TO IAN GRIFFITHS.

This needle exchange in London's East End is resourced as a comprehensive harm reduction service open virtually every day of the year.



In contrast, the only needle exchange in this English seaside town (resident population 130,000) is now open for just two hours two day week.

2.5%. Had hepatitis C been tested for the chances are that a higher prevalence plus continued sharing would have been found to have created many new infections.

Was it treatment which reduced risk?

There was some encouraging data among the sub-samples who had continued to inject over the follow-up year. Here sharing had halved (down to 18%) in the attenders but fallen by just a quarter (to 32%) among the non-attenders. But whether the exchanges were responsible is uncertain – it could instead be due to the kind of injectors attracted to them. Even at its most basic – reducing sharing by improving access to injecting equipment – they seem to have made no difference; the proportions of attending and non-attending injectors who said they shared because of difficulty obtaining equipment were identical.

If the four exchanges did have an impact, it may not have been down to their equipment supply or harm reduction advice, but to their ability to help committed injectors access acceptable treatment – treatment with *injectable* drugs. In this the four exchanges may have been exceptional,[195] perhaps partly because they operated in areas with doctors prepared to prescribe injectables.

Being prescribed injectables divorces injectors from drug using networks,[196] making it less likely that they will jointly purchase and use street drugs and share the equipment needed to inject them.[197] At the first interview, a quarter of attenders were being prescribed injectable methadone but just 7% of non-attenders. When injecting this methadone they were also far less likely to share needles and syringes than when injecting heroin. By the end of the follow-up year, 71% of attenders were receiving some form of methadone on prescription but just 27% of non-attenders.

Stress on attraction and retention

As intended, the early schemes contacted a heavily injecting population unwilling to enter treatment or unsuitable because opiates were not their major problem.[189] On the other hand, they were disproportionately missing out on women and on injectors early in their careers. Most attenders lived within two miles of their scheme,[104 198] an early signal that convenient access is vital.

Two years later, in 1989 and 1990 a study of 20 English exchanges found little change in the attender profile.[195] Each attender came about three times in four weeks and was given on average 14 syringes – assuming twice-daily injection, nearly enough for a new syringe each time and more than the average of nine recorded two years earlier.[189] Most schemes aimed to provide equipment on an exchange basis but did so flexibly, and most did not cap the amount of equipment they would supply at any one time.

Universally the pilot exchanges saw their role as reducing the risk from continued drug use and injecting, but the degree to which they could systematically reduce risk seems to have been curtailed by resources (most workers had other roles in the agency) and by concerns not to stray too far from the informal, accessible, non-judgemental stance seen as important in attracting and retaining customers.[189 195]

Commonly staff preferred to wait until rapport had been established before addressing HIV risk behaviour and how to reduce it. Only six out of the 15 pilot exchanges ensured that all clients were advised on drug-related HIV transmission, a core function. Just one had a policy of always giving individualised harm minimisation advice. Most visitors were not in a position to receive such advice from any other competent service.[189 195] A wide range of other services were available directly or through referral, but there was no mechanism for making sure that need (other than for injecting equipment) was assessed and met. Advice and counselling were usually delivered when the opportunity arose, which might have as much to do with workload at the time as with the visitor's needs.

Informality and accessibility were the watchwords, and indeed there was some evidence that not adopting this stance deterred attendance. When former attenders were asked why they'd stopped going, about 30% each cited the questions they'd been asked at the exchange and being kept waiting, and over a fifth the exchange's rules, though these generally seemed to have been stripped to the essentials.[189] However, 'accessibility' rarely stretched to late-night and weekend opening hours.[195]

One of three studies in the North West detect risk reduction

A handful of other early studies were also unable to show that attending needle exchanges reduced risk behaviour or prevented infection and most found that sporadic attendance was typical. The most substantial was a series conducted between 1988 and 1993 in the north west of England.[74] The first in 1988 and 1989 involved interviews with 266 primary opiate injectors contacted through drug services or by 'snowballing' to injectors not in touch with services.

Exchangers pass on used supplies

In these early days, just a third (designated the attenders) obtained most of their needles from exchanges. Among these – specifically those *not* on methadone in the past six months – there was an unexpected finding. During this period nearly half had passed on used equipment over 10 times, about twice as many as in the rest of the sample. Adjusting for other factors confirmed that the only outcome linked to attending exchanges was an *increase* the numbers who passed on used equipment. Pressure to do so arose mainly because legitimate sources were inadequate, partly because some injectors were wary of going to exchanges, and partly because exchange attenders were more accessible (eg, at night) than the exchanges themselves. Though not ideal, this trend could actually have decreased the risk of infection.[iv 140] In any event, it was a phase which soon passed.

In contrast to attending an exchange, being in treatment seemed protective against both receiving and passing on used equipment. Additionally, under 10% of injectors in treatment saw sharing as acceptable compared to over 20% not in treatment. These statistics might reflect the relatively energetic risk-reduction interventions undertaken by treatment staff compared to the "more low-key approach" of exchange workers.

Sociable speed users reduce risk

Later the same team checked if the situation had improved as specialist and pharmacy exchange expanded. In some ways it had. By the early '90s, attenders were no longer being pressured to pass on used syringes and, with more liberal dispensing, could 'afford' to pass on sterile equipment instead. Importantly, there was at last some evidence that attending an exchange reduced both passing on and receipt of used syringes. It came from interviews in 1990 and 1991 with 102 amphetamine injectors. None were in treatment but 40% were regular exchange attenders.

Exchanges could be expected to make an impact on these injectors which they had not made on the earlier sample of opiate injectors. They shared more often than comparable (ie, not in treatment) opiate injectors, giving more scope for reductions. They had been targeted through mobile exchanges and out-of-hours outreach, and exchanges were now more willing to hand out lots of equipment. Exchange attenders tended to form distinct and active social networks, creating

the opportunity to bring about a collective shift in risk behaviour. Pharmacists were not expected to attempt such work, giving the exchanges a potential advantage.

These efforts seem to have worked. The more regularly an injector attended, the less likely they were to have re-used another person's equipment. For example, just 3% of regular attenders had re-used over ten times in the past six months compared to 31% of non-attenders. Once other risk factors were accounted for, attending an exchange was highly significantly related to avoiding re-use of other people's equipment. Findings were similar, but less striking, with respect to passing on used equipment.

While these results were *consistent* with an impact from the exchanges (a major advance), still it could not be proved that exchanges were the active ingredient. There remained the possibility that injectors who would in any event have shared less chose to go to exchanges rather than pharmacies. There is also the reverse possibility – that the exchanges' benefits had been *under*estimated because they attracted high-risk injectors.[v]

Almost back to square one

In the same region, in 1991 to 1993 interviews with 250 injectors suggested that the risk-reduction benefits of exchange use did not extend to heroin injectors, at least not to those also injecting other drugs.[74 100] Nearly two-thirds regularly used the by now extensive exchange services. Overwhelmingly they saw them as 'user friendly'. However, over a third had re-used someone else's needle and syringe in the past six months and they were no less likely to have done so (or to have passed on used equipment) then the rest.[vi]

Widespread secondary exchange could have obscured the benefits of directly attending the exchange. Often attenders distributed fresh equipment to other people, a practice encouraged by some exchanges and aided by policies which at each visit permitted an average 60 sets to be handed out. Some high-volume exchangers were drug dealers, and for some of these it was associated with an "educational" role *vis-à-vis* their customers.

Exchanges which handed out the most needles and syringes tended to be the ones regularly attended. Overall ease of access (not just opening hours) was also influential.

Benefits inconsistent and limited

Taking the North West studies as a whole, across two time periods when circumstances had changed considerably, heroin injectors who relied on an exchange for injecting equipment were no less likely to re-use previously used equipment than those who relied on other sources. In the late '80s the equipment flow from exchanges may have been too little to make a difference, while perhaps in the early '90s the flow from pharmacies (and from exchange attenders) and the general awareness of risk was such that attending an exchange gave no added value.

Only among amphetamine injectors had the exchanges seemed to make a difference. We can make some informed guesses why. Though more extensive, their sharing was also a relatively 'soft' target. Around this time, other injectors were learning to restrict sharing to intimate partners – more difficult to shift than the sociable and leisure-related sharing of amphetamine injectors.[100] Also, the exchange's influence would stand out more because amphetamine users were unlikely to be attending other drug services.

'Not promoting behaviour change'?

