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► [The impact of needle and syringe provision and opiate substitution therapy on the incidence of hepatitis C virus in injecting drug users: pooling of UK evidence.](#)



Turner K.M.E., Hutchinson S., Vickerman P. et al.
Addiction: 2011, 106, p. 1978–1988.

If unable to obtain a copy by clicking on title above you could try asking the author for a reprint (normally free of charge) by adapting this [prepared e-mail](#) or by writing to Dr Hickman at matthew.hickman@bristol.ac.uk.

Together studies recently conducted across the UK suggest that consistent participation in methadone maintenance treatment plus adequate access to fresh injecting equipment has prevented many hepatitis C infections, supporting calls for needle exchange to be expanded and methadone treatment sustained.

Summary For drug injectors, opiate substitution therapy reduces drug dependence and the frequency of injecting while providing hygienic injecting equipment through needle and syringe programmes reduces unsafe injecting using shared syringes. These interventions have been shown to reduce self-reported injecting risk behaviour, but there is little direct evidence of impact on the incidence of hepatitis C infection. By pooling data from studies across the United Kingdom, this study aimed to determine whether opiate substitution therapy and needle and syringe programmes, singly or in combination, can reduce the transmission of hepatitis C among drug injectors.

The analysts searched for studies conducted in the UK and published since the year 2000 which related hepatitis C infection among injectors outside prison to their participation in opiate substitution therapy and/or needle and syringe programmes. Six such studies were found of 2986 injectors in total, conducted in Birmingham, Bristol, Glasgow, Leeds, London and Wales. Two of the studies were follow-up studies which directly assessed the incidence of new infections by [retesting](#) injectors a year later. The other four which took measurements at a single point in time used a [laboratory test](#) to identify which injectors were relatively newly infected. For the follow-up studies injectors were considered to have been in opiate substitution treatment if this treatment occupied at least six of the 12 months of the follow-up period. For the remaining studies the definition was currently

being in treatment. Injectors were considered to be 'highly covered' by needle and syringe programme provision if from these sources they had obtained at least enough sterile injecting equipment to have used a fresh set for each injection. These categories were then combined to form three levels of harm reduction coverage:

- *full coverage* by both consistently being in opiate substitution therapy *and* high coverage needle and syringe programmes;
- *partial coverage* by consistently being in opiate substitution therapy *or* high coverage needle and syringe programmes;
- *minimal coverage*, neither consistently accessing opiate substitution therapy *nor* obtaining high coverage of injecting equipment needs from needle and syringe programmes.

Main findings

Across the six studies the proportions of injectors infected with hepatitis C ranged from 70% in Glasgow to 26% in Wales. The estimated proportions who became or were newly infected ranged from 5% to 40% per year. 57% had recently been or were (as defined by the study) in opiate substitution therapy and 67% were highly covered by needle and syringe programmes.

Interest centred on the 1457 injectors who (for the follow-up studies, initially) tested negative for hepatitis C antibodies. Only these injectors could be shown to have become newly infected, either by a retest a year later in the follow-up studies, or by a further hepatitis C RNA test in the studies conducted at a single point in time. Missing data and the exclusion of people who had not injected during the relevant periods reduced the numbers in each analysis to around 1000.

In three of the six relevant studies, being or having been in opiate substitution treatment was associated with a lower risk of becoming newly infected with hepatitis C. Though there were inter-study differences in the strength and direction of this link, these were not statistically significant, meaning the results of the studies could be pooled. These pooled results revealed that across the six studies there was a statistically significant association between opiate substitution treatment and a lower risk of becoming infected. Similarly across the five relevant studies, high coverage participation in needle and syringe programmes was also linked with a lower risk of becoming infected. In both cases the **effect size** indicated a medium-strength effect.

A finer grained analysis assessed whether injectors were at lower risk of infection when they were partially covered by either opiate substitution treatment *or* high coverage needle and syringe programmes, but not both. After **differences in risk profiles** had been accounted for, in both cases the odds of becoming infected versus remaining uninfected were halved relative to the risk faced by injectors who had not adequately participated in either type of harm reduction service. However, in neither case was the risk reduction statistically significant. When injectors had used *both* types of services, their risk of infection was just a fifth of that faced by injectors who had used neither to the degree set by the featured study, and this time the risk reduction was statistically significant. The raw numbers were 8 of 392 fully covered injectors becoming infected versus 13 of 120 who had used neither service to the set degree.

