The Heroin Problem: Policy Alternatives in Dealing with Heroin Use,

Robert E. Marks

The paper examines the social and private aspects of heroin use in the U.S. today and attempts to estimate the associated costs, both society's and the individual user's. Possible goals of any government policy are discussed. Twelve possible policy alternatives are examined, eight dealing with the demand for heroin, and four dealing with its supply. These alternatives are compared using a rough cost-benefit analysis in terms of costs and benefits to society at large. A more detailed comparison is made of therapeutic communities, methadone maintenance, and the British experience of prescription heroin maintenance as alternatives. The conclusion is reached that to minimize social cost while containing the spread of heroin usage a scheme of prescription heroin should be implemented; but if the spread of usage is seen as benign, the best policy is to sell the drug freely to any adult as alcohol is today.

THE CIVILIAN VIEW

THE HERION PROBLEM:
POLICY ALTERNATIVES IN DEALING WITH HEROIN USE

Robert E. Marks, B.E., M.Eng.Sc., M.S.

We have examined four possible alternatives in dealing with the supply of heroin and ten possible alternatives for dealing with the demand for heroin:
(1) pre-emptive buying of the entire world opium crop—unlimited probable cost;
(2) direct controls on foreign plantings of opium—very high cost and certain leakages;
(3) tighter customs searches to prevent entry of heroin into the U.S.—very high cost and certain leakages if not domestic production;
(4) increased enforcement to stop the drug once in the country from reaching the addict—success depends on an elastic demand for heroin and even then would be extremely expensive;
(5) the deterrent of jail sentences and the health hazards of addiction—completely ineffective and of no practical use;
(6) DT detoxification—almost a complete failure;
(7) CC civil commitment—almost a complete failure and an extravagant waste of taxpayers' money in the past;
(8) TC therapeutic communities—a few noteworthy successes but expensive with no prospect of increasing the success rates;
(9) OA outpatient abstinence—very little information but apparently little more than a boost for would-be abstainers, not very expensive, not important except possibly in an educational sense;

Mr. Marks is a doctoral candidate in the Department of Engineering-Economic Systems at Stanford University. He has previously attended the University of Melbourne, M.I.T., and the University of Cambridge, and while researching and writing this paper the author was supported by an Australian Commonwealth Scientific and Industrial Research Organization Postgraduate Studentship.
be made assuming that (1) addicts spend approximately 70% of the time using heroin, (2) there are 500,000 addicts in the U.S., (3) only 42% of the addict’s average income comes from property crimes, (4) the addict receives only half the value of any stolen goods from the thieves, (5) the average cost per addict per day is $30. These assumptions lead to a total of $1.4 billion of property stolen per year.17 A “social experiment” in Santa Barbara whereby all known addicts on controlled rehabilitation programs were jailed for two months led to a 55% drop in crimes against property.18 Assuming additionally that (6) 50% of all heroin is earned through dealing, heroin purchases in the U.S. must cost approximately $1.9 billion annually.19 If the cost of a kilo of 100% heroin on the street is $330,000,20 then approximately 5,750 kilos of pure heroin are used in the U.S. per year.

The consumption of heroin on the rest of the community, including the involuntary redistribution of $3.2 billion of existing wealth per year through such crimes as stealing from trucks, shoplifting, stealing from offices, burglary, pick-pocketing, and forgery. Thus the community spends money to prevent crime and to apprehend, try, punish, and rehabilitate criminals: this includes both private spending and public expenditures on police, courts, and correctional systems. To the extent that these resources would be employed elsewhere in the absence of heroin addiction, they are properly counted as social costs of addiction. Social costs also include the medical expenses, foregone productivity, and premature deaths of addicts. Finally one must include the fear and anxiety, avoidance of normal activity, disruption of community life as unquantifiable but nonetheless real costs of crime and drug addiction.21

In addition to these costs, Packer22 lists the existence of a profitable black market which leads to the consolidation of organized crime, undesirable police practices including corruption, the regressive burden of the poor who live in areas of high addiction, the stigmatization of research dealing with illegal drugs, and the intimidation of doctors who might legitimately want to prescribe these drugs.

Figures for most of these costs are obtainable or unavailable, but we can state some of them. Total federal expenditure for law enforcement in fiscal 1972 (enforcing laws against the illegal importation, manufacture, distribution, and possession of narcotics and dangerous drugs) was to be $115,822,000,23 through the BND and the Law Enforcement Assistance Administration in the Department of Justice, and the Bureau of Customs and the Internal Revenue Service in the Treasury Department.

Half a million addicts who did not earn the sums and have not earned the use of heroin, which has long been found in slums and has recently been used among middle class youth. Since possession of the drug (or even of a syringe to administer it) is illegal, figures of total numbers of addicts in the U.S. are vague and range from a low of 140,000 to a high of 720,000.2 For the purposes of this report a figure of 500,000 addicts will be used (which is close to the Bureau of Narcotics and Dangerous Drugs figure of 600,000). By “addict” is meant people who use heroin on a daily basis, injecting a dose every six to eight hours as the effect of the previous dose wears off. They may spend anything from $10 to $100 with it, but the use of heroin is not a sufficient condition for addiction. In order to become addicted, the drug user must have the ability to sustain the habit, the purity of the drug bought, and the price level of the city in which they live. The average quantity used per day is probably about 55 milligrams of pure heroin and a price of 55 cents per milligram; this results in a daily expenditure of approximately $30 for the average addict.

