International Drug Policy Consortium
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Briefing Paper

Heroin Assisted Treatment

The state of play

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The International Drug Policy Consortium (IDPC) is a global network of NGOs and professional networks that specialise in issues related to illegal drug production and use. The Consortium aims to promote objective and open debate on the effectiveness, direction and content of drug policies at national and international level, and supports evidence-based policies that are effective in reducing drug-related harm. It produces occasional briefing papers, disseminates the reports of its member organisations about particular drug-related matters, and offers expert consultancy services to policy makers and officials around the world.

Introduction

The United Nations Office on Drugs and Crime (UNODC) estimates that there are presently between 15.5 and 21.1 million opiate users in the world, the majority of whom are heroin users.[1] There has been a growing awareness of the importance of treatment for this population in recent decades, with Opiate Substitution Therapy (OST) prominent amongst the range of treatment modalities. While methadone remains the most widely used substitute, clinicians and researchers recognise that there is a significant number of users for whom methadone has proved ineffective. This recognition has driven an expansion in the range of substitution modalities, and, in some parts of the world, clinicians have employed heroin (or, more precisely, *diacetylmorphine* or *diamorphine*, its licit, unadulterated pharmaceutical form) in the treatment of opiate addiction. This briefing paper explores the question of Heroin Assisted Treatment (HAT), examines the growing body of evidence emerging from its clinical use in addiction therapies, and makes recommendations for policy makers.

Heroin arrives on the scene

The name *Heroin* was a brand name devised by the German pharmaceutical company Bayer in the late nineteenth century.[2] It refers to the chemical diacetylmorphine, a semi-synthetic drug derived from the opium poppy which has powerful painkilling and euphoric properties. Bayer, which also produced aspirin, marketed the drug as a cough medicine. It was also used for a short time as an addiction cure for those dependent upon morphine or opium; however, it quickly became apparent that the drug was itself powerfully addictive.[3]

At the end of the nineteenth century there was already a pervasive drug culture in the United States. Heroin rapidly became popular in New York City, where the pharmaceutical industry factories were clustered. Its recreational use was confined primarily to a population of youths belonging to street gangs, and it was in this context that heroin began to acquire the association with crime and the urban underworld which continues to cling to it in the present day.[4] Following the establishment

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of the international drug control regime in the early twentieth century, heroin was increasingly produced illicitly, becoming one of the mainstays of the illegal drug market and establishing centres of consumption in cities across the world.[5]

Early roles in addiction treatment

The US passed the Harrison Act in 1914 in an attempt to regulate the expanding market in hedonistic drug use. After this, doctors in general practice found it increasingly difficult to prescribe opiates for dependent patients without running afoul of federal law, and the US government permitted a number of clinical facilities where addicts could go to receive medically supervised doses of opiates; however, it is noteworthy that it was morphine that was supplied, not heroin. These clinics were themselves subject to growing pressure from the federal authorities, and had all been closed down by the end of 1923.[6] From this point onward, opiate addicts in the US had only two choices: either give up or seek supplies on the illicit market. Perhaps predictably, the illicit market responded to consumer demand with a dynamism and a flexibility that outstripped the ability of enforcement authorities to suppress it, and established itself as a permanent presence in American society.

In Britain and the Netherlands, a different path was taken. Although both nations passed legislation in accordance with their obligations under the Hague Convention (the first binding international drug control treaty) to limit the use of drugs to 'medical and scientific' purposes, they interpreted these obligations differently to the US. While the latter adopted policies centred on the criminalisation of users, a more public health oriented approach was taken by the Dutch and British governments. Following the report of a parliamentary commission in 1926, chaired by the eminent physician Humphrey Rolleston, Britain amended its dangerous drugs regulations to allow doctors to treat their addicted patients with prescribed doses of drugs, including heroin. No special license was needed–any medically qualified doctor could prescribe. This policy included a strong public health component: the objective was to treat individual need and at the same time to prevent the establishment of an illicit trade that would otherwise arise to meet the demand, as it had in America.[7]

The different polices adopted by the US and Britain were the result of complex historical, social and political factors, foremost amongst which, for the purposes of the present discussion, were the greater influence of the British medical profession and the fact that Britain had, relative to the US, much lower numbers of addicts. In addition, these individuals were not, for the most part, associated with criminality or social deviance. The 'British System' of addiction treatment, as it became known, was soon to be unique, as more and more countries followed the lead of the US and banned altogether the manufacture of heroin, prohibiting the drug's use even for the treatment of pain. The British system permitted 'take-away' doses of drugs to addicts, and the individual physician was allowed almost total discretion as to the amount prescribed and the duration of treatment.

This system lasted until the 1960s, when it was judged to be unable to cope with the stresses of social change, which saw both very large increases in the numbers of drug users (particularly of heroin) and, importantly, the appearance of a different *type* of user – often young, working class, and unwilling to cooperate with the medical model underpinning the British system.[8] In these circumstances, the system buckled: having restricted the numbers of addicts to no more than a few hundred per year between the 1920s and the 1950s, it allowed prevalence to climb steeply in the 1960s. This led to further parliamentary investigation and, in due course, a new set of regulations that restricted heroin prescribing to newly established clinics overseen by consultant psychiatrists who were licensed by the Home Office to prescribe heroin and cocaine. However, with its vision of therapy being largely confined to prescribing (most heroin patients being transferred to injectable methadone), and its client-staff relations characterised by ongoing conflict, the

'clinic' regime that replaced the British system in 1968 remained remote from the HAT model as it is theorised and practised today. It is to this model that we now turn.

Rationale for OST and HAT

Many heroin addicts (though not all)[9] suffer from a range of health problems including HIV, Hepatitis C (HCV), injection injuries, abscesses and overdoses, in addition to severe psychological and social problems including homelessness, poverty, criminal involvement in order to finance dependent use, imprisonment, prostitution, stigmatisation and marginalisation. It is important to note that, while it is addictive, heroin in its pure form is not harmful to the body; the street drug, however, may be poorly manufactured, stored or transported in infectious conditions, and is often adulterated with unknown and potentially dangerous substances. Most of the harms that accrue from addiction to opiates stem from these factors and from the associated lifestyle, which is organised around the highly stressful imperative of obtaining sufficient supplies to ward off withdrawal symptoms and attain some level of comfort. This lifestyle often involves resort to crime in order to raise cash money.

