



AIDS AND INJECTING DRUG USE IN THE UNITED KINGDOM, 1987–1993: THE POLICY RESPONSE AND THE PREVENTION OF THE EPIDEMIC

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Abstract—This paper assesses policy development, service changes and trends in HIV infection and risk behaviour among injecting drug users (IDUs) in the United Kingdom. In 1986, the U.K. was faced with the possible rapid spread of HIV infection among IDUs. The combination of an outbreak of HIV infection with prevalence levels of 50% or more in Edinburgh, the recent diffusion of drug injecting, and high levels of syringe-sharing risk behaviour, suggested that HIV infection might spread rapidly through IDU populations. HIV prevention activities commenced in 1986 and developed in 1987. The first report on *AIDS and Drugs Misuse* by the Advisory Council on the Misuse of Drugs in 1988 was a major catalyst for change. It supported and legitimized emergent views on new ways of working with drug users. Between 1988 and 1993 innovative public health projects increased the ability to target vulnerable populations through syringe distribution, expansion of methadone treatment and outreach to hard-to-reach populations. There were major changes in service philosophy and practices, as ideas of harm minimization, accessibility, flexibility and multiple and intermediate goals were developed. There is evidence that these public health projects encouraged extensive changes in the health behaviour of IDUs. There have been major reductions in syringe-sharing risk behaviour and sharing syringes is no longer the norm. Evaluation of specific interventions (e.g. syringe-exchange) shows their importance in encouraging reductions in risk behaviour. Levels of HIV infection in IDUs remain low by international standards. Outside of London rates of about 1% have been reported; London has a low and declining prevalence of infection to around 7% in 1993; previous high levels in Edinburgh (55%) have since declined to 20%. Britain has to date avoided the rapid increase in HIV infection among injectors that has occurred in many parts of the world. The same period saw the continuation of high prevalence levels in New York and many European cities, and the explosive spread of HIV in many countries in south-east Asia. This paper acknowledges the difficulties in proving links between social interventions and epidemic prevention. It argues that there is *prima facie* evidence for the success of public health prevention, that the collection of intervention approaches in the U.K. had a significant impact on IDUs behaviour, and that this has helped prevent an epidemic of HIV infection among IDUs. The U.K. experience adds to the growing evidence of the significance of early interventions in encouraging behaviour change and in limiting the spread of HIV infection.

Key words—injecting drug use, AIDS, HIV prevalence, United Kingdom, policy, prevention, risk behaviour

INTRODUCTION

It was only in 1986 that people in the United Kingdom became aware of the potential for an epidemic of HIV infection to occur among people who inject drugs. In the context of growing national AIDS awareness, intense media interest in HIV and AIDS, evidence of HIV and AIDS among homosexual men, and the unfolding epidemic in Africa, the reports from Edinburgh of high levels of HIV infection in drug injectors brought a new dimension to governmental and public concern. There were widespread and well-founded fears of rapid spread of HIV infection in various population groups. Drug injectors were thought to be a particularly important focal group, being viewed, in the language of the time, as a 'bridge' for the spread of HIV infection to others. They were also considered a difficult group in which to encourage changes in behaviour.

Since then, there is evidence for a major success in public health intervention, and Britain has to date avoided the rapid increase in HIV infection among injecting drug users (IDUs) that has occurred in many parts of the world. The conclusion of this paper—which would have seemed extremely unlikely only a few years ago—is that drug injectors can change their health behaviour, and that this has reduced their risk of HIV infection. This statement is based on an assessment of a variety of evidence. Between 1988 and 1993 innovative public health projects encouraged extensive changes in the health behaviour of drug injectors.

This is extraordinary given perceptions about drug injectors in a pre-AIDS era. Many people working with drug injectors would have been pessimistic about the prospect of behavioural change. There was widespread acceptance of the folk myth that most injectors are incorrigible addicts, impelled down a

pipeline leading to high morbidity and premature mortality, and caring for little but their next injection. From the late 1980s onwards it was discovered that behaviour changes falling short of abstinence could be achieved, and that these appear to have had an impact on limiting the spread of HIV infection.

The first Report on *AIDS and Drugs Misuse* by the Advisory Council on the Misuse of Drugs [1] in 1988 was a major catalyst for change. It supported and legitimized emergent views on new ways of working with drug users. Five years later the AIDS and Drug Misuse Working Group was reconvened to assess progress, and its *Update Report* was published at the end of 1993 [2]. The changes occurring in the period covered by the two reports provide an opportunity to assess the potential link between policy and service developments, their impact of the behaviour of IDUs, and the impact of behaviour change on trends in HIV infection.

METHODS: SOURCES OF INFORMATION AND PROBLEMS OF INTERPRETATION

This paper is an analysis of social policy and practice with respect to drug use and HIV infection in the U.K. It does not report on the results of a specific research project: instead it draws upon a range of materials and the personal experience of the author. Being based on the analysis of a recent historical period in which the author was personally involved, the reader should be aware of the particular perspective and potential for bias. Attempts to guard against this have been made by the triangulation of data from a wide range of sources. Materials include published research reports, government documents, and commentaries, along with various unpublished materials available to the author by virtue of contact with people active in the field. The author was involved in many of the policy discussions and developments and participated in working groups on the prevention of HIV infection among IDUs (including the Advisory Council on the Misuse of Drugs). The author also participated in research projects including the assessment of HIV risk behaviour and prevalence, the evaluation of specific interventions (particularly syringe exchange), and fieldwork studies with drug users in and out of treatment. Assessment of the U.K. situation has been helped by comparison with the situation regarding HIV infection and IDUs in other countries, through participation in international collaborative studies, through work with the World Health Organization Global Programme on AIDS and Programme on Substance Abuse, and with the United Nations International Drug Control Programme. Preparation of the paper has been helped by the author's own notes of conversations with colleagues and key people including civil servants, drug agency workers, health service purchasers, doctors and researchers. To preserve confidence, these are not reported verbatim.

The main methodological difficulty for this and similar analyses lies in trying to draw links between events and outcomes. Specifically, it is the difficulty:

- (a) in assessing the association between policy developments and changes in services and other interventions;
- (b) in assessing the impact of interventions on the health behaviour of IDUs;
- (c) and in assessing the link between behaviour changes and trends in HIV infection.

The paper argues that there is *prima facie* evidence that public health interventions have made a major contribution to helping IDUs reduce their risk behaviour. In turn this has helped keep levels of HIV infection among IDUs relatively low by international standards.

It is acknowledged that there are difficulties with this kind of macro-analysis of social changes. *Firstly*, there can be no certainty that all significant factors have been examined. For example, the focus of the present paper is on the impact of drug and HIV policies: other analysts might argue that what is important is the broader social policy context and the social condition of the population (e.g. regarding housing, health status, welfare provision, education, access to the media, receptivity to health messages and so on). *Secondly*, it is difficult to prove that a particular cluster of policies and interventions has particular outcomes: it is not feasible to conduct controlled trials at a national level where multiple factors are interacting. *Thirdly*, it is difficult to prove that something has *not* occurred because of the policies and interventions. Such methodological difficulties are not unique to public health, but are common in social policy analysis, and in historical analysis in general. The persuasiveness of the argument rests on the ability to convince the reader that things might have been otherwise: in other words, that the course of history would have been different had it not been for the events under consideration.

THE SITUATION IN 1986 AND 1987

The analysis starts with the period immediately preceding the first report on *AIDS and Drug Misuse*, to draw out the contemporary assessment of the situation. Key features of the situation were evidence of rapid spread of HIV infection in Scotland, a large population of injectors, and high levels of risk behaviour.

In 1986 and 1987 the U.K. was faced with the possible rapid spread of HIV infection among drug injectors. The first case of AIDS in an IDU was reported in March 1985 (and later reassigned to 1984) [3, 4]. Following the introduction of the HIV antibody test that year, HIV was discovered among drug injectors in several parts of the country. But the explosive evidence emerged from Edinburgh and

the East of Scotland [5–7, 12]. Roy Robertson, a general practitioner, conducted HIV tests on samples of stored blood, and found that 51% of the drug injecting patients known in his general practice population were HIV positive [6]. By June 1986 511 HIV positive drug injectors had been reported to Communicable Diseases Scotland Unit (compared with only 54 from England and Wales) [7]. It was later established that the virus had appeared in the Edinburgh population in 1983 and that the number of HIV positive patients rose rapidly in 1984 and 1985 [8].

The Edinburgh outbreak (and an associated outbreak in Dundee rising to 38% prevalence) was (and remains) unique in the U.K. But similar rapid epidemic spread had occurred in cities in other countries. Data presented at the *First International Conference on AIDS* in Atlanta in 1985 showed high prevalence rates in New York and New Jersey. Data presented at the 1986 Paris AIDS conference showed similar high prevalence—of around 50%—in cities in Austria, Italy, Spain, France, Switzerland and Austria (Fig. 1). This evidence was known to McClelland and his team who were asked in February 1986 by the Scottish Home and Health Department to investigate the Scottish epidemic [7]. The Edinburgh situation sufficed to suggest that the worst case scenario of 50% prevalence might be replicated in other U.K. cities.

The second factor was that the early 1980s had seen the diffusion of injecting into new population groups in the U.K., which in turn was part of a Europe-wide spread of heroin use [9]. A new phenomenon was the spread of heroin use and injecting among people living in deprived areas of inner cities such as in London, Manchester, Glasgow and on Merseyside [10, 11]. The size of the injecting population was (and remains)

unknown. It was estimated by the Advisory Council on the Misuse of Drugs to be between 37,000 and 75,000 injectors of notifiable drugs (mainly opiates) plus injectors of other drugs such as amphetamines, in England and Wales in 1986 [1]. For the purposes of this paper, an estimate of 100,000 injectors will be used for England and Wales. To observers at the time, evidently if the Edinburgh situation were repeated, this could lead to a large population of infected drug users in England and Wales—50,000 or more. This would have huge consequent personal and institutional costs.

The third factor was that sharing of syringes was normal behaviour for many drug injectors, and this suggested the potential for rapid diffusion of HIV infection. Studies conducted between 1983 and 1987, at or just before the emerging awareness of AIDS and HIV infection, showed that syringe sharing was common (Fig. 2). For example, in 1986, 63% of an Edinburgh agency sample reported sharing syringes at least once a week [12]. The published studies (mainly from Edinburgh and London) showed between 59% and 83% of injectors reporting sharing syringes (there were variations between studies in definitions, time periods, sampling and recall methods) [12, 6, 13–16]. Confirmatory retrospective data for Edinburgh (collected in 1992) confirm this picture with 67% of injectors reporting sharing syringes during any year up to 1986 [17]. With between 60% and 80% of drug injectors sharing syringes there was an obvious risk of rapid transmission of HIV infection. Such figures also provide a baseline against which to judge later changes.