How is the money for the habit obtained? A recent survey4 shows that 58% of the addict’s average weekly income comes from “victimless” crimes, such as selling drugs to other addicts, prostitution, and gambling. In addition the study shows that less than 2% of an addict’s income comes from crimes against the person, such as mugging. If other factors remain the same, the total social cost of heroin addiction will be less if the percentage of consumed heroin “earned” from the profits of dealing is higher.

A rough estimate of the direct cost of heroin addiction to the rest of society can
viewpoint of the addict, or the viewpoint of society. Any solution to the problem should be judged by its ability to deal with both aspects of the problem. Similarly, the problem can be viewed statically or dynamically. Since it has been the increase of addiction and the increase of accompanying social costs which have drawn the public's attention to the problem, the effects of possible alternative solutions on the dynamics of the problem should be considered.

Possible objectives for an overall solution should be considered. There is at present a prohibition on heroin use of any kind. This prohibition is effective. One goal might be to increase enforcement of the prohibition in an attempt to make it effective, ideally totally so. This is not really compatible with the notion of economic efficiency which leads to an "optimal" level of enforcement where the marginal cost of enforcement equals the marginal savings in social terms that the additional enforcement would bring. If society's preference were prohibition at any price, then the optimal level of enforcement would be the one needed for total prohibition. The "optimum" level goal is related to the goal of minimizing the damage to society and to the addict from heroin use, but this objective admits the possibility of dealing with the demand for the drug too. (Enforcement programs, except where the addict is jailed or otherwise deterred from using the drug, deal with the supply of the drug.)

We have discussed above the costs to society of the present situation. The costs to the individual are not so easily quantified, but it can be argued that the prohibition has increased those costs as well. The individual's costs include ignorance of the purity or amount of the heroin bought on the street,22 the risk of apprehension and jail,23 the possibility of impoverishment, and the risk of infectious diseases from lack of hygiene and careless injecting. With a plentiful supply of legal, low-cost heroin, these costs would largely disappear: the drug would be pure and the amount known, the price (even if not subsidized) would be modest, and there would be no incentive to spread disease by sharing crude and unsterile syringes as was done when possession even of these was illegal. When opiates are cheap and freely available, novice users prefer to eat, sniff, or smoke them, as an estimated 90 to 95% of U.S. heroin users did in Viet Nam in 1971.24 (Only after an anti-drugs campaign did the price rise and with it the popularity of injecting, the users apparently trying to obtain the same effect with smaller quantities.25)

In the U.S. today almost everyone must be aware of at least some of the results of pursuing the illegal habit, but given the addicting nature of heroin, the user might decide too late that the price is too high. It is not clear how important the costs to the individual user should be in evaluating alternative policies.

Supply Solutions

We can consider the heroin problem as one of supply and demand, and this gives us a taxonomy for possible solutions. Four possible alternatives have been suggested for reducing the supply of heroin to the addict:

(1) pre-emptive buying of the entire world's opium crop
(2) direct controls of foreign plantings of opium poppies
(3) tighter customs searches to prevent entry of heroin into the U.S.
(4) increased enforcement to stop the drug once in the country from reaching the addict.

Opium is legally grown in India, Turkey, the USSR, China, Iran, Yugoslavia, Pakistan, and Japan (the last three grow negligible quantities), and is illegally grown in Burma, India, Pakistan, Thailand, Laos, Afghanistan, Turkey, Mexico, and other countries in North Africa and the Near East.26 The opium is the hardened milky liquid obtained from the pods of the opium poppy (Papaver somniferum) several days after flowering in June and July. It is estimated that between 175 and 250 man-hours are needed to obtain 1 kilo of opium,27 which fetches from $10 to $60 legally for the farmer, or between $12 and $1400 illegally.28 The yields range from 3 kilos/acre/year in Iran and India to 15 kilos/acre/year in the USSR.29 Morphine is one of several natural alkaloids of opium (another is codeine).30 The morphine content of opium varies from 4 to 13% and is highest in Turkey.31 On average, ten kilos of crude opium make one kilo of morphine base,32 and by heating morphine in the presence of acetic acid and other chemicals, a little more than one kilo of heroin (diacetylmorphine) is produced.33 It is estimated that 65% of the heroin the U.S. comes from Turkey, 25% from South East Asia, and 10% from South America.34

(1) The proposal of pre-emptive buying is desceptively simple. The price offered to the farmer would have to be above that offered by the illegal traffickers. Unfortunately there is evidence that the demand for heroin is inelastic35 and so the effect of such a policy would merely raise the black market price, and hence the social cost of heroin. The problem would remain because if the demand were elastic, the costs of such a scheme would be great: it is estimated that only 2% of the estimated world production of opium is needed to supply the U.S. market.36 The highest price traffickers have paid in Turkey is $35 a kilo,37 and paying this would ceteris paribus mean a cost of $85 millions to buy the entire world crop.38 But the traffickers would pay much more than this if they had to: in Iran the government support price is $50-$60 a kilo (set high to discourage illicit trading) and the traffickers still find it profitable to pay $100-$400 a kilo.39 The supply of opium is elastic and the policy would lead to increased crops and higher prices to overbid the traffickers. The cost seems unlimited.