Another possibility has to be faced. That disappointing outcomes in the North West were down to deficiencies in the exchanges. Concerned that "services were not maximising contact with drug users and promoting behaviour change", the region's main drug training provider commissioned research into five local exchanges.[115 116] In 1996 and 1997 interviews were conducted with 96 visitors who had been attending at least monthly for the past three months, commonly after several years when they did not attend. Each collected on average 280 sets a month but injected just 90 times. Still, in the past four weeks six had borrowed used equipment directly from another person and eight had re-used a used syringe/needle.[vii 199]

Sharing spoons, water and filters (not supplied by the exchanges[199]) was the norm, often with several people commonly no closer than a casual friend. Though on average they had been in contact for three years and attended nearly twice a week, most attenders were unaware of the risks, partly because staff rarely talked about them. For each of spoons, water and filters, under a fifth recalled receiving relevant advice from any drug worker. These were *regular* attenders, so the knowledge transfer to exchange users as a whole was probably even less. Perhaps the "low-key approach" of the area's first exchanges[74] had continued into the mid-90s, or perhaps now their workload precluded anything other than a quick exchange.

Did exchanges curb the spread of hepatitis C in Glasgow?

Scottish law is interpreted as requiring a limit on the number of needles and syringes which can be supplied at any one time. In the early '90s the guideline was five on a first visit then ten on a one-for-one basis.[200] Yet from Glasgow comes strong (but not conclusive) evidence that needle exchanges did reduce both risk behaviour and the spread of hepatitis C. Each year from 1990 to 1994 researchers interviewed city-wide samples of over 500 injectors.[86] During this period pharmacy and specialist provision increased until virtually none of the injectors lived over two miles from an exchange. Perhaps because convenient access encouraged frequent visits, despite the quantity limit and despite injecting several times a day, they generally seem to have received sufficient for a fresh needle more or less every injection.

The analysis pooled all legitimate suppliers of needles and syringes, but exchanges were the dominant source.[187] Across all five annual samples, in the past six months 28%

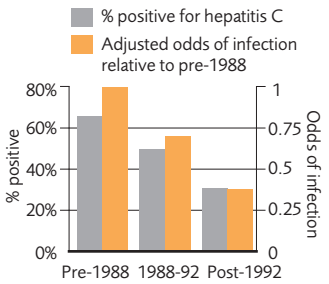
UK equipment supply falls short of demand

Ensuring that every time an injector wishes to inject there is a sterile needle and syringe to hand does not guarantee that these will not be shared but it does remove one of the main reasons for re-use and for sharing.[102 118] Even a country such as Britain with unusually widespread needle exchange provision has yet to achieve this ideal.

Based on figures collected across the UK in April 1997, needle exchange schemes (pharmacy, drug service-based, standalone and others) were supplying 27.5 million syringes/needles to an estimated 86,000 to 171,000 injectors, enough to supply each with 160–320 sets a year, a fresh set daily or every other day.[99] Since twice-daily injection is the norm this amounts to between about a quarter and nearly half of the number needed for a fresh set per injection. Scotland lagged behind with just 50–90 sets distributed annually per injector and at the time Northern Ireland had no identified exchange services.

Part of the reason for Scotland lagging behind is that it had fewer exchanges per injector – based on those notified to the researchers, about one to every 130 compared to about one to every 67 in England and to every 45 in Wales.[xiii] The extra two-and-a-half million syringes a year sold to drug injectors by pharmacies in England and Wales[211] would not materially alter this picture.

Scotland's relatively limited provision reflects official restrictions. At the time Scottish Office approval was required before needle exchanges could operate and legal guidelines severely capped the quantities of equipment they could supply.[200]



In Glasgow the chances of becoming infected with hepatitis C fell when exchanges started to open in 1988 and fell further after 1992 when they were fully implemented.

of injectors who had exclusively used legitimate suppliers had re-used another injector's needle or syringe. Though still too high, this was half the proportion found among the few who had resorted to illegitimate sources. Moreover, the more equipment an injector legitimately sourced, the less likely they were to have re-used someone else's equipment. Injectors living within two miles of an exchange were also less likely to re-use.

A later analysis isolated the contribution of the exchanges, seeming to confirm that they were responsible for the gains.[187] Injectors who over the past six months had sourced needles and syringes from exchanges had re-used after another person on average about once every two to three weeks. The remainder had done so three times as often. Exchangers also passed on used equipment less frequently. However, neither analysis could exclude the possibility that, rather than any effect of the exchanges, it was simply that the kind of people who chose to attend them were less likely to share.

Even if there had been an effect, it still left nearly 1 in 3 attenders at risk of infection from used needles and syringes on average more than once a week and half potentially passing on their own infections to others about as often.[187] By 1996, despite widespread exchange services, 16% of the city's injectors had in the past month re-used syringes or needles after someone else.[58]

Hepatitis C spread curbed but still rapid

Though incomplete, the sharing reductions to which exchanges probably contributed were enough to hold HIV prevalence down to 1–2% of injectors[187] and may have slowed the spread of hepatitis C, but not enough to stop the virus continuing to sweep rapidly through the city's injectors.

Glasgow's exchanges came fully on stream in 1992.[58] Over the same injecting career, someone who had started injecting after this watershed was a third as likely to become infected with hepatitis C as someone who had begun before exchanges started in 1988, and just over half as likely as someone who had begun during the intervening period ◤ chart. But whether exchanges were the cause is unclear. Regardless of exchange attendance, sharing rates in Glasgow dropped between 1990 and 1991 (probably in response to anti-HIV publicity),[86] potentially accounting for the findings.

Even after 1992, within on average just over a year of starting to inject, 36% of injectors had become infected with hepatitis C[58] – staggeringly high given the generally close proximity of exchanges.[86] New infections seem to have been generated by continued syringe and needle sharing by a minority (including exchange attenders) and probably by much more extensive sharing of equipment not routinely supplied by the city's exchanges, coupled with the high likelihood of sharing partners being infected.[58]

Intervention opportunities missed

Glasgow's exchanges attracted a high proportion of the city's injectors, but in 1995 a study suggested that more could have been done with them.[201] Seven exchanges were studied, all based in clinics or health centres and staffed by nurses and drug workers. A medical examination agreed to by 112 of their visitors revealed a widespread and often severe need for medical care. All but a few had a current condition related to injecting and were aware of it, yet over the past six months three-quarters did not recall receiving health care at an exchange. Almost as many had not been referred to other services and of those who had, a third did not go.

For many, exchanges were the only health facilities where they could be open about their injecting and receive medical care for its consequences. Resigned to injuries or illness as part and parcel of their lifestyles, and concerned about how they would be received, they tended to shy away from seeking treatment at other medical facilities, especially if this meant admitting to injecting while on oral methadone. Together with shortfalls in the exchange's services, this left nearly three-quarters without the medical care they needed. An earlier report on the same services found that in 1992 primary health care was provided on about 30% of visits but advice on safer injecting on just 8%.[202] On just 4% of occasions were visitors referred to external services such as GPs and drug agencies. Provision of social services was virtually non-existent.

Perhaps Glasgow's exchanges were a victim of their own success. Supplying equipment to large numbers funnelled into limited opening hours may have left little time for attending to anything other than the most pressing and obvious medical conditions.

Not enough added value in London

Unmet medical need also seemed apparent in south-east London where in 1995 researchers compared four needle exchanges based in drug agencies against nine in pharmacies.[32 203] The issue was whether the more expensive and specialised agency schemes added value. The answer was yes, but arguably not as much as they could and should have done.

Interviews were conducted with a representative sample of 280 injectors as they attended the exchanges. People interviewed at pharmacies mainly relied on these for their supplies and vice versa, so differences between them could be used to compare the two types of exchange.

In both samples equipment supply seems to have been adequate (8 in 10 normally used each syringe only once) and most interviewees were in treatment. As might be expected, sharing rates were low. Less expected was the finding that in several respects they were higher among agency than pharmacy attenders. In the previous four weeks significantly more (12% versus 5%) had shared with a close friend and in the past six months twice as many (26% versus 12%) had re-used equipment after first cleaning it, rarely an adequate safeguard.[102] Many had also regularly shared spoons, water containers, and filters. On one measure, this was more common in the agency sample; in the last four weeks 49% had shared with a close friend compared to 35% in the pharmacy sample.

Some of this excess risk might have been due to the 'magnet effect'. Agency exchangers were more socially marginalised and had a higher risk profile. In particular, two-thirds had injected cocaine in the past year, about twice as many as at pharmacies.

Medical need remains unmet

In both groups medical problems were common and often severe. Tests showed that 3 in 4 were infected with hepatitis C and nearly a third with hepatitis B. A third had felt their drinking was out of control and many drank enough to aggravate liver disease. Over the last year a third had survived overdoses and injection-related damage was the norm.