The emerging policy response: 1986–1988

The Scottish Home and Health Department report, in September 1986, was the first government report on

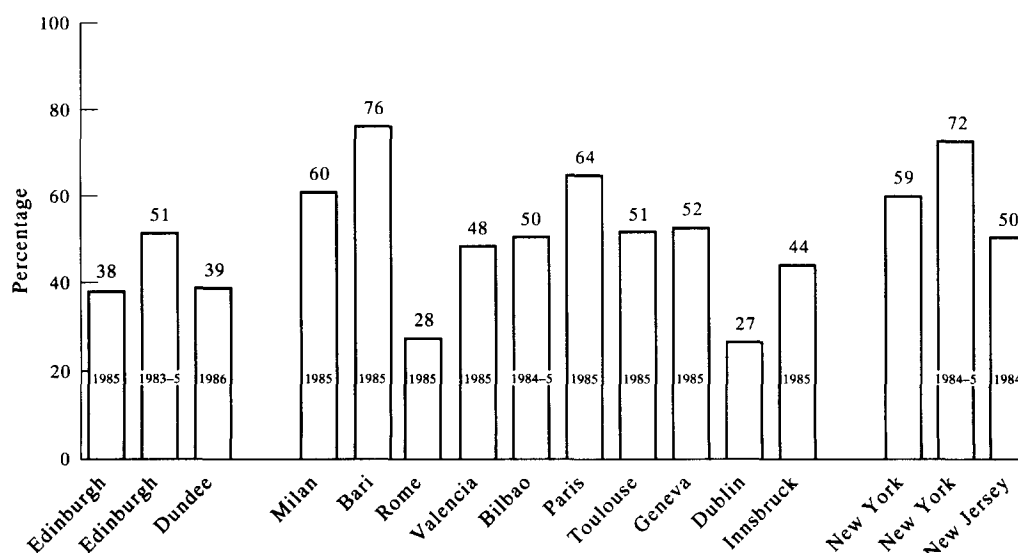


Fig. 1. Prevalence of HIV infection in injecting drug users, reported by 1986. Source Ref. [7]. Original references cited in source text. Date given = year of data collection.

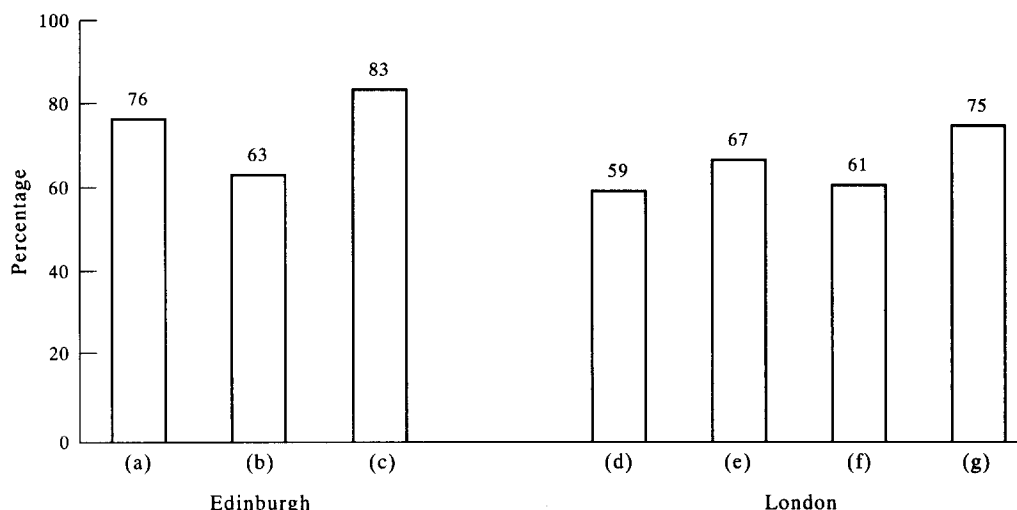


Fig. 2. Syringe sharing among injecting drug users, to 1987. (a) 1985, 'at least monthly' [12]; (b) 1985, 'once a week' [12]; (c) 1985, 'usually' or 'sometimes' [6]; (d) 1984-86, 'in last 4 weeks' [13]; (e) 1985, 'shared with another' [14]; (f) 1986-87, 'sharing syringes' [15]; (g) 1986-87, 'sharing in past year' [16].

HIV infection among drug injectors. The Committee had heard that the rapid spread of infection in Edinburgh was helped by police activity to discourage sale and possession of syringes, medical opposition to maintenance prescribing, and the low level of investment in services for drug users. The Committee was impressed by what had been done for drug users in Amsterdam (two committee members visited the city). It suggested that making sterile needles and syringes available to people who inject drugs, along with improved treatment services and substitute prescribing would help to reduce sharing levels and the spread of HIV infection. The report is the first U.K. government document to refer to 'safer drug taking'.

The Advisory Council on the Misuse of Drugs considered syringe-distribution in early 1986, but rejected it because there was insufficient evidence that drug injectors shared because of a shortage of syringes, and that the provision of syringes was probably not a viable solution to the prevention of the spread of HIV infection. The agenda item did not raise informed or urgent debate.

Meanwhile, there were other developments. In England, the sale of syringes to drug injectors was never illegal but pharmacists operated a voluntary sales ban from 1982. This was rescinded by their professional body in 1986 [18]. During 1986, a handful of drug agencies in England began distributing syringes—the earliest in April in Peterborough, and later that year at the Kaleidoscope project in Surrey, in Dundee, Swindon and in Sheffield. In October 1986, the idea of syringe-exchange for HIV prevention was discussed at a World Health Organization (WHO) conference in Sweden [19] and the Maryland Centre in Liverpool started distributing syringes immediately afterwards.

English politicians feared that the Scottish events could be repeated in English cities. The Secretary of State for Health, Norman Fowler, saw AIDS as a special issue, and visited Amsterdam, where syringe distribution had started in 1984. Late in 1986, the Department of Health and Social Security and the Scottish Home and Health Department decided to support a pilot syringe-exchange programme in England and Scotland. This was a bold move, and relatively controversial. It was the first government-funded response to AIDS among drug injectors. The pilot schemes started in April 1987. There were 15 agencies participating in the experiment (12 in England and a further three in Scotland). They were required to provide injecting equipment on an exchange basis so that used equipment did not pose a health risk to the public, and to discourage the circulation of used equipment in the drug injecting population. Evaluation was an integral part of the experiment (itself a novel idea in British drugs policy) [20, 21].

Advisory Council on the Misuse of Drugs—first report on AIDS and Drug Misuse

That was the situation when the Advisory Council on the Misuse of Drugs (ACMD) met in May 1987. ACMD is a ministerial advisory group, established under the Misuse of Drugs Act, with members appointed by the Home Secretary. Its published reports have often had a major influence on British drugs policy. That May, in response to increased awareness and concern, ACMD established the AIDS and Drug Misuse Working Group. It was chaired by Ruth Runciman, and was asked to consider the implications of HIV and AIDS for drug users and drug services. The working group took evidence from people working in HIV prevention and drugs services

in the U.K. and elsewhere. It worked with a sense of imminent crisis, under intense pressure from the media and drug experts who were anxious to learn of its recommendations, in a period of fervent activity and debate among drug services workers.

The ACMD report on *AIDS and Drug Misuse* published in 1988 set four principles for HIV prevention. The Working Group had no hesitation in concluding that:

The spread of HIV is a greater danger to individual and public health than drug misuse. Accordingly, services that aim to minimise HIV risk behaviour by all available means, should take precedence in development plans. [1]

The first sentence emerged as the most frequently repeated quotation from the report, pointing to the need to prioritize AIDS and HIV over drug problems. The conclusion was not original to the ACMD. It echoed a recommendation of the earlier Scottish Home and Health Department report that:

The gravity of the problem is such that on balance the containment of the spread of the virus is a higher priority in management than the prevention of drug misuse. and ...authorities should be reminded that the threat to life of the spread of HIV infection is greater than that of drug misuse. On balance, the prevention of spread should take priority over any perceived risk of increased drug misuse. [7]

The second principle outlined by ACMD was that:

We must be prepared to work with those who continue to misuse drugs to help them reduce the risks involved in doing so, above all the risk of acquiring or spreading HIV. [1]

and:

In particular, we must recognise that, for the time being, many drug misusers will not be sufficiently motivated to consider abstinence and that many drug injectors will not be sufficiently motivated to change their route of administration. (p. 17)

This principle set the seal of approval on what came to be called *harm minimization*, in other words, working with people to help them reduce their risk of infection, or of transmitting HIV to others. This principle legitimized behavioural targets other than abstinence [22, 23]. The third principle was that a change in professional and public attitudes was necessary, otherwise drug misusers might remain hidden.

A change in professional and public attitudes to drug misuse is necessary as attitudes and policies which lead to drug misusers remaining hidden will impair the effectiveness of measures to combat the spread of HIV.[1]

The working group had heard evidence that many drug users found it difficult to gain access to drug and other services, and that many services were not providing appropriate help. A change in attitudes would be required to make services more attractive to drug users. A related strategic idea was the issue of *accessibility* of services. ACMD pointed to the need to bring more drug users into contact with services. Rather than services waiting for drug

users to contact them, or using waiting lists to test their motivation for treatment, the emphasis was now to be on improving the ability of services to attract and to retain clients. Further key concepts were for *flexibility* in the prescribing of substitute drugs, and that a *range of treatment goals* should be adopted running from changes in risk behaviour through to abstinence.

The principles set out by ACMD were initially met by silence by government departments, but were eventually endorsed, and substantial central money for AIDS and HIV services for drug users soon followed (Table 1). The recommendations were readily accepted by many of those working in drug agencies—they resonated with the developing mood for a new approach to drug problems [24]. The exceptions were from those clinicians who still prioritized the treatment of addiction over the prevention of HIV infection. The ACMD statements were reproduced and reformulated in guidance documents by health authorities and by drug agencies seeking funds.

Some have assumed that the report considered that drug misuse itself may be disregarded. This was not the position of the working group. A fourth principle pointed to the importance of preventing drug misuse for tackling the spread of HIV.

Prevention of drug misuse is now more important than ever before and in the longer run the success or failure of efforts to prevent young people from embarking on a career of drug misuse will have a major effect on our ability to contain the spread of HIV. [1]

This idea was ignored in much subsequent debate. This was probably because the report focused largely on the need to reach and help change the behaviour of people who were already injecting and who intended, for the time being, to continue to do so. Also, it did not fit well with the new *Weltanschauung* of agency workers.

That broadly was the situation in 1988. Prospects for the future course of the epidemic were estimated in the first short-term predictions for AIDS. These appeared at about the same time that the ACMD report was published. David Cox's working group on AIDS projections estimated that in 1992, there would

Table 1. Department of Health allocations for drug misuse services and funding specifically for HIV/AIDS services for drug users (England)

	Drug misuse (£ million)	HIV/AIDS* and drug misuse (£ million)	Total (£ million)
1987/88	5.235	1.132	6.367
1988/89	5.470	4.000	9.470
1989/90	5.745	9.048	14.793
1990/91	6.032	9.500	15.532
1991/92	6.849	10.105	16.999
1992/93	6.682	13.361	20.043
1993/94	8.239	16.132	24.371

*All expenditures specifically targetted for HIV and AIDS including prevention of HIV infection, services for HIV + drug misusers, pharmacy based needle exchange and methadone prescribing.

be 500 new cases of AIDS from drug injecting (Fig. 7) [25].