(2) The continuing enforcement of direct controls would be both costly and difficult, especially in countries with weak central governments, such as grow most of the world's opium. Moreover, there is widespread acceptance of opium use in many rural countries, and little desire to do anything to help the U.S. In Turkey, where there is little opium use, controls have been extremely unpopular because of both the loss of an important source of farm income and the rising anti-American sentiment.40 Paying farmers not to grow the crop would be difficult. The alternative of labelling the drug "encouragement" not to switch crops, and hence unlimited cost. Even if there were resources and willingness to impose effective controls, the high profits involved might lead to clandestine crops: it is estimated that the entire U.S. market for heroin could be supplied from at most an area of 25 square miles.41

The path followed by opium from Turkey until it is heroin on the street has been described as follows:42 crude opium is supplied by Turkish farmers to opium brokers at $25 a kilo. The brokers sell the crop at the same price to the lab operators in the Levant where it is converted into morphine base and sold at $500 a kilo to heroin refining labs, which are simple and inexpensive and hence relatively mobile.43 (Ten kilos of opium make one kilo of morphine.) These labs sell their output of 85 to 90% heroin for $2000 a kilo in quantities of more than 100 kilos, or for up to $4500 for a single "key" to the dealer/smuggler. The landed price in the U.S. is between $6000 and $10,000 per kilo. The 100-kilo man in NYC will not usually sell in less than 10-kilo loads, and the man buying at this level will pay from $10,000 to $13,000 per kilo, and sell at from $18,000 to $20,000, a 50% activity (10%) as the natural opium. The net effect of the whole opium-morphine-heroin-adulterated heroin cycle is thus to put the active opiate in its most concentrated form for the smuggling leg of its trip to market.44

(3) The importation of heroin is prohibited, yet the prohibition is ineffective. Border
seizures amounted to less than 5% of the estimated amount of smuggled imports in 1970.\(^4\) It is not hard to see why: we have estimated above that only five or six metric tons of heroin are needed to supply the U.S. annually. Yet total imports per year are about 100 million tons,\(^4\) and every year approximately 250 million people, 65 million motor vehicles, 306 thousand planes, and 157 thousand ships enter the U.S.\(^4\)

Even if it were possible to watch all these (recorded) entries, there is still the entire coastline and land frontier to be watched for smugglers—an impossible task.

But even if there were no flow of heroin into the U.S.—because of the success of one of the three preceding policy alternatives—opiate addiction could still exist inside the country. There are numerous synthetic opiates today which do not require opium as a raw material for their manufacture, and even heroin can be synthesized. Formulas of these synthetics are known and their synthesis is not difficult. Only the low relative price of opium today is stopping their profitable production.\(^4\)

(4) A more realistic goal is to attempt to tighten domestic law enforcement and to increase the risks and operating costs of those involved in the distribution system. Theoretically, the best allocation of police power is such that the incremental gains from enforcement actions (in terms of reduced social costs) are equal to the incremental costs of the enforcement efforts. How close is the law enforcement effort to reaching this social optimum? We can judge this by performing the sensitivity analysis of seeing what effect seizures have had on prices. (If the demand is inelastic, a rising price shows that the supply has been noticeable reduced.) During fiscal 1971 the quantity of heroin seized was much higher than in previous years,\(^5\) yet the price of heroin remained steady.\(^9\) In 1972 the BND received $62 millions for law-enforcement, a doubling in two years.\(^9\) It seems that only an expenditure of several times this amount will affect the supply. But we might be chasing a mirage: if the demand is inelastic and the supply is reduced then the price will rise, and with it both total and incremental social costs.

Several studies have been made of the domestic heroin distribution system.\(^8\) One of them\(^8\) shows that the most likely structure for the distribution system is a monopoly or monopolistic competition, which, as well as maximizing profit while minimizing the risk of detection, could most efficiently (1) restrict the total supply of heroin to maintain high prices, (2) regularly and reliably supply an amount of heroin fairly close to the realized demand, (3) manipulate supply conditions in the system above with a minimum of explicit planning and negotiation, and (4) adjust to errors in supply with a minimum of negotiation and activity. But for a monopoly to exist, there must be some degree of leverage or barrier to entry, such as (1) special knowledge unavailable to others, (2) total control over some vital raw material, or (3) total control over the market so as to make the cost of entry prohibitive. For an illegal business, however, there are additional techniques of monopolization available, including violence and political corruption.\(^9\) Gross profits include (1) the firm's opportunity cost, (2) a risk premium, and (3) a monopoly return. We could expect that law enforcement could raise the price of heroin by increasing the risks and operating costs, as well as by reducing the supply of heroin, but as long as the demand is inelastic a higher price will merely increase the social cost of addiction. And if effective, enforcement would increase competition by disrupting established distribution chains, and this would lead to lower prices and increased sales.

As stated above, there is evidence that demand is inelastic,\(^3\) but it could be elastic for two reasons: (1) the development of methadone has created a low-cost substitute (in certain ways) for heroin, and (2) there has been a long-term rise in the price of heroin against other consumer goods which might mean that the present prices are the highest many addicts can afford.