Instead of actual infections, similar analyses assessed the links between harm reduction coverage and behaviour which put the injector at risk of infection: specifically, sharing

needles over the past month and frequent injecting. Injectors who had used *both* opiate substitution treatment *and* high coverage needle and syringe programmes to the degree set by the study were on both counts at lower risk than those who met neither service access criterion. They were half as likely to have shared versus not shared and they injected 21 times fewer per month. Among the partially covered injectors who used one service but not the other, the only statistically significant result was a reduction in the frequency of injecting amounting to 13 times a month among opiate substitution patients.

The authors' conclusions

By pooling UK data the study showed that opiate substitute treatment (in Britain, mainly using methadone) and high coverage needle and syringe programme participation can reduce the transmission of hepatitis C among injectors. After adjusting for important influences on the risk of infection (such as gender, homelessness and crack use), access to either type of service approximately halved the risk of infection, and the combination of both could reduce risk by up to 80%. The true effect of opiate substitute treatment may have under-represented, since most of the studies recruited only current injectors, missing the risk reduction achieved by those helped to stop injecting altogether by treatment. In line with previous evidence, the study also showed that this combination of services was associated with lower levels of infection risk behaviour in the form of injecting and the sharing of injecting equipment.

The analyses did not assess the impact of using needle and syringe programmes as such, but use at a level adequate to meet the injector's need for fresh equipment. In areas where hepatitis C is very common among injectors, even infrequent infection risk behaviour is enough to sustain transmission. Preventing it requires not just use, but high levels of use of needle and syringe programmes, preferably allied with opiate substitute treatment. Under these conditions, these harm reduction interventions are effective in intercepting transmission of the virus. How much more will be required to actually drive down levels of infection across the injecting population remains to be determined.

FINDINGS

The featured analysis bolsters the contention (details below) that fully implemented and multi-pronged harm reduction services can dent the transmission of hepatitis C, and supports calls for current services (especially needle exchange provision) to be upgraded to meet this challenge.

One of its strengths is that as well as demonstrating a link between new infection and service use, it also showed how this link might operate by reducing the frequency of injecting and the proportion of injectors who continue to share injecting equipment, reducing opportunities for the virus to be transmitted. Completing the expected causal chain from service use, through behaviour change, to actual infection, adds credibility to the assumption that the links between service use and infection found by the study are due to an effect of the interventions.

It remains the case however that this conclusion is based on an association which could have been due to other factors. Conceivably, for example, injectors concerned and stable enough to stay in treatment and to make regular use of needle exchanges would have found other ways to avoid infection, even if exchanges and treatment were unavailable. In this scenario, it would not be the services which were the essential factor, but the characteristics of the injectors who tended to use them most.

For example, of the six studies on which the featured analysis was based, [one in Wales](#) was important because it was one of the two to follow-up uninfected injectors and see if later (in this case, a year later) they had become infected with hepatitis C, and because its results contributed considerably to the positive findings on opiate substitution treatment. However, the researchers admitted that "it is possible that we failed to identify differences between those in and out of treatment. Of particular concern is that being in [treatment] might arguably reflect more care seeking and lower risk behaviour ... rather than an effect of treatment per se." Also this study was able to follow up just 286 of the 516 injectors who initially tested as uninfected.

Another study in [Bristol](#) contributed considerably to the positive findings on needle exchange provision. Its findings were based largely on just 14 individuals who showed evidence of recent infection. The sample was asked about their exchange use over the past week, but the infection could have occurred months before. It may be the case, as the authors say, that "their service use will probably have changed little over this relatively short period", but the salient issue is whether they had attended exchanges with sufficient regularity and diligence to get all the equipment they needed to use a fresh set for each injection, a condition presumably easier to dip in and out of than attending versus not attending. But the major unanswered question is in what ways the high coverage exchange users differed from those who did not get enough for a fresh set each time, and whether their diligence would have led them to protect themselves in other ways such as effective cleaning, re-using only their own equipment, or sharing only with trusted infection-free associates.

In line with other research

The findings confirm research [reviewed by Findings](#) which indicated that in respect of hepatitis C, "Trickle-feed needle exchange does not work, or not well enough. It has to be nearer a flood. Hepatitis C demands 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, and all the ways this might happen."