Service developments in response to HIV—harm minimization and flexible goals

The years from 1987 to 1993 witnessed major changes in working philosophy and practices in drug services as the ideas of harm minimization, accessibility, flexibility and multiple and intermediate goals were developed [24–29]. Recognising that many people who inject drugs are unable and unwilling to stop injecting, services tried to find ways of helping them to change their behaviour to reduce the risks of infection with HIV and of transmitting it to others. The early development of harm minimization centred predominantly on the idea of distributing new and exchanging old syringes. Syringe exchanges provided sterile injecting equipment to injecting drug users on an exchange basis, often with swabs for cleaning skin, and safe containers for return of used equipment. Syringe-exchange rapidly became the hub of HIV prevention. Following the start of the 15 pilot schemes in 1987, the number of agencies providing syringes grew to nearly 200 by 1990. About two-thirds of all drug agencies were involved in some kind of syringe distribution, and some had a detached service taking syringes to homes and drug using venues [20, 36]. There was an accompanying expansion in the sale of syringes by retail pharmacies (high-street chemists) [30]. This followed the decision of the pharmacists' professional association to lift the voluntary ban on syringe sales to drug users.

'Syringe exchange' epitomized a new cluster of ideas about the nature of problem drug use and what could be done to respond to it. This paradigmatic shift included a focus on injecting (rather than on dependence) and on the health of drug users (rather than their mental functioning) [24, 22, 31]. Syringe exchanges were symbolic of new aims, but were only one highly visible part of a re-orientation to drugs problems that occurred from 1987. Of equal significance was the literature on harm minimization, with posters, leaflets and comics including advice and tips for safer drug use. The active promotion of *safer drug use* for injectors probably first appeared in a booklet for drug users produced by the South London Community Drug Project in 1987. Social policy analysts have left unexplored the links between various HIV prevention domains: the response to drug use was undoubtedly influenced by the indigenous gay response to the threat of AIDS, which put *safer sex* on the agenda. Harm minimization soon spread from a focus on HIV prevention to include concern for a wider range of health hazards faced by injectors (such as abscesses, hepatitis and septicæmia), and to include health promotion advice on diet and exercise. The reshaping of drug services included the adoption of a more 'user friendly' ethos by drugs workers, especially by those working in the

non-NHS sector. The relationship of staff and clients began to take on more of a collaborative and facilitative flavour, and became less directional and coercive [24].

These developments took place in the context of a wide array of services for drug users in the U.K. Drug services in the period included drug dependency clinics (10% of all services), residential rehabilitation units (15%); advice and counselling agencies (40%); community drug teams; Narcotics Anonymous; and private rehabilitation units based on the Minnesota Model.

There was a wide range of substitute prescribing methods practised at this time. In U.K. law, any medical practitioner may prescribe methadone for the treatment of addiction. The prescription of heroin or cocaine to addicts requires a special licence. Methadone prescribing may include oral, tablet and injectable preparations. The extent of methadone prescribing increased, and some health regions developed large volume drug dependency clinics. It is difficult to establish the number of methadone patients. There are no central of local records, but the amount of methadone distributed by manufacturers and wholesalers to pharmacies increased nearly fourfold from 93,166 g in 1988 to 338,458 g in 1992. A small amount of this was not used in the treatment of drug users. The total quantity consumed in 1992 would sustain between 15,000 and 20,000 patients a year (assuming a dose of either 60 ml or 45 ml per day) [32]. Oral, tablet and injectable preparations were (and are) prescribed. By way of illustration, North West Thames Regional Health Authority served a population of 3.5m in the north west quadrant of London: in this region, from 1990 to 1992 the total volume of methadone dispensed rose from 915 to 1589 g, and injectable methadone accounted for 11% of all methadone prescriptions (by volume) in 1990 and 14% in 1992 [33]. In the U.K. methadone was mostly prescribed on a reducing basis, though many patients were maintained by default (i.e. after failing to reduce and become abstinent). During this period there were no structured methadone maintenance programmes of the sort found in the U.S.A. Prescriptions for heroin were rare, and mainly confined to older addicts who had received prescriptions since the 1960s. There were some small scale experiments in prescribing amphetamine.

From 1988 there was also an expansion of outreach activities, aimed at reaching people not coming to agencies. Outreach, as a community-based activity, aimed to contact individuals or groups who were not being reached by conventional health education channels or services, to help reductions in the risk of HIV transmission [34, 35]. They were typical of the change in professional attitude called for by the ACMD: rather than dealing with drug users in the safety of agency territory, they strove to contact drug users on their territory.

Factors facilitating the response to AIDS and drug use

The quick U.K. drug service response to AIDS has been envied by workers in many countries. This raises the interesting question for social policy analysis of the factors that facilitated this transformation. How could the U.K. response to AIDS develop as it did? Three reasons have been suggested and are discussed at greater length elsewhere [22, 23]. Important *firstly* was that the idea of reducing drug-related harm is a common theme within the English response to drug problems. The idea (though not the current terminology) can be identified in the recommendation of Humphrey Rolleston's Committee in 1926. This Committee considered that it was legitimate medical practice to prescribe drugs of addiction to those addicted to them [37–39]. This recommendation allowed medical practitioners the right to prescribe to addicts, a practice endorsed in subsequent reports over the next 40 years [40, 41]. The idea was apparent in underground drugs literature in the 1960s, and again in the early 1980s, with advice on minimizing harm from solvent sniffing [42, 29]. Harm minimization was also recognised in the Advisory Council on the Misuse of Drugs Report on *Prevention* in 1984 which concluded that "prevention includes both the prevention of drug use and the prevention of drug related harm" [43].

Secondly, there was the establishment of new services for drug users in the 1980s. In England, most of the agencies in place by the end of the decade had been set up under the Central Funding Initiative (CFI) of the Department of Health and Social Security. The CFI lasted three years from 1983; after this, earmarked central funding for drug services from 1986/7 enabled further development and expansion [2, 44]. Until 1970 there were only 19 drug dependency units (DDUs), seven advice and counselling agencies and five residential rehabilitation houses. In the 1970s residential houses increased to 16. The CFI and subsequent earmarked funding facilitated major service expansion.

Between 1982 and 1992 the number of hospital services for drug users increased, providing both in- and out-patient care, and there was a marked increase in prescribing as a treatment option. Community services (including non-NHS specialist drug services such as 'street agencies' and advice and information agencies, and NHS community drug teams) became important. The range of services diversified, including syringe exchange, prescribing, outreach and services for women. Particularly important was the growth of drug advice and information agencies. Most were accessible on a walk-in basis. By 1990, there were 135 advice and counselling agencies, 75 community drug teams, 49 residential rehabilitation units, 33 DDUs and 200 syringe exchange services (mostly sited in other services). Over 70% of services operating in 1990 had been established post-1984 [44]. Many of the new services were staffed by social workers or nurses, who

often did not accept abstinence-oriented views on the treatment of drug users, and who were keen to introduce new ideas and methods of working. New people were responsive to new issues, and readily adapted to the emerging problem of HIV and AIDS.

Thirdly, there was the social policy framework within which this occurred. The CFI provided little direction from central government about detailed operation. Although they were funded by central government money, the activities of these agencies, reflecting the context of the NHS at the time, were relatively unmonitored and unregulated at a central or local level [22]. The new drug agencies could respond quickly, flexibly and creatively to new problems.

The cost of HIV prevention services for IDUs

Substantial money flowed in the wake of the syringe-exchange funding and in response to the ACMD report. Annual Department of Health allocations to Regional Health Authorities in England specifically for AIDS and drug misuse rose from £1.132m for 1987/8 to £10.105m for 1991/2. This was a total of £34m for the period (Table 1). This money went through district health authorities to fund services and other interventions [45]. Not all this funding found its way to AIDS related activities, or to activities that were necessarily effective: but this nevertheless suggests the scale of DH commitment. It surpassed the central funding for drug services *per se*, which rose from £5.235m in 1987/8 to £6.894 in 1991/2. Whether the AIDS funding was a good investment must be judged by the outcomes achieved—this is discussed later.

Achievements—the profile of AIDS and HIV infection in the U.K.

To date the U.K. has not experienced a major spread of HIV infection among injecting drug users.

AIDS data collated by the Public Health Laboratory Service show that exposure through injecting drug use accounted for 4.7% of the 7341 AIDS cases to August 1993. This was a cumulative total of 464 cases (which included 120 injectors who also had male/male sexual intercourse as an exposure factor). This total was nowhere near the 500 new cases predicted, back in 1988, for 1992 alone. Scotland accounted for 126 of the total 464 [46]. Reports from voluntary HIV testing show the cumulative number of known HIV infections in the U.K. attributed to drug injecting was 2644 (including injectors who were also men who had sex with men) from November 1984 to March 1993, comprising 13.6% of the total 19,524. Of the injectors, 952 were in Scotland, 13 in Wales, and 1679 in England. These figures underestimate true levels of infection, being based on people who have voluntarily sought to be tested. Given that about 60% of injectors have been tested for HIV [47], the true numbers HIV positive through injecting might be in the region of 4406 for the U.K., about 2798 of which would be in England and Wales.

Survey data among selected samples of IDUs show low rates of infection. The Public Health Laboratory Service AIDS Centre [48] multi-site study of drug agency attenders throughout England and Wales, found a prevalence rate of HIV infection among IDUs at around 1% outside London and stable. London has higher rates than the rest of England and Wales (Fig. 3). Our London MRC/WHO multi-site tracking studies which recruit injectors in and out of treatment show a decline and then stabilization of the prevalence rate in London: from 12.8% in 1990, 9.8% in 1991, down to 7% in 1992 and 6.9% in 1993 [47, 49, 122]. Other London studies have found an HIV prevalence

of 12% among current injectors in treatment and community settings in South London [50] and 6.7% among drug injectors attending drug treatment and helping services in 1992 [48]. On the current evidence, the prevalence of HIV infection among London IDUs is probably about 7% or 8% and stable or declining.