In conclusion, only if demand is elastic would a policy of increased enforcement have any chance of success; but even then the total cost is unknown but definitely much higher than current expenditures.

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**Demand Solutions**

Demand-type solutions can fall into three categories: (a) deterrents, (b) cures, and (c) continuing programs. Deterrrent solutions attempt to dissuade the addict from beginning or continuing to use the drug, either on the threat of the illegality of the possession of heroin, or by the threat of the ill-health and suffering that addiction is said to lead to. Cures attempt to treat the addict so that he no longer needs or wants the drug, but is, it is hoped, a socially useful person. Continuing programs attempt to enable the addict to lead a reasonably normal life while continuing to be treated indefinitely, with no certain hope of eventual "cure," that is, eventual freedom from drug use or treatment.

**Deterrents**

The deterrent of a long prison-term has proved to be little or no deterrent at all: even with increased arrests the numbers of new addicts continue to grow.\(^3\) Even the total cost of apprehending, convicting, and detaining half a million law-breaking addicts\(^5\) is too high to be considered as a reasonable alternative. Similarly, attempts to convince addicts or would-be addicts of the deleterious effects\(^6\) of addiction have failed: the irony of this is that given pure heroin properly administered the addict suffers few if any side effects.\(^1\) On the other hand, the appearances at schools and colleges by apparently "cured" addicts might suggest that giving heroin up is easy, when in fact it really is an addicting drug.\(^3\) It is possible that proper education might be a deterrent, but for this to be effective educators will have to win back the confidence of their audiences, people who are often too well informed on the effects, and the overruling message will have to be: heroin is an addicting drug, a drug that many users continue to take even though they want to stop, decide to stop, try to stop, and even succeed in stopping for days, weeks, months, or even years.\(^3\)

Why is it that the numbers of addicts rise despite the real consequences of the illegal use of heroin? One theory is that dealers give away samples to new users until they are addicted, and are captive buyers.\(^6\) But the evidence seems to be\(^8\) that turning people on with free samples is both too expensive and too dangerous to be seriously contemplated—confirmed addicts would lie to get the free dope, and the dealer would soon gain dangerous notoriety. It usually takes a couple of weeks of using two bags of good heroin a day (between 50 and 100 mg a day) to acquire any noticeable physical dependence.\(^5\) But even then the probability of addiction to heroin is not 100% by any means, the fact that it seems likely that most young blacks in the ghetto have tried heroin, and the majority who have experimented with it have not become addicted.\(^3\)

In experiments in which volunteers received injections of morphine, less than 10% liked the experience,\(^8\) and in a controlled double-blind experiment in which heroin was injected, only about 10% of the subjects were enthusiastic or mildly pleased.\(^8\) The researchers reached the conclusion that opiates are not inherently attractive, euphoric, or stimulant.\(^6\)

Another theory is the "contagion" model, whereby addiction spreads from addicted friends and acquaintances.\(^8\) This leads to the necessity to "quarantine" those addicts in the "infectious" stages of addiction. But whereas one does not choose to catch a disease from a friend, one does choose to use heroin offered by a friend. There is considerable evidence that both the ready availability of the drug and a social milieu tolerating drug use are important factors.\(^5\) But most importantly it seems that the danger of addiction lies in the person and not in the drug.\(^3\) The potency of heroin makes it difficult to believe that large numbers of intermittent users never become addicted,\(^5\) and it seems safer to assume that they might.
Cure Treatments

Alternative cures considered are:

1. DT: detoxification treatment—the addict is helped through withdrawal from the drug, in hospital or in a clinic, and then released;

2. CC: civil commitment—the convicted addict is given the choice of prison or commitment in an institution to help him overcome his addiction. After treatment (sometimes of longer duration than an equivalent term in prison) he is released sometimes with an aftercare rehabilitation program of counseling. CC has been tried by the Federal government in California, New York, New Jersey, and other states.

3. TC: therapeutic communities such as Synanon, Phoenix House, and Daytop Village which operate on the assumption that a person can be cured by group therapy alone.

4. OA: outpatient abstinence—programs which bolster abstinence by group therapy while the addict is living at home.

OA and TC account for about half the addicts in treatment programs (together with CC), MM accounts for the other half. (Note that OA might be either a cure or a maintenance program depending on what was intended.)

It is not entirely clear what the goals of treatment are, although the apparent goals are obvious: for the addict to stop using heroin and to stop committing crimes and instead find a job, stabilize his personal life, generally improve his character, and become a productive citizen. But apart from the problem of getting data on the results of programs, information has tended to concentrate on whether the patient has stopped using heroin, with the concomitant belief that if he stops using heroin use means failure. It has become apparent that this is a false position: after treatment, an addict might hold a job, support a family, refrain from criminal activity, and still occasionally use heroin; he might continue to commit crimes, but fewer than before; his physical health might improve although he is not better off; or he might swap heroin use for alcoholism.

Because of these provisos, this report has attempted to obtain data on several aspects of the program’s effectiveness, and then to weight these measures by the prices society has attributed to the costs and services involved. In this way it is possible to compare different programs directly in terms of the value of their costs (or benefits) to the government or to society in general, as well as to the addict/patient. In the case of the cure treatments, the primary goal is to end heroin use, and what little data there are on the other aspects of the treatments’ successes have been mentioned in the text.