As in the featured study, the review also found evidence that treatment and needle exchange exert a synergistic impact on risk. By reducing the frequency of injecting, oral opiate substitution programmes also reduce the opportunities for sharing equipment and for viral spread. Meantime, the role of exchanges is to see that uncontaminated equipment is used for each remaining injection and to remove potentially contaminated equipment. By reducing the number of injections, treatment should make it easier to meet the reduced demand for injecting equipment. Treatment can also address the lifestyle and psychosocial factors which thwart the efforts of exchanges. Prescribing injectable drugs too may help. Even if it does not reduce injecting frequency, sourcing injectable drugs from a doctor divorces injectors from the shared drug procurement and consumption arrangements which characterise illegal drug use, making it less likely that they will also share injecting equipment. Evidence for a synergistic impact was apparent in the early years of needle exchange in Britain, when injectables were more widely prescribed than today. Facilitating access to this treatment was probably one of the main ways exchanges reduced infection risk. In the USA, studies have found that by reducing the frequency of injecting, treatment augments the risk reduction impact of attending exchanges, whose main effect is not to reduce injecting, but the sharing of injecting equipment.

Findings from the featured study parallel those from [Amsterdam](#), where over the decade from 1985 to 2005 injectors who had more fully implemented harm reduction (were being prescribed at least 60mg daily of methadone *and* had either stopped injecting or injected only with needles from needle exchanges) were less likely to become infected

with HIV or hepatitis C than continuing injectors who did not use exchanges and were not in methadone treatment. In contrast, less complete harm reduction access – lower doses of methadone and/or not fully relying on exchanges for one's syringes – did not significantly reduce the rate of new infections. [Similar findings](#) have also emerged from Baltimore in the USA, where syringe exchange participants who entered treatment reduced their drug use, crime and injecting more than syringe exchange alone was able to achieve.

Policy implications

The findings of the featured study were fed in to a [simulation model](#) for the UK. This extrapolated back to a hypothetical zero access to substitute prescribing and adequate needle exchange, leading to an estimate that current service provision levels may have reduced what would have been a 65% infection rate among injectors to 40%. But to make further substantial progress would it was calculated require scaling up these interventions so that both reach not half the injectors in the UK, but at least 8 in 10. To do this would probably require both considerably more injectors to start using these programmes and for them to stay considerably longer.

Among the implications of these findings is that needle exchange services and commissioners should prioritise adequate provision of injecting equipment, an objective [known to be furthered](#) by liberal rather than restrictive distribution policies. Another is that exchanges can make their provision more effective by finding ways to promote treatment entry by their clients, like co-location with treatment services and active referral. These were among the [recommendations made](#) in 2009 by Britain's National Institute for Health and Clinical Excellence, in a report which saw a triumvirate of services – high coverage needle exchange, substitute prescribing, and the treatment of hepatitis C infection – as the foundation of an anti-infection strategy.

How far England (and probably even more so other UK nations) is from implementing such a strategy was revealed by [an audit](#) of the impact of the national hepatitis C action plan launched in 2004. At the end of the first decade of the 2000s hepatitis C was [spreading more rapidly](#) than in the early 2000s, infecting a quarter of injectors within three years of their starting to inject.

This means that the [reduction](#) in the sharing of injecting equipment seen among drug injectors surveyed at drug services has been insufficient to dent the spread of the [highly transmissible](#) hepatitis C virus. It [has been estimated](#) that to get to the point where less than 1 in 10 injectors in London are infected with hepatitis C would require the average injector to cut their sharing of used syringes from 16 times a month to one or two times, and that the impact of even this kind of achievement would be jeopardised unless sharing reductions extended to very recently initiated injectors.

Such a scenario is currently well beyond the capacity of available services. Exchange services in Britain and elsewhere [are commonly](#) patchily provided, under-funded and hampered by formal or informal restrictions on their abilities to 'flood the market' with hygienic injecting equipment. In the mid-2000s, in [England](#) access to sterile injecting equipment from needle exchanges fell well short (on average just one syringe per exchange user every two days) of the level needed to permit use of a fresh needle each

time, and only a minority provided some other equipment such as sterile water. At about the same time in [Scotland](#), syringe supplies from exchanges were even more limited – at best an average of one per user every three days, though since then distribution [may have modestly increased](#).

When the entire population of injectors is considered whether or not they attend exchanges, the shortfall is bound to be greater still. For example, in 2000/1 exchanges in [Brighton and Liverpool](#) supplied enough equipment for just over 1 in 4 injections in their areas and in London 1 in 5, if anything less than a [national estimate for England](#) for 1997.

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