It is for these reasons that addiction treatment often includes the prescribing of a similar (but clean and safer) drug, in order to allow users to disengage from this intensive lifestyle, reduce their intake of street drugs, and establish a relationship with health and social support services.[10] This is the rationale for OST in general, and represents a well researched health intervention that has been found to largely succeed in reaching its objectives. Despite these successes, however, there remains a substantial population (estimated at 5-10%)[11] of heroin users that either does not engage at all with OST or fails to make good progress when it does engage. Many heroin users simply do not like methadone, and continue to use street heroin alongside it, often thereby increasing both the extent of their dependence and, potentially, the dangers of overdose. For these individuals, the prescribing of heroin can represent a much more effective means of obtaining the overarching goals of OST.[12] Other areas of medicine deploy what are known as 'second line treatments'– drugs or other clinical interventions that are made when the standard treatment fails. For the treatment of addiction, HAT may be regarded as an effective second-line therapy, with an evidence base which has developed rapidly in strength and depth over the past ten to fifteen years.

Switzerland and the open drug scenes

During the early 1990s, the centre of gravity of the clinical use of heroin for addiction treatment shifted away from Britain, the country with which it had been historically associated, moving instead to Switzerland on the European mainland. The factors underlying this shift were several, but among the most important was the existence of 'open drug scenes' located in several Swiss cities, particularly Zurich and Bern.[13] These were spaces in the city centres (often public parks) where the police tolerated drug use so long as it remained geographically confined; lurid scenes of the infamous 'needle-park' at Platzspitz, with public injecting, thousands of users milling around, and small-scale dealing going on twenty-four hours a day, seven days a week, were broadcast around the globe by News media. The Platzspitz scene was closed in 1992, but soon migrated across the city to the disused Letten railway station. The sheer size of the problem made enforcement solutions impractical, yet the squalid and highly visible nature of the drug problem was deeply disturbing to the traditionally conservative and well-ordered Swiss society. There were, in addition, high levels of HIV infection amongst this population; in the decade leading up to 1995, Switzerland had the highest figures for HIV prevalence and incidence in Europe. As Ambros Uchtenhagen, one of the major drivers of the Swiss HAT project, puts it– "The situation was typified by misery and dirt, and television teams from all over the globe visited the dark heart of proper and efficient Switzerland."[14]

Georges Dulex, Head of the Zurich Canton Police Service, described events as follows: "Early in 1992, the city authorities could no longer tolerate the situation. As a result, Needle Park was closed down on February 4, 1992. What happened afterwards shows that the coordinated efforts of all the disciplines involved were inadequate at the time. The problem – the misery – simply moved elsewhere. Drug addicts wandered along the banks of the river and in neighbourhoods close to the city. The situation became unbearable for everyone: residents, businesses and authorities."[15] Things became so extreme that five murders took place in the space of a few weeks around the Letten station scene. In the face of this challenge to legal and social organisation, pragmatism became the order of the day, and new policies and programmes (the 'Four Pillars' model)[16] in which harm reduction was prominent were devised and set up in place of the traditional reliance on enforcement. These measures were to include the prescribing of heroin according to a particular model; it is this specific model, in which prescribing is embedded in a supervised clinical setting and tightly interwoven with psycho-social support mechanisms, that is referred to in this briefing as HAT. In this approach, heroin is only one element, albeit a very important one, in a larger package of therapeutic and social-support.

HAT- The Swiss experience

The Swiss model for prescribing heroin was designed with a particular population in mind: the 'hardcore' users who frequented the open drug scenes, were immersed in the concomitant lifestyle and had received little or no benefit from orthodox treatments using methadone or buprenorphine. In order to attract these clients, who were associated with HIV infection, crime and disorder, the new treatment needed to be both readily accessible and to offer their pharmaceutical component of choice, which was heroin. The project also had to take account of popular opinion, and to avoid potential pitfalls such as overdose, nuisance around clinics, and so forth. The initial Swiss project for the Medical Prescription of Narcotics (or PROVE, an acronym formed from the German terms Projekt zur ärztlichen Verschreibung von Betäubungsmitteln) began in January 1994, and was supplemented by follow-up and further studies including the Swiss National Cohort Study. The programme was structured in the following way.[17]

Objectives

- To recruit heroin users who were not reached by other treatments
- To retain clients in treatment
- To reduce clients' illicit drug use
- To improve health and social function, the latter with particular reference to criminal activities
- To compare injectable heroin with methadone and morphine
- To facilitate transfer of clients to regular treatment programmes

Design

The Swiss PROVE study was conducted across 14 cities between 1994 and 1996. The main component was set up as a longitudinal prospective study in which the cohort was analysed *before* and *after* treatment; several sub-studies were also conducted. These included a Randomised Control Trial (RCT) carried out at Geneva, comparing injectable diamorphine with morphine and methadone. The Swiss National Cohort study was conceived as a continuation of the initial PROVE research, and continued until December 2000. The research included the overall involvement of 1,969 clients at 21 centres in 19 cities.

Target population

In order to qualify for the programme, clients were required to be long term users considered chronically dependent, and to suffer severe problems related to their drug use. In other words, naive users and those whose use was not problematic were disqualified from entry. Entrants had to be over 20 (later revised downward to 18) and to have at least to two unsuccessful treatment episodes using conventional therapies. The clients were, in the event, 80% male, with a mean length of prior heroin dependence of 10 years.

Entry criteria entailed a minimum of two years' documented addiction, recorded health and social problems related to drug use, and willingness to surrender driving license for the duration of their treatment. Clients also had to certify that they would comply with the treatment and research protocols.