A parallel MRC/WHO study in Glasgow shows a low stable rate of around 1% and 2% with a general downward trend [49, 51]. The prevalence rate remains higher in Edinburgh, but at a lower level—20%—than reported earlier [17]. The lower-than-previous rate for Edinburgh is confirmed by another

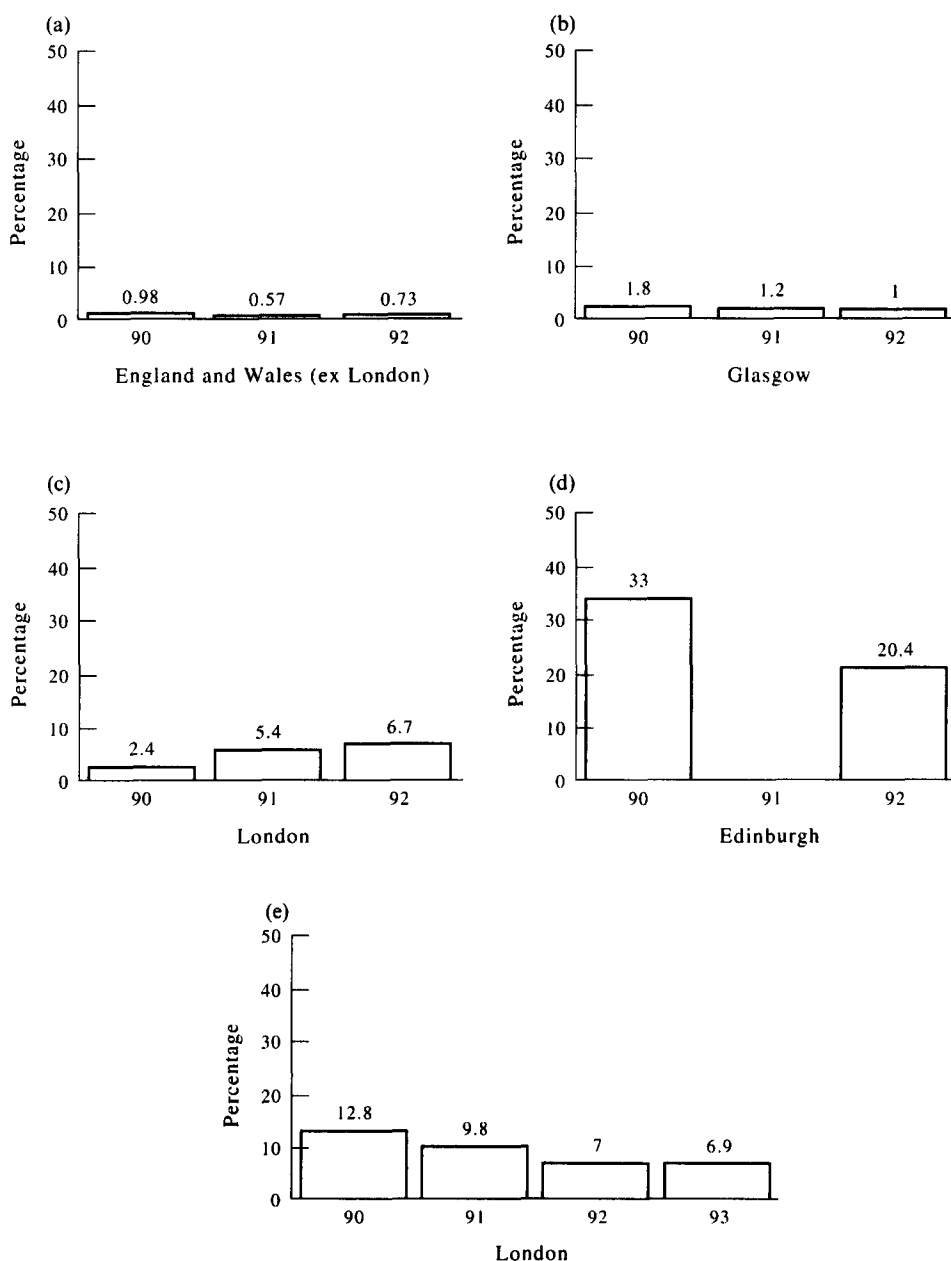


Fig. 3. Prevalence of HIV infection in injecting drug users, U.K., 1990–1993. (a) Source: Ref. [48]; (b) source: Refs [49, 51, 120]; (c) source: Ref. [48]; (d) source: Refs [53, 17]; (e) sources: Refs [47, 49, 122].

study giving a rate of 33% in 1990 [52, 53]. New cases of HIV infection are very few in Robertson's original general practice cohort [53].

International comparisons. The HIV prevalence rate for IDUs in the United Kingdom is low by international standards and the epidemic has not taken off: the worst case scenario has not occurred. The Edinburgh experience has not been repeated elsewhere in the U.K. This despite the fact that HIV has been present among IDUs in the U.K. since 1983. The U.K. has avoided the rapid epidemic spread and high levels of infection found for example in New York—with a prevalence there of around 50 to 60% [54], Bangkok at around 40% [55, 56], Geneva at between 35 and 40% [57], Manipur at around 50% [58], and Myanmar at around 75% [59]. Particularly dramatic in the period was the rise in HIV infection in drug injecting populations in South East Asia, starting in Thailand in 1987 and 1988, Myanmar around 1988 and 1989, and Manipur in North East India between 1989 and 1991 [121].

The U.K. remains at the low end of the HIV prevalence rates reported from the WHO multi-city study of HIV infection and drug injection conducted between 1989 and 1991 (Fig. 4) which found HIV prevalence rates of 5% or less in Athens, Glasgow, Sydney and Toronto, of between 10 and 20% in Berlin, London, Naples and Rome, of between 30 and 50% in Bangkok, Rio de Janeiro and New York, and 60% in Madrid and Santos [60]. The U.K. rates are also lower than those in many other European cities where drug injecting is prevalent [61].

The U.K. data suggest that HIV prevalence rates among injectors may be stabilizing. Stabilization of HIV prevalence has also been reported from other countries including New York, Bangkok and Amsterdam, although at much higher levels than in the

U.K. In Geneva prevalence levelled at around 35–40% between 1983 and 1988 [57]. In Rome, HIV seroprevalence remained stable and incidence has declined from 9% (1985–87) to 5% (1987–8) [62], and in Milan from 7.3% in 1987 to 4.5% in 1989 [63]. In San Francisco, stabilization occurred at a prevalence level of around 10% and an incidence rate of about 2% [64–66]. The significance of the U.K. data is that stabilization appears to have occurred at a low prevalence level.

Explanations for low and stable HIV prevalence among IDUs in the U.K.

Various hypotheses have been proposed for the low and stable prevalence rates found in the U.K. [67, 68]. *Firstly* there are possible biological explanations, in terms of differences in genetic susceptibility to HIV infection, or differences in viral strains which may vary in infectiousness. These biological explanations seem an unlikely explanation for low and stable HIV rates in the U.K. because high prevalence rates have been experienced in some locations (e.g. Edinburgh) and not adjacent ones (e.g. Glasgow). *Secondly*, the apparent stabilization of rates may be due to sampling bias. The difficulty of generating representative samples of drug injectors may result in the under-sampling of groups with high levels of HIV infection: social network sampling (often used to recruit injectors in the community) may under-sample HIV networks. Sampling bias seems an unlikely explanation given the variety of multi-site studies, some controlling for network effects (London) and geographical location (London and Glasgow). *Thirdly* prevalence rates alone can be misleading without information about the numbers of new cases, loss of old cases, and change in population size. The prevalence rate is affected by

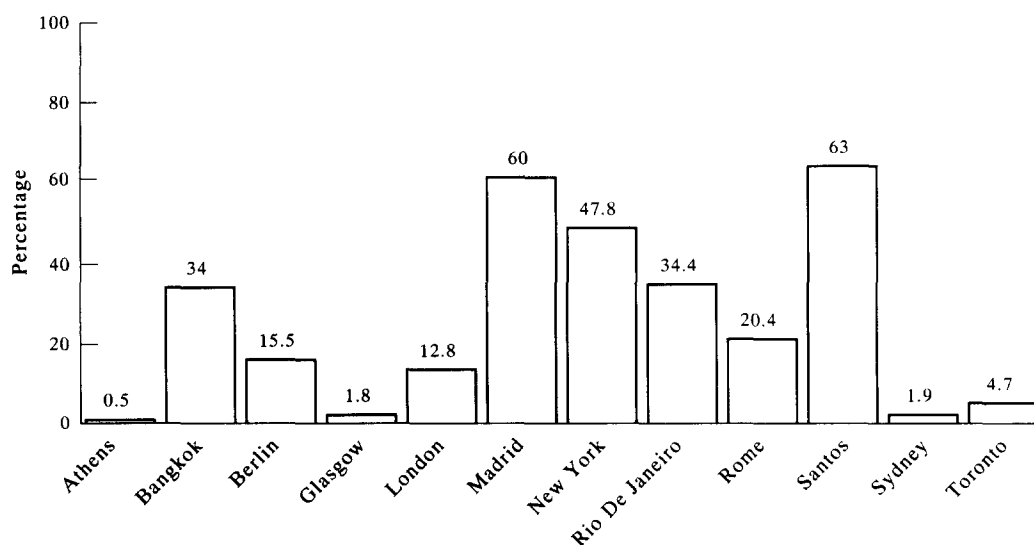


Fig. 4. Prevalence of HIV infection in injecting drug users, WHO Collaborative Study, 1990. Source: Ref. [60].

numerator accumulation (the flow in of new HIV positive cases), and numerator attrition (the flow out of existing HIV positive cases from the sampled population). Stabilization of prevalence with continued seroconversion (incidence) occurs in New York with an annual seroconversion rate of 5% pa [54]; in Amsterdam a stable prevalence rate of about 30–35% is found with an incidence rate of about 4% pa (down from about 12% pa in 1986) [69]. Changes in the denominator also affect the prevalence rate. An increase in the total population of injectors, coupled with a commensurate increase in the number of HIV positives, will lead to a stable prevalence rate, though there are more cases of infection. Prevalence data must be therefore supplemented with information on incidence, attrition and population denominators: to date little such information is available in the U.K., except in Glasgow [70], and it is difficult to evaluate their effect on the prevalence rate. *Fourthly* stable low prevalence may reflect epidemiological saturation of high risk groups and insufficient mixing between them and other subgroups to facilitate further viral spread [68]. High risk behaviour and high HIV prevalence can occur within isolated subgroups, with no impact on further transmission. What is important is the rate of mixing between different segments of the population. This hypothesis has interesting implications for prevention policy: policies that encourage migration of high risk and high prevalence groups, and the mixing of people from different areas (as in prison) increase the potential for HIV transmission. On current evidence the epidemiological saturation hypothesis seems unlikely because there are no major differences in risk behaviour between HIV positive and HIV negative IDUs [105, 123].

Behavioural change and low and stable HIV prevalence rates

This leads to a *fifth* hypothesis, which is that prevalence rate has remained low and relatively stable because risk behaviours have changed. There is considerable evidence for this.

Risk behaviours of drug injectors in the U.K. have changed since the high levels of syringe sharing reported in the mid-1980s. Risk reduction by drug injectors has been reported by researchers using various methods in different locations. Despite research limitations (in particular the unavoidable reliance on self-report) data are sufficiently consistent. The multi-site evaluation of the syringe-exchange programmes in England and Scotland, reported past month sharing levels of 28% in 1987 and 1988, down to 21% by 1989 and 1990 [71–73, 20] among exchange users (Fig. 5). Comparison samples of injectors not attending syringe-exchanges showed higher levels of risk behaviour: but non-attenders' risk behaviour declined over time, probably due to increased syringe availability from pharmacies and the impact of other HIV interventions. Lower syringe sharing rates (of

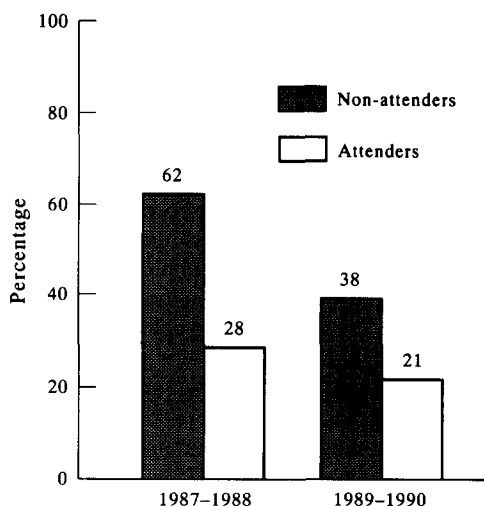


Fig. 5. Syringe sharing among attenders and non-attenders of syringe-exchanges. Source: Ref. [20].

around 9%) were found in a subsequent evaluation of syringe-exchanges in Wales [74]. Low and declining sharing rates were reported from a single site study of a major stand-alone London syringe-exchange [75], from six syringe-exchange and community recruited samples in London and South-West England [76], among drug dependence clinic attenders [16, 77], general practice patients in Scotland [78, 53, 79], and among treatment and community recruited samples in London, Glasgow and Edinburgh [51, 80, 17].