Pharmacy exchange episodes offer little opportunity to address such problems[106] but more is expected of specialist exchanges. To an extent, it was delivered. For example, many more of their visitors had read health leaflets and half (compared to 1 in 10 at pharmacies) had sought advice from staff. However, the scope for more can be appreciated by looking at what was *not* done. Despite their problems, over the past year most agency visitors could not recall being referred elsewhere for help, about 60% did not remember being advised to see their GP, and over three-quarters had not seen a doctor or nurse at the agency – potentially important as many exchange attenders fail to action referrals to outside medical help.[201]

Some very basic interventions were often missing. Four in ten agency exchangers had not discussed injecting with staff and nearly

half had not had their injecting sites inspected. Also missing were interventions which might have further curbed the spread of infection. Over the past year half had never received a structured intervention in the form of counselling and three-quarters had been counselled less than once every two months. Over 7 in 10 had not been immunised against hepatitis B.

Lack of opportunity was not the explanation. Visitors felt comfortable about asking for advice and appreciated the chance to chat to sympathetic staff. Usually they had attended for at least a year and each visit lasted half an hour. Yet typically over a quarter left without having had a conversation with staff – probably an underestimate as those who preferred to be quickly in and out will also have refused to be interviewed.

A limiting factor may have been the preparedness of exchange users to put up with 'hassle'. Most cited the lack of this and sympathetic staff as reasons for attending. Staff might have feared that these perceptions would have been jeopardised by assertive intervention. On the other hand, they had a solid reserve of trust to draw on and could be expected to have the skills to intervene without alienating clients. Perhaps, too, they were prevented from doing more by factors such as workload and lack of facilities.

Access, assessment and expertise are the issues in rural Kent

An active local research unit has provided an unusual amount of data on Kent, a counterweight to studies from major conurbations. Among more dispersed populations, access is a major obstacle to exchange attendance, and avoiding recognition a prime concern of injectors unprotected by the anonymity of a metropolis. These issues interact: a local service would improve access, but might not be used because of the risk of being recognised.

Secondary exchange extends access

Research in 1993 into a drug agency-based exchange in the small town of Ramsgate found that it had provided syringes and needles for 44 injectors over three months, perhaps ten of whom had not personally visited.[204] Each was supplied on average every three weeks. Amphetamine was the most commonly injected drug, so the maximum of 50 syringes per transaction could have been enough for a fresh one each time.

As in the North West,[74] amphetamine injectors formed a cohesive social network, fertile ground for peer education and secondary exchange. Indeed, many attenders collected for other people and promoted safer injecting messages absorbed at the exchange. Those with stocks at home were also called upon when the exchange was closed. These indirect services were important. Injectors were deterred from directly attending by concerns over being recognised, their names being leaked to police, and police attention when carrying syringes. Just getting to the exchange was a problem. Intoxication does not lend itself to driving nor to planning and executing extended or complicated journeys. Injectors with more convenient access were the ones most likely to attend.

The friendly and non-judgemental attitude of staff was valued by visitors but it was not enough. Several felt the need for a more knowledgeable and detailed dialogue about injecting-related risks. There was no formal or routine assessment of each new visitor's risk profile. Some staff lacked confidence in their abilities to make such assessments and to offer consequent advice, and for some it seemed antithetical to their other roles as counsellors.[viii]

Elsewhere in Kent, the thorough infection risk investigation entailed in research into pharmacy schemes[194] was valued by most participants who felt it had improved their awareness of risk, an echo of findings in Amsterdam.[184] A substantial minority were

Policy catches up with the epidemic

Until recently UK national policy gave little guidance on what priority to attach to hepatitis C and how to deal with it.[212] In 1999/2000 nearly two-thirds of English drug action teams had yet to plot a strategy for the virus.[213 214] In contrast, in 2001 the Scottish Executive declared exchanges "vital" to combating infection and committed itself to reducing by a fifth the proportion of injectors testing positive for the virus by 2005.[215] The same year in England more urgency became apparent when the Department of Health issued guidance on hepatitis C for people working with drug users.[7]

National strategy highlights exchange

At last, in summer 2002 a long campaign[9] bore fruit in a new English strategy for containing hepatitis C.[6] It spotlights needle exchange as having a "key role" and cites research indicating that "the greatest practical impact" in preventing transmission of the virus will come from "improving the provision of needle exchange services".

At its most basic the strategy calls for geographical gaps in needle exchange to be monitored and for progress to be made on eliminating them. Exchanges are also likely to be important vehicles for implementing the strategy's calls for campaigns to prevent sharing of injecting equipment other than syringes and needles, for user involvement in planning initiatives, for expansion of outreach and peer education services, for hepatitis B immunisation to be available in all drug action team areas, and for improved treatment uptake. In the absence of reliable data on incidence, the proposed national target is "A reduction in the prevalence of hepatitis C in injecting drug users who started to inject in the last 3 years", a rough proxy for how rapidly the infection is spreading. In turn this target focuses attention on newer and (usually) younger injectors which exchanges have done least well in attracting and retaining. The policy is welcome but action has yet to follow.[210]

New service framework

Also in 2002 the English drug service framework developed by the National Treatment Agency included guidelines for exchanges.[216] Among these are a requirement for drug action teams and commissioning groups to ensure "comprehensive coverage". Fixed-site specialist exchanges will be expected to employ nurses to inspect injecting sites and to deal with minor infections and dressings, and to train their staff to provide health checks.

All exchanges are expected to provide harm reduction advice and facilitate access to hepatitis B immunisation, HIV and hepatitis counselling and testing, drug treatment, and interventions to prevent or reducing injecting. Much of this hinges on first assessing the risks run by their visitors. The guidelines say specialist exchanges should normally assess at the first visit and then repeat to ensure that advice remains relevant. Exchanges are also expected to periodically mount harm reduction campaigns. In addition to basic caseload statistics, records may be required of sharing behaviour, new attendances, referrals to treatment, and per client costs.

Supply restrictions relaxed

From August 2003 the law which banned supply of injecting equipment other than needles and syringes was relaxed to permit provision of water ampoules, swabs, utensils such as 'cookers' used for preparing drugs, filters and citric acid, by medical practitioners, pharmacists and people engaged in drug treatment including needle exchange workers.[217] Though a great advance on the previous situation, the impact of the new law will be hampered by limitations including the prescription-only status of water for injection and the continuing illegality of peer distribution of these items. Perhaps the main limitation will be the willingness of funders to pay for the new equipment.

In Scotland needle exchange users received a welcome 2002 Christmas present from the Lord Advocate who raised the legal limits on the number of needles/syringes that can be issued at any one visit. The limits are now 20 on the first visit and 60 on subsequent visits, or 120 in exceptional circumstances such as at holiday periods or when facilities are closed or difficult to access.[218]

prompted to consider moves such as hepatitis C testing and changing to safer injecting. Just such an assessment was missing not just in Ramsgate but probably too at most other exchanges. The upshot must have been that chances to reduce risk were being missed.

Despite exchanges risk levels can remain high

A patchwork of other studies confirm that risk behaviour can continue at worryingly high levels despite the presence of needle exchanges. In microcosm, a report on an exchange in Sheffield in 1988–1989 confirmed the national picture.[205] The new exchange had trouble attracting women and younger injectors and even more trouble turning these into regular attenders.[ix] A mission to educate visitors about HIV was rapidly replaced by a simple exchange transaction which left misconceptions uncorrected. Most worrying, 28% of attenders had shared injecting equipment in the past four weeks.

Unusually, in 1987 a scheme in Cambridge was sited at a drug dependence treatment clinic.[188] Nearly half the patients used it but sporadically, averaging under two visits in six months. Many lived outside the city and were not prepared to travel to the exchange, and opening hours were seen as too restricted. A quarter of the patients had recently shared injecting equipment. Attenders were no less likely to have done so than non-attenders

Sporadic attendance averaging once every few months typified two exchanges in the Bath and Swindon areas.[206] As in Cambridge, concern over unwelcome police attention deterred some would-be users. Others had simply not heard of the exchange or would have responded better to an outreach service. Also in south-west England, a recent study which included needle exchanges among its sampling frame found that in the past month 40% of injectors had shared syringes and needles and 85% had shared other injecting equipment.[96 207]

In the same region, in the mid-90s a study focused on a city-based drug agency exchange which also coordinated the pharmacy scheme, facilitating dual use and transfer from one to the other in response to need and giving injectors confidence in the pharmacies.[106] But all was not well. Injectors knew the risks of sharing needles and syringes but still did so with close friends and when equipment had been 'cleaned', and sharing of spoons and filters was common. Over 80% of some local samples of injectors were infected with hepatitis C. The agency exchange gave individualised risk reduction advice but this must have been very limited. During the three hours it was open it often saw over 60 people. When detailed assessment or counselling was undertaken other callers had to kept waiting, a deterrent to re-attending.[189] As elsewhere, typically visitors had been injecting for years; new injectors were not being picked up soon enough.