Delivering Heroin Assisted Treatment

The definitive feature of the Swiss study is that in contrast to the operation of the old 'British system' of prescribing discussed above, HAT was delivered solely within a clinical setting. In practical terms, what this means is that clients were required to attend an authorised clinic on a daily basis (up to three times daily) in order to receive their doses of heroin. Injection took place in a clean, secure environment under the supervision of clinic staff (i.e. in direct visual presence). The clinics opened 365 days a year; take-away doses of heroin were not available under any circumstances, and clients were required to attend each and every day, including public and religious holidays. If they were unable to attend, injectable heroin was not made available; doses of oral methadone would be arranged for holidays, etc.

Clients were involved in deciding the appropriate dose of heroin: the average dose was 500-600 milligrams, which has drawn some comment from US researchers: "a massive amount by the standards of U.S. street addicts."[18]

If clients arrived for their medication in an intoxicated condition (they were examined by staff for signs of this), they were required to wait until the effects had worn off before being permitted to inject.

Clients would be interviewed by researchers and by key-working staff or physicians according to project protocols. If clients found these requirements onerous, they had the option of withdrawing from the treatment at any time. If they wished to remain in treatment, however, such routines were part of the package, and contributed to a 'normalising' of lifestyle as well as to therapeutic, administrative and research objectives. Failure to comply could result in temporary or, in extreme cases, permanent exclusion.

Research

The research was carried out by independent researchers based at universities and clinical intuitions, according to a protocol drawn up by the Federal government and the ethics committee of the Swiss national medical Academy, and adverse events were closely monitored (these could include irritations around injection sites, overdose, etc). The research team worked according to the guidance of a national expert research committee; protocols were reviewed by an international panel set up by the World Health Organisation (WHO).

The research instruments included oral interviews conducted by independent interviewers, clinical observations made by staff, case histories from previous treatments, information supplied by the police and laboratory data.

Results

These results relate to Swiss studies carried out between January 1994 and December 2000.[19] Retention in treatment was high, with 83% remaining in treatment for at least 3 months, 70% at least one year, 50% at least 2.5 years, and 43% for 5 years or over. In the first 4 months of the programme, 9% of clients left to enter residential abstinence treatment. Over 3 years, this figure was 29%.[20]

The use of illicit street heroin was reduced dramatically, with 81% of clients using in the 6 months prior to admission, and the figure dropping to 18% after 18 months in HAT. The equivalent figures for other drug use were: from 29% to 5% for cocaine, from 19% to 9% for benzodiazepines, and no significant change in the case of cannabis. These measures were based on client self-report. The daily consumption of heroin and cocaine, such a central feature of the lifestyle of this group, was the site of special progress, while the use of cannabis did not produce noticeable effects on treatment outcomes.

Criminal involvement was also reduced, with 70% of clients engaged in dealing, shoplifting, handling of stolen good and so on during the 6 months before entering HAT, and this figure dropping to 10% after 18 months in the treatment.

Health gains were significant, with clear improvements in body mass index, a range of physical and psychological health criteria, diet and nutrition. These were matched by enhancement of socio-economic status, with unemployment reduced from 44% to 22%.

Thus all the key objectives of the project were met with clear improvements in the health and social status of this population, which had proved so difficult to reach by previous methods of treatment.

No fatal overdoses took place, and no diamorphine was diverted into the illicit drug market. While fears had been expressed by opponents of the project that clients would demand continuous increases of dose, in practice this did not occur; doses were stabilised, and even reduced over time.

In the RCT and double-blind studies (the latter being programmes in which neither client nor researcher is aware which medication is in use), which aimed to provide comparison between different opiate substitutes (HAT, injectable methadone and morphine), the diamorphine clients were easier to recruit, were more successfully retained in treatment, and used less street heroin and cocaine.[21]

Summary

HAT made improvements in the recruitment and retention in treatment of the designated population. Those in HAT made notable gains in health, social function and reduction in drug use, as measured against their prior records and in comparison with other substitute medications. HAT appeared on the strength of these results to provide an effective second line treatment for those experiencing chronic problematic opiate dependence.

Further considerations

Each HAT treatment place costs approximately 57 Swiss Francs per day. However, the overall benefit to the Swiss economy deriving from each client being in heroin-assisted treatment is approximately 104 francs per day (costs mainly accruing from criminal justice expenditure). The total savings represented by each client in treatment is therefore some 47 francs per day (i.e. the estimated daily savings to the Swiss economy per patient, 104 francs, less the cost of a day's heroin assisted treatment, 57 francs in 2007.[22]

Locations in which the clinics were situated found no increases in public disturbance or nuisance as a consequence. Concerns were also expressed prior to the introduction of HAT that it would render other substitution treatment unpopular; this has not occurred. HAT clients represent about 8% of total treatment places, while methadone is used in 87%.