A more fundamental problem is that since no one knows why people become narcotics addicts, no one knows either how to make them stop or what will happen if they do. As mentioned above, the TC method of treatment is based on a theory that there are psychological factors underlying addiction, factors which can be altered by the therapy so that the addict no longer “needs” the drug. (That this theory is wrong is perhaps suggested by the low success rates of TCs.) The other theory is that taking heroin causes a permanent or long-term physiological change in the addict that makes him crave the drug after he becomes abstinent. This theory is gaining favor with researchers, but conclusive evidence is still lacking.

Results of the four “cure” treatments are shown in Table 1. The acceptance rate is the percentage of those wanting treatment who are accepted. The graduation rate is the percentage of those starting treatment who complete it. The abstinence rate is the percentage of graduates who manage to avoid taking heroin for some time.

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<tr>
<th>Table 1</th>
<th>Results of “Cure” Programs</th>
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<td>DT</td>
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<td>Acceptance rate</td>
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<td>Graduation rate</td>
<td>10-20%d</td>
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<td>Cost of Treatment</td>
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<td>Length of Treatment</td>
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<td>Abstinence rate</td>
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<td>a author’s estimate</td>
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<td>b for 1 month or more</td>
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<td>c volunteers lost against medical advice</td>
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Cures have not proved very successful.

1. It seems that DT programs have virtually no long-term successes; almost all addicts relapse, with no change in crime rates. It can confidently be asserted that only those heroin users who have small habits and are not really addicted benefit from DT programs, for which hospitalization is not necessary. (There is a minor benefit in that addicts lose some tolerance after DT and thus need less money to buy less heroin to achieve the same effect as before. The social cost is slightly reduced.)

2. The actual cost of “successes” in CC programs is about $40,000 and $250,000, disregarding drop-outs and merely considering the performance of the graduates. If the opportunity costs incurred by the government in terms of lost income taxes of the 15 months (on average) of length of treatment are included the cost is closer to $41,000 and $251,000. But the figures only indicate the degree of inefficiency of the treatment (there is a 50% rise in other drug use among the “successes”).

3. The actual cost per “success,” assuming a three-year stay on average, is between $35,000 and $128,000. If the opportunity cost of the taxes foregone while the addict is being treated are included, the costs will rise by $210,000 no average per “success,” but this is offset by an 84% rise in employment corresponding to an increase in the income tax revenue of $590 per addict cured per year.

4. OA programs seem to have lower success rates, and high drop-out rates. There are inadequate data to put a comparative cost on them, but the author feels that the low likelihood of much success with this modality means that more accurate figures are not urgent.

In conclusion, we can state that no effective cure for heroin addiction has been found—neither rapid nor gradual withdrawal, neither long terms of imprisonment since the 1914 Harrison Act, neither the TC programs, neither the TCS. Nor should we be surprised by this uninterrupted series of failures. For heroin really is an addictive drug.

Continuing Programs

Continuing programs are of two types: firstly, continuing dosage with heroin or another opiate (morphine or methadone) either in a maintenance program with the drug administered by someone medically qualified, or in a program where the drug is available to the addict on prescription as in Britain, or in a situation where the
drug is freely available to adults as was the situation in the U.S. before 1914 (possibly under the same restrictions as alcohol). The six possible programs are: MM methadone maintenance (the most popular method in the U.S. today), PM prescription methadone, FM free methadone, HM heroin maintenance, PH prescription heroin (close to the British system), and FH free heroin (the pre-1914 situation). There are reliable data only for MM, PH, and FH.

Secondly, treatment with an opiate antagonist (AT), a drug which, if administered before heroin is taken, blocks both the relief and the euphoric effect of the heroin, or, if administered after heroin is taken, precipitates withdrawal. In neither case does the narcotic antagonist ease the "hunger" for heroin, or allow the heroin, if taken, to satisfy the "hunger" itself. The motivation for this type of treatment, which is still at the experimental stage, is the physiological theory of addiction, which was given a boost recently by the announcement that "receptor sites" had been found in mammal brain cells into which both the opiate drug molecules and the antagonist molecules fit. The antagonists seem to block the opiates by displacing them in the nervous system. Use of the antagonists is still only experimental and will have to deal with the problem of the addict's "hunger" for heroin before becoming viable as an alternative for treating addiction.

Heroin is a derivative of morphine and reverts to morphine once in the body. Methadone is a synthetic opiate. All can be taken orally, through the nose, or by injection (subcutaneously, intramuscularly, or intravenously). All are analgesics, euphorogens, and superb tranquilizers. All are highly toxic for the non tolerant user (100-200 mg of morphine will lead to fatal respiratory depression), but tolerance rapidly increases with use and there is no limit to the amount that can safely be taken by the tolerant individual. All are addicting—the likelihood of addiction varying, it is believed, with the drug, the route of administration, and especially with the frequency and duration of use. Addicts who take an opiate regularly develop "tolerance" to most of the effects of the drug: that is, the drug has little effect when taken regularly in a uniform dose—but lack of the drug produces in addicts a "withdrawal" that can be severe or even fatal in extreme cases, but is usually no more upsetting than a bout of flu, and lasts as long. There is cross-tolerance between the opiates, and the principle of methadone treatment is to substitute this drug for heroin, doses of 50 mg or more blocking heroin withdrawal and "hunger" (or long-term craving), and doses above 80 mg blocking any euphoria from heroin consumption.