A community drug team needle exchange in Worcestershire[x] provided filters and sterile water as well as needles and syringes but this did not stop them being shared.[208] Though most knew this posed a risk, most attenders had shared water and filters with someone else (often regularly) and were prepared to do so again. As a result, nine in ten were at appreciable risk of infection. The information flow from the exchange seemed inadequate both in terms of the proportion of users advised about risks (only a third recalled being warned about sharing water) and in its impact on their behaviour.

In 1998 a dramatic increase in recorded hepatitis B infections in a Scottish city[xi] prompted a study of its specialist exchange.[209] Over the four years from 1995 each exchange client had attended on average 13 times and within each year just 6–7 times, yet two thirds injected daily. Infrequent attendance plus legal caps on equipment supply meant most could not have used their own fresh equipment each time.[xii] As in Malmö,[61] supply shortfalls from the exchange could not be made up from elsewhere because it was the main legitimate local source. Also as in Malmö, long gaps between visits together with strict one-for-one return requirements may have risked infection spread by extending the interval used equipment was kept in circulation, and limits on supplies would also have stopped attenders passing sterile equipment to their contacts.

Solid foundation but it needs to be built on

In trying to make sense of this evidence we must remember that British research is patchy, precluding strong conclusions, and that needle exchange is one element of a complex system which is extremely difficult to disentangle. Failure to detect a positive impact does not mean this does not exist.

The 'magnet effect' can hide benefits (part 2) and so too can the fact that exchanges may foster risk reduction across entire injecting populations, obscuring their specific contribution when attenders are compared to non-attenders, the typical paradigm.

The mechanisms are both practical and symbolic. By pumping sterile equipment into circulation and removing contaminated material, exchanges reduce the likelihood that any given piece of equipment – in the hands of an attender or not – can spread infection. Exchanges can relieve pharmacists of the most demanding injectors, probably making them more willing to meet remaining demand, and many encourage secondary exchange. By demonstrating how seriously the threat is being taken, and by showing concern for injectors beyond an insistence that they stop injecting, exchanges also lend credibility to anti-sharing messages. Once an exchange is up and running in an area, one defence against acting on these messages ('I know I shouldn't share but I can't get needles') is removed and sharing is exposed as irresponsible rather than unavoidable.

'Limited overall effect' of first schemes

Given these caveats, what can we make of the early work in Britain, still the most detailed we have? These new services, wary of frightening off jittery customers, were concerned not to over-force the pace of risk-reducing behaviour change – and there is little evidence that their customers *did* change more than they would have done anyway. On the plus side, they attracted committed injectors who would not otherwise have been in a position to be offered risk-reduction advice. Where such treatment could be had, exchanges acted as a route to methadone prescribing and in particular to injectable methadone, which reduced sharing levels. They also acted more broadly as a conduit to advice and treatment. However, the core exchange function could not be shown to have reduced HIV risk.

From the team at the Centre for Research, the verdict was that where (as in England) there is in any event good access to injecting equipment, sharing levels are already low, and HIV infection rare, "syringe-exchanges have only a limited overall effect on further reductions in syringe-sharing".[195] The qualifications to this verdict are important. Dundee showed that where there are few alternative sources, closing needle exchanges makes equipment hard to obtain and results in pre-AIDS levels of sharing.[189]

Their prescription was for exchanges to extend their work.[104] Attenders should be equipped with the social skills needed to resist risky injecting and supported by more attention to their material, physical and psychological well-being. They should also be recruited as secondary distribution points and as peer educators. More exchanges and diversification of supply would help reduce equipment shorages. Access to substitute prescribing and particularly to injectable methadone would enable exchanges to make the most of their contacts with opiate addicts. Access to effective treatments for stimulant injectors might also help reduce HIV risk. These messages remain relevant. The difference now is that we have a solid foundation of experience and credibility to build on.

Glimmers of light from later work

Of the later studies, it may be no accident that the best evidence that exchanges reduce hepatitis C infection risk comes from Glasgow, which hosted a long-term, consistent research programme. Had such work been done elsewhere, we might have found similar results. It may also be no accident that Glasgow's exchanges achieved near saturation levels of needle/syringe distribution across the entire city; for exchange, coverage is, if not everything, close to it. Yet even here the exchanges cannot be shown to have been the active ingredient and hepatitis C continued to sweep rapidly through the city's injectors.

The other short-lived glimmer comes from the north west of England where circumstances combined to isolate the effect of exchanges from that of other outlets and from treatment services, while at the same time delivering a set of customers particularly amenable to change. This peculiar constellation of factors rendered visible a direct effect of exchanges on their visitors which may have been obscured elsewhere.

Elsewhere or at other times the story is of residual levels of needle/syringe sharing and widespread sharing of other equipment which exchange attendance cannot be shown to have dented. Beyond research limitations, the possible reasons for limited evidence of success fall into two strands. The first is the restrictions which hobbled exchange in the case study cities, restrictions present (usually to a lesser degree) in Britain. These are most obvious in the legal quantity limits in Scotland but also in restricted opening hours and inadequate staffing and facilities, and in cost constraints which ignore the long-term costs of unaverted infection.

The second may be curbs on the degree to which exchanges engaged with their customers to safeguard health, improve functioning, and reduce their risks of contracting or transmitting infection. Such curbs were imposed by resource limitations but perhaps too were partly self-imposed, grounded in the concern of the early exchanges not to deter injectors who had yet to be convinced that the new services were 'on their side'. There are signs that this concern unduly limited the extent to which exchanges exploited the reservoir of trust they had built up and the experience and skills of their staff to make greater gains. Though the research is not there to document their work, in recent years many exchanges have embraced a more activist agenda[xiv] and more would if the resources were available. Which initiatives they might look to is the subject of the next and final part of this series.

NOTES

i The accepted term though in the UK strict exchange is rarely enforced and some schemes see themselves as primarily in the business of supplying sterile needles and syringes (Richard Velleman, personal communication November 2003; UKHRA mailing list postings 2003).

ii When only skeleton information on each attender was collected on intake sheets.

iii Not only had the *AIDS* article chosen a different comparator, it also seemed to deny the existence of this alternative benchmark: "Resources did not permit follow-up of subjects and different people were interviewed."

iv Exchangers' second-hand needles were in demand because often they been used just once and were sharper. Without them, non-attenders might have had to resort to equipment with a longer track record and more likely to be contaminated.

v More attenders injected heroin and there may have been other, undocumented risk-elevating influences which the exchanges had successfully countered.

vi Again, the 'magnet effect' may be implicated, though the analysis did account for the frequency of injecting.

vii Degree of overlap between these categories not known.

viii Some may have felt that locally restricted access to treatment (probably especially acute for stimulant users) meant assessment for these purposes was pointless.

ix Instability in injecting and drug use patterns accounted for some of this irregularity.

x Investigated probably in the late '90s,

xi Almost certainly Aberdeen.

xii To do so each would need to have taken on average 70 needle/syringes each visit instead of 18 in 1998.

xiii Estimates assume mid points of ranges of number of injectors in each country.

xiv To judge by reports to their national forum.

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Nuggets **8.2 5.8 1.8 1.7**

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OFFCUTS

Screening primary care patients for risky drinking is an ineffective use of health care resources was the conclusion of study published in the *British Medical Journal* at a time when a World Health Organisation project is seeking to persuade GPs to do just that. The conclusion was based on a meta-analytic compilation of relevant studies.[1] From this emerged an estimate that on average 1000 patients have to be screened to gain 12 months later just two or three who have stopped drinking above levels which the study defined as excessive. The main problem was not the efficacy of brief interventions but 'wastage' before patients got to this point: across the studies, screening indicated that 90 out of 1000 patients might be drinking too much and just 25 of these were assessed as suitable for and actually received an intervention.

Critics argued that outside a research context more of those who screened positive would have been talked to about their drinking, that drinking reductions which don't fall below excessive may still be valuable, that alcohol screening could be incorporated in broader health screening, and that screening does not have to be universal – it could be targeted at categories of patients likely to include heavy drinkers or at specific types of consultations. Finally, it was argued that even accepting the meta-analysis's estimates, screening for alcohol problems is no more hit and miss than screening for other medical conditions for which it is considered worthwhile. The authors replied sticking by their conclusions. They argued that the proportion of positive screen patients who actually receive a brief intervention is likely to be roughly the same in normal practice as in the research, that selective screening is untested in general practice, and that what is needed is a study comparing screening-based approaches with normal patient-centred clinical procedures.