Limitations of the Swiss studies

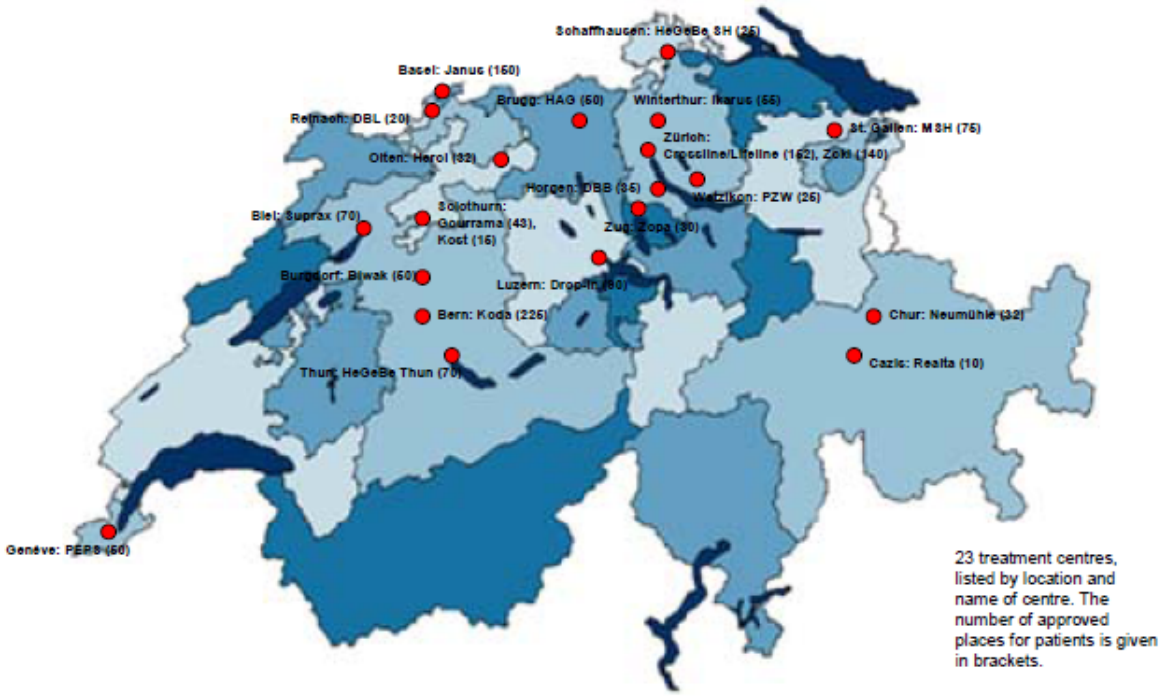
The major criticisms of the Swiss studies have focused on their lack of scientific rigour–the major study was not a RCT, which is considered the 'gold standard' for research (though it included an RCT element). This meant that there was no control group with which the HAT group could be compared. A 'before-and-after treatment' study of the type undertaken is regarded as being less able to pin the measured effect down to a specific variable–in this case, HAT.

Consequences of the Swiss studies

Despite this criticism, the Swiss studies caught the public imagination at an important moment for policy development, and have had a considerable impact on the field of drug treatment, inspiring further research, including several RCTs, in a number of European countries and in North America (these are discussed further below). In addition to this extensive scientific work, the Swiss project has captured the interest of governments and publics around the world. These studies are best viewed as an initial step in a longer process of scientific and political development, and in this sense they

have proved truly ground-breaking. Moreover, in Switzerland itself the HAT model has been extensively debated, and put to repeated referenda in which it received the backing of the Swiss population. In 1994, 54% of voters approved the continuation of the treatment, while in the final 2008 referendum, 68% voted to make the programme a permanent feature of Switzerland's healthcare system. The Swiss authorities have moved steadily to shift HAT from an experimental to a regular treatment. In March 1999, the Federal Office authorised HAT as a standard drug treatment, before revising the Narcotics law in 2008 to secure it on a permanent basis. The diamorphine used in Swiss HAT is the trademark name Diaphin, which was registered by Swissmedic in 2001.[23] Heroin Assisted Treatment is today fully integrated into the Swiss national healthcare system; 23 clinical centres provide HAT to clients, 2 of which are located in prisons. At the end of December 2007, there were 1,283 clients enrolled in HAT in Switzerland, occupying 89% of available treatment places. Interestingly, the Federal authorities estimate that heroin addiction is decreasing by about 4% per annum in the country,[24] and it appears that addicts compose an aging population, with the number of young (under 35) HAT clients decreasing each year, and older clients (45 plus) increasing. In the mid-1990s, it was estimated that there were around 29,000 opiate addicts in Switzerland; that figure had fallen to around 23,000 in 2002,[25] and the decline has apparently continued since that time. While this cannot be attributed entirely to HAT, it is very likely that it represents one of the factors. In Switzerland, the public image of heroin may be changing from one associated with street life and rebellion to that of a chronic medical condition requiring intensive daily treatments—not so much youth culture cool as a kind of shuffling diabetes of the elderly. Whether this trend persists in the longer term remains to be seen.

HAT centres in Switzerland as at 31st December 2007



Courtesy of HAT Database, Federal Office of Public Health 2007

Further studies: The Netherlands

If Switzerland's achievement was to open the political and scientific door to HAT, other countries stepped in to add weight to the scientific evidence base for the treatment. Among the first to do so was the Netherlands.

There was an estimated 25,000 heroin addicts in the Netherlands.[26] The country is believed to be unusual in Europe in that a high proportion of these are heroin smokers, who 'chase the dragon' (inhale the fumes of melted heroin on foil) rather than inject the drug. There are, however, substantial heroin smoking populations in other countries, although numbers are largely unknown. Of the heroin using population, it was estimated that between 5,000 and 8,000 were experiencing 'problematic' use despite their enrolment in orthodox treatment (i.e., they were still using illicit street heroin and other drugs, suffering from serious health and psycho-social problems, and funding their use through criminal involvements). Two randomised controlled trials were undertaken with members of this population, one using injectable heroin and the other, inhalable heroin.[27]

Design

The study comprised two multi-centre open-label RCTs. 549 clients took part, 375 inhaling and 174 injecting. (All participants were prescribed oral methadone, with experimental groups co-prescribed diamorphine. Many trials include or offer oral methadone to those participants who are randomised to diamorphine treatment; this is to compensate for the fact that diamorphine wears off more rapidly than methadone, leaving the clients vulnerable to withdrawal symptoms overnight). Each was compared to a control group using solely methadone, over a period of 12 months. Doses of diamorphine were supplied at supervised clinical facilities. No take-home doses of diamorphine were allowed, while up to 400mg of heroin could be consumed per visit, up to a maximum of 1,000 mg per day. All trial subjects had access to standard medical and psychosocial services. At the end of the 12 month experimental period, heroin prescription was discontinued for a period of at least two months.

Participants

The minimum age for entry was 25, and clients were required to have been in OST during the previous 6 months. They were also required to meet the Diagnostic and Statistical Manual 4 (DSM 4) criteria for heroin dependence. Participants were recruited from existing OST programmes in 6 Dutch cities, and were allocated to the inhalation or injecting group according to their customary method of consumption (they were then independently randomised to the experimental or the control group).