The opiates vary in several ways affecting their attractiveness for the addict, their abuse potential, and the ability of a user to stabilize his dosage and lead a relatively normal existence. The major elements of variance involve the peak effect or maximum analgesic effect (thought to correspond to maximum euphoric effect), the duration of action or time before onset of withdrawal, the method of administration, and the potency and power, where the power is the upper limit of the absolute effects the drug can produce and the potency relates to the dosage necessary to produce a given effect.

The main difference between heroin and methadone is intensity and timing of the peak of maximum analgesic effect and the duration of action. For any drug these vary depending on mode of administration: intravenous administration ("mainlining") brings a higher peak more quickly and duration is shorter than with oral administration.

In the U.S., methadone is only dispensed for oral administration, leading to blockage of heroin "hunger" and withdrawal, without itself leading to a euphoric effect. This gives a peak in four hours with a duration of 24 hours' slow decline. When taken orally, heroin peaks more slowly and has a duration of between 12 and 24 hours. Usually (as in Britain) heroin is injected which gives a peak in less than 30 minutes, a duration of between 4 and 6 hours and a rapid decline. See Figures I and II.

For these reasons, methadone (given orally, with no euphoria) is considered more convenient than heroin (given by injection): only one dose is needed as day against
The results from the five alternative continuing programs with any reliable data are tabulated in Table II. Because of the controversial nature of the relative merits of the alternatives, figures have been estimated (and clearly noted as such) only when the result has been thought obvious. The popularity rate of a program is the percentage of addicts who will voluntarily try the treatment available, and is important in deciding the relative merits of methadone and heroin treatments, which can be thought of as substitutes for each other to some extent. The acceptance rate is the percentage of those wanting treatment who are accepted. The retention rate is the percentage of those starting who remain after some time (mostly twelve months). The abstinence rate is the percentage of those remaining who are still abstinent. These rates can be multiplied to find total abstinence rates, the most common measure of programs not involving heroin, as discussed above.

Ideally to compare programs we should have one-dimensional measures: this would enable sensitivity analysis to determine the most crucial figures, and might allow cardinal comparisons of three or more alternatives. However, the goals of treatment are not clear. Apparently they are for the addict to stop using heroin, and committing crimes, to get a job, to stabilize his personal life and generally improve his character, to become a useful and productive citizen.29 But it is clearly possible to hold a job while addicted;29,31 a program might simply reduce the number of crimes without eliminating criminal acts29,31 (non-addicts commit crimes, too); the health of the addict seems dependent not on the drug used but on the conditions of use;32,33 and finally an addict might exchange addiction to one drug for addiction to another.28 Thus the self-explanatory measures of change in crime rate before and during the program, physical and psychological health during the program, and changes in usage of other drugs before and during the program. A further measure should be what effect the program has on the increase of addiction.

There are no figures for PM or FM since neither of these alternatives has been tried, but it is this writer's opinion that the type of program (maintenance clinic, prescribing, or free) is more critical than the drug used (heroin or methadone).

In order to compare programs, the easiest and least contentious weighing of the different measures is the set of prices that society has imputed to the goods and services involved in comparison. We shall compare MM with PH since these are the only two alternatives with well-documented results.

Crime:29,32 MM—a reduction of 90% means a saving to society of $5850 per addicted person per year in property alone,119 assuming that property crimes are reduced by 90%; PH—a similar reduction of $5850 per addicted person per year.

Psychological Health:11,12 both PH and MM good.

Physical Health:11,12,16 both drugs lead to excellent health when properly administered in a maintenance program, and there is no proof that either causes any organic damage to body or brain. Death through "overdose" might be because of respiratory failure (heroin is a powerful suppressant of the nervous system) or might be because of a severe, unpredictable, allergic reaction to heroin.120 The poor health of British addicts is explained by their lack of care and hygiene when injecting themselves with the drug, rather than because of heroin use as opposed to methadone. (High death rates were recorded among British addicts before the 1968 Act,11 but the changes since then might have reduced them.)

Employment: MM leads to an increase from 26 to 78% employed of those in the program,118 corresponding to an increase in productivity of $3500 per addicted person per year on average, and an increase in tax revenues of $350 per addicted person per year on average.123 However, these figures are possibly overestimates since the patients in the study were especially selected.123 They had to be at least 20 years old, have a five-year history of addiction, display no serious psychiatric problems and have no addictions to drugs other than heroin. PH leads to an increase from 5% to 50%,108 corresponding to an increase in productivity of $3150 per addicted person per year on average and an increase in tax revenues of $315 per addicted person per year on average.123

Other Drug Use: both of the programs show little change on other drug use besides a reduction in barbiturate usage.115,118 There is a high rate of other drug use in both programs.

Drug Costs: running costs of MM are between $500 and $1000 per119 with higher costs during the induction period of up to $2500 per addicted person per year. No figures could be found for the costs of prescription heroin clinics, but staffing details14 indicate a cost of $500 per addicted person per year.