1 Beich A. *et al*. "Screening in brief intervention trials targeting excessive drinkers in general practice: systematic review and meta-analysis." *British Medical Journal*: 2003, 327, p. 536–542. For this study and responses to it see http://bmj.bmjjournals.com.

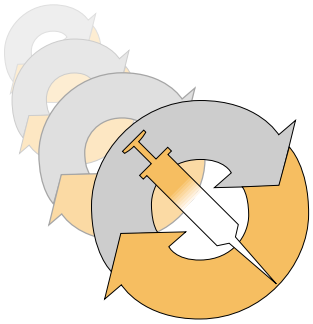
PART 4 • THE ACTIVE INGREDIENTS

hepatitis C and needle exchange

Needle exchange can help stem the hepatitis C epidemic – but it takes high volume, high activity, high support and lateral thinking. The final part of this series isolates the most promising practice ingredients and mixes.

by **Mike Ashton**
a FINDINGS *analysis*

This series was compiled with the assistance or encouragment of Neil Hunt of the Kent Institute for Medicine and Health Sciences; Ali Judd of the Centre for Research on Drugs and Health Behaviour; Holly Hagan of the National Development and Research Institutes in New York; Duncan Stewart of the National Addiction Centre; Anita Morrison of the Scottish Substance Misuse Effective Interventions Unit; Laurence Gruer of the Public Health Institute of Scotland; John Egan, Visiting Research Fellow at the National Centre in HIV Social Research in Australia; Jim Camp and Terry Shields of the National Needle Exchange Forum; Lawrie Elliott of the University of Dundee; Clare Sears of the University of California; Hilary Klee of Manchester Metropolitan University; Amina Lahrichi of the Addaction Harm Reduction Team in London; Shaun Speed of the University of Manchester; Bobby Smyth; Jon Derricot; Avril Taylor of the University of Paisley; Richard Velleman of the University of Bath; and John Witton of the National Addiction Centre. Though they have enriched it, they bear no responsibility for the final text.



THIS CONCLUDING PART of the series aims to tease out from the previous parts the practices which help or hinder needle exchange curb the spread of hepatitis C, all the time keeping in mind that each exchange is a complex system whose elements interact with each other and with the environment. Like cooking, rather than any particular practice ingredient being 'good' or 'bad', it all depends on quantities, combinations, and context.[140]

The core service: supplying sterile equipment

One thing seems clear. Trickle-feed needle exchange does not work, or not well enough.[219 220] Hepatitis C demands much more ambitious strategies which aim to eliminate even occasional risky sharing and which extend to all the equipment directly or indirectly in contact with an injector's blood,[221] and all the ways this might happen.[222]

VOLUME AND ACCESS

The ideal is to have a fresh needle and syringe to hand on each injecting occasion, making it at least as easy to employ a clean as a used one. Rather than a straggling line, sterile equipment emanating from exchanges should be like a "swarm" of malaria-free mosquitoes displacing their infectious cousins.[223]

Rarely is output sufficient to approach this ideal. Though Britain is relatively well endowed, in England syringe output is sufficient for a fresh set to be used for just one in four injections while in Scotland supplies are a third as adequate.[99 281] Commonly at the root of the problem lies a reluctance to support services seen as accepting of drug users' lifestyles.[12 140] Services which are funded may be forced into overly strict one-for-one exchange and limits on quantities,[129 224] opening hours, and locations.[113 148 153 155 156 157] Sometimes these are a well-meaning attempt to induce frequent attendance, reduce injecting,[225] prevent equipment being sold or used to initiate new injectors, or to ensure safe disposal,[129] but the effect can be to condemn exchanges to an avoidable failure.

How the elements fit together is important. For example, a one-for-one policy need not be a problem if exchanges do not unduly limit supplies, and go to users rather than making users come to them carrying used equipment.[76 141] On the other hand, the conjunction of fixed-site, one-for-one exchange and limits on supplies demands unrealistically frequent visits[61] from high-rate injectors.[113 153]

Diversifying outlets helps with coverage[19 226] but potentially at the cost of behaviour change. If pharmacy exchanges work in partnership with drug agency or specialist exchanges, the advantages (access, low cost) will be retained and the disadvantages (lack of proactive risk reduction) could be reduced through cross-referral and shared training. The Avon model of an agency exchange managing and acting as an assessment (and re-assessment) service for the pharmacy scheme is one example.[106]

MATCHING DISTRIBUTION TO DEMAND

Sheer volume is necessary but not sufficient. Despite overall abundance, limits on the times and places when equipment can be obtained can create a mismatch between supply and demand,[76] especially when cocaine binges sharply escalate the rate of injection.[75 113 148 151] Rather than an indiscriminate flood, the outflow may need to be micro-managed to ensure that equipment reaches in to all the niches where and when injecting occurs.[102 113 123]

The problem arises partly from a defining feature of addiction: the urgent focus on obtaining and taking the drug. The result is an at times highly

THE 4 PARTS OF THE SERIES

Issue 8 The first part of this series established that hepatitis C is spreading rapidly due to continued sharing of injecting equipment and that needle exchange is the main service modality with the potential to curb the epidemic.

Issue 9 Six case studies showed that this potential can be realised, but also that exchanges have usually been unable to demonstrate effectiveness against the virus. Service restrictions forced by or intended to deflect public hostility seemed the major reason for the deficiencies.

Issue 10 Revealed that in Britain there is no hard evidence that exchanges have helped attenders reduce risk behaviour or avoid infection. The early pilot studies were flawed and we know little about the effects of today's exchanges.

Issue 11 This article and the final part of the series dissects the previous parts to identify the practice elements which limit or can extend viral control.

is fragile[236] and quickly reversed.[224]

Other solutions include secondary exchange,[277] home pick-ups,[157] and (for at least the return part of the exchange journey) safe disposal bins in premises such as public toilets. These efforts can still be thwarted if injectors lack close links with an exchange user who can collect for them,[277] or because instability in injecting locations and in drug users' lifestyles mean they cannot be guaranteed to inject while near a bin, or to be in when a worker calls.[236]

Around the core: options for enhanced risk reduction

Getting sterile equipment to injectors is essential but not necessarily enough. Proactive intervention aimed at behaviour change may be needed if the exchange's output is not simply to feed unchanged sharing patterns ◤ *To intervene or not* p. 28. Armed from the previous parts of this series with an understanding of why risk behaviour has persisted, we can suggest an extended menu of intervention options. Few have been tested at exchanges. Much more research has been done in the context of outreach, peer education, community organisation, and brief interventions. Reviewing this work is beyond the scope of this article, but some pointers are offered.

ESSENTIAL FIRST STEP: ASSESSING RISK

Referral to treatment, individualised risk-reduction, adapting services to the local risk profile, evaluating performance – all hinge on first assessing the risks run by visitors to the exchange,[116] yet sometimes this essential step has been lacking.[32 189 204] Assessments also allow exchanges to focus interventions on visitors whose risk behaviour stems from factors not addressed simply by supplying equipment and standard information. Assessment could itself reduce risk, both directly[243] and by encouraging injectors to arrange HIV and hepatitis tests and counselling,[184 194] especially if as a result they become aware that they are infected and infectious.[51 244 245]

Deciding when to do the first thorough assessment requires sensitivity. Wariness at probing too hard too early is justified,[32 189] but if visitors do not return at all or for months, delay amounts to a lost risk-reduction opportunity. In terms of what to do, only detailed questioning will uncover all the potential hepatitis C transmission routes, allied with an interviewing style which does not offer easy ways out of admitting this behaviour or encourage denial by seeming judgemental. Interview schedules developed for research provide validated frameworks.[90 95] The assessment should cover overdose as well as infection risk, and be regularly repeated.[246]

Risk-elevating attributes identified by research offer clues to priority targets and assessment topics: younger injectors;[23 45 52 55 56 62 75 85 86 87] women in a sexual relationship with a male injector and anyone for whom co-injecting friendships make non-sharing difficult;[74] those who let others take the lead in buying and preparing their drugs[96] or in helping them inject;[100 148] people unaware of the risks and how to avoid them, specifically injectors who underestimate the risks from close friends or lovers[2 101 106] or who falsely believe that cleaning syringes protects them;[100] those so depressed, fatalistic or disturbed that they do not care about the risks or do not react rationally;[154] very frequent injectors;[50 121 151] those so chaotic that accidents will certainly happen;[157 172] injectors unusually negligent about the risks, associated with heavy drinking,[139] indiscriminate polydrug use[56] and injecting cocaine, speedballs,[52 62 68 69 70 71 75 76 78 79] or tranquillisers;[56 74] more dependent injectors;[74 96 101 112] people who jointly purchase and inject street drugs, especially those with larger injecting circles[42 44] and in fluid injecting networks;[119] the homeless, ill-housed and materially deprived and (related to this) those who inject in public or in the street.[71 75 76 80 100 104 111 112 151]