Research

Independent researchers assessed trial participants at baseline (i.e. at the start if the trial) and every two months thereafter. A variety of research instruments were used to test the levels of health, social functioning and severity of addiction, etc. The chosen primary outcome measures were improvements in physical, psychological and social function, with additional measures including treatment retention and sustained response. A series of statistical calculations were performed.

Results

Completion rates were high in all groups, but slightly higher in the methadone-only group. This is in itself an interesting finding, and, when combined with the considerable difficulties many HAT trials have experienced in recruiting sufficient numbers, may point to the problems stemming from the tight regulation of the HAT model (i.e. attending a clinic twice or more daily, every day). This will be discussed further below. Nonetheless, researchers found that HAT treatment (both injection and inhalation groups) was significantly more effective according to trial criteria than methadone alone. Moreover, when diamorphine co-prescription was ceased at the end of the 12 month period, 82% of clients "deteriorated substantially". The trial also found that diamorphine was more cost-effective

than methadone. In their discussion, the researchers[28] draw out the following conclusions from the trials: "In our two trials supervised medical co-prescription of heroin to treatment resistant heroin addicts was more effective and probably just as safe as methadone alone. We saw considerable improvements in physical and mental condition and social functioning and few serious adverse events... we consider that out study provides strong evidence of the efficacy of prescribed heroin for addicts who are resistant to other forms of treatment."

A subsequent study of 147 patients who remained in HAT treatment after the Dutch trials[29] monitored both retention in treatment and progress in terms of physical and psychological health and social function. This group was compared with those who had left treatment, and was found to be stable or improved across these domains, as well as showing reduced use of illicit heroin, cocaine and alcohol. 56% of those eligible for HAT remained in the treatment for at least 4 years. Measured across the period from the inception of the trial, patients who refrained from non-prescribed heroin use were: 0 at baseline (such use was, it will be recalled, a criterion of admission to the trial), 58% after 1 year of HAT and 86% after 4 years. The authors conclude that long term engagement in HAT continues and stabilises the significant improvements found in the original study.

Further Studies: Summary

This research stimulated interest in HAT amongst scientist and clinicians in several countries. While the various studies differ in certain respects such as main emphasis or in elements of methodology, they are similar in both overall objectives and results. Rather than detail every piece of research individually, therefore, a summary of HAT studies undertaken may be consulted in Box 1 below.[30] The table is restricted to studies in which the HAT model was employed, and does not include research using alternative interventions (e.g., those using take home doses of heroin).

Accumulating the evidence

As will be seen from Box 1 above, there now exists a substantial body of scientific evidence, all of which is supportive of the role of HAT as a

BOX 1 HAT Studies

Country	Study Name and/ or principal investigator	Design	Objective, intervention	Study group	Outcomes	Results
Canada	NAOMI (North American Opiate Medication Initiative) 2005-2008	Multicentre RCT	Injectable heroin/oral methadone (OM) or Injectable dilaudid/OM compared to methadone	Problematic heroin users (PHUs), not responding to orthodox OST N=246	Retention in treatment, improved physical, psychological & social function	Self-reported street heroin use in past 30 days: HAT 5.3, OM 12.0. Retention rate: HAT 88%, OM 54%.
Germany	D. Naber 2003-2004	Multicentre RCT, stratified	Injectable heroin (+oral meth if requested) compared to methadone	PHUs, not responding to orthodox OST or not in treatment N= 1,032	20% improvement in physical and psychological health. Reduced use of street H., and no increase in cocaine use	Health response: HAT 80%, OM 74% (or 1.4) Street heroin use: HAT 69%, OM 55.2% (or 1.9) Retention rate: HAT 67% OM 39%

Netherlands	W. Van den Brink 1998-2002	2 Multicentre RCTs (one RCT tested injectable heroin, one inhalable heroin)		PHUs in orthodox treatment, not responding N= 549	40% improvement in physical, psychological or social health. Reduced street heroin use, no increase in cocaine.	Response rate: 56 % injected HAT to 31% OM; 50% inhaled HAT to 27% OM. Retention rates: 87% injectable HAT to 68% OM; 85% inhalable HAT to 72% OM. 82% responders deteriorated rapidly on ceasing HAT.
Spain-Andalucía	J. March 2003-2004	RCT	Injectable heroin & oral methadone compared to methadone	Regular injectors of street opiates-PHUs, not responding to orthodox OST. N=62	Physical, psychological and social health (inc. street drug use, crime, HIV risk behaviour)	HAT/OM (p) physical health 3.2 (0.034) Drug related problems 2.1 (0.004) Street H. Use 2.4 (0.02) HIV risk behaviour 1.9 (0.004) Psychosocial adjustment, no difference Crime 3.2 (0.09) Retention rate: HAT 74%, OM 68%.
Spain (Catalonia)	Casas, M. Et al 2004-2006	RCT	Oral heroin compared to oral methadone/ morphine and to oral methadone	PHUs who did not respond to orthodox OST in past, and are not in current OST	Retention, improved physical, psychological and social health	Not yet published
Switzerland	PROVE, Swiss Cohort Study etc 1994-2006	RCT, cohorts, cohort follow-up	Injectable heroin, oral heroin (instant & slow release) compared to oral methadone	PHUs, not responding to orthodox OST, or whose health precludes other treatments N= 1,273	Retention, Improved physical, psychological and social health. Permanent abstinence.	HAT retention rates: 1994-2004, 72% for 1 year, 58% for 2 years or longer. Improved physical, psychological and social health.
United Kingdom	RIOTT (Randomised Injectable Opiate Therapy Trial) 2006-2008	Multicentre RCT	Injectable heroin compared with injectable methadone and optimised oral methadone	PHUs currently in OST, not responding. N=127	Reduction of illicit heroin and other drug use; Reduction of risky injecting practices	Reduction in illicit drug use- HAT 72%, OM 27%, IM 39%. Retention rate at 26 weeks: HAT 88%, 81% IM, 69% OM.