With respect to the government budget, the net cost of MM is either $2150 or $150 per addicted person per year, and the net cost of PH is $185 per addicted person per year. With respect to the full employment social product, the net benefit of MM is either $3350 or $1350 per addicted person per year, and the net benefit of PH is $2965. Since the gains from crime are almost identical for each program, there is no need to consider the vexing problem of the value to society of the involuntary redistribution of wealth of property theft.

The pair of figures in each case for MM comes from the difference between the "bare bones" program (standardized doses, outpatient induction, cheap, random urinalysis, and only addict-run supporting services) and a more lavish program—results24 indicate that the "bare bones" programs are no less effective in treating the addict than the more expensive programs. When the worse health of the self-doing British addict is accounted for, MM (or at least maintenance as opposed to prescription) is clearly preferable to PH in terms of social costs and benefits. But MM has some drawbacks12 (which might also apply to heroin): (1) there is
opposition from some groups in society who see MM as no better than heroin addiction, in fact a form of repression on the part of the "Established".189 but if detoxification from methadone is found to be any easier than detoxification from heroin, then MM should be more acceptable to these people. (Unfortunately, a phenomenon, the "20 mg Barrier," has been seen in attempts to "wean" addicts off methadone: daily methadone dosage below 20 mg sometimes brings on withdrawal symptoms,192 and strangely craving not for methadone but for heroin;196 (2) there will be leakage of methadone from the clinics which might lead to euphoric injections of distilled methadone, to new addicts to methadone not previously addicted to heroin, and to children being in errantly drunk in the refrigerator.198

How do maintenance and prescription programs compare with programs of free opiates? Despite some leakage, both maintenance and prescription programs retard the rapid spread of addiction. However, a program of freely available heroin, possibly similar to the arrangements for selling alcohol, would have a higher rate of spread of addiction.193 It is also likely that the health of the addict would be worse if the heroin were free than if it were administered in clinics: the pleasure-seeking addict will probably take the drug by injection, which leads to the ephorically "tooth," not orally,194 which merely eases the "hunger"—it is the unsupervised use of the needle which has caused much addict sickness in Britain,195 and the supply of once-only syringes has not helped the situation there. Even if the drug were dispensed in a form suitable only for oral administration, the addicts would use their obvious ingenuity (they manage to raise the money necessary for their habit) to develop means of converting it into injectable form as has happened with methadone in the U.S.196 The additional cost of properly administered or maintained prescription or maintenance of drug per addict per year, while the cost of a hospital bed is at least $100 a day, so that if the average stay in a hospital were greater than five days per addict per year, maintenance or administration clinics (with free entry) would be more efficient economically. But evidence from addiction among servicemen in South East Asia, when the heroin was good, plentiful, and cheap,197 indicates that in those circumstances the user will prefer to smoke, snort, or drink the drug rather than inject it.

What of the effect of maintenance or prescribing on the black market? It is the hundred-fold increase in value of the heroin on entering the U.S. (partly due to the intensity of the supply measures mentioned above), that is the generator for the black market—if the black market did not disappear and if black market prices did not fall substantially, then there would still be substantial social costs involved. In Britain a cheap, although not necessarily unlimited, supply of good heroin through the clinics has eliminated a black market which supplies both British and foreign heroin and methadone.199 But it is not always easy for an opiate user to become registered in Britain,200 and even when registered the addict has no choice how much licit heroin (or methadone) he gets.201 The laws of supply and demand lead us to conclude that if the pure heroin in the supplied cheaply and freely then there will be no demand for the more expensive, unreliable black market heroin.

Conclusion

So far we have rejected as either ineffective or too expensive all alternatives considered except MM and PH. MM is hopeful in the sense that it is substituting a more stable legal drug for the more turbulent illegal heroin. Compared to PH it has the edge in increase in employment rates, as would be expected by the more gradual characteristics of oral methadone. The net cost to the taxpayer of the "bare bones" MM programs is about $150 per addict per year compared to the present situation, and these programs are equivalent in every sense to the more expensive programs costing the government up to $2150 per addict per year. But a drawback to any MM program is the uncertain figure that without coercion only 50%202 of heroin addicts would prefer MM to illegal heroin use.

PH has slightly lower employment rates compared with MM and in Britain at any rate the physical health of the addicts is worse on PH. This seems to be due to lack of care about health and hygiene of the self-administering addict, but could be redressed somewhat by the dispensing of once-only syringes and with better guidance on proper methods of injecting the drug. It is possible that freely available, cheap, pure drugs would lead to a reduction in injecting and an increase in swallowing the drug, with an accompanying improvement in the addicts' health (analogous with the changes among servicemen users in Viet-nam), and it is almost certain that the black market associated social costs would vanish. (FH and/or FM.) But the numbers of users might well increase if there were no strong incentives not to try heroin (which is after all one of the most effective tranquillizers in a drug-oriented society. Thus the government is concerned about the future spread of heroin use, the best policy seems to be a combination of the "bare bones" MM programs and HM programs—the drug is professionally administered.

So far the ethical questions involved with addiction and telling others what they should and should not do have not been discussed, but Szasz203 argues that every adult should have the right to self-administer whatever substances he pleases even if they are addicting, as long as he is subject to existing laws which preserve the rights of one person not to be hurt, physically or financially, by the actions of another. If the government takes this view, and is uncumbered by the spread of heroin use and addiction) a possible alternative is to make heroin and methadone as available as alcohol is now (FH and FM).