Comparable studies in London, Glasgow and Edinburgh, using a six-month period for self report (as opposed to one month) found significant reductions from 1990 to 1991 in Glasgow and London in the percentage of injectors receiving used needles and syringes and a levelling from 1991 to 1992 [67, 81–83]. The levels of risk behaviour shown in Fig. 6 start from a date when substantial risk reduction had already occurred. Data for Edinburgh were only available for one year but are similar. In another Edinburgh analysis, 33% reported sharing in the past six months in 1992 (compared with an averaged 67% for the years 1980–1986); the main period for behaviour change occurred from 1986 through to 1990 [17]. Figure 6 also shows the four-week sharing rate for 1992 at 15% in treatment and community samples in London [47]. Routine monitoring of drug injecting clients new to drug services within Greater London in 1991–1992 showed a reported one month sharing rate of 16% [84]. Self-reported quantitative data are supported by ethnographic, observational and other in-depth studies which suggest that sharing is no longer normative [85, 86]. Qualitative studies suggest important behavioural changes among HIV-positive IDUs in Glasgow [87]. Most studies have focused on risk behaviour among continuing injectors. There is also evidence that the prevalence of injecting has declined among some populations of injectors attending services, with a major drop in this method

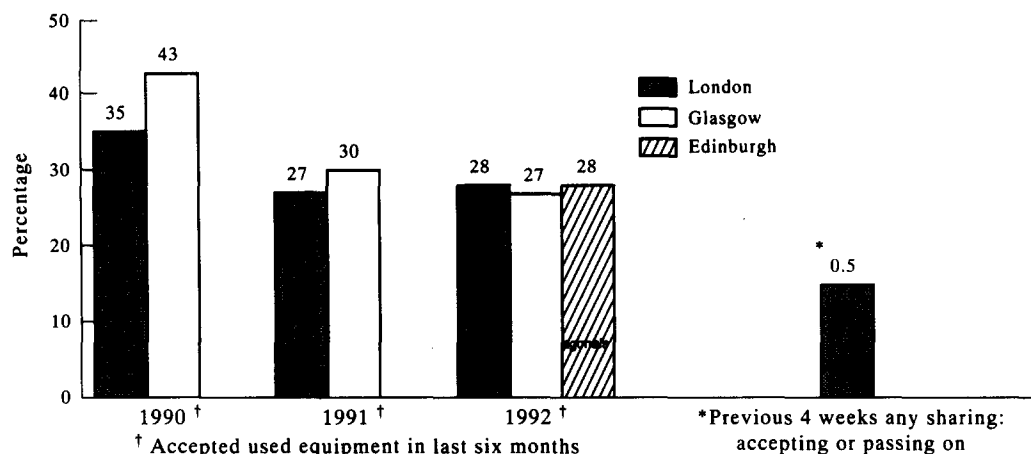


Fig. 6. Syringe sharing: London, Glasgow and Edinburgh. Sources: Refs [81–83, 123].

of administration reported for Edinburgh between 1988 and 1991 [88].

The significance of these findings is illustrated by comparison with earlier reports. Rates of syringe sharing are one quarter to one third of the levels found in the U.K. before 1988, which were typically 60–80% (see above). Sharing rates are also lower than those found in parts of the U.S.A. where syringes are not readily available: for example a National Institute on Drug Abuse tracking study found continuing high rates of syringe sharing (in four of the seven cities 70% or more had recently shared) and only modest risk reduction [89].

Syringe sharing is also more selective. Qualitative studies show injectors reporting partner selectivity according to risk assessment and social distance [85, 86]. Surveys show that the number of sharing partners is falling, and that sharing is largely confined to intimates—to close friends or sexual partners. Table 2 shows that the mean number of sharing partners in the last six months is around two in London and Glasgow and three in Edinburgh. These means are inflated by a few people with many multiple partners. Other data from these studies indicates a preponderance of close friend or sexual partner sharing, rather than with acquaintances or strangers.

Table 2. Syringe sharing: London, Glasgow and Edinburgh. Number of different people from whom used equipment was accepted in last six months

	1990	1991	1992
<i>London</i>			
Mean	2.8	2.2	2.2
n	(252)	(177)	(189)
<i>Glasgow</i>			
Mean	3.7	2.5	2.2
n	(212)	(157)	(135)
<i>Edinburgh</i>			
Mean			3.2
n			(55)

Sources: Refs [81–83].

These data indicate that the rate of partner mixing is low.

Interaction between HIV prevalence, infectiousness, transmission risk and behaviour change

There is therefore substantial evidence that behavioural change has occurred, and this may explain the stabilization of prevalence rates at lower than epidemic levels. Two other factors (suggested by Bloor *et al.* [67]) may be important, because despite behaviour change, some sharing continues. One issue is the continued transmission of hepatitis B and C. There are no definite figures on the transmission rate for HIV infection through equipment sharing, but it has been estimated that the risk is low at between three and ten transmissions per 1000 exposures [90] (this is lower than for hepatitis B or C). A further factor is that HIV positive individuals are most infectious in the first few months after they themselves become infected: after that their infectiousness declines as antibody levels rise. The fewer the number of new infected individuals, the less likely that HIV will be transmitted.

Therefore in the U.K. several factors may be interacting to keep the prevalence of HIV infection low:

- the low level of HIV prevalence means that the risk of sharing a syringe with an HIV positive individual is low;
- there are relatively few seroconversions, hence few newly infected individuals who are highly infectious;
- the risk of transmission per injection event is low in comparison with other blood-borne diseases;
- and there has been substantial reduction in syringe sharing risk behaviour.

U.K. projections for AIDS and HIV from drug injecting

The absence of rapid epidemic spread of HIV among IDUs is reflected in repeated downward

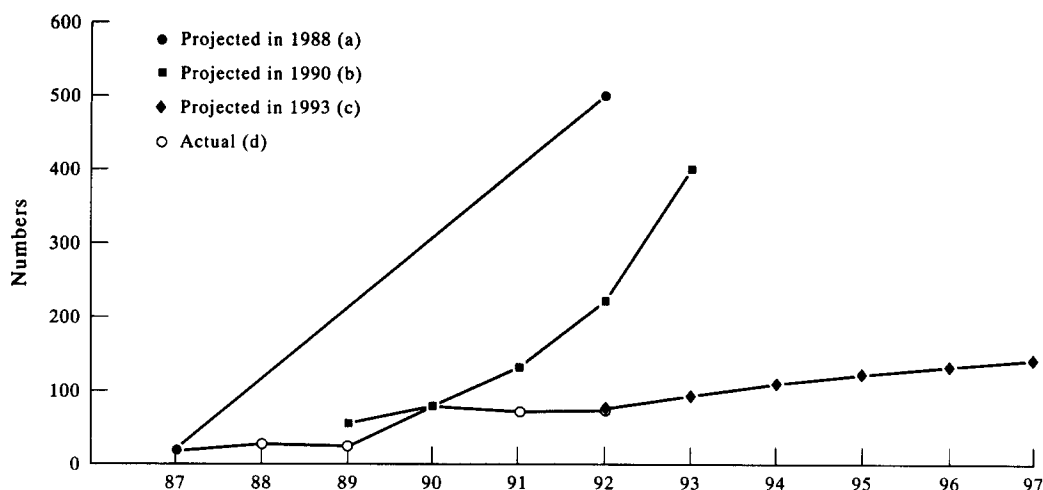


Fig. 7. Projections of AIDS incidence, injecting drug use, England and Wales. Sources: (a) Ref. [25]; (b) Ref. [91]; (c) Ref. [92]; (d) Ref. [46].

projections for AIDS cases from drug injecting in England and Wales. These reflect reassessments of the number of HIV infections. The first projections in 1988 [25] were for 500 new cases of AIDS from drug injecting in 1992 (Fig. 7). Projections made in 1990 suggested 400 new cases in 1993 [91]. The latest estimates from the Working Group on the *Short-term Prediction of HIV Infection and AIDS in England and Wales* predict even fewer cases: in 1993, it was estimated that there would be 145 new cases of AIDS from drug injecting in 1997 [92]. Figure 7 also shows the actual cases of AIDS from injecting from 1987 to 1992. Calculation of the possible epidemic curve suggests that the peak of new cases of HIV infection from injecting in England and Wales may have occurred during the mid to late 1980s and declined after that. The report concluded that:

The occurrence of such a change in a group normally resistant to health education may be surprising...It now seems probable that the number of new AIDS cases in this group will evolve in a way that three years ago was proposed as a possibility but then seemed highly optimistic. (p. S15)

The ACMD AIDS and Drug Misuse update report, 1993

The *Update Report on AIDS and Drugs Misuse* from the Advisory Council on the Misuse of Drugs was published in 1993, five years after the *First Report*. The working group, again chaired by Ruth Runciman, was asked to review progress since 1988 and to make new recommendations [2]. The *Update Report* affirmed the general conclusions of the *First Report*, in particular the need for interventions which will help prevent the transmission of HIV infection. The *Update Report* concluded that there were still prevention opportunities, while experience of caring for drug users who are ill with HIV disease (the subject of the *Second Report* in 1989 [93]) remained limited.

The strategy to curb the spread of HIV through drug use which is already in place in the UK has served us well to date.

This report represents a reinforcement of that strategy with some refinements and a few important extensions. We believe such changes will significantly enhance our capacity to limit the spread of HIV in this country in the coming years. (para 1.25)

The report noted the importance of targeted interventions such as syringe exchange schemes, community based advice and treatment centres, and substitute prescribing. The *First Report* focused on the task of working with the population of current IDUs, but also noted the importance for HIV prevention of efforts to reduce the extent of drug misuse *per se*, a point subsequently overshadowed by the response to the needs of current injectors. The *Update Report* gave greater prominence to reducing overall levels of problem drug use, including discouraging new recruitment into drug use and discouraging drug injecting among potential injectors. The Report noted the success of the strategy of drawing drug users into contact with services, and of reaching them through outreach and other activities, but pointed to the limitations of increasing the numbers in contact. It gave greater emphasis to community-based responses, including a new approach to outreach and greater contributions from GPs and prisons. The Report noted that there had been much imaginative and innovative work since 1988, that it was now time to consolidate good practice and improve the efficiency of agency work. Health Service purchasers, it says, should adopt a "broad based public health approach". Key recommendations of the report include:

- (a) the importance of oral methadone maintenance programmes in reducing illicit drug use and HIV risk taking behaviour;
- (b) an extended role for outreach, in particular oriented to promoting community change as much as individual change;
- (c) the need to target sexual behaviour;

- (d) encouraging early testing for HIV and an expansion of testing facilities in a variety of settings;
- (e) the need for more training for GPs with support from specialist services;
- (f) and the need to develop work in prisons.

Future prospects for HIV prevention in the U.K.