second line treatment for 'hard-to-treat' heroin users. Over time, the studies have become more rigorous, from the groundbreaking Swiss studies of the mid-1990s to the recently concluded North American Opiate Medication Initiative (NAOMI) in Canada and the Randomised Injectable Opiate Therapy Trial (RIOTT) in the UK. The RIOTT study, a multi-site RCT conducted in England compares HAT, injectable methadone and Optimised Oral Methadone (OOM). Strang

and colleagues wondered whether the superior results demonstrated for HAT resulted from the poor standard of some oral methadone treatment, which lacks adequate dose levels, additional psycho-social support and sufficient duration. These characteristics have been shown to provide the best results for methadone treatment. Recourse to the OOM control group ensured that HAT was being compared to good quality methadone treatment that met these high clinical standards. Despite this, the RIOTT study found HAT significantly more effective at reducing the consumption of street heroin. This study also included an objective, laboratory based technique for testing for the use of illicit heroin, which worked by identifying an alkaloid (papaverine) which is present in the brown Afghan heroin appearing on the UK streets, but not in pharmaceutically manufactured heroin. This methodological refinement meant that measures of illicit heroin use did not have to rely on self-report by patients. Findings arrived at by this method confirm those of studies using self-report, namely, that HAT is associated with impressive reductions in the use of illicit heroin.

Limitations of HAT

As noted above, recruitment to HAT trials has often been slow and difficult, even allowing for the rigorous entry requirement in place in this research. Nick Lintzeris, one of the drivers behind the RIOTT research in the UK, has commented perceptively on a certain paradox that some of these studies display. Discussing the results of the Dutch study (Blanken et al, 2010), Lintzeris observes that while HAT has been proposed as a response best suited to those who are most chaotic in their engagement with heroin, only those who adjusted well to HAT and became more stable were continued on the treatment, "while HAT was withdrawn from the 'difficult-to-treat' patient, who was then returned to methadone treatment."[31] He questions whether these patients may have had better outcomes if they had remained in HAT longer; alternatively, he says, "this 'too difficult to treat' group may be considered as individuals who may not want to 'respond to treatment', or participate in rigid treatment modalities...(and) who desire access to high quality legal heroin available without medical intermediaries."[32] This is a recognition, unusual on the part of clinicians and researchers in this field, that there exist persons for whom the adoption of the heroin lifestyle (the life of the 'righteous dope fiend')[33] is a conscious choice, driven in part by a desire to escape just the kind of tight regulation of experience and behaviour that HAT requires. Despite these problems, however, there is little doubt that for some (if not all) of these people, HAT can produce an important therapeutic, even life-saving, impact.

Methodological differences between the studies and the specificity of local cultural contexts have led some to question the effectiveness of the treatment. A 2005 Cochrane review[34] of four randomised trials held that firm conclusions could not be drawn owing to the heterogeneity of the studies. In the meantime, however, further studies have been completed, and the body of evidence has grown increasingly convincing, resulting in an emergent consensus in relation to the treatment, summarised below.

Implications of the studies: the Science and Politics of HAT

There is now a powerful body of evidence demonstrating consistently that heroin-assisted treatment, delivered in a clinical setting with appropriate safeguards and supports, is a more effective treatment for problematic heroin users than oral methadone, even where this is delivered to optimised standards. HAT is as safe as other forms of OST, and of greater cost-effectiveness. Although most of the studies so far undertaken have been relatively short term, those longer term investigations that have been completed point to continuing benefits.[35] Such benefits accrue, moreover, in a population suffering considerably higher levels of mortality

and morbidity, and which is more engaged with crime, than the general population, and which has been found very difficult (or impossible) to reach by more standard therapies.

So, what are the implications of this evidence for policy makers? The scientific conclusions, as elaborated in the foregoing, are robust, consistent and clear. However, the possibilities of HAT being expanded are conditioned not merely by science, but also, crucially, by politics. In a number of countries, political considerations have already outweighed scientific and clinical imperatives, and a number of proposed studies have been unable to get off the ground. These include planned projects in the United States, Belgium, France and Australia. A proposed study based in a Spanish prison had to be abandoned, though two other trials did take place in Spain. In Australia, a proposal for a heroin trial that had already received the approval of the country's Ministerial Council on Drug Strategy, was halted by the federal authorities, the Prime Minister publically opining that such a trial would "send a wrong message."[36] This type of resistance occurred while countries were merely *considering* a limited scientific experiment with HAT, let alone rolling out the treatment for more general use. At the time of writing, only Switzerland, the Netherlands and Germany have taken steps on the basis of the research findings and integrated HAT into their standard treatment programmes.[37] In Spain, the government has been slow to act on the results of trials, and, indeed, the Spanish drug control authority pronounced that the Grenada trial had not produced conclusive results in favour of HAT. Consequently, the legislative and administrative changes necessary to normalise the treatment have not been made. In the UK, a new government and a period of economic austerity render the future of HAT uncertain, despite the commitments of the previous administration and the widely publicised successes of the RIOTT study. In Denmark, by contrast, the possibility of running a local RCT was discussed, with Danish government representatives visiting the RIOTT project in the UK and examining the range of evidence for HAT. Based on these inquiries, which found the evidence 'conclusive', it decided that further trials were unnecessary, and took the singularly rational step of legalising the prescribing of heroin to addicts in 2008. The first HAT clinic opened in Copenhagen early in 2010, with places for 120 patients.[38] At the international level, meanwhile, the International Narcotic Control Board (INCB) has reacted with scepticism toward HAT, expressing concern in 1994 and reiterating them in a 1999 note.[39] Regular warnings about HAT are included in INCB Annual Reports,[40] despite the fact the Legal Affairs Section of the United Nations Drug Control Programme has announced that such measures fall within the provisions of the international drug control treaties.[41]