KNOWLEDGE AS WELL AS NEEDLES

From the start exchanges acknowledged that beyond needles and syringes, reducing risk behaviour required *knowledge* of the risks and how they could be avoided.[1]

In the early years of the HIV epidemic,[12 86] information campaigns almost certainly curbed syringe sharing. Injectors today are poorly informed about the risks of sharing paraphernalia and how hepatitis C can spread,[115 116 117] suggesting the need for similar campaigns on these issues.[276] Ignorance may be partly why, even when it is supplied, paraphernalia can continue to be shared.[76 208]

The implication is that supplying this equipment should be seen not as an end in itself, but as paving the way for interventions to reduce re-use and joint use. Research suggests that exchange users would welcome structured face-to-face education[194 204 245] – as long as the trainer was knowledgeable about the virus and about injecting lifestyles. Current and former injectors have a credibility head-start.[12 245] But information itself is often insufficient to reduce risk,[80 93 123 208] especially if this is grounded in shared lives and shared purchase and use of drugs.[102 117 118] Here the aim must be to construct anti-sharing norms strong enough to counter the practical and emotional attractions of sharing equipment ◤ *True friends do not share (syringes)*, p. 29.

For hepatitis C in particular, the 'facts' are unlikely to be enough to energise risk-reduction. Injectors may see the virus as a minor issue compared to HIV, overdose, and the daily batterings of a life centred on illegal drug use.[247 248] Also, the virus may be seen as virtually unavoidable and therefore not worth trying to avoid.[280]

STRUCTURED RISK-REDUCTION

Because supplying sterile syringes has been difficult there, the USA has generated alternatives. In Britain, these could also be used to augment needle exchange. One approach tested in two national programmes used outreach workers to encourage injectors back to 'off street' locations for one or two brief risk-reduction sessions.[249] There were no control groups, but the findings suggest a consequent reduction in the numbers injecting, in injection frequency, crack use, re-use of needles and syringes and other equipment, and more frequent decontamination of used equipment, all protective against infection.

High volume and high access make it possible for sterile supplies to displace potentially contaminated equipment

Just two sessions can make a worthwhile impact. In one of the programmes contacts were randomly allocated to extra sessions.[250] Six months later these had slightly increased treatment uptake and exits from injecting, but risk-reduction overall had not been improved. However, the basic two sessions were much more than a swift encounter on the street. In session one, time was set aside in private for a manual-driven programme of HIV testing and pre- and post-test counselling, and to introduce injectors to a hierarchy of means and skills for reducing risk. The follow-up session reinforced these messages and provided an opportunity to discuss how they had worked out in practice.

Another US study collated results from HIV risk-reduction interventions during drug treatment.[251] These reduced sexual risk behaviour and improved risk-reduction skills, skills which could help prevent risky injecting among injectors not in treatment.

Whether exchanges should train visitors how to clean syringes is a moot point. The issue is whether it is feasible for injectors to practice sufficiently thorough decontamination to kill hepatitis C, or whether encouraging them to do so takes everyone's eye of the ball – never re-using other people's equipment.[12] Even if adhered to (and they rarely are[32 85 93 100 106 115 116 201]), methods recommended against HIV may be little use against hepatitis C.[6 7 252] The main effect could be to give false reassurance.[93 106]

ENCOURAGING TREATMENT ENTRY

Exchanges attract the highest risk and most dependent drug users – the very people who when they enter addiction treatment make the greatest gains for themselves and for society,[254 255] including the avoidance of viral infection.[256 257 258]

That exchanges can act as conduit to treatment has been demonstrated overseas[234] and by early work in Britain.[190] Towards the end of the '80s, one London exchange logged

constricted circle beyond which injectors will not (metaphorically or actually) travel to obtain sterile injecting equipment, typically in distance a mile or two.[104 153 188 198 204 275] Proximity is not the whole answer,[86 93 123 157 172] but it helps. Accessible exchanges encourage attendance[126] and living close to one has been linked to reduced sharing.[86]

Proximity is not an issue when an exchange is conveniently located within a small area of injecting drug use. In this situation, extending hours may be all it takes to ensure adequate supplies. Elsewhere, it may require diversification to all-night pharmacies, outreach workers,[58] mobile exchanges, vending machines,[226] and emergency departments.[74 204] In other cases it is about identifying hotspots where even extensive and diversified access leaves injectors with drugs but without sterile equipment, a risky combination.[93 275] Examples are Vancouver's welfare hotels, America's shooting galleries,[68 103] and the pre-outing social gatherings of amphetamine injectors in north-west England.[100] Here the aim is to ensure the service is there in person or via its customers doing secondary exchange.[148 149]

Mobile or peripatetic exchanges seem an ideal solution, but if they operate for only a short time at each location there is a high chance that they will be missed and that sharing will fill the gap.[150] Home delivery and collection[157] is particularly suitable for injectors wary of carrying syringes in the street or of being identified using the exchange. Both tactics have a special role where injectors are thinly spread across a wide area.

GAPS IN THE CUSTOMER BASE

With a virus as transmissible and prevalent as hepatitis C, preventing its spread requires the 'inoculation' of a high proportion of a network of injectors through access to sterile equipment.[114 252] If some groups are missed, the entire enterprise is threatened.

In particular, hepatitis C places a premium on reaching new injectors, as early as within a year of their starting to inject.[222] Yet exchanges in Britain[74 86 104 106 115 189 190 194 195] and elsewhere[121 148 185 227 228] typically attract few new injectors. They also often miss younger injectors[76 123 179 277] and those who do come may attend less often.[76] Being able to point to the long injecting history of your visitors is a defence against accusations of consolidating or initiating injecting careers, but one with a price. Women too are often found to be under-represented,[32 121 189 195 205] though in London those who did come found exchanges helpful and accessible.[229]

Catching people early is doubly important because younger and newer injectors[86 222] are at greater risk of infection due to riskier behaviour. Special efforts should also be made to attract and retain other high-risk groups[123]

◤ *Essential first step: assessing risk*, p. 27.

Diversification of outlets helps because injectors unwilling or unable to use one can use another. Compared to exchanges, in France vending machines tend to attract young injectors, those not in treatment, and those who inject less frequently.[226 230] In Britain, pharmacy schemes attract people who prioritise speed and convenience[32] while others prefer what they see as the more welcoming and comprehensive response of a specialist or drug agency exchange.

STERILE EQUIPMENT FROM EXCHANGES SHOULD BE LIKE A SWARM OF MALARIA-FREE MOSQUITOES DISPLACING THEIR INFECTIOUS COUSINS

ALL THE EQUIPMENT, ALL THE TIME

Another priority is to widen the focus to equipment other than needles and syringes.[222] This 'paraphernalia' includes filters, spoons to heat drugs in, water to clean and flush syringes and dissolve drugs, and acid to dissolve heroin and crack cocaine.[231] Hepatitis C also places the emphasis on hygiene – safely cleaning up blood spills and disposing of swabs and tourniquets.[19 27]

Exchanges have a poor record at preventing paraphernalia sharing.[32 76 80 93 117 179] An obvious reason is because these materials have not been supplied.[111 115 116] In one English evaluation, around 80% of injectors given sterile water and 'cookers' said they were now less likely to re-use someone else's.[279] Not providing these materials may also send an implicit message that re-using them is 'OK' – certainly how some English exchange users see it.[106] Meeting the established demand[232] for this equipment is likely to be most important for people without their own homes who cannot, for example, just reach for a fresh spoon or fresh water.[233]

THE PROBLEM OF SPORADIC ATTENDANCE

Sporadic attendance is a common (but not universal[195]) obstacle to effective exchange.[61 188 189 205 206 209 220] Especially coupled with caps on how many sets the exchange is prepared to give out or the attender to carry, infrequent attendance leads to supplies falling short, in turn linked to re-use of other people's equipment.[61 76 77 209]

Even without caps, infrequent attendance elevates risk by extending the time used syringes remain in circulation.[234 235] At exchanges which require these to be returned at the next visit, the time between visits roughly corresponds to the circulation time. The longer this is, the more opportunities there are for equipment to become contaminated and for people to become infected by it.[236]