The U.K. has—to date—avoided the rapid spread of HIV infection among injectors that has occurred in many global sectors. If the argument in this paper is accepted, the current epidemiological profile in the U.K. shows that personal, institutional and social costs of HIV infection can continue to be avoided by investment in effective prevention activities.

The return on prevention investment. It is beyond the scope of this paper to conduct elaborate cost–benefit analyses, but crude examination of figures suggests that the investment return is considerable. The cumulative Department of Health expenditure on AIDS and drugs in England, 1987–1992, was £33.785m. Under the worst case scenario England might have had by the end of 1992 more than 50,000 HIV positive injectors, whereas it is estimated (above) that there were in England and Wales about 2800 (2798) cumulative by 1992: it may be assumed for these calculations that 47,200 infections have been avoided. The cost per prevented infection is £716 (probably less than this because not all these prevention pounds will have been spent effectively, and some of these infections occurred before 1988). The cost of treating patients with AIDS is about £25,000 per person. Each £716 of prevention money has saved at least £25,000, a return on investment of nearly 3500%. Such calculations take no account of savings in the prevention of personal and community suffering. The gains made—and the costs avoided—between 1988 and 1993 indicate the importance of continued investment in prevention.

Five issues can be highlighted for future prevention investment and activity

Reducing the number of injectors. There has been relative neglect of the prevention of drug injecting as an HIV prevention measure. Injecting is extending to new drugs and diffusing to new population groups. This is a global phenomenon [9]. In the U.K., Home Office statistics of new addict notifications show that the number of those under 21 years who were injecting has increased. These people started injecting in an AIDS era. Besides targeting current injectors for risk reduction, there is a need to target *potential injectors* to discourage recruitment to injecting and the diffusion of injecting to new populations. Research on drug transitions provides insights into the movement between different modes of administration [94, 95]. Similarly, insufficient attention has been given to discouraging continued injecting: ‘early retirement’ may be encouraged by persuading people to switch to non-injectable means of administration, or—through

treatment or self-help—to cease drug use. The aim must be to shorten the window of exposure to the risk of HIV infection.

Facilitating changes in sexual behaviour. The second issue for prevention is the need to target sexual behaviour. Drug injectors are an important target for sexual behaviour change—they are predominantly male, young and more likely to have a number of sexual partners [96]. Many male drug users have non-drug using female partners [97, 98]. Higher risk sexual behaviour has been noted with the use and injection of temazepam and amphetamines [99, 100] and with severity of dependence [101]. There has been no major change in the sexual behaviour of drug injectors over time [97]. Most drug injectors are sexually active, with about 80% reporting recent sexual activity with a member of the opposite sex. One study showed that in a six-month period two-thirds of injectors had vaginal intercourse at least once a week [96]. Levels of condom use are probably about the same as in the general population; condom use is rare with primary partners, but more common with casual partners. Some female prostitutes also inject drugs (14% and 33% in London [102, 34]), (25% in Birmingham [103]), (59% in Glasgow [104]). Among samples of drug injectors it is estimated that 12% in London and 19% in Glasgow are involved in prostitution [80]. HIV among prostitutes who inject is more closely associated with drug injecting than with sexual transmission [96]. The potential to avert sexual transmission among injectors requires investigation of the obstacles that stand in the way of giving and receiving effective advice on sexual behaviour. Problems may be due to the frame of the setting (both clients and drugs workers are meeting in the context of drugs rather than sex), to lack of imagination in the development of safer sex messages for heterosexuals (which focus mainly on penetrative sex), to drug workers’ reluctance to be proactive in engaging clients in discussions about sexual behaviour, and to drug users’ perceptions of the low relative risk of HIV infection through sexual intercourse.

Improving the impact of methadone prescribing. The third issue is the contribution of methadone prescribing to the reduction of HIV risk behaviour. In 1988 the ACMD argued that prescribing could attract drug users to services and keep them in contact, and facilitate change away from HIV risk practices. The emphasis was on flexible prescribing [26] and the adoption of a range of goals additional to abstinence. Mounting international evidence suggests that oral methadone maintenance programmes for opiate users can help reduce risk behaviour and levels of HIV infection [106, 107]. Methadone maintenance programmes are associated with reductions in injecting, reductions in needle-sharing, reductions in heroin use and lower rates of HIV infection [108]. Key variables are the length of time in treatment, programme structure and goals, and programme management. There is a relationship between higher doses of

methadone, longer retention rates in treatment and behavioural change, and between higher dose and lower rates of HIV infection. Evidence shows that methadone maintenance programmes should consider setting a daily dose of > 60 mg for patients once they have been stabilized [118, 119]. In the U.K. doses in excess of 60 mg a day are exceptional. There is a marked absence of methadone maintenance programmes in the U.K. Instead there is a catholic range of individually tailored unresearched treatments. A priority must be to implement structured methadone maintenance programmes and evaluate what has been demonstrated elsewhere to work.

Generic services. The fourth issue for HIV prevention is the need to implement change outside the dedicated drug services. Drug injectors have contacts with a wide range of agencies. The criminal justice system probably has as much contact with drug injectors as the treatment and helping system. Approximately 8% of prisoners in England and Wales—more in Scotland—have injected drugs in the period immediately preceding imprisonment [109, 110]. Prevention opportunities in the prison system are being missed. There has now been a confirmed outbreak of syringe transmitted HIV infection in a Scottish prison [111]. A similar range of treatment and help must be available in prison as there is outside [112]. In 1988, ACMD argued for the involvement of general practitioners in responding to drug problems, a plea which has been repeated, with little progress. Finally, there is the marginalization of drug injectors within some general HIV services. The neglect of drug users by agencies which have a broad HIV remit, is something that needs to be urgently addressed.

Community outreach. A fifth issue for prevention is outreach work. Outreach has made substantial achievements in contacting and working with the hard-to-reach but has not realised its full potential. The expansion of outreach activities was influenced by the ACMD argument about contacting the hidden population of drug users. In the U.K. much outreach work tended to become domiciliary service, taking services—such as the provision of needles, syringes and advice—out of the agency; or, outreach acted as a funnel from the community into services [113]. In retrospect the ACMD recommendation was flawed. It is impossible to directly reach all the target population, to bring all the target population into contact with services, and for services to expand to cope with this potential load. It may not be even be desirable to turn all injectors into patients or clients. The current focus limits both the numbers of contacts that may be made, and the range of influence.

Client services are important and need to be maintained, but also important is the need to get clients to pass on AIDS prevention messages to others. Outreach workers need to be alert to the fact that the social networks through which HIV may be transmitted are the same social networks that may be

coopted for HIV prevention [114]. In this way HIV prevention messages will reach the widest possible population, and safer behaviour become properly incorporated within the routine daily life of people who inject. From the point of view of HIV prevention, actions concerning individuals must take cognisance of their wider impact on the community of injectors and beyond. Outreach will need to develop peer education and community change programmes aimed at changing norms and behaviour among social networks of injectors [114–117]. Drug users contacted by public health workers could themselves be encouraged or trained to become AIDS prevention activists, responsible for passing on harm minimization messages and for helping changes in the behaviours of their peers. Evidence from Australia, the Netherlands and the U.S.A. shows that outreach projects which involve the target population and encourage a collective response to behaviour change may be more effective than interventions which restrict their focus to individuals alone. This is because community-wide social norms and beliefs, what has been called the *social etiquette* of drug injecting [85], influence the ability of individuals to adopt safer practices.

CONCLUSION

The Methods section of this paper highlighted difficulties in drawing connections between the various events in the history of HIV infection among IDUs in the U.K. This paper has argued that there is a link between policy developments and changes in services and other interventions, between the interventions and reductions in risk behaviour of IDUs, and between their risk behaviour and the low and stable prevalence of HIV infection. The paper argues that there is *prima facie* evidence that the public health interventions made a major contribution to encouraging behaviour change by IDUs, and that this in turn has helped keep levels of HIV infection among IDUs relatively low by international standards. There are difficulties in this kind of causal analysis. It requires judgement of how things might have been otherwise. Single country analyses need to be supplemented by analysis of the response to HIV infection and trends in the epidemic in other countries. Future work in this area will benefit from comparative analyses.

In summary, the years between 1987 and 1983 in the U.K. were a period of great innovation, and funders, managers and workers adventurously risked investment in new ways of working with drug users. That investment appears to have paid off. Based on the evidence in this paper it is argued that these years were a period of great achievement for public health prevention. Drug injectors may have done more to change their behaviour in the face of AIDS than many in the general population. Along with other marginalized and stigmatized groups, they showed that people can respond favourably to the threat of

HIV infection. What was achieved was, in part, a result of having in place a range of services which could rapidly respond to the threat of HIV infection. The Advisory Council on the Misuse of Drugs's advice in 1988 about the need to bring drug injectors into contact with services led to these services becoming more accessible, making contact with more people, dealing with peoples' needs, and providing them with the inspiration and means to change their behaviour. It was also the result of the ready adoption of pragmatic harm reduction practices, for example the willingness to distribute needles and syringes and to offer a wide range of other services and help. The U.K. success points to the desirability of political support and public tolerance for HIV prevention measures.

The current low prevalence level was probably achieved because behavioural change was initiated before the prevalence of HIV infection began to rise (with the exception of Edinburgh). In the U.K. there was an interaction between several factors which—to date—have helped to keep the prevalence of infection low. *Firstly*, because there is a low level of infection, there are low risks that a syringe sharing partner will be HIV positive, and hence a low risk of transmission per sharing event. *Secondly*, at any time there are few people who have recently become infected and who are highly infectious—this also serves to reduce the transmission risk. *Thirdly* there has been substantial reduction in syringe sharing risk behaviour.

This interaction between prevalence level, infectiousness and risk behaviour may also explain the rapid spread of HIV infection among AIDS-naïve populations of drug injectors elsewhere, and the subsequent maintenance of high prevalence levels. HIV infection spreads most rapidly when there are many newly infectious cases and where high risk behaviour is found. This scenario occurs in populations newly exposed to (and unaware of) HIV, in those without access to sterile equipment, and where factors combine to encourage syringe sharing across networks of individuals (as in prison, in shooting galleries and the use of professional injectors) [121]. In turn, an interaction between high-risk behaviour, high prevalence and high infectiousness, will then sustain high incidence. This has important implications for preemptive prevention policies, suggesting the benefits of early interventions. If sufficient behaviour change occurs before prevalence rises, the combination of low risk behaviour, low prevalence and few highly infectious cases means that the risk of infection per occasion is kept low. On a global scale, the U.K. experience adds to the growing evidence that effective early interventions can limit the spread of HIV infection.