While the scientific evidence is clear, then, the political context introduces powerful additional forces into the policy equation, forces which have little to do with any reasoned development of the implications of the research. This returns us to our introductory discussion, which briefly described the early association of heroin with delinquency and social deviance – an association that has proved robust and enduring. This is largely because that original linkage, particularly strong in the United States, led to a clutch of prohibitive policies that served to reinforce it, creating a self-fulfilling prophecy by forcing addicts onto the illicit market. That market developed in giant strides to meet the demand that legitimate sources were forbidden to answer. The result was a vicious circle of addiction and crime, and the linkage of heroin with criminality now seems to belong to the natural order, and is enshrined in patterns of 'common sense' belief across the world. As eminent historian Virginia Berridge writes: "Contextual issues like these, not the intrinsic properties of the drug itself, affected different national responses to treatment and to the prescription of heroin..."[42] Yet, as Berridge reminds us, heroin was originally a legitimate pharmaceutical product, a medicine like others, and continues to be regarded by many physicians as essential to the practice of palliative medicine. Another factor impeding the development of HAT has stemmed from the attitudes of special interest groups within addiction treatment. Aside from some who remain committed to abstinence-

only interventions and are consequently hostile to OST in principle, this group includes those apparently unwilling to recognise the shortcomings of methadone, even when it is deployed to best effect (i.e. in optimal therapeutic dosages, alongside psycho-social support, etc).[43] In a Comment piece appearing in *The Lancet* following the recent publication of the results of the RIOTT study in the UK, the authors express the view that, "In the era of evidence-based decision making, moving forward will probably need those embroiled in this debate to cast aside the stigma associated with heroin prescription...The existing interference and non-evidence-based opposition from politicians and care providers, who refuse to acknowledge the limitations of methadone maintenance and the superiority of prescribed heroin in selected populations, is arguably unethical."[44]

Switzerland presents an interesting instance of the fruitful interaction of scientific and policy developments. Can we learn anything from the Swiss case that can be applied in other circumstances? Ambros Uchtenhagen advises caution in drawing any such inferences. This is because the Swiss example, while promising insofar as it shows that a conservative culture can be the site of quite radical progressive moves in drug treatment policy, is very specific. The changes took place at an extreme juncture, when severe and highly visible drug problems clearly demonstrated the inadequacy of existing provisions. Moreover, the pragmatism of Swiss society and its constitutional uniqueness contributed to the adoption of a fresh approach. Certainly it seems undeniable that a strong evidence base has been assembled, and while each new trial adds specific further data to it, the time has now come to translate this evidence into practical measures that expand the range of available treatments. As Benedict Fischer has observed: "The pressure was primarily on science to produce the evidence basis on HAT–the pressure is now on politics to use the evidence generated in the interest of reduced harms and costs related to the problem of heroin addiction."[45]

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Notes and References

1 United Nations Office on Drugs and Crime *World Drug Report 2009* http://www.unodc.org/unodc/en/data-and-analysis/WDR-2009.html Accessed 10.06.2010
2 Walter Sneader (1998) The Lancet, Volume 352, Issue 9141, Pages 1697 - 1699, 21 November 1998
3 Tom Carnworth and Ian Smith (2002) *Heroin Century* Routledge, London 2002
4 Dean Latimer and Jeff Goldberg (1981) *Flowers in the Blood: The Story of Opium* Franklin Watts New York 1981
5 Courtwright, David T. (2001) *Forces of Habit: Drugs and the Making of the Modern World.* Cambridge: Harvard University Press
6 David Musto (1999) *The American Disease: origins of narcotic control: Third Edition* Oxford University Press
7 Virginia Berridge (2009) *Heroin Prescription and History* New England Journal of Medicine Volume 361, number 8 pages 820-821 20th August 2009
8 Judith Blackwell (1988) *The Saboteurs of Britain's Opiate Policy: Overprescribing Physicians or American-Style 'Junkies'?* The International Journal of the Addictions 23(5) pp.517-526
9 David Shewan & Phil Delgarno (2005) *Evidence for controlled heroin use? Low levels of negative health and social outcomes among non-treatment heroin users in Glasgow (Scotland)* British Journal of Health Psychology (2005), 10, 33–48
10 WHO/UNODC/UNAIDS (2004) *Position paper: Substitution maintenance therapy in the management of opioid dependence and HIV/AIDS prevention* http://www.unodc.org/docs/treatment/Brochure_E.pdf Accessed 10.06.2010
11 John Strang, Nicola Metrebian, Nicholas Lintzeris, Laura Potts, Tom Carnwath, Soraya Mayet, Hugh Williams, Deborah Zador, Richard Evers, Teodora Groshkova, Vikki Charles, Anthea Martin, Luciana Forzisi (2010) *Supervised injectable heroin or injectable methadone versus optimised oral methadone as treatment for chronic heroin addicts in England after persistent failure in orthodox treatment (RIOTT): a randomised trial* The Lancet, Volume 375, May 29th 2010 PP.1885-95
12 Gerry V. Stimson & Nicky Metrebian (2003) *Prescribing heroin: What is the evidence?* Joseph Rowntree Foundation 2003 http://www.jrf.org.uk/publications/prescribing-heroin-what-evidence Accessed 02.06.2010
13 Ambros Uchtenhagen (2009) *Heroin-assisted treatment in Switzerland: a case study in policy change* Addiction Volume 105, Issue 1 pp.29-37
14 See Uchtenhagen (2009), Ref. 13.
15 Georges Dulex (2002), Evidence submitted to the Canadian Parliament's Special Committee on Illegal Drugs, 2002. http://www.parl.gc.ca/37/1/parlbus/commbus/senate/com-e/ille-e/witness-e.htm Accessed 18.06.2010
16 Jean-Felix Savary, Chris Hallam & Dave Bewley-Taylor (2009) *The Swiss Four Pillars Policy: An evolution from local experimentation to federal law* Beckley Briefing Paper 18 http://www.beckleyfoundation.org/policy/papers.html
17 Ambros Uchtenhagen (2002) *Heroin Assisted Treatment for Opiate Addicts: The Swiss Experience* Evidence submitted to the Canadian Parliament's Special Committee on Illegal Drugs http://www.parl.gc.ca/37/1/parlbus/commbus/senate/com-e/ille-e/presentation-e/ucht1-e.htm Accessed 18.06.2010
18 Robert J. MacCoun and Peter Reuter (2001) *Drug War Heresies: Learning from Other Vices, Times, & Places* Cambridge University Press. P.290
19 Berkhin, Maria, Dürsteler-MacFarland, K., Strasser J. and Scholer, A. *Injectable Heroin Prescription: The Swiss Experiences* http://www.iatdmct.org/images/File/INJECTABLE_HEROIN_PRESCRIPTION_version_Feb5.pdf Accessed 12.06.2010 (Paper not dated)