Attempting to force frequent visits by capping quantities risks under-supply and the rapid spread of infection.[174 177] An alternative is to look at the deterrents to attendance. One commonly reported is fear of being stopped by the police while carrying needles and syringes.[32 50 101 109 157 186 188 194 204 206 224 236 237 277] Sometimes the stigma of drugs and AIDS is such that exposure as an injector also risks ostracism and violence from the public.[220] Where reactions are less extreme, possible exposure to family, employers, friends and neighbours still deters exchange attendance.[277] Having to carry back used equipment aggravates the situation, but regardless of whether this is required, injectors prefer not to be seen at syringe outlets.[186 194 204 240 226]

Because they extend the circulation time of used equipment,[154] deterrents to attendance are particularly damaging when coupled with a one-for-one exchange service to which users have to travel. One-for-one policies stem partly from concern that otherwise used equipment will be dangerously discarded. That concern has some foundation, especially when police pressure and stigma encourage injectors to quickly discard used syringes rather than risk exposure while depositing them in public sharps bins or returning them to the exchange.[157 238]

One way out of this bind is to be able to reassure injectors by gaining the cooperation of local police. Drug users' networks can quickly spread the news, making a big difference to attendance,[239] but trust in the police

WHY EXCHANGES RESTRICT SUPPLIES

A study in Ontario gives us a rare glimpse of what drives the distribution policies of needle exchanges.[225] Staff who saw syringes and needles not as the means to avoid infection, but primarily as posing a risk to injectors and to the public, tended to limit the amount they gave out and to insist on one-for-one exchange. In these services the return rate is all-important, pressure is put on customers to see that the statistics tally, and secondary exchange may be banned.

Such attitudes can be a defensive response to the precariousness of public support for exchanges.[161] In Ontario they were most common in newer services still establishing their credibility and those under attack from hostile local opinion. More confident and less besieged services could focus on distributing sterile needles and syringes rather than collecting used ones. In these services, output restrictions are seen as obstacles to supplying life-saving equipment. Returns are encouraged not by sanctions but through dialogue and mutually agreed solutions such as home pick-ups and return containers. An injector's assessment of the amount they need is accepted and secondary exchange encouraged. Such services may still aim to take back as much as they give out, but not necessarily at each transaction.

A lone sterile syringe has no chance against contaminated equipment

722 visitors, of whom nearly 40% were not just given, but apparently acted on referrals to external help, mostly to treatment services.[282] A fifth of the referred clients had come seeking such help (far more than those not referred) but presumably many were steered in this direction by the exchange. At Baltimore's exchange, the treatment entry rate of clients referred to methadone maintenance was only a little below par and they did about as well as other patients.[120]

How many of their users benefit from treatment is partly in the exchange's hands; focusing on referral can greatly increase treatment uptake.[186] These findings lend weight to calls for exchanges to actively forge links with treatment services and refer to those services.[123 140 191 259] One suggestion is to interview attenders monthly to identify those whose injecting is accelerating (in this study, also the most regular attenders) in order to target them for referral to treatment.[191]

Successful referral paves the way for treatment and exchange to exert a synergistic impact on risk. In so far as they reduce the frequency of injecting, oral substitution programmes also reduce the opportunities for sharing equipment and for viral spread.[256] Meantime, the role of exchanges is to see that uncontaminated equipment is used for each remaining injection and to remove used equipment. Evidence for precisely this kind of joint impact is available from the USA[77 120 126] and from Britain, where in the early years of needle exchange injectables were more widely prescribed than today; facilitating access to this treatment was probably one of the main ways exchanges reduced infection risk.[104] By reducing the number of injections, treatment should also help exchanges meet the remaining demand for equipment.

Even if it does not cut the frequency of injecting, sourcing injectable drugs from a doctor divorces patients from the joint drug procurement and consumption arrangements[196] which characterise illegal drug use,[88 102 103 117 118 197] making it less likely that they will share injecting equipment. Treatment can also address psychosocial risk factors beyond the reach of exchanges ◤ *below*.

The accessibility of treatment limits whether staff will refer and clients attend.[149 259 260] Where services are lacking or unsuitable, exchanges can still use their access to injectors to lobby for improvements.[123 204]

ADDRESSING POVERTY AND DISTRESS

Tackling material deficits and psychological problems will be required where these make risk behaviour resistant to simple needle exchange or direct intervention.[114]

Exchange users are often very poor, seriously depressed and distressed, lack stable housing, and in legal trouble. Often depression responds well to treatment but there is no reason to believe (and no evidence) that the same is true of starting to use an exchange. In a US study, exchange users were nearly twice as likely as methadone patients to be seriously depressed.[261]

Where food, shelter, safety and avoiding arrest are immediate concerns, the distant prospect of AIDS or liver disease may seem less pressing.[94 245] Material deficits and psychological problems also limit the resources injectors can call on to safeguard their health, leading to risky sharing and impeding behaviour change.[32 77 104 111] Among exchange attenders in New York, having lived in one's own house during the last six months halved the chances of continued re-use of used syringes.[77] In Vancouver, housing, poverty and distress lay at the heart of risk behaviour.[148 151] Needle exchange is the drug service most likely to be in contact with these marginalised populations, giving exchanges a potentially central role in responding to their needs.[274] Often exchanges will be unable to directly address these needs but they can link to services which can, act as advocates, and help their visitors do the same.[149 151]

INJECTORS ARE NOT JUST THE EXCHANGE'S CUSTOMERS, BUT ITS COLLABORATORS

CUSTOMERS ARE ALSO SERVICE PROVIDERS

The social nature of sharing suggests a key role for working with networks of injectors. In this vision, injectors are not just the exchange's customers, but its collaborators.[114] The argument has been powerfully made that further progress in infection control requires a shift from targeting individuals, to targeting networks and the group norms which sustain risk behaviour despite needle exchange provision.[1 18 76 77 114 204]

Helping to shape the service to their requirements is a basic role for exchange users, particularly important in Britain where exchanges compete against pharmacies and other injectors.[157] Beyond this is engaging users in delivering the service. Practically from the start, exchanges have supplied visitors with extra equipment to pass on to their contacts. Quantity caps so low as to effectively prohibit this are the main impediment.[61 74 177 209] Where these allow it, 'secondary' distribution can be very common in Britain[32 100 106 197 199 203 204] and elsewhere,[76 77] providing an important extension to the service,[140 240] particularly where group injecting is the major risk scenario.[262] Though it might attract criticism, deliberately engaging drug dealers in syringe supply and collection could also be effective risk-reduction.[100]

Baltimore's exchange was prepared to frequently hand out large amounts of equipment, with the result that 9% of its visitors distributed two-thirds of its output.[262 263] Their motives varied from making money to saving lives. Those of their 'customers' included (compared to going to the exchange) convenience and confidentiality and less chance of being caught with syringes.[237]

San Francisco's Prevention Point hands out more syringes than any other US ex-

TO INTERVENE OR NOT

Exchanges with a poor record of risk-reduction have commonly adopted, or been forced to adopt, a non-interventionist stance.[32 74 115 116 161 184 189 195 205] Particularly when equipment is readily available from other outlets, the result may be no added risk-reduction.[71 145 150 184 241] The fact that hepatitis C has spread, and risk behaviour persisted, despite accessible and low-threshold exchange suggests that a more interventionist stance is needed.[219 222] Risk-reduction and health-promotion enhancements are also the main ways specialist exchanges distinguish themselves from pharmacy schemes, justifying the extra investment.[32 74 106 242] These services can also aid coverage by attracting more visitors.[197]

Obstacles to intensified engagement are both practical and philosophical.[149 183 185] Shortage of time,[106 170] under-resourcing, and unsuitable premises, locations or vehicles,[155] all preclude extended encounters.[76] Exchange's founding assumption[1] that injectors would not knowingly risk infection when they had the means to avoid it, also implied that energetic intervention was unnecessary, as were the costly staff and facilities needed to mount them. Exchanges were, after all, going with the flow of injecting drug use, seeking only to divert it a little in the injector's interests. The limited success of this approach has focused attention on the fact that *not* sharing injecting equipment is in some ways very much against the flow of injecting subcultures, and that safer injecting requires big means like housing and self-respect as well as the little means of needles and syringes.[222]

Would it deter customers?