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REFERENCES

1. Advisory Council On The Misuse Of Drugs. *AIDS and Drug Misuse: Part One*. Department of Health and Social Security, London, 1988.
2. Advisory Council On The Misuse Of Drugs. *AIDS and Drug Misuse: Update Report*. Department of Health, London, 1993.
3. *Communicable Disease Report* (nd).
4. *Communicable Disease Report*. 3, 1, 1985.
5. Peutherer J. F., Edmonds E., Simonds P., Dickson J. D. *et al.* HTLV-III antibody in Edinburgh drug addicts. *The Lancet* 2, 1129, 1985.
6. Robertson J. R., Bucknall A. B. V., Welsby P. D., Roberts J. S. K., Inglis J. M., Peutherer J. F. and Brettie R. P. Epidemic of AIDS-related virus (HTLV-III/LAV) infection among intravenous drug abusers. *Br. Med. J.* 292, 527, 1986.
7. Scottish Home And Health Department. HIV infection in Scotland. *Report of the Scottish Committee on HIV Infection and Intravenous Drug Misuse*, 1986.
8. Robertson R. The Edinburgh epidemic: a case study. In *AIDS and Drug Misuse* (Edited by Strang J. and Stimson G. V.). Routledge, London, 1990.
9. Stimson G. V. The global diffusion of injecting drug use: Implications for human immunodeficiency virus infection. *Bull. Narcotics XLV* (1), 3, 1993.
10. Parker H., Bakx K. and Newcombe R. *Living with Heroin: the Impact of a Drugs "Epidemic" on an English Community*. Open University Press, Milton Keynes, 1988.
11. Pearson G. *The New Heroin Users*. Basil Blackwell Ltd, Oxford, 1987.
12. Brettie R. P., Davison J., Davidson S. J. *et al.* HTLV-III antibodies in an Edinburgh clinic. *The Lancet* 1129, 1985.
13. Sheehan M., Oppenheimer E. and Taylor C. Why drug users sought help from one London drug clinic. *Br. J. Addict.* 81, 765, 1986.
14. Mulleady G. and Green J. Syringe sharing among London drug abusers. *The Lancet* 1425, 1985.
15. Power R., Hartnoll R. and Daviaud E. Drug injecting, AIDS and risk behaviour. *Br. J. Addict.* 83, 649, 1988.
16. Hart G. J., Sonnex C., Petherick A., Johnson A. M., Feinmann C. and Adler M. W. Risk behaviours for HIV infection among injecting drug users attending a drug dependency clinic. *Br. Med. J.* 298, 1081, 1989.
17. Bath G. E., Dominy N., Burns S. M., Peters A., Davies A. G. and Richardson A. M. Fewer drug users share needles. *Br. Med. J.* 306, 1414, 1993.
18. Pharmaceutical Journal. *Council Statement*. Sale of hypodermic syringes and needles 205, 1986.
19. World Health Organization. *AIDS Among Drug Abusers*. Regional Office for Europe, Copenhagen, 1987.
20. Donoghoe M. C., Stimson G. V. and Dolan K. A. *Syringe-exchanges in England: An Overview*. The Tufnell Press, London, 1992.
21. Stimson G. V., Alldritt L., Dolan K. and Donoghoe M. Syringe-exchange schemes for drug users in England and Scotland. *Br. Med. J.* 296, 1717, 1988.

22. Stimson G. V. and Lart R. A. HIV, drugs and public health in England: new words, old tunes. *Int. J. Addict.* **26**, 1263, 1991.
23. Stimson G. V. and Lart R. The relationship between the State and local practice in the development of national policy on drugs between 1920 and 1989. In *Heroin Addiction and Drug Policy: The British System* (Edited by Strang J. and Gossop M.). Oxford University Press, Oxford, 1994.
24. Stimson G. V. AIDS and HIV: the challenge for British drug services (Fourth Thomas James Okey Lecture). *Br. J. Addict.* **85**, 329, 1990.
25. Department Of Health, Welsh Office. *Short-term Prediction of HIV Infection and AIDS in England and Wales*. Report of a working group (Cox Report). Her Majesty's Stationery Office, London, 1988.
26. Strang J. The roles of prescribing. In *AIDS and Drug Misuse: The Challenge for Policy and Practice in the 1990s* (Edited by Strang J. and Stimson G. V.). Routledge, London, 1990.
27. Strang J. Intermediate goals and the process of change. In *AIDS and Drug Misuse: The Challenge for Policy and Practice in the 1990s* (Edited by Strang J. and Stimson G. V.). Routledge, London, 1990.
28. Strang J. and Stimson G. V. The impacts of HIV: forcing the process of change. In *AIDS and Drug Misuse: The Challenge for Policy and Practice in the 1990s* (Edited by Strang J. and Stimson G. V.). Routledge, London, 1990.
29. Stimson G. V. Minimising harm from drug use. In *Heroin Addiction and Drug Policy: The British System* (Edited by Strang J. and Gossop M.). Oxford University Press, Oxford, 1994.
30. Glanz A., Byrne C. and Jackson P. *Prevention of AIDS among Drug Misusers: the Role of the High Street Pharmacy. Findings of a Survey of Community Pharmacies in England and Wales*. Institute of Psychiatry, Addiction Research Unit, London, 1990.
31. Stimson G. V., Lart R. A., Dolan K. and Donoghoe M. C. The future of syringe-exchange in the public health prevention of HIV infection. In *AIDS: Responses, Interventions and Care* (Edited by Hart G., Aggleton P. J. and Davies P.). Falmer Press, Basingstoke, 1991.
32. Home Office. *Report to International Narcotics Control Board*, 14 September 1993. Data supplied to author, 1993.
33. North West Thames Regional Pharmaceutical Service. *Supply of methadone within NWT*. Unpublished report, 1993.
34. Rhodes T., Holland J. and Hartnoll R. (Eds) (1991) *Hard to Reach or Out of Reach?: An Evaluation of an Innovative Model of HIV Outreach Health Education*. the Tufnell Press, London, 1991.
35. Rhodes T., Hartnoll R. and Johnson A. (1991) *Out of the Agency and on to the Streets: A Review of HIV Outreach Health Education in Europe and the United States*. Research Monograph 2, Institute for the Study of Drug Dependence, London, 1991.
36. Lart R. A. and Stimson G. V. National survey of syringe exchange schemes in England. *Br. J. Addict.* **85**, 1433, 1990.
37. Adams E. W. *Drug Addiction*. Oxford University Press, London, 1937.
38. Stimson G. V. and Oppenheimer E. *Heroin Addiction*. Tavistock, London, 1982.
39. Berridge V. Drugs and social policy: the establishment of drug control in Britain 1900-1930. *Br. J. Addict.* **79**, 17, 1984.
40. Interdepartmental Committee On Drug Addiction. *Report*. HMSO, London, 1961.
41. Interdepartmental Committee On Drug Addiction. *Second Report*. HMSO, London, 1965.
42. Institute For The Study Of Drug Dependence. *Teaching About a Volatile Situation* (pamphlet). Institute For The Study Of Drug Dependence, 1981.
43. Advisory Council On The Misuse Of Drugs. *Report on Prevention*. Her Majesty's Stationery Office, London, 1984.
44. Macgregor S. et al. *The Impact on Drug Services in England of the Central Funding Initiative*. Report. Institute for the Study of Drug Dependence, London, 1990.
45. Department Of Health. Figures supplied to author, 1993.
46. Public Health Laboratory Service Aids Centre And Communicable Disease (Scotland) Unit. *AIDS/HIV Quarterly Surveillance Tables No 19: Data to end March 1993*. Public Health Laboratory Service Aids Centre And Communicable Disease (Scotland) Unit, 1993.
47. Donoghoe M. and Hunter G. Estimates of HIV prevalence and rates of HIV testing among drug injectors in London. *Executive Summary*, 33. The Centre for Research on Drugs and Health Behaviour, London, 1994.
48. Public Health Laboratory Service Aids Centre. Unlinked anonymous monitoring of HIV prevalence in England and Wales: 1990-92. *Commun. Dis. Rep.* **3**, R1, 1993.
49. Haw S., Frischer M., Donoghoe M., Green S., Crosier A., Hunter G., Finlay A., Covell R., Ettorre B., Bloor M., Stephens S., Goldberg D., Stimson G. V., McKeaganey N., Platt S., Taylor A., Follett E. and Parry J. The importance of multisite sampling in determining the prevalence of HIV among drug injectors in Glasgow and London. *AIDS* **1992** **6**, 517, 1992.
50. Strang J., Gossop M., Griffiths P. and Powis B. HIV among south London heroin users in 1991. *The Lancet* **339**, 1060, 1992.
51. Frischer M., Bloor M., Green S., Goldberg D., Covell R., Nickeganey N. and Taylor A. Reduction in needle sharing among community-wide samples of injecting drug users. *Int. J. STD AIDS* **3**, 288, 1992.
52. Follett E., McIntyre A., O'Donnell B., Clements G. B. and Desselberger U. HTLV-III antibody in drug abusers in the west of Scotland: the Edinburgh connection. *The Lancet* (i) 446, 1986.
53. Ronald P. J. M., Robertson J. R. and Roberts J. J. K. Risk taking behaviour on the decline in intravenous drug users. *Br. J. Addict.* **87**, 115, 1992.
54. Des Jarlais D. C. and Friedman S. R. The epidemic of HIV infection among injecting drug users in New York City: the first decade and possible future directions. In *AIDS and Drug Misuse: The Challenge for Policy and Practice in the 1990s* (Edited by Strang J. and Stimson G. V.). Routledge, London, 1990.
55. Vichai Poshychinda. Drug injecting and HIV infection among the population of drug abusers in Asia. *Bull. Narcotics* **XLV**, 77, 1993.
56. Weniger B. G., Khanchit Limpakarn Janarat, Kumnuan Ungchusak, Sombat Thanprasertsuk, Kachit Choopanya, Suphak Vanichseni, Thongchai Uneklabh, Prasert Thongchareon and Chantapong Wasi. The epidemiology of HIV infection and AIDS in Thailand. *AIDS* **5**, S71, 1991.
57. Robert C.-F., Deglon J.-J., Wintch J., Martin J.-L., Perrin L., Bourquin M., Gabriel V. and Hirschel B. Behavioural changes in intravenous drug users in Geneva: rise and fall of HIV infection, 1980-1989. *AIDS* **4**, 657, 1990.
58. Sarkar S., Das N., Panda S., Naik T. N., Sarkar K., Singh B. C., Ralte J. M., Aier S. M. and Tripathy S. P. Rapid spread of HIV among injecting drug users in north-eastern states of India. *Bull. Narcotics* **XLV**, 91, 1993.