A variation on this theme204 would be to have very cheap government-controlled freely available methadone, and to price government-controlled freely-available heroin sufficiently high that continual use of heroin were discouraged and yet sufficiently low that the black market were made unprofitable and collapsed. The relative prices in the British black market suggest that this alternative is feasible.

Topics for future research:

(1) does the route of administration change as the price and availability of the drug change?
(2) is the demand for heroin elastic or inelastic?
(3) what proportion of heroin users on the street is MM unacceptable to?
(4) are there antagonist chemicals which can block the "hunger" for heroin while blocking its effects, that are not themselves addictive?
(5) can we learn to predict whether a person will become addicted to heroin (or an alcoholic for that matter)?

NOTES


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in useful occupations, the respect of associates, living in social conformity, avoidance of legal prosecutions except those brought about by violations of narcotics laws, undiminished mental activity, unchanged personality—as much as 900 mgm of morphine daily without losing one day’s work because of it.


Terry, C. & Pellsen, M. The Opium Problem, Bureau of Social Hygiene, 1928, pp. 864-72. cited in Ashley, p. 113. Regular productive work was the rule rather than the exception for addicts in New York (Harrison Act).


Wald, P.M. & Hutt, P.B. op. cit. p. 27. Studies show that almost all heroin addicts get arrested at least once every two years of active addiction and spend an average of 15% of their addicted life in jail.


Zinberg, N.E. in New York Times Magazine Dec. 5, 1971, p. 116 and Emerson, G. in New York Times Magazine Sept. 12, 1971, passim. in Brecher, pp. 190.1. The Army’s anti-heroine campaign in Vietnam raised prices from $2 or $3 to $12 per 250 mg. compared to about $125 in NYC. Maintaining increased in popularity. When a widely used drug suddenly becomes more difficult to obtain, users will conserve their supplies for greatest effect.


BND Intelligence Staff, op. cit. p. 7 cited in Holahan, p. 261. In Turkey, licit opium $1 a kilo, illicit $25 a kilo in Iran, licit opium $50-$60 a kilo, illicit $300-$400 a kilo. In Iran the government support price is set high to discourage illicit trading.


Brecher, E.M. op. cit., p. 95.

Ashley, R. op. cit. p. 23.


BND Intelligence Staff, op. cit. pp. 10,13, cited in Holahan, p. 256, 259. Estimated licit production 1060-1085 tons per annum; estimated illicit production 1260-1395 tons per annum; estimated total production 2420-2480 tons per annum; estimated U.S. needs 4500-5000 kilos per annum; estimated U.S. needs 45-55 tons of opium per annum (1 ton = 1000 kilograms).

$35 X 2.48 X 10^3 = $85 million.


6000 kilos of heroin requires 60,000 kilos of opium @ 4 kilos per acre = 23.4 square miles of opium crop.


Helpen, M. “Epidemic of Fatal Malaria Among Heroin Addicts in NYC” Am J of Surgery 26
James, I.P., "Delinquency and Heroin Addiction in Britain," *B J Criminology*, April, 1969, cited in May, p. 381. n = 50 addict-criminals: if one discounts drug convictions, there were fewer convictions after addiction than before.


O'Donnell, J.A., op. cit., p. 115, cited in Brecher, p. 133. 4 of 45 on legal heroin committed crime (9%); 59 of 82 on illegal heroin committed crime (72%).


Stimson and Agbourne, passim, cited in May, p. 374. n = 111 — 84% had used other drugs in month preceding interview.

May, E., op. cit., p. 374. Clinic doctors report increase in use of methamphetamine and barbiturates in London addicts.


Bewley, James, and Mahon, passim, cited in May, p. 374. While many addicts were taking more and different drugs than those prescribed, such misuse had been seen reduced over two years since 1968.

From note 8. $6,400 worth of property stolen per addict per year — thus 90% reduction in crime implies $5,850 saving per addict per year.


$7000 \times (0.78 - 0.26) = 3500$ productivity gain; 10% of $3500 = $350 income tax revenue gain.


$7000 \times (0.50 - 0.05) = 3150$ productivity gain; 10% of $3150 = $315 income tax revenue gain.


Lambeth: 96 active patients

| 1 1/4 doctor | = $25,000 |
| 5/14 social worker | = $ 5,000 |
| 1 nurse | = $12,000 |
| 1 secretary | = $10,000 |

$42,500 implies $500/addict/year


Wald, P. M. and Hutt, P.B., op. cit., p. 23.


Dole, V.P., "Research in Methadone Maintenance Treatment" in *Einstein, op. cit.*, p. 24.

Kunnes, R., op. cit., p. 117.

Ashley, R., op. cit., p. 222.

May, E., op. cit., p. 379. 1970 black market prices — British heroin $14.40/grain ($22.20 per 100 mg); Hong Kong Heroin $3.60/half-grain ($5.55 - $11.10/100 mg); methadone $7.20 - $12.80/grain ($11.10 - $19.80 per 100 mg).

ibid., pp. 361-364.

Sid, pp. 366-368.


Howard, R.A., in private conversation.