There was also a more positive reason for the early exchanges not to push too hard for behaviour change. To attract visitors, exchanges had to avoid seeming just like the drug treatment clinics most injectors then[283 284] (and now[274 281]) stayed away from. The emphasis was on 'low thresholds', 'user friendly' staff, and, above all, on not pressurising the visitor – and rightly so. Fears that too precipitate an approach could deter visitors were well founded,[32 203] and improving coverage by lowering the threshold remains critical. The challenge is to upgrade to intensified intervention without alienating visitors or making access to equipment contingent on extra risk-reduction activities.[129]

change, aided by the fact that half its visitors also exchange for others. Research found that direct and indirect exchangers both had reduced risk behaviour compared to other injectors, presumed to reflect indirect transmission of harm reduction messages from the exchange along with its equipment.[277]

The same city illustrates the potential of peer exchange in a community small enough for the networks to be personal, and for peer exchangers to reach a high proportion of their peers. Four injectors recruited at a 'camp' used by young homeless drug users were trained by a local agency.[264] Each recruited a small crew with a view to maintaining a 24-hour service. Compared to sites without secondary exchange, at the camp many more injectors sourced syringes from exchanges rather than friends, and needle sharing was nearly four times less likely.

NATIONAL POLICY SEES COMMUNITIES OF INJECTORS AS TARGETS TO BE DISMANTLED RATHER THAN NURTURED

In the Netherlands, Australia, and New Zealand, drug users' groups commonly not only do peer exchange 'in the field', but themselves manage exchanges.[3 77 278]

TRUE FRIENDS DO NOT SHARE (SYRINGES)

Exchanges also provide a platform from which to influence social norms governing how equipment is used, either directly by recruiting influential local injectors,[2 104] or indirectly by cooperating with outreach and peer education initiatives.[18] The aim might, for example, be to replace the norm 'friends share', with the norm, 'true friends do not share injecting equipment'.[107]

Employing (ex)injectors to conduct outreach among their networks, and to recruit other HIV risk-reduction advocates, is a well established tactic.[265] In Baltimore, potential peer leaders were identified simply by asking injectors to nominate and bring back for interview people who drug users might listen to about HIV prevention.[266] Eight in ten were themselves injectors. There was strong evidence that participating led them to reduce their risk behaviour and suggestive evidence of a similar impact among their contacts.

Another approach borrows from pyramid selling but incorporates quality checks into its reward structure. Noting that younger injectors rarely turn up at exchanges, an Australian project recruited some, taught them about hepatitis C transmission routes, and paid them to teach other injectors who returned to the project to be 'examined', for which they in turn received payment.[227] 'Bonuses' were paid to the peer educators if their pupils got high marks. A similar intervention has been implemented in the USA, and replicated in Russia alongside secondary exchange.[240] Quality checks are important to prevent off-message or off-putting communications from self-appointed opinion leaders.[267] This seems an attractive way to get information to new injectors and to encourage them to use the exchange via contact with older exchange users.

Other methods trialed in the USA involve bringing together groups of injectors to discuss HIV risk and how to avoid it. Some studies show greater risk reduction than individual approaches.[265] In one the initiative began simply by asking injectors to bring in their syringe-sharing contacts.

Which type of intervention is feasible will depend on the nature of the local network. Where this is relatively stable and based on ties that go beyond joint drug procurement and use, natural groups can exert influence and spread information. Elsewhere, one may need to identify and recruit the few stable participants in an unstable social scene.

TIME TO FOCUS ON *preventing* INJECTING?

In respect of hepatitis C, the difficulty of instilling truly safe practices has refocused attention on cutting the prevalence of injecting as well trying to make it safer.[15 22 117 268 269]

Exchanges have at least two potential roles. First, they can seek to shorten injecting careers by encouraging visitors to take drugs in other ways and by putting them in touch with treatment and other services ☛ *Encouraging treatment entry*, p. 27 and *Addressing poverty and distress*, p. 28. Second, they can try to prevent their visitors spreading the injecting habit, building on the prominent role played by current injectors in initiating others.

Though not at an exchange, an intervention along these lines has been trialed in Britain.[270] In a session lasting under an hour, drug worker and client explored initiation and its risks, how the client may inadvertently promote injecting, and responses to common initiation scenarios. The intervention was practicable, and was followed by substantial reductions in the frequency of injecting in front of non-injectors and of non-injectors asking to be initiated. Six of the trainees had initiated someone in the three months before the session, just two after it. However, for many trainees the session would have been wasted. Most had never initiated anyone and would resist doing so. Cost-effectiveness dictates screening these out and targeting only potential initiators ☛ *Essential first step: assessing risk*, p. 27.

STAFF SKILLS AND TRAINING

To undertake enhanced intervention, staff need the skills and confidence to maximise behaviour change without alienating users. Though willing, sometimes they feel unable to do more due to insufficiently detailed knowledge of injecting and related risks[204] or inadequate communication skills.[116]

A basic requirement is sufficient knowledge to be able to train injectors in safer injecting and good hygiene.[201] To encourage clients to act on this training, staff might draw on techniques used in other settings where the client is, from their point of view, attending for another purpose. Motivational interviewing has a strong research record.[194] Cognitive therapy is another model.[7 80] One aim might be to generate motivation by making it hard to persist with risk behaviour and still see oneself as a 'responsible' injector. Ability to organise marginalised groups, advocate on their behalf, and to foster the interpersonal skills required to negotiate risk avoidance, are also important.[94 104]

CHALLENGE YOUR ASSUMPTIONS

Evaluating exchanges often produces surprising results which would probably not have been predicted by staff.[219 271] Though basic information on syringe sharing is now called for in English guidelines,[216] self-evaluation against anti-infection criteria (as opposed to caseload and syringe output and recovery) is not central to needle exchange practice.

Periodic reassessments of visitors (especially after risk-reduction initiatives) are a fundamental way to assess performance, but should be supplemented by more detailed exercises. A research mentality and research inputs are important because (especially to staff) visitors may prefer to under-report their risktaking[183] and because how questions are phrased greatly affects the answers.[90 95 246]

Beyond counting outcomes, exchanges might also talk in depth to a sample of their customers or commission researchers to do the same, preferably using a standard interview schedule. Detailed information on how, where and why risk arises should be an important stimulus to developing the service.[116] Vancouver shows how valuable talking to less than 20 injectors could be.[172]

Home delivery and collection at squats like this one in East London extend the service to the most risk-prone injectors

COURTESY OF IAN GRIFITHS OF THE HEALTHY OPTIONS TEAM NEEDLE EXCHANGE IN NEWHAM.

Services will also want to go beyond their attenders to assess the risk profile of the local drug injecting population and to find out why some under-use the exchange.[194 204] One way is to link in to needs assessments conducted for drug action teams or local services. In Canada this led to the instigation of mobile exchanges and ongoing contacts with injectors to identify injecting 'hotspots'.[275] Commissioners too have a role in encouraging monitoring, setting risk-reduction targets, and funding needs assessments.[116]

LINKS Hepatitis C and needle exchange. Parts 1, 2 and 3, issues 8, 9 and 10 Nuggets 8.2 5.8 1.8 1.7

Extended reach needed to control hepatitis C

Despite focusing on the shortfalls, what emerges from this review is not a case for cutting back on exchange, rather the opposite. Inadequacies stem from the under-resourcing and marginalisation of this work which leaves it unable to match the size of the task. So fragile is the support for needle exchange that one potential needle-stick injury to a local resident may be all it takes to close a service or to force it to make unrealistic demands on its customers, potentially at the cost of many drug injectors' lives.[272]

Uniquely, specialist or drug agency exchanges can attract large numbers of high-risk injectors into a space (mental and physical) where their injecting can be acknowledged and responded to by knowledgeable and trusted staff.[32 106] Exchanges can only realise this potential if they no longer have to constrict themselves due to shortsighted financial restrictions, community opposition, and misplaced morality, or deliberately choose to tie their own hands.

To match the size of the task, needle exchange should be convenient and widespread and seen as a priority within drugs work, not (as it often is) restricted to a few hours a week from an unsuitable location.[9]

Time, resources and support, enable a change of working style – from transaction to pro-action. The threshold must remain low, but once crossed the injector would find themselves in an environment equipped for and conducive to intervention. Hurried exchanges conducted under pressure and perhaps under sufferance by inadequately trained, unmotivated and undervalued staff give no leeway for making this shift.

Progress will be greater still when a service delivery model is replaced by one in which injectors use services to achieve behaviour change rooted in their own social networks. Exchanges are well placed to stimulate, influence and support these social trends, though they will be working against the grain of a national policy which sees communities of injectors as targets to be dismantled rather than nurtured.

Such conclusions were reached many years ago by experienced British staff.[253 273] The most developed services are already comprehensive harm reduction and welfare centres offering the safety net of an extended hours service accessed simply by knocking on the door. With a sufficient boost, Britain has a platform from which to step up.

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