59. Myanmar Aids Prevention And Control Programme. *Annual Report 1992*. Disease Control Programme, Department of Health, 1993.
60. Who Collaborative Study Group. An international comparative study of HIV prevalence and risk behaviour among drug injectors in 13 cities. *Bull. Narcotics* **XLV**, 19, 1993.
61. EC Study Group. European Community concerted action on the prevalence and risk factors of HIV infection among injecting drug users, January 1990-June 1991. *AIDS Surveillance Q. Eur.* **36**, Chap. 4, 1993.
62. Rezza G. Personal communication, 1990.
63. Nicolosi A., Correa L., Musicco M. and Lazzarin A. Incidence trends of HIV infection and risk factors for parenteral and sexual transmission in intravenous drug users from Milan and northern Italy. *Seventh International Conference on AIDS*, Florence, Abstract THC103, 1991.
64. Moss A. R. Control of HIV Infection in injecting drug users in San Francisco. In *AIDS and Drug Misuse* (Edited by Stimson G. V. and Strang J.). Routledge, London, 1990.
65. Moss A. R. and Vranizan K. Charting the epidemic: the case study of HIV screening of injecting drug users in San Francisco 1985-1990. *Br. J. Addict.* **87**, 467, 1992.
66. Watters J. K., Cheng Y., Segal M., Lorrwick J., Case P. and Carlson J. Epidemiology and Prevention of HIV in Intravenous Drug Users in San Francisco. *Sixth International Conference on AIDS* June, San Francisco, 1990.
67. Bloor M., Frischer M., Taylor A., Covell R., Goldberg D., Green S., McKeeganey N. and Platt S. Tideline and turn? Possible reasons for the continuing low HIV prevalence among Glasgow's injecting drug users. *Sociol. Rev.* forthcoming.
68. Blower S. Behaviour change and stabilisation of seroprevalence levels in communities of injecting drug users: correlation or causation. *J. Acquired Immune Deficiency Syndromes* **4**, 920, 1991.
69. Van Den Hoek J. A. R., Van Haastrecht H. J. A. and Coutinho R. A. Heterosexual behaviour of intravenous drug users in Amsterdam; implications for the AIDS epidemic. *AIDS* **4**, 449, 1990.
70. Frischer M., Bloor M., Finlay A., Goldberg D., Green S., Haw S., McKeeganey N. and Platt S. A new method of estimating prevalence of injecting drug use in an urban population: results from a Scottish city. *Int. J. Epidemiol.* **20**, 997, 1991.
71. Donoghoe M. C. Syringe-exchange: has it worked? *Druglink ISDD*, Jan/Feb, 8, 1991.
72. Stimson G. V., Alldritt L., Dolan K. A. and Donoghoe M. C. HIV risk behaviour of clients attending syringe-exchange schemes in England and Scotland. *Br. J. Addict.* **83**, 1449, 1988.
73. Donoghoe M. C., Stimson G. V., Dolan K. A. and Alldritt L. Changes in risk behaviour in clients of syringe-exchange schemes in England and Scotland. *AIDS* **3**, 267, 1989.
74. Keene J., Stimson G. V., Jones S. and Parry-langdon N. Evaluation of syringe-exchange for HIV prevention among IDUs in rural and urban areas of Wales. *Addiction* **88**, 1063, 1993.
75. Hart G. J., Carvell A. L. M., Woodward N., Johnson A. M., Williams P. and Parry J. V. Evaluation of needle exchanges in central London: behaviour change and anti-HIV status over one year. *AIDS* **3**, 261, 1989.
76. Dolan K. A., Stimson G. V. and Donoghoe M. C. Reductions in HIV risk behaviours and stable HIV prevalence in cohorts of syringe-exchange clients and other injectors in England. *Drug Alc. Rev.* **12**, 133, 1993.
77. Mulleady G., White D., Phillips K. and Cupitt C. Reducing sexual transmission of HIV for injecting drug users: the challenge for counselling. *Counselling Psychol. Q.* **3**, 325, 1990.
78. Robertson J. R., Skidmore C. A. and Roberts J. J. K. HIV Infection in Intravenous Drug Users: a follow-up study indicating changes in risk-taking behaviour. *Br. J. Addict.* **83**, 387, 1988.
79. Skidmore C. A., Robertson J. R. and Roberts J. J. K. Changes in HIV risk-taking behaviour in intravenous drugusers: a second follow-up. *Br. J. Addict.* **84**, 695, 1989.
80. Rhodes T. J., Bloor M. J., Donoghoe M. C., Haw S., Ettorre B., Platt S., Frischer M., Hunter G. M., Taylor A., Finlay A., Crosier A. N., Stephens S. F., Covell R., Stimson G. V., Goldberg D. J., Green S. T. and McKeeganey N. P. HIV prevalence and HIV risk behaviour among injecting drug users in London and Glasgow. *AIDS Care* **4**, 413, 1993.
81. Hunter G. M., Donoghoe M. C. and Stimson G. V. Changes in the injecting risk behaviour of injecting drug users in London: 1990-1993. *AIDS* **9**, 493, 1995.
82. Taylor A. Personal Communication, 1993.
83. Davies A. Personal Communication, 1993.
84. Daniel P., Brown A., Jones M. and Morgan D. *Problem Drug Use reported by Services in Greater London: A Collaborative Report by the Regional Drug Misuse Databases*. St George's Hospital Medical School, London, 1993.
85. Burt J. and Stimson G. V. *Drug Injectors and HIV Risk Reduction: Strategies for Protection*. Health Education Authority, London, 1993.
86. Power R. *Coping with Illicit Drug Use*. Tufnell Press, London, 1955.
87. McKeeganey N. Being positive: drug injectors' experiences of HIV infection. *Br. J. Addict.* **85**, 1113, 1990.
88. Peters A. D., Reid M. and Griffin S. G. Edinburgh drug users: are they injecting and sharing less? *AIDS* **8**, 521, 1994.
89. Battjes R. J., Pickens R. and Amsel Z. Trends in HIV infection and AIDS risk behaviours among intravenous drug users in selected US cities. *Seventh International Conference on AIDS*, Florence, Abstract THC46, 1991.
90. Chin J. Plenary address. *VII International Conference on AIDS*, Florence, Italy, 1991.
91. Public Health Laboratory Service Working Group. Acquired immune deficiency syndrome in England and Wales to end 1993: projections using data to end September 1989. *Commun. Dis. Report (Supplement)*, January, 1990.
92. Public Health Laboratory Service Working Group. The incidence and prevalence of AIDS and other severe HIV disease in England and Wales for 1992-1997: projections using data to the end of June 1992. *Commun. Dis. Report* **3** (Supplement 1), S1, 1993.
93. Advisory Council On The Misuse Of Drugs. *AIDS and Drug Misuse: Part Two*. Department of Health and Social Security, London, 1989.
94. Strang J., Des Jarlais D. C., Griffiths P. and Gossop M. The study of transitions in the route of drug use: the route from one route to another. *Br. J. Addict.* **87**, 473, 1992.
95. Des Jarlais D. C., Casriel C., Friedman S. R. and Rosenblum A. AIDS and the transition to illicit drug injection—results of a randomized trial prevention program. *Br. J. Addict.* **87**, 493, 1992.
96. Rhodes T. J., Donoghoe M. C., Hunter G. M. and Stimson G. V. Sexual behaviour of drug injectors in London: implications for HIV transmission and HIV prevention. *Addiction* **89**, 1085, 1994.
97. Donoghoe M. C., Stimson G. V. and Dolan K. A. Sexual behaviour of injecting drug users and associated

- risks of HIV infection for non-injecting sexual partners. *AIDS Care* 1, 51, 1989.
98. Klee H., Faugier J., Hayes C., Boulton T. and Morris J. AIDS-related risk behaviour, polydrug use and temazepam. *Br. J. Addict.* 85, 1125, 1990.
 99. Klee H., Faugier J., Hayes C., Boulton T. and Morris J. Sexual partners of injecting drug users: the risk of HIV infection. *Br. J. Addict.* 85, 413, 1990.
 100. Klee H., Faugier J., Hayes C., Boulton T. and Morris J. Factors associated with risk behaviour among injecting drug users. *AIDS Care* 2, 133, 1990.
 101. Gossop M., Griffiths P., Powis B. and Strang J. Severity of heroin dependence and HIV risk. II. Sharing injecting equipment. *AIDS Care* 5, 159, 1993.
 102. Day S., Ward H. and Harris J. Prostitute women and public health. *Br. Med. J.* 297, 1585, 1988.
 103. Kinnell H. *Prostitutes, their Clients and Risks of HIV Infection in Birmingham*. Occasional Paper. Department of Public Health Medicine, Birmingham, 1989.
 104. McKeagney N. P. and Barnard M. A. *AIDS, Drugs and Sexual Risk: Lives in the Balance*. Open University Press, Buckingham, 1992.
 105. Rhodes T. J., Donoghoe M. C., Hunter G. M. and Stimson G. V. Continued risk behaviour among HIV positive drug injectors in London: implications for intervention. *Addiction* 88, 1553, 1993.
 106. Selwyn P. A., Feiner C., Cox C. P., Lipshutz C. and Cohen R. L. Knowledge about AIDS and high risk behaviour among intravenous drug users in New York City. *AIDS* 1, 247, 1987.
 107. Des Jarlais D. C. The first and second decade of AIDS among injecting drug users. *Br. J. Addict.* 87, 347, 1992.
 108. Farrell M., Ward J., Mattick R., Hall W., Stimson G. V., Des Jarlais D., Gossop M. and Strang J. Methadone maintenance treatment in opiate dependence: a review. *Br. Med. J.* 309, 997, 1994.
 109. Maden A., Swinton M. and Gunn J. Drug dependence in prisoners. *Br. Med. J.* 302, 880, 1991.
 110. Maden A., Swinton M. and Gunn J. Women in prison and use of illicit drugs before arrest. *Br. Med. J.* 301, 1133, 1991.
 111. House Of Commons Scottish Affairs Committee. *Drug Abuse in Scotland: First Report*. Report together with the Proceedings of the Committee. HMSO, London, 1994.
 112. Turnbull P. J., Dolan K. A. and Stimson G. V. *Prisons, HIV and AIDS: Risks and Experiences in Custodial Care*. AVERT (AIDS Education and Research Trust), Horsham, West Sussex, 1991.
 113. Rhodes T. and Stimson G. V. Buzzwords: HIV outreach glossary. *Druglink* January/February, 8, 1994.
 114. Stimson G. V., Eaton G., Rhodes T. and Power R. Potential development of community oriented HIV outreach among drug injectors in the UK. *Addiction* 89, 1601, 1994.
 115. Friedman S. Going beyond education to mobilising subcultural change. *Int. J. Drug Policy* 4, (2) 91, 1993.
 116. Friedman S. R., Neaigus A., Des Jarlais D. C., Sotharan J. L., Woods J. and Sufian M. Social intervention against AIDS among injecting drug users. *Br. J. Addict.* 87, 393, 1992.
 117. Friedman S. R., De Jong W. and Wodak A. Community development as a response to HIV among drug injectors. *AIDS* 7, Supp 1, S263, 1993.
 118. Ball J. C. and Ross A. *The Effectiveness of Methadone Maintenance Treatment: Patients, Programs, Services, and Outcome*. Springer Verlag, New York, 1991.
 119. Ward J., Mattick R. and Hall W. *Key Issues in Methadone Maintenance Treatment*. New South Wales University Press, Australia, 1992.
 120. Taylor A., Frischer M., Green S., Goldberg D., McKeagney N. and Grover L. Low and stable prevalence of HIV among Glasgow drug injectors. *Int. J. STD AIDS* 5, 105, 1994.
 121. Stimson G. V. Reconstruction of subregional diffusion of HIV infection among injecting drug users in southeast Asia: implications for early intervention. *AIDS* 8, 1630, 1994.
 122. Donoghoe M. C., Hunter G. M., Rhodes T. R., Stimson G. V. and Parry J. B. HIV prevalence in community-wide samples of injecting drug users in London (1990-1993), 1995.
 123. Rhodes T. R., Bloor M. J., Donoghoe M. C., Haw S., Ettorre B., Platt S., Frischer M., Hunter G. M., Taylor A., Finlay A., Crosier A. N., Stephens S., Covell R., Stimson G. V., Goldberg D. J., Green S. T., McKeagney N. P. and Parry J. HIV prevalence and HIV risk behaviour among injecting drug users in London and Glasgow. *AIDS Care* 5, 413, 1993.