20 Federal Office of Public Health, Switzerland (2008) *HAT Annual Report 2007* http://www.bag.admin.ch/themen/drogen/00042/00629/00798/01191/index.html?lang=en Accessed 18.06.2010

21 Thomas V. Perneger, Francisco Giner, Miguel del Rio and Annie Mino (1998) *Randomized trial of heroin maintenance programme for addicts who fail in conventional treatments* British Medical Journal 1998, 317 pp. 13-18

22 Federal Office of Public Health (2008), Ref. 20.

23 Uchtenhagen (2009), Ref. 13.

24 Federal Office of Public Health (2008), Ref. 20. P.3

25 Peter Reuter & Dominic Schnoz (2009) *Assessing Drug Policies and Problems in Switzerland, 1998-2007* Swiss Federal Office of Public Health http://www.bag.admin.ch/themen/drogen/00042/00624/06044/07683/index.html?lang=en Accessed 21.06.2010

26 Wim van den Brink, Vincent Hendricks, Peter Blanken, Maarten W.J. Koeter, Barbara J. van Zwieten & Jan M. Van Ree. (2003) *Medical prescription of heroin to treatment resistant heroin addicts: two randomised controlled trials* British Medical Journal Volume 327 9th August 2003

27 Wim van den Brink et al (2003) Ref. 26

28 Wim van den Brink et al (2003), Ref. 26.

29 Peter Blanken, Vincent M. Hendriks, Jan M. van Ree & Wim van den Brink (2010) *Outcome of long-term heroin-assisted treatment offered to chronic, treatment-resistant heroin addicts in the Netherlands* Addiction, Volume 105, Number 2, February 2010 , pp. 300-308

30 The information in this table draws on: Benedikt Fischer, Eugenia Oviedo-Joekes, Peter Blanken, Christian Haasen, Jurgen Rehm, Martin T. Schechter, John Strang, and Wim van den Brink (2007) *Heroin-assisted Treatment (HAT) a Decade Later: A Brief Update on Science and Politics* Journal of Urban Health: Bulletin of the New York Academy of Medicine, Vol. 84, No. 4 However, the table incorporates further results which were not available when Fischer et al published their paper.

31 Nick Lintzeris (2010) *Commentary on Blanken et al (2010): Long-term heroin-assisted treatment — some more questions and answers* Addiction, Volume 105 p.309-310

32 Nick Lintzeris (2010), Ref. 31p.309

33 Phillip Bourgois and Jeff Schonberg (2009) *Righteous Dope Fiend (California Series in Public Anthropology)* University of California Press.

34 Ferri, M., Davoli, M. Peruccia, C.A. *Heroin maintenance for chronic heroin dependents* (Cochrane Review) http://www2.cochrane.org/reviews/en/ab003410.html Accessed 24.06.2010

35 Uwe Verthein, Karin Bonorden-Kleij, Peter Degkwitz, Christoph Dilg, Wilfried K. Köhler, Torsten Passie, Michael Soyka, Sabine Tanger, Mario Vogel & Christian Haasen (2008) *Long-term effects of heroin-assisted treatment in Germany* Addiction. Volume 103 number 6 pp. 960-6
See also Peter Blanken et al (2010) Ref. 29.

36 Alex D Wodak, Alison J Ritter and Charles RR Watson (2002) *Separating politics and scientific research on heroin prescription* Medical Journal of Australia Volume 176, number 10. P. 449 http://www.mja.com.au/public/issues/176_09_060502/wodak060502_fm.html Accessed 22.06.2010

37 *Germany Approves Prescribing Heroin to Long -time Users Unable to Quit* Huffington Post, May 28th 2009. http://www.huffingtonpost.com/tony-newman/germany-approves-prescrib_b_208799.html Accessed 24.06.2010

38 *Dose of Reality Fuels New Initiatives to Help Addicts* The Guardian, 5 February 2009 http://www.guardian.co.uk/society/2009/feb/05/denmark-state-funded-heroin Accessed 24.06.2010
See also: *First free heroin clinic opens in Denmark* AFP news agency, 22 February 2010. http://www.google.com/hostednews/afp/article/ALeqM5gTkinlRauGzVuolBAMquCoxnlbbA Accessed on 24.06.2010

39 United Nations Information Service (1999) *Concerns Over Heroin Use for Addicts Remain After Swiss Project Evaluated, INCB Says* http://www.incb.org/pdf/e/press/1999/unis-nar-663.pdf Accessed 24.06.2010

40 For example, International Narcotics Control Board (2008) *International Narcotics Control Board Report 2008* United Nations INCB, Vienna Para 178.

41 United Nations Drug Control Program, Legal Affairs Section (2002) *Flexibility of Treaty Provisions as regards Harm Reduction Approaches* http://www.ungassondrugs.org/index.php?option=com_content&task=view&id=87&Itemid=102 Accessed 20.06.2010

42 Virginia Berridge (2009), Ref. 7. P.820

43 Marc Shinderman (2003) *This article only demonstrates that the authors do not use effective methadone doses* Rapid response, British Medical Journal 15th August 2003 http://www.bmj.com/cgi/eletters/327/7410/310#35740 Accessed 24.06.2010

44 Thomas Kerr, Julio S.G. Montaner & Evan Wood (2010) *Science and politics of heroin prescription* The Lancet Volume 375, Issue 9729, May 29th 2010 p. 1849-1850

45 Benedikt Fischer et al (2007) Ref. 30 p